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RESTRICTED

MINOPS PTY LTD

REPORT ON EXPLORATION PROGRAMME

OONAH MINE PROSPECT, ZEEHAN, TASMANIA

OPEN FILE

January, 1971

S. C. Pearce

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925002

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MINOPS PTY. LTD.REPORT ON EXPLORATION PROGRAMME AT THE
OONAH MINE PROSPECT, ZEEHAN, TASMANIAIntroduction

In March, 1969 exploration Licence No. 6/69 of 75 square miles, was granted to A.R.A. Dodson by the Mines Department of Tasmania. The area which is located on the west coast of Tasmania and embraces the township of Zeehan, was subsequently re-issued to Mr. Dodson as exploration licence No. 44/70. The old Oonah Mine workings are located about one mile west of the town centre and within this exploration licence. Soon after the licence was granted Minops Pty. Ltd. commenced investigations of the mineral occurrences of the Oonah Mine and this report deals with the work carried out on this project.

Location, Access, Transport, etc.

Zeehan is connected by well-made road to the northern seaport of Burnie (96 miles) and to Hobart (130 miles). In the early days of mining, railways linked Zeehan with both Burnie and the small seaport of Strahan some 26 miles to the south. The southern railway ceased operation some years ago and the railhead to Burnie has been re-located some 5 miles north of Zeehan. The rail formation, however, still exists on these disused sections, although the southern link to Strahan is being converted to a light-duty road formation.

As stated above, the mine site is about one mile west of Zeehan town centre and the Trial Harbour Road passes within 1/3 mile of the Oonah Main Shaft. A rough track exists over the section from the road to the mine area.

The mine workings are situated on the slopes of Oonah Hill, which rises some 600 feet above the level of the Trial Harbour Road. The access track traverses some 250 feet of low-lying swampy ground between the road and the toe of the hill. Much of the lower slopes and the creek valleys are covered in fairly dense scrub

except in the vicinity of the Main Shaft and Adit, where mullock dumps have prevented re-growth. On the upper slopes scrub gives way to open, button-grass country.

Brief History

Mining of the Oonah lodes probably commenced in 1890. The Oonah Silver Mining Company mined the main galena lode to the bottom of No. 6 level (422 feet) and ceased operations in 1899. Various tributors then mined out the stannite lode from the surface to the main adit level. In 1905 an English Company, the Oonah Mines Limited, was formed and a smelter erected at Silver Bell, south of Zeehan, to produce a copper-silver matte and a copper-tin alloy. By 1910 much of the stannite ore above the No. 6 level had been mined and it was planned to sink the main shaft another 150 feet to a total depth of 600 feet. No development below the No. 6 level was carried out, however, and shortly afterwards the mine closed down apparently due to ineffective smelter treatment.

Little or no mining has been carried out since.

Production

Complete records of the production of stannite are not available, but the following partial records give some idea of the amount:-

Year	Quarter Ending 31 March Tons	Quarter Ending 30 June Tons	Quarter Ending 30 Sept. Tons	Quarter Ending 31 December Tons
1898			1	
1899				35.5
1900		173.22		
1901		122.5		76) * Waller reports
1902	165		469.47 for last year	) 1227 tons from) July 1901
1903	81 (2 mos) 244.55 sold for last 6 months	137	120	119
1904	73	94	112.25	47
1905	26.5			
1906				150 tons stacked
1907			500 tons sent to England	
1908			1230 firsts	
1909		1260	477 seconds	1027
1910	1191	723.5 matte	9157 (567 matte)	369 (matte)

The above figures give a total of 16,862 tons of stannite mined. Allowing for the tonnage of stannite when only matte was reported and when the production was not recorded, the total amount of stannite mined was probably between 20,000 and 25,000 tons.

The following information is available with respect to grades:-

	1	2	3	4	5	6	7	8	9
Silver, oz. per ton	63.0	22.0	84.0	50.0	63.0	59.6	75.5	60.5	68.0
Copper, per cent	10.7	5.5	11.5	10.3	13.8	12.0	13.5	12.25	11.5
Tin	9.2	4.5		16.0		9.73		8.7	9.0
Arsenic '	4.4								
Bismuth '	Trace	0.4							
Antimony '		0.45							
Zinc '	N/D	N/D							
Iron '		26.0							
		27.0							
Sulphur '	29.75	29.0							
Silica '	23.0	22.0							
		27.0							
Alumina '	2.20	4.0							
		5.0							

Column 1. Bulk assay of 70 tons of hand-picked ore sold in 1903.

Column 2. Bulk analysis of ore as mined in 1909.

Column 3-9 Assays of parcels of hand-picked ore (from 11 to 61 tons each) sold during 1901-3.

Of note is the following extract from a report by Waller in 1904:- ' Up till quite recently the only metals paid for were silver and copper, nothing being allowed for tin. Lately, however, a contract has been entered into, by the terms of which the company guarantees the ore to contain at least 8 per cent of tin, and in return receive £1 per ton in addition to the ordinary tariff for silver and copper.

Recent Exploration

Although several organisations have held the mine property under licence in the past 20 years, the only information available regarding exploration activities concerns the work carried out by Placer Prospecting Pty. Ltd., from 1963 to 1966 and geophysical surveys carried out by the Bureau of Mineral Resources in 1963-64.

1. B.M.R. Geophysics

The B.M.R. carried out geophysical surveys in the Oonah Hill-Queen Hill area, using electrical (induced polarisation and self-potential), electromagnetic (Turam) and magnetic methods. The results of these surveys are reported in B.M.R. Record Nos. 1964/25 and 1965/95. Government regulations do not allow for their inclusion in this report. However, in regard to the Oonah area, the following features of the survey should be noted:-

- 1. Subsequent drilling by Placer confirmed that the anomalous zones indicated were due to the 'Stannite Lode'.
- 2. The anomalies extended from the Oonah workings, south to Bradshaws Lode and that the anomalies were persisting strongly at the northern and southern limits of the surveys.
- 3. Another anomalous zone occurs some 700-1,000 ft. east of the Main Shaft in the low lying, swampy ground and is apparently not associated with any workings. The anomalies have not been further explored.

2. Placer's Operations

Placer's work appears to have consisted mainly of surface mapping of their general licence area, clearing, mapping and sampling old workings, and diamond drilling. The results of diamond drilling and an investigation of stannite ore from the Oonah Mine carried out by the Mines Department of Tasmania, make up the available data significant to the present work.

Diamond drill holes Nos. 2, 3, 4, and 5 were sunk in the vicinity of the old workings; Nos. 3, 4, and 5 being sunk in a 'fan' from the same site to the north of the 'slide', whilst No. 2 was designed to intersect the ore body at depth, to the south of the

slide, in the vicinity of the Main Shaft, With the exception of DDH No. 4, which seems to have passed through old workings, all of these drill holes intersected what appears to be the 'stannite lode'.

Diamond drill holes Nos. 1, 6 and 7 were put down to the south of the workings, in the vicinity of 'Bradshaws Open Cut'. All these holes intersected mineralised zones, however, only sporadic copper and tin values are recorded.

Placer's operations were stopped when all their Tasmanian projects were suddenly curtailed in 1966.

No further work was carried out until Minops Pty. Ltd. acquired the area as part of its exploration licence.

Geology

The Oonah Quartzite-Slate is a Lower Cambrian series of interbedded white quartzites and grey and black slates, containing varying amounts of tuffs, breccias and associated lavas, generally called 'pyroclastics.' These rocks, in the vicinity of the mine, strike generally in a direction a little north of west and dip both ways at various angles. Because of lack of persistence, along the strike, of the different rock types, structure is often difficult to interpret and it is dangerous to join up similar looking rock types.

These rocks suffered deformation in both the Cambrian and Devonian orogenies and movement along pre-existing faults has doubtless proceeded right to the Tertiary. Because of the extensive mine workings, the main shear systems have been recognised, and it is the channelways provided for the mineral solutions, rather than the differing host, rocks which have determined the present ore bodies.

The Ore Bodies

There are two principal lode systems, both striking generally north and dipping to the east, the Galena Lode to the east and the Stannite lode (which is a double lode separated by country rock) to the west. The latter dips at a shallower angle (50°), so theoretically the two lodes should come together at depth. These lodes terminate to the north in a west trending fault, called the Main Slide. The galena lode has not been located north of this fault,

but the stannite lode appears, displaced some 130 feet to the west. This main slide is pre-mineral as it has itself been mineralised but later movements have occurred in it, displacing the stannite lode to the west.

During the early mining operations, most of the payable ore was mined from the Galena Lode and this Company has been attempting to prove ore reserves in the Stannite Lode both north and south of the 'Main Slide'.

The ore is a complex one, consisting mainly of stannite cassiterite and chalcopyrite with pyrite in a gangue of quartz and siderite. The most favourable host rock is the black slate, but mineralisation does occur in the pyroclastics.

Operations by Minops Pty. Ltd.

Survey

In carrying out their 1963 geophysical surveys, the Bureau of Mineral Resources established a grid over the area. A firm of Authorised Surveyors, Peacock, Darcey and Anderson, were engaged by Minops Pty. Ltd. to relocate the grid and to provide a number of accurately located reference points in the vicinity of the mine workings. By magnetic compass observations the grid was found to be oriented 24° east of magnetic north. A vertical datum station was established on a corner of a concrete block adjacent to the Main Shaft collar and given an arbitrary reduced level of +1000.00 feet.

Having established these basic survey points, the vertical and horizontal location of drill holes, workings, etc. was carried out by staff of Minops Pty. Ltd. by theodolite methods. All co-ordinates shown on the accompanying map refer to the B.M.R. grid and all bearings quoted are related to magnetic north.

Exploration

The drilling programme to date has been advised to test the stannite lode, both to the north and south of the Main Slide.

Drill holes Nos. M1, M2, M3, M5, M7, M8 and M10 were to the north and Nos. M4, M6, and M9 to the south.

008

Previously, three holes, put down by Placer, to test the lode at various depths just north of the slide, had indicated promising percentages of Sn, Cu and Ag. The No. M1 hole of Minops, 230 feet north of these also gave encouraging results, and seemed to indicate a lode strike length of 300 feet and a vertical range of 600 feet. However, hole No. M8 midway between the two locations was disappointing. Although significant tin mineralisation (0.42% over 73 feet) was encountered it was not concentrated as in the other holes. Just as much tin was met with, but it appears much more widely dispersed. The explanation may be that the hole was put down on the position of a cross shear zone which had the effect of disseminating the ore. Shearing in parts of the core seems to suggest this. So that the original estimates may still be valid.

Drill hole No. M10 was drilled to intersect the lode at a shallower depth than in No. M1. The lode was encountered at the target depth.

Drill hole No. M3 was put down 100 feet north of No. M1 and Drill Hole No. M2, 200 feet north of No. M3. The lode was encountered in No. M3 but with diminished tin content and in No. M2 the mineralisation was negligible, suggesting a lensing out of values to the north.

Drill holes Nos. M5 and M7 were designed to prospect the lode at shallow depths but neither showed significant values, suggesting that the stannite lode does not persist above Adit level.

To the south of the slide, No. M4 Drill Hole was designed to intersect the lode at about 150 feet below the No. 6 level, near the Main Shaft. The lode was encountered at the expected depth and Drill Hole No. M6 was put in 130 feet south of No. M4 to test the southern continuation of the lode. No mineralisation was encountered at the target depth, but 200 feet lower, lode material of low grade was cut. This intersection was 350 feet below the No. 6 level. It thus appeared that the lode had been faulted to the west and hole No. M9 was put in to try to find the lode 70 feet south of No. M6 and at a shallower depth. However, no mineralisation was found in this hole and it appears that either the lode cuts out further to the south or that it is displaced by yet another cross fault.

To the north of the 'slide' sufficient drilling has been carried out to allow an estimate of indicated reserves to be made, although the depth limit has not been ascertained. However, to the south only one discovery hole has been drilled (DDH M4) and estimates here must be very tentative.

The following table summarizes the relevant intersections:

DDH No.	Inters'n Width (ft)	True * Width (ft)	Vertical Dph. Below Shaft Colr. (ft)	Av. Assay Value			Remarks
				Sn.%	Cu.%	Ag(Oz/T)	
3	24.7	22.4	369	1.20	1.00	3.3	
4	5.0(?)	5.0(?)	225	-	-	-	Probable Stope
5	4.1	2.9	529	6.34	5.3	2.8	No assays above high grade intersect.
M1	21.0	19.0	342	1.51	1.90	5.0	
M8	35.5	32.2	356	0.38	0.13	1.1	Possible Cross Shear
M10	9.0	8.9	229	1.15	1.10	4.6	
M3	8.5	8.2	440	0.75	T	T	Lensing out of Lode (?)
M4	12.4	11.4	576	0.91	2.91	9.5	

* Based on adopted average dip = 50°

As stated previously it appears that the stannite ore body is lensing out to the north. In estimating reserves therefore, it has been assumed that payable ore would cut out between DDH Nos. M1 and M3 and a strike length of 350 feet has been adopted for the northern part of the orebody. Further, the deepest drill hole sunk in the area (DDH M4) intersected pay-ore at a vertical depth of 576 feet and it is assumed that economic mineralisation extends to a 25% greater depth, i.e. to 720 feet vertical depth. South of the slide a similar vertical limitation is assumed and a strike length of 200 feet is adopted.

In estimating average width and grade of the body it is necessary to make two estimates. As stated previously it is felt that the wide dissemination of mineralisation encountered in DDH M8 may have resulted from localised cross-shearing and that therefore the intersection may not be representative of the entire ore body.

010

Hence, a first estimate has been made excluding DDH M8 and a second with the results of this hole included (both estimates include the results of Placer DDH Nos. 3 and 5 and Minops DDH Nos. M1, M10 and M4).

- 1. Width, grade and reserve (excluding DDH M8)
Average true width - 12.9 feet
Average grades - 1.46% Sn, 1.81% Cu, 5.1 oz/Ton Ag.
Tonnage reserve - 540,000 Tons
- 2. Width, grade and reserve (including DDH M8)
Average true width - 16.1 feet
Average grades - 1.10%Sn, 1.25%Cu, 3.7 oz/Ton Ag.
Tonnage reserve - 674,000 Tons

Suggested further work

- 1. A programme of deeper drilling, in zones of pay ore, both north and south of the 'slide' to endeavour to ascertain the depth limitation of the body.
- 2. Drilling of the geophysical anomaly to the east of the Main Shaft in the swampy area.
- 3. Further geophysical work and drilling if warranted, to the south of the Oonah workings and to the south of Bradshaw's workings.

S.C. PEARCE

19th January, 1971.

APPENDIX I

DRILL HOLE LOGS AND ASSAYS (PLACER & MINOPS)

Associated Diamond Drillers
 16-12-69

Rig E 1000
 Rotary Core

MINOPS PTY. LTD.

012

From	To	Core Recovd.	Log	Recovery	xx	Sn %	Cu %	Ag oz/ton	Pb %	Zn %	Au dwt/ton
0	18.0	0.5'	Decomposed pyroclastic	3.8							
18	35.0	1.1'	As above + quartz fragments	6.4							
35	42.0	0.5'	As above - minor qtz veins approx. parallel to axis of core.	7.1							
42.0	99.0	Nil									
99.0	102.0	2.1	Pyroclastic	70.0							
102.0	106.0	2.6	As above	65.0							
106.0	109.5	3.0	As above	85.5							
109.5	110.0	0.4	As above	80.0							
110.0	111.0	0.9	As above	90.0							
111.0	117.0	1.75	As above. Minor silicified veins with pyrite. 111.4-111.5 pyritic vein 95% sulphide	29.0							
117.0	119.5	0.3	Pyroclastics	12.0							
119.5	119.75	0.1	As above	40.0							
119.75	122.0	2.0	Pyroclastic - fine grained. Minor qtz veins, erratic, split. 0.1' minor galena 1-2% & pyrite.	74.4							
122.0	126.0	3.3	As above. Siderite & qtz veins 50° to axis of core. Minor pyrite & galena (possibly stannite). Minor disseminated galena at 123.0-126.0.	82.0	123-126 T	0.01	0.7	0.3	0.17		

Property: E.L. 6/69 Location: Oonah Mine M 1

Bearing: 1070 Inclin: 253° Mag 70° 1

925013

Contractor

Rig

Start

Finish

Type of Drilling

MINOPS PTY. LTD.

013

From	To	Core Recovd	Log	Recovery	xx Depth	Assays						
						Sn %	Cu %	Ag oz/ton	Pb %	Zn %	Au dwt/ton	
126.0	135.5	1.5	As above. Veins leached. (Mineralisation leached?)	15.7	126-136.5	T	0.007	0.7	0.1	0.063		
135.5	136.5	0.5	As above. Silicified, leached.	50.0								
136.5	137.0	0.5	Minor pyrite, galena. Dissem. Sulphide zones. 80% sulphides 40% pyrite, 30% galena 10% stannite	100.0	136.5 - 137.1		0.04	0.43	19.8	12.7	0.96	1.3
137.0	140.5	3.5	136.5-137.1 Pb, Sn, Ag, Cu, Au Pyroclastic, minor veins of siderite & qtz. <1% galena, pyrite. Dissem & associated with veins.	100.0	137.1 - 141.0	T	0.005	1.3	0.34	0.103		
140.5	142.0	0.5	As above. Veins qtz pyrite minor galena.	33.0	141.0 - 144.5	T	0.005	1.5	0.5	0.043		
142.0	146.0	3.1	As above. Qtz & siderite veins Dissem & veins mineralisation Galena, Pyrite to 144'4	77.0	144.5 - 148.5	T	0.004	0.5	0.02	0.046		
146.0	152.5	6.5	Contact 148.25. Pyroclastics. Banded to mudstones. Contact 20° to axis of core Banded mudstones. Qtz siderite veins. Veins 45° to bedding. 20° to axis. Veins 20° to core axis.	100.0								
152.5	154.5	1.8	Grey mudstone. Minor secondary pyrite blebs.	90.0								

Oonah Mine

M1

2

925014

Contractor: Rig: HILL

Dates: Start: Finish: Type of Drilling:

MINOPS PTY. LTD.

014

From	To	Core Recovd.	Log	% Recovery	xx Depth	Assays					
						Sn %	Cu %	Ag oz/ton	Pb %	Zn %	Au dwt/ton
154.5	156.75	2.0	Mudstone. Erratic qtz veins	89.0							
156.75	157.4	0.3	As above & sandstone. Silicified?	46.0							
157.4	160.0	2.4	As above. Pyritous. Bedding 35° to axis.	92.0							
160.0	162.5	2.8	Ditto as above	100.0							
162.5	167.0	4.1	Ditto. Minor siderite. Qtz veins with pyrite.	91.0							
167.0	170.2	2.8	Ditto. Minor qtz parallel to axis	88.0							
170.2	175.5	5.2	Ditto. Bedding 35° to axis. Minor pyrite veins. Sphallerite? Noted specs.	98.0							
175.5	180.5	5.0	Ditto. Coarser, argillaceous	100.0	175.5 -						
180.5	185.3	4.9	Ditto. Qtz & pyrite veins. Inclusion of pyrite & primary pyrite.	100.0	180.5 -	T	0.004	0.3	T	T	
185.3	189.4	3.6	Ditto. Brecciated zones. Qtz inclusions. sulphides, pyrite Arsenopyrite (stannite?) minor galena. Bedding 45° to axis.	88.0	180.5 -	T	0.003	0.3	T	T	
189.4	191.4	2.0	As above	100.0	185.3 -	T	0.003	0.3	0.03	T	
191.4	197.3	5.9	Banded siltstone & mudstones. Minor veins qtz.	100.0	189.4 -	T	0.003	0.3	0.03	T	
197.3	201.8	4.5	As above.	100.0	189.4 -	T	0.005	<0.3	0.01	T	

Oonah Hill

M1

3

925015

Contractor

Rig

Start

Finish

Type of Drilling

MINOPS PTY. LTD.

015

From	To	Core Retr'd	Log	Recovery %	xx Depth	Sn %	Cu %	Ag oz/ton	Pb %	Zn %	Au dwt/ton
201.8	204.5	2.9	As above with silicified sections. Dissem. sulphides pyrite minor etc.	100.0							
204.5	207.5	3.1	Brecciated zone (Lode?). Dissem & veins pyrite & stannite minor galena. Qtz & siderite. Sulphide at 207' 15-20%	100.0	204.5 - 207.1	T	0.008	0.5	0.07	0.039	
207.5	210.5	3.0	Lode. Mineralised, brecciated. Qtz siderite with bands of pyrite minor stannite. Chalcopyrite & galena. Sulph. 15-20%. Zone 209.6 to 210.7 60% sulph.	100.0	207.1 - 209.0 209.0 - 210.1 210.1 - 210.9	0.10	0.38	1.2	0.13	0.022	
210.5	211.25	0.9	As above less sulphides.		210.9 -						
211.25	213.0	1.8	As above		213.0	T	<0.002	0.4	<0.014	T	
213.0	217.0	4.0	As above to 216! 216' less silicified. less sulphides. Blebs pyrite & Qtz. Chlorite shearing. Bedding at 220' - 45°.	100.0	213.0 - 215.9	T	<0.002	0.3	<0.014	T	
217.0	219.0	1.7	As for 216'	85%	215.9 -						
219.0	221.3	)	As above.		221.3	T	0.003	<0.3	<0.014	T	
221.3	222.6	) 4.8	Lode. Mineralised. Silicified. Pyrite, Stannite? Arsenopyrite 10-15% sulph.		221.3 - 223.0	T	0.077	0.7	<0.014	T	
222.6	223.1	)	Mudstone	94.0	223.0 - 224.75	T	<0.003	0.3	<0.014	T	

Remarks

Location

Oonah Hill

M1

Records

N L

Bearing

Inclination

No. 4

925016

016

Contractor: Rig:
 Date: Start: Finish: Type of Drilling:

MINOPS PTY. LTD.

From	To	Core Recovd.	Description	Recovery	Depth	Sn %	Cu %	Ag oz/ton	Pb %	Zn %	Au dwt/ton
223.1	227.1	3.9	Mudstone interbedded with fine siltstones which are pyritous (primary) dissem. inc blebs euhedril.	198.0	224.75 - 228.9	<0.01	0.002	0.1	0.012	0.002	
227.1	231.1	4.0	As above with minor pyrite veins with minor arsenopyrite or bismuthite, some primary & euhedril dissem. pyrite.	100.0	228.9 - 233.0	<0.01	0.005	0.2	0.018	0.004	
231.1	236.6	5.4	232-232.5 a small pyrite mineralised zone app. 20% pyrite. Bedding 15° to core axis. Some primary slumping.	98.0							
236.6	241.25	4.8	As above v. minor pyrite veins little primary pyrite.	100.0							
241.25	247.75	6.5	As above v. minor pyrite	100.0							
247.75	257.25	9.8	As above minor pyrite veins.	100.0							
257.25	261.5	4.1	Finely bedded penecontemp. faulted mudstones with occas. 0.5' bands of mineralised sandstone with dissem. pyrite and arsenopyrite.		259.5 - 260.2 260.2 - 261.0	<0.01	0.002	0.2	0.008	0.001	
261.5	264.0	3.4'	As above. Minor pyrite veins and dissem. pyrite & arsenopyrite. Bedding at 263' 55° to core axis.		261.0 - 261.9 261.9 - 263.9 263.9 - 265.3	0.03	0.002	0.1	0.012	0.002	
						<0.01	0.003	2.1	0.010	0.001	
						0.01	<0.001	0.1	0.012	0.003	

Location: Oonah Hill

M1

Records: R L Bearing Inclination

No. 5

925017

017

MINOPS PTY. LTD.

From	To	Core Recovery	Log	Remarks	xx Depth	Sn	Cu	Ag	Pb	Zn	Au
						%	%	oz/ton	%	%	dwt/ton
264.0	267.6	3.3	283.9'-265.5'. Arenite bands with lge qtz siderite veing smaller qtz-sid pyrite veins cutting the core at many angles also dissem pyrite. Last few feet the mudstones p.c.f. contains both primary and vein pyrite.	265.3 - 267.6	-	0.01	0.003	0.2	0.040	0.014	
267.6	271.9	4.25	267.6-270.1 - Breccia zone of arenite & mudstone centred with siderite with some pyrite also pyrite (primary & dissem) with the fragments. 270.1-271.1 Zone of leached mineralisation containing clays & pyrite. 271'.9 Breccia zone with pyrite.	267.6 - 270.3	-	<0.01	0.003	0.2	0.030	0.004	
271.9	272.6	) 1.3	Breccia zone with minor vein pyrite & undissem	270.3 -	-	0.01	0.009	0.2	0.048	0.045	
272.6	273.9) 1.3	Mudstone. Little pyrite.	273.9 -	-					
273.9	276.1	1.3	Mudstone veined with qtz & pyrite & at 275.9 a 0.25" vein of pyrite.	273.9 - 277.25	-	0.01	0.003	0.2	0.015	0.004	
276.1	277.25	0.75	Mudstone - fractured core	277.25 -	-						
277.25	277.75	0.25	Mudstone - fractured core	277.25 -	-						
277.75	278.9	1.2	As above dissem pyrite & primary pyrite.	282.5	-	<0.01	0.002	0.2	0.008	0.002	
278.9	282.5	1.75	As above, nebulous siderite veins. Some dissem pyrite & arsenic (bismuth or stannite) pyrite.	282.5 - 283.25	-	0.02	0.002	0.1	0.026	0.006	
282.5	283.4		Breccia zone with qtz siderite and dissem. and primary pyrite								

Donah Hill

M1

925018

MIROPS PTY. LTD.

018

From	To	Core Record	Log	Recovery	xx Depth	Sn %	Cu %	Ag oz/ton	Pb %	Zn %	Au dwt/ton	
283.4	284.15	)	Mineralised zone 80% pyrite & Qtz.		283.25 -						
284.15	284.75	)		Qtz zone with pyrite (breccia) & arsenopyrite & stannite.		286.5	<0.01	0.008	0.3	0.044	0.042
284.9	286.0	)	Qtz - siderite breccia with small pyrite & arsenopyrite or stannite (some cassiterite?)								
)		2.0 primary pyrite within the fragments with the breccia.								
286.0	286.8	)	Arenite & siltstone interbedded with mudstones.		286.5 -						
286.8	292.8	4.95	As above with primary and dissem pyrite very disturbed Qtz veins minor pyrite veins. At 288.8 dip 55° to core axis.		288.0 -	<0.01	0.002	<0.1	0.006	0.002		
						288.0 -						
						291.75	0.01	0.002	<0.1	0.008	0.001	
						291.75 -						
292.8	302.1	8.75	As above interbedded silts arenite, arenite and & mudstones. Dissem pyrite within the coarser bands.		293.25	0.01	0.003	0.1	0.017	0.018		
						293.25 -						
						295.0	0.01	0.003	0.2	0.008	0.002	
302.1	309.25	7.15	As above some primary pyrite.									
309.25	310.8	1.5	As above									
310.8	316.1	6.9	As above. Little dissem pyrite.									
316.1	320.4	3.6	As above. At 316.9 primary bedded pyrite appears and bedding is 30° to core axis. Small breccia zone with vein Qtz & siderite & minor pyrite & chalcopryite, minor pyrite veins									

Granary

Location

No. M1

Record

R L

Bearing

Inclination

Oonah Hill

Page No. 7

925019

Contractor: Rig:
 Date: Start Finish Type of drilling:

MINAPS PTY. LTD.

019

From	To	Core Recovery	Log	Recovery	xx Depth	Sn %	Cu %	Ag oz/ton	Pb %	Zn %	Au dwt/ton
320.5	327.0	6.1	As above. Minor qtz (thin) pyrite veins primary pyrite and pyrite siderite vein at 326.5		326 - 329.1		0.004	0.3	0.009	0.003	
327.0	330.8	3.7	As above mar qtz siderite veins also mar pyrite veins & primary pyrite.								
330.8	333.0	1.9	As above. No primary pyrite At 332.5 bedding 32° to core axis.		332.9 - 335.2		0.004	0.3	0.010	0.003	
333.0	336.5	3.5	Banded siltstone & mudstones Dissem pyrite & minor pyrite veins. 0.5%. Bedding 55°.								
336.5	340.5	4.0	As above. Minor siderite. Qtz veining.		337.2 - 340.7		0.003	19.5	0.010	0.003	
340.5	346.6	6.1	As above. Brecciated zones. Silicified 345-346.0.		340.7 - 342.6		0.005	0.5	0.014	0.003	
346.6	351.6	4.5	As above. Minor sulphides 1% Bedding 35° to axis.		342.6 - 346.5		0.003	0.3	0.009	0.003	
351.6	353.8	1.8	As above - graphitic		351.6 -						
353.8	354.3	0.5	Banded graphitic mudstone. Bands of pyrite. Minor siderite & qtz.		354.2 - 354.2		0.002	0.3	0.011	0.003	
354.3	356.3	2.0	As above brecciated. Erratic veins qtz & pyrite 3-10% pyrite.		359.2		0.002	0.3	0.007	0.003	
356.3	357.9	1.1	As above brecciated sulphides 15-25%								

Property: Location: Oonah Hill No.M1
 Records: R L Bearing: Inclination: Page No.8

925020

020

020

MINOPS PTY. LTD.

From	To	Core Recovery	Log	xx Depth	Sn %	Cu %	Ag oz/ton	Pb %	Zn %	Au dwt/ton
357.9	365.5	6.8	As above to 359'. Mudstones little to no sulphides - some contorted bedding.							
365.5	372.8	1.0	As above. Qtz veins 25° Bedding X 55°.							
372.8	381.3	3.75	Muddy slate banded with some pyrite veins approx 83%.							
381.3	382.25	0.1	As above.							
382.25	382.8	0.5	As above.							
382.8	384.8	0.4	Graphitic slate minor pyrite <1%							
384.8	385.8	) 8.3	As above.							
385.8	393.1		) Slate or mudstone, certain fine laminations of fine primary pyrite & coarser material Pyrite <1% After 387.9 bedding to core axis 55°.							
393.1	397.5	4.4	Ditto as above. Small coarser bands.							
397.5	404.8	5.25	Slate with some coarser qtz rich bands. Qtz & siderite veins with associated pyrite many coarser arenite horizons with dissem pyrite. pyrite is in places primary 1.2%.							
404.8	408.1	3.25	As above completely (pyrite 1%)							
408.1	412.7	5.1	Slate with interbedded fine							

Location: Oonah Hill

No. M1

Page No. 9

925021

021

021

MINOPS PTV ITH

From	To	Core Recvd.	Description	Depth	Sn %	Cu %	Ag oz/ton	Pb %	Zn %	Au dwt/ton
408.1	412.7	5.1	(cont) arenites with pyrite criss cross barren qtz/siderite veins. Pyrite blebs as above pyrite <1%							
412.7	414.7	1.7	As above til 413' when we have an arenite with less shale.							
414.7	415.1	0.4	As above qtz with arenless pyrite.							
415.1	416.5	1.3	Arenite as above v.minor pyrite <1%.							
416.5	417.8	1.3	Arenite as above qtz veins and dissem pyrite 1%							
417.8	421.3	3.5	Qtzite veins of qtz & pyrite some dissem pyrite 1%.							
421.3	422.75	1.4	As above.							
422.75	424.1	1.0	To 423.25 as above. to 424.1 shale							
424.1	425.4	0.75	Minor sulphides, pyrite. Qtzite. Minor qtz bands & pyrite. Dissem pyrite.							
425.4	426.8	1.7	As above. Bedding 60°.							
426.8	433.3	6.7	As above.							
433.3	436.0	2.6	Siltstone. Black 0.1' vein qtz with chalcopyrite at 435.4. Possible stannite crystals and sulph 50%							
436.0	443.75	7.7	As above minor brecciated zones from 440.1. Minor qtz & pyrite.							

Property Location Oonah Hill

Hole No . M1

Records R L Bearing Inclination

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925022

Compressor

Rig

Start Finish

Type of Drilling

MINOPS PTY. LTD.

022

From	To	Core Recovd.	Log	Recovery	xx Depth	Sn	Cu	Ag	Pb	Zn	Au	
						%	%	oz/ton	%	%	dwt/ton	
443.75	453.9		As above. Sulphides 5-20% Pyrite. Minor chalco. 450-450.7 100% sulph. pyrite 450.7-450.9 90% stannite chalco & pyrite 450.9-453.0 85% pyrite & chalco 1-2% 453-454 70% pyrite, stannite 50 10 chalcopyrite 10 & qtz rest. Lode 60° angle to axis of core at 450.7. 60° at 452.1		443.7 -							
					448.4 -	0.32	0.02	0.3	0.02	0.01		
					448.4 -							
					450.0 -	0.53	0.06	0.3	Nil	0.01		
					450.0 -							
					453.9 -	3.0	3.4	6.5	0.02	0.08		
					453.9 -							
					454.6 -	0.06	0.4	0.3	Nil	0.01		
453.9	464.1	10.1	453.9-454.3 Breccia zone. pyrite & qtz 30% sulph. 454.3-460.9 80% sulph. (75% pyrite, 5% chalco) qtz. 460.9-461.5 Arenites & mud- stones. Minor pyrite = qtz veined. 461.5-464.1 80% sulph. (all pyrite with minor pyrite) Qtz. Possibly stannite.		454.6 -							
					455.7 -	0.08	0.13	0.6	0.01	0.02		
					455.7 -							
					459.4 -	1.4	1.84	6.2	0.03	0.05		
					459.4 -							
					460.9 -	0.06	0.06	0.3	0.03	0.05		
					460.9 -							
					466.4 -	0.27	0.59	1.0	0.10	0.64		
464.1	466.5	2.2	Massive sulphides (80%) Pyrite minor chalco.		466.4 -							
					468.0 -	0.15	0.45	3.0	0.31	0.92		

Property

Location

Hole No. M1

Records

R L

Bearing

Inclination

Oonah Hill

Page No. 11

925023

023

023

Contractor: RIG:
 Date: Start: Finish: Type of Drilling:

MINOPS PTY. LTD.

From	To	Core Recovd	Log	% Recovery	xx	Assay					
					Depth	Sn %	Cu % oz/ton	Ag %	Pb %	Zn %	Au dwt/ton
466.5	473.1	5.2	466.5-468.6 40% sulphide . (Pyrite, minor chalco) Breccia zone with qtz & country rock & stannite. 468.6-472.4 Mineralisation with 80% sulph. 40% pyrite, 20% stannite, 20% chalco). Qtz & country rock. 472.4-473.1 Breccia zone with country rock, qtz & <10% mineralisation (pyrite)		468.0 -						
					469.3	1.6	3.17	9.0	0.70	0.16	
					469.3 -						
					471.0	6.3	6.55	20.0	0.07	0.24	
					471.0 -						
					475.2	0.18	0.14	1.4	0.04	0.14	
473.1	475.25	2.0	As above, brecciated zone with 25% mineralisation (pyrite)								
475.25	480.1	4.8	Fine qtzite, minor veins qtz. Dissem. pyrite. Minor vein pyrite, V.minor chalcoppyrite.								
480.1	481.1	0.8	Fine qtzite, m inor veins qtz. Dissem. pyrite, Minor veins pyrite.								
481.1	485.5	2.4	Shale with minor primary pyrite and some vein pyrite 10% pyrite.								
485.5	491.75	5.75	485.5 -)As above, primary pyrite 487.75)& vein pyrite 10% pyrite. 487.75) Mineralised zone 80% 489.25) sulphide pyrite & V. minor chalcoppyrite.								

Property: Location: Oonah Hill Hole No. M1
 Records: R L: Bearing: Inclination: Page No. 12

925024

024

MINOPS PTY. LTD.

From	To	Core Record	Log	Recovery	xx Depth	Sn %	Cu %	Ag oz/ton	Pb %	Zn %	Au dwt/ton
			489.25) As before. Min zones. 491.75)								
491.75	493.4	1.7	Sst & shl minor primary pyrite.								
493.4	494.1	)	As above.								
494.1	496.1	)	Mineralised zone, small breccia								
		)	qtz & country rock. 30% pyrite								
		)	no other recog sulphides.								
496.1	498.0	)	Sst with minor shl primary dissem. pyrite. some pyritic vein 10% mineralisation.								
498.0	501.25	2.75	Laminated shl & sst. primary pyrite qtz & siderite veins.								
501.25	506.75	3.0	As above. Bedding 75° to core axis.								
506.75	513.25	5.9	Laminated sst, silst. & shl minor pyrite.								
513.25	514.75	1.4	As above.								
514.75	516.25	1.1	Broken core, as above.								
516.25	517.1	1.0	Sst.								
517.1	518.4		Sst zone of pyritic min. 30% pyrite with qtz & siderite.								
518.4	522	2.8	1'6" sst rest dark graphitic shale minor qtz min. Bedding 63° to core axis.								
522.	525.	2.	Dk graphitic shale with some thin siltstone contortions.								
525	528	3	As above								
528	531.5	3.5	As above								

Oonah Hill

Hole No. M1

Records R L Bearing Inclination

No. 13

925025

025

025

Contractor Rig
 Name of Staff Finish Type of Drilling

MINOPS PTY. LTD.

From	To	Core Recovd.	Log	% Recovery	xx Depth	Sn	Cu	Ag	Pb	Zn	Au
						%	% oz/ton	%	%	dwt/ton	
531.5	534.75	1	As above								
534.75	536	1.4	As above								
536	536.7	0.7	As above								
536.7	541.25	4.25	As above. 539' bedding 40° to core axis.								
541.25	542.9	1.75	As above								
542.9	547	4.25	"								
547	553.4	6.2	"								
553.4	555.2		"								
555.2	559.25	4.0	"								
559.25	561.25	2.0	" 561.25 bedding 40° to core axis.								
561.25	586.5	Core disturbed	"								
586.5	605	" " "	Fine grained grey micaceous sst with thin interbedded shales? graphitic?								
605	615	3	Sandstones as above								
615	616	1	sst and rotten clay.								
616	621	3.75	Black graphitic shales with thin & medium laminations of cross bedded st. sand & siltstones <1% primary dissem pyrite.								
621	623	2	As above minor siderite veins.								
623	626	2.5	As above.								
626	629	2.25	As above. 627 bed 70° to core axis.								

Property Location Oonah Hill Hole No. M1

Records R L Bearing Inclination Page No. 14

925026

MINOPS PTY. LTD.

026

From	To	Dip	Description	xx						
				Depth	Sn %	Cu %	Ag oz/ton	Pb %	Zn %	Au dwt/ton
629	634	5	Fine micaceous sst with many minor qtz & siderite veins & thin inter-related shale between thicker sst beds. Bottom part of slumped shale and sst.							
634	636	2.2	Interbedded (thinly) shale & sst penec faulted with much assoc. slumpy.							
636	644	7.8	As above. 637' Bed. to core axis 40°.							
644	650	5.5	Laminated shale & silty horizons.							
650	657	7.3	To 652 as above. Onwards sst with some thin shale to 661							
657	663	3.5	sst as above. After laminated silty sst & shales.							
663	667	4.3	Sandstone beds 6" thick with thicker beds of laminated sst & shale.							
667	677	10	As above with some pyrite mineralisation at 675 bed 60° to core axis. Approx. 1% min.							
677	684	7	Banded graphitic shale with sandstone.							
684	689	4.75	Sst with some shale. Dissem pyrite. Qtz veins with minor pyrite.							

Oonah Hill

Hole No. M1

Records R L Bearing Inclination

Page No. 15

925027

Contractor

Rig

Dates: Start

Finish

Type of Drilling

MINOPS PTY. LTD.

027

From	To	Core Recovd	Log	Recovery	xx	Sn	Cu	Ag	Pb	Zn	Au
					Depth	%	%	oz/ton	%	%	dwt/ton
687	697	8	As above								
697	704	6.9	As above								
704	708	4.8	As above. Slightly more pyritic 1%.								
708	710	2.5	As above.								
710	714	3.0	As above.								
714	715	0.8	Shale with little fine bedded sst.								
714	717	2	Sst with shale pyrite in veins with qtz & siderite veins.								
717	722	4.2	Sandstone with qtz veins & siderite pyrite veins also dissem pyrite 718' bedding 40° to core axis.								
722	725	3	Graphitic shale, sandstone and a barren qtz vein with siderite.								
725	728	3.3	Sandstone with many qtz veins and siderite.								
728	730	2.	As above with graphitic shale.								
			END OF HOLE.								

Property

Location

Oonah Hill

Hole No. M1

Records

R L

Bearing

Inclination

Page No. 16

925028

028

Associated Diamond Drillers Rig E 1000
 25-2-70 Finish 13-4-70 Type of Drilling Rotary Core
 4-11-70 27-11-70 MINOPS PTY. LTD.

028

Depth	Core Recovd.	Log	Recovery	
Collar	10	4.5	Micaceous qtzite. Erratic leached qtz veins. Weathered.	45
10	14	3.0	As above siltstone bands	75
14	24	8.6	As above	86
24	30	6.0	As above limonitic & qtz veins leached.	100
30	39	8.0	As above. Sheared. Minor siltstone bands.	88
39	42	2.8	Contorted banded siltstone. Bedding 50° to core axis.	93
42	49	7.0	As above. Minor chloritic shears.	100
49	55	6.0	As above. Minor graphitic shears.	100
55	57	1.5)	As above. Bedded siltstones.	75
57	66	2.8)	Bedding 40° to core axis.	31
66	68	1.5)		75
68	70	1.1)		75
70	73	2.4)	Bedded siltstones. Minor veins of	80
73	74	0.9)	qtz and siderite. Parallel or near	90
74	75	0.8)	parallel to core axis.	80
75	78	3.0)	Cross bedded.	100
78	80	1.6)		80
80	83	2.7)		90
83	86	3.0)	As above. Sections with contorted	100
86	88	1.8)	bedding. Qtz and siderite veins.	90
88	91	3.0)		100
91	93	2.0)		100
93	97	4.0)		100

E.L. 6/69

Location

Oonah Hill

Hole No. M2

Co-ords 727N
585W

1083

Bearing 262° mag.

Inclination

68°

Page 1

925029

Associated Diamond Drillers

Rig E 1000

029

DRILL LOG

Date

25/2/70

Finish

Type of Drill

925030

029

From	To	Cora Recon	Log	Recovery	To
97	99	2.0			100
99	100.5	1.5	As above sections with		100
100.5	104	3.5	contorted bedding qtz and		100
104	106	2.0	siderite veins		100
106	108	2.0			100
108	112	4.0			100
112	114	2.0			100
114	118	4.0			100
118	128	10.0	Siltstones with contorted bedding Erratic leaches qtz veins		100

Property

6/69

Location

OONAH HILL

Hole No

M2

& L 1083.4

Bearing

262

Inclination

68°

Page No

2

Associated Diamond Drillers

25/2/70

13/4/70

MINOPS PTY. LTD.

925031

030

From	To	Core Recvd.	Log	
128	132	4.0	Siltstones, Minor breccia zones Bedding 35° to axis	100
132	137	5.0	As above	100
137	140	3.0	As above. Qtz. veins parallel to core axis	100
140	145	5.0	As above	100
145	149	4.0		100
149	154	5.0	Siltstones - Qtz. veins Contorted brecciated zones with chlorite & graphitic shears	100
154	156.5	2.5	As above with less Qtz.	100
156.5	161.5	5.0	As above. Erratic Qtz. veins	100
161.5	164.0	2.5	As above	100
164.0	167.0	3.0	As above. Mostly Qtz. and minor Siderite	100
167.0	172.0	5.0	As above. Contorted bedding erratic Qtz. veins with siderite	100

Demerby

6/69

Location

OONAH HILL

M 2

Records

R L

1083.4

Bearing

262

Inclination

68°

3

Contractor: Associated Diamond Drillers
 Date: 25/2/70

Rig:
 Type of Drilling:
 MINOPS DTV LTD.

925032

031

From	To	Core Recvd.	Log	Recovery
172	173	1.0	Thinly bedded siltstones. Bedding 45° to core axis	100
173	175	2.4	As above	125
175	177	1.0	Graphitic mudstones. Qtz. & Siderite veins. Broken core. Minor disseminated primary pyrite. Fault?	50
177	186.0	0.9	As above. Broken Core. Leached Qtz.	10
186	195	1.7	As Above. Leached Qtz. fragments	19
195	205	2.0	As above. Graphitic Shears.	20
205	210	2.0	Qtz. in clay. Weathered pyroclastic with Qtz. veins - leached	40
210	216	4.0	Weathered pyroclastic and minor siltstone bands. Clay bands	66
216	221	1.0	Clay with fragments of slate and pyroclastics and Qtz.	20

6/3/70

Year	6/69	Location	00NAH HILL	Hole NO	M 2
Records	R L 1083.4	Bearing	262	Inclination	268°
					4

Contractor: Associated Diamond Drillers
 Dates: 25/2/70 Finish: 13/4/70

Rig: _____
 Type of Drilling: _____

925033

032

MINOPS PTY. LTD.

From	To	Core Record	Log	Remotary	To	Depth	Cu. PPM	Pb. %	Zn. %	Bi. PPM	Ag. oz/t	Sn. %
221	222	1.0	Graphitic slates with siltstone bands some primary pyrite	100								
222	225	2.1	As above	70								
225	226	0.75	Qtz. Sandstone	75								
226	229	2.2	Finely bedded siltstone and shale Minor Qtz. and siderite veins	70								
229	232)	2.0	As above	20								
232	237)		Pyroclastics with minor siderite veins									
237	239	1.6	As above	80								
239	247	4.0	As above	50								
247	248	0.6	As above	60								
248	256	2.3	As above	28								
256	259	2.4	As above. Vesicles of siderite & galena. Thin veins of siderite and galena.	80								
259	261)	6.75	As above with galena and siderite vesicles. Contorted bedded shales with much primary pyrite (up to 50%)	85	259.7 -							
261	267)		263.6 -		17	0.046	0.04	70	-0.33	0.05		
			263.6 -		8	0.036	0.07	50	-0.33	0.05		
			1" vein of pyrite.		264.3							

Property: 6/69 Location: OONAH HILL Hole: M 2
 Records: R L 1083.4 Bearing: 262 Inclination: 68° Page: 5

Contractor: ...

Date: Start: ... Finish: ...

MINOPS PTY. LTD.

925034

033

From	To	Core Recovd	Log	Recovery	Is
267	268	0.75	As above. Pyrite and siderite veins.	75	
268	271	2.5	Slightly contorted shales with coarser bedded horizons. some primary pyrite and siderite stringers.	80	
271	274	2.75	As above	88	
274	276	1.0	Shales with deformed bedding. Interbedded bands of micaceous arenites. Thin veins of siderite and qtz.	50	
276	278	1.25	Siltstones with deformed bedding siderite in signordal shear infills.	60	
278	287	2.75	Grey micaceous arenite with veins of qtz and siderite, pyrite.	27	
287	289	1.75	Dark pyritous shales, few veins of pyrite. Much primary pyrite.	85	
289	290.75	)	Interstratified contorted bedded siltstone and shales with primary pyrite.	100	
290.75	294	) 5.0	Predominantly shales with much dissem. primary pyrite. Veins of siderite with galena parallel to core axis.		
294	297	2.5	Banded fine arenite. Deformed banding in places. Micaceous primary pyrite. Veins of siderite and pyrite.	80	
297	302	4.5	As above. Shear zones with tension	90	

Property: ... Location: Oonah Hill

Hole No. M2

Records: ... K L Bearing Inclination

034

MINOPS PTY. LTD.

925035

From	To	Interval	Description	Recovery
297	302	4.5	gashes infilled by siderite and qtz. Bands of primary pyrite.	
302	305	3.0	Pyritous & micaceous shale inter- stratified with arenaceous lenses. Siderite & pyrite veins.	100
305	307	2.0	Slate with some interbedded arenite Pyrite & qtz on cleavage faces.	100
307	310	3.0	Interstratified slates and banded siltstones. Siderite veins with some galena and pyrite.	100
310	311	0.75	Black slate.	75
311	314	3.0	Interstratified black slate and banded siltstones. Few qtz and siderite veins. Primary & secondary pyrite.	100
314	316	1.75	As above.	85
316	317.5	) 4.0	Black slate.	
317.5	320		Micaceous qtz arenite with shaley graphitic partings and deformed shale lenses.	100
320	322	2.0	As above. Less coarse banded arenites. Lens of pyrite at 321. Minor qtz veins.	100
322	324	1.25	Fine banded arenite. Shaley partings	60
324	325	1.0	As above. Small qtz veins with minor pyrite.	100
325	327	2.0	Interstratified banded siltstones	100

Cont
Oonah Hill

Hole No. M2

Vertical R L Bearing Inclination

035

MINOPS PTY. LTD.

925036

From	To	Cord Record	Log	Recovery
325	327	2.0	graphitic slates and micaceous qtz arenites with much fine pyrite and irregular qtz veining.	
327	328	1.0	Banded micaceous siltstone. Minor qtz veins.	100
328	338	9.75	Interstratified banded micaceous siltstones, dark slates and micaceous qtz arenites. Qtz veining parallel to and oblique to bedding.	98
338	339)	6.25	contorted banded slate	80
339	340)		Micaceous qtz arenite with	
340	342)	6.25	lenses of thin pyrite	
342	345)		Banded siltstones	
345	345.5)		Dark siltstones, slates. Qtz and siderite veins	
345.5	346.75)	9.75	Dark slate	
346.75	349)		Banded siltstone with qtz veining	
349	351.5)		Interstratified contorted bedded siltstone and slate with qtz veining with some pyrite	
349	351.5)	9.75	Predominantly slates with thin bands of siltstone. Siderite veins.	98
351.5	355)		Banded siltstones - micaceous with some qtz veins.	
355	355.5)	3.75	Dark banded siltstone	90
355.5	356.5)		Dark banded slates	

Location Oonah Hill

Hole No. M2

Records R L Bearing Inclination

Page No. 8

Contractor

Date: Start

Finish

925037

036

MINOPS PTY. LTD.

From	To	Core Record	Log	Recovery
356.5	357.5)	3.75	Banded siltstones with irregular qtz veining. Graphitic partings	
357	359)		Banded siltstone. Graphitic partings	
359	360)		Banded siltstone. Graphitic partings	
360	361.5)		Light grey banded siltstones with irregular qtz veining. Some minor pyrite, galena, sphaleite	70
	)	5.0	Bedding 30° to core axis	
361.5	362.25)	2.0	2" qtz vein. Light baded arenite	
362.25	366)		Dark slate. Minor qtz and siderite veins.	
366	367)	2.0	Siltstone with minor qtz veining, some parallel to bedding	100
367	368)		Slate with minor qtz veining	
368	369.5)	3.5	Slate with minor qtz veining	100
369.5	371.5)		Banded siltstone with irregular qtz. veining	
371.5	374.5	3.0	Banded micaceous siltstone. Qtz and siderite veining.	100
374.5	377.5	3.0	Banded micaceous siltstone. Qtz veining parallel to core axis. Some pyrite, not associated with qtz veining. 377-377.5 Dark Slate Bedding 60° to core axis.	100
377.5	378.5)		Dark banded slate. Small siderite veins.	100

Property _____ Location Oonah Hill

Hole No. M2

Bearing _____ Inclination _____

Page No. 9

Contractor: ...

Range: Start ... Finish ...

MINOPS PTY. LTD.

925038

037

From	To	Core Recevd.	Log	
378.5	379)	6.0	Grey banded siltstone. Irregular qtz and siderite veins.	
379.0	383.5)		Dark slates with irregular qtz and siderite veining, trace pyrite disseminated primary pyrite	
383.5	384.5)	6.5	As above shear zone of qtz and siderite. Irregular veining. Trace pyrite and galena.	100
384.5	390)		As above, thin bands of qtz zone siltstone. Dip 60° core axis. Few qtz veins. Some penecontemporaneous faulting in bands.	
390	391.5		Dark slate. Qtz and siderite veins with pyrite. Bands of fine pyrite and disseminated primary pyrite.	
391.5	392.5		As above. Few qtz and siderite veins	
392.5	395.5		Dark slates with coarse banded siltstones with deformed banding irregular qtz and siderite veining pyrite in qtz and siderite. Bands of pyrite and arsenopyrite	
395.5	397.0		Dark banded slates. Minor Qtz veining Bedding 60° of core axis.	
397.0	400.5)		Banded slates. Much qtz and siderite and pyrite veining. Mostly dipping 25° to core axis. Veining parallel or near parallel to core axis. Some bands of pyrite (primary) parallel to bedding	
				Oonah Hill
Bearing	D. E.	Bearing	Inclination	

Hole No. M2

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Contracted by: MIMOPS PTY. LTD. Rig: Type of Drilling:

925039

038

MIMOPS PTY. LTD.

From	To	Core Recovery	Log	Recovery
400.5	402)	6.5	Banded slates. Much qtz and siderite veining, dipping 25° to core axis. Thin siderite veins parallel to core axis.	86
	)		Two, pyrite veins 3" qtz filled tention gashes	
402	404.5)		Dark, banded slates. Primary pyrite in bands. Little secondary pyrite qtz and siderite.	100
404.5	409.5	5.0	Interbanded dark slates with graphitic cleavage surfaces. Light siltstones. Penecontemporaneous faulting and slumping. Much banded and disseminated primary pyrite. Bedding 55° to core axis. Qtz and siderite veins with little pyrite 20-25° to core axis.	
409.5	412.5)		As above. Qtz and siderite veining associated with penecontemporaneous faulting	
412.5	412.75)	5.0	Graphitic slate with qtz veining	90
412.75	413.0)		qtz with horges of slate. Bronze coloured??? Bismuthmite	
413	415		Soft graphitic slate with qtz veining often forming a breccia. Some siderite Much primary pyrite	

Property: Location: Oonah Hill Hole No. M2

MINOPS PTY. LTD.

925040

039

Depth	Top	Core Recovery	Description	Weight
415	415.75	3.0	Micaceous qtzite with siderite veining & pyrite. Veins dip 25° to core axis. Thin bands of graphitic shale.	100
415.75	418		As above. Qtz veins dipping 40° to core axis. Bedding 30° to core axis.	100
418	422.5	4.5	As above	100
422.5	424.5	2.0	As above. Minor pyrite & chalco-pyrite.	100
424.5	426	0.75	Darker fine micaceous qtz arenite with graphitic/micaceous, partings irregular qtz and siderite veining	50
426.0	429.5	3.0	As above. Fine qtz and siderite veining. Dipping 25° to core axis.	100
429.5	430.25	1.25	Lighter coarse micaceous qtz arenite with cross-cutting qtz and siderite veins.	83
430.25	431.0		Black graphitic slate. Poor recovery Minor Qtz.	
431.0	434.5	3.0	Light fine sand to silt grade qtzose sandstones with much qtz veining 45° to core axis. Thick qtz veining parallel to core axis. Graphitic partings.	87
434.5	437.5	2.75	Fine micaceous qtz arenites with qtz veining & siderite veins dip 50° to core axis. Graphitic partings at 437'. Minor pyrite and galena.	88

Oonah Hill

Hole No. M2

Records

H L

Bearing

Id. list

Contractor

Rig

Start Finish

Type of Drilling

925041

040

MINOPS PTY. LTD.

From	To	Core Recevd	Log	Recovery	To
437.5	439	1.78	As above. Last few inches, grey slate	100	
439.0	441.5	2.0	Interbedded fine silty micaceous arenites and dark graphitic slates. Primary pyrite. Some qtz and siderite veining. Bedding 40° to core axis.		
441.5	447.5	6.0	Dark graphitic and micaceous siltstones with primary pyrite	100	
447.5	452.5	10.0	Dark siltstones and mudstones with primary pyrite in vesicles and bands	100	
452.5	457.5		Dark siltstones with contorted bedding some primary pyrite and qtz veinging graphitic partings.		
457.5	460.0	5.25	Dark siltstones with graphitic slaty partings. Some qtz and siderite veining	84	
			Bedding 50° to core axis. Veinging 25° to core axis.		
460	463.5		Micaceous qtz arenite with some qtz and siderite veining		
463.5	465		As above	100	
465	466.5	4.0	Dark siltstone and fine sandstone with thin graphitic shales		
466.5	467.5		Dark qtz arenite with graphitic partings. Qtz and siderite veining parallel to core axis.		
467.5	468.75	1.75	As above, veining 25° to core axis		
468.75	469.25		Qtz with horges of sandstone	100	

Property

Location

Oonah Hill

Hole No. M2

Records

R L

Bearing

Inclination

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Contractor

RIS

Date: Start Finish

Type of Drilling

925042

MINOPS PTY. LTD.

041

From	To	Core Recovd.	Log	Recovery
469.25	471	1.75	Dark micaceous qtz arenite qtz and siderite veining. Traces at chalcopyrite. Veins 20° to core axis	100
471.0	473.0		Dark micaceous qtz arenite. Siltstones with much qtz veining and siderite. Primary pyrite.	
473.0	473.75	0.75	Dark fine micaceous qtz arenite	100
473.75	477.25	3.75	As above with banded siltstones 20° to core axis. Minor qtz and siderite veining.	100
477.25	481	7.75	As above	93
481.0	482.75		As above, numerous small siderite and qtz veins dipping 25° to core axis. Small pyrite veins.	
482.75	483.5		As above, Thicker qtz veins and lenses of fine primary pyrite	
483.5	485.5		Dark, fine qtz arenite with contorted banding. Very well cemented	
485.5	486.5		Dark fine micaceous qtz arenite	
486.5	487.5	5.5	Minor qtz and siderite veining	100
487.5	488.75		Banded dark fine micaceous qtz arenite and black siltstone. Dip 30° to core axis. Lenses of primary pyrite	
488.75	491.0		Micaceous qtz arenite with lenses of primary pyrite. Qtz & siderite veins	
			Coarser micaceous qtz arenite, minor qtz and siderite veining	

Hole No. M2

Records

R L

Bearing

Inclination

Oonah Hill

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Contractor

Date: Start

Finish

Type of drilling

925043

042

MINOPS PTY. LTD.

From	To	Core Recovery	Log	Recovery	To
491.0	493.25	) 3.5	As above, Minor pyrite Fine dark qtz arenites and banded siltstones with much fine qtz and siderite veining. Broken core	84	
493.25	495.25				
495.25	496.5	) 5.0	Micaceous qtz arenites with graphitic partings. Qtz and siderite veining pyrite Micaceous qtz arenite with graphitic partings. As above. Micaceous qtz arenite, with much qtz and siderite veining. Minor pyrite. Barren qtz Micaceous qtz arenite with graphitic partings and much irregular qtz and siderite veining	100	
496.5	498				
498	498.75				
498.75	499.25				
499.25	500.00				

DEVIATION OF INCLINATION

- 100' - 69°
- 200' - 69°
- 300' - 67°
- 400' - 66°
- 500' -

Property

Location

Oonah Hill

Hole No. M2

Records

R. L.

Bearing

Inclination

Contractor: Associated Diamond Drillers

Rig: F25

Dates: Start: 25-2-70 Finish: 13-4-70

Type of Drilling: Rotary Core

925044

043

4-11-70 27-11-70

MINOPS PTY. LTD.

From	To	Core Recovd.	Log	% Recovery	To	Assays			
500	505'	5'	Mainly dark slates with bit of qtzite & veins & bunches of qtz (70° to d.c.a.)	100					
505'	514'	8'	Massive qtz in qtzite Small pyrite pockets in qtzite. Siderite vein with pyrite ½" thick, 45° to d.c.a. Micaceous qtzite with siderite & qtz veins. Micaceous qtzite with pyrite, siderite & qtz veins (30° to d.c.a.) Pyrite veins ¼" to ½" thick.	85					
514'	523'	6'	Micaceous qtzite with pyrite & siderite veins, also qtz. Black slate. Micaceous qtzite with qtz siderite in gash veins, small pockets of pyrite. Slates & qtz veins & bunches (core broken)	66					

Property	E.L. 6/69		Location	Oonah Hill		Hole No	M2
Records	727N L 585W	1083 Bearing	2620 mag.	Inclination	68°	Page	16

Core No.

925045

Dates: Start..... Finish..... Type of Drilling.....

MINOPS PTY. LTD.

044

From	To	Core Recvd.	Log	% Recovery	To	Assays							
523'	538'	13'7"	Micaceous slates with siderite & qtz veins and a little pyrite disseminated along veins. Micaceous slates with pyrite veins (1/4-1/2") at 45° to d.c.a. Also siderite & qtz veins with small amount of chlorite (?) in qtz veins.	90									
538'	539'6"	1'5"	Black slates with qtz veins & small siderite veins, slump structure appear to be evident?	98									
539'6"	549'6"	8'	Mainly slates (small amount qtzite) with fair amount of qtz & siderite veins & bunches, small pockets of pyrite towards end of footage.	80									
549'6"	555'6"	5'7"	Mainly micaceous qtzite, with small bands of slate, abundant qtz & siderite veins & bunches. First few inches has small pyrite vein & some chlorite.	90									

Property	Location				Oonah Hill				Site No.	M 2
Records	R L	Bearing	Inclination						Page No.	17

Contractor:

Dates: Start

Finish

Type of Drilling

925046

045

MINOPS PTY. LTD.

From	To	Core Recovd.	Log	% Recovery	To	Losses				
555'6"	562'6"	6'6"	Mainly massive dark slates occasional thin pyrite vein. Qtz & siderite veins present roughly at right angles to d.c.a.	90						
565'6"	571'6"	6'	As above but qtz veins at 25° to d.c.a.	100						
571'6"	577'	6'6"	As above	100						
577'	578'6"	1'6"	As above	100						
578'6"	582'	3'6"	As above Pyrite vein ¼" wide at 50° to d.c.a.	100						
582'	584'6"	2'6"	Mainly black slate - core broken. Black slate with qtz & siderite, very small amount of pyrite.	100						
584'6"	588'6"	4'	Mainly black slate with thin bands of qtzite, one small vein of pyrite & bunches & veins of qtz & siderite, small fault at 586'9".	100						

Property

Location

Oonah Hill

Block No

M2

Records

R L

Bearing

Inclination

Page No

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925047

DRILL

LOG

046

Contractor..... Rig.....

Dates: Start..... Finish..... Type of Drilling.....

MINOPS PTY. LTD.

From	To	Core Recovd.	Log	% Recovery	To	Assays					
588'6"	590'4"	1'8"	Mainly black slate, with thin qtzite bands, very thin veins of siderite.	98							
590'4"	591'6"	1'2"	Micaceous qtzite with qtz & siderite veins at 50° to d.c.a. Tiny amount of pyrite in veins.								
591'6"	592'	0'10"	Alternating bands of qtzite & siderite, dip 50° to d.c.a. Small qtz & siderite veins with minor amount of pyrite.								
592'	599'6"	7'3"	Alternating bands of slate & qtzite with qtz & siderite veins (30° to d.c.a.) Fine pyrite in some siderite veins also some chlorite.	98							
599'6"	603'	3'6"	As above but more pyrite veins - one at 602' is 1/4" wide.	100							
603'	608'6"	3'9"	As above	70							
608'6"	612'	3'6"	Qtzite type with qtz veins & disseminated pyrite.	100							

Oonah Hill

M2

19

Contractor: Rig:

Dates: Start: Finish: Type of Drilling:

DRILL
LOG

MINOPS PTY. LTD.

From	To	Core Recovd.	Log	% Recovery	To	Assays					
608'6"	612'	3'6"	(cont) Alternating bands of qtzite & slate with siderite/ qtz veins at 45° to d.c.a. Small patches of pyrite. Two gash veins about 1/2" with siderite & pyrite.	100							
612'	618'6"	6'	Qtzite with siderite qtz vein running parallel to d.c.a. Massive qtz in qtzite with vugs in qtz filled with pyrite. Qtzite with irregular qtz/ siderite veins containing disseminated pyrite, few small bands of slate. Alternating qtz/siderite bands with qtz veins - thin pyrite veins.	85							
612'	618'6"	6'	Qtzite with qtz veins at 50° d.c.a., small amounts of pyrite in qtz veins.								
618'6"	621'	2'6"	Qtz/siderite mixture with small patch of pyrite, qtz veins.	100							

Property				Oonah Hill	Site No	M2
Records	R L				Page No	20

047

925048

Contract No.
 Dates: Start Finish Type of Drilling

MINOPS PTY. LTD.

925049

From	To	Core Recvd.	Log	% Recovery	To	ANALYSIS						
618'6"	621'	2'6"	(cont) Qtz/siderite mixture fault breccia with large pyrite vein running parallel to d.c.a. up to 1" wide - some chalcopyrite in vein.	100								
			Qtz/siderite mixture with pyrite vein 1/4" wide.									
621'	622'	1'	Alternating bands of qtz/siderite with irregular qtz & small patches of siderite & pyrite.	100								
622'	643'	21'	Black slates with qtzite bands, qtz & few small siderite veins - small pyrite veins throughout - more near 642. cleav. 45°.	100								
643'	653'	4'6"	Slates, few qtzite bands. qtz veins & pyrite dissem. throughout	45								
653'	655'	1'6"	Slates	75								
655'	658'6"	3'	Slates & qtzite - brecciated in places qtz/siderite - dissem. pyrite 1'6" barren graphitic slates.	70								

Property	Location	Oonah Hill	Hole No.	M2
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Records	R L	Bearing	Inclination	Page No.	21
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Contractor:

Rig:

DRILL

Dates: Start: Finish:

Type of Drilling:

L O C

MINOPS PTY. LTD.

049

925050

From	To	Core Recovd.	Log	% Recovery	To	Assays							
658'6"	662'6"	3	Siderite/qtz veins with pyrite perhaps split after results of 643-653'	75									
662'6"	668'	5'	Mainly black slates minor pyrite veins. at 60°. Vein of siderite/pyrite with epidote?	85									
668'	673'6"	5'	Black slates occasional small pyrite vein.	90									
673'6"	683'	7'	Black slates - core broken.	70									
683'	688'	4'	Black slates - core broken.	80									
688'	693'	4'	Slates with qtzite, qtz/siderite vein.	80									
693'	696'6"	3'6"	Slates with qtzite, qtz' siderite vein.	100									
696'6"	700'6"	3'8"	Slates - brecciated in places. Qtz/siderite/pyrite vein 1" wide. Qtz/siderite/pyrite throughout brecciated zone.	98									
700'6"	702'	1'6"	Brecciated slates qtz/siderite.	100									
702'	704'	1'8"	Brecciated slates qtz/siderite.	80									

Property

Location

Oonah Hill

Hole No.

M2

Records

R L

Bearing

Inclination

Page No.

22

Contractor: Rig:

DRILL

Dates: Start: Finish: Type of Drilling:

LOG

050

MINOPS PTY. LTD.

From	To	Core Recovd.	Log	% Recovery	To	Assays								
704'	706'		Black slates											
706'	710'6"	4	Black slates - cleav. 60°.	80										
710'6"	718'	6'6"	Black slates - cleav. 60°. Qtz vein & bunches.	75										
718'	722'6"	4	Black slates - cleav 60°. Qtz vein & bunches.	85										
722'6"	728'6"	1'10"	As above small pyrite vein at 728'.	70 bb										
728'6"	737'6"	1'6"	Black slates - slight brecciation.	30										
737'6"	738'6"	1'	Slates with siderite/pyrite veins at 20° - stringers.	100										
738'6"	741'6"	3'	Slates qtz/siderite vein. Slates with mineralisation in qtz/siderite.	100										
741'6"	743'	1'3"	Slates small siderite/qtz/pyrite veins.	90										
743'	744'	1'	Slates	100										
744'	764'	20'	Slates - micaceous in places occasional small qtz/siderite/pyrite vein cleav. about 10°.	100										

Property	Location				Oonah Hill	Hole No.	M2
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Records	R L	Bearing	Inclination	Page No.	23
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Associated Diamond Drillers

Rig E1000

16-4-70

Finish 24-6-70

Type of Drilling Rotary Core

MINOPS PTY. LTD.

151

Depth	Core Record	Log	Recovery	Is
Collar 7.0	3.25	Soft, grey mudstone, occas. banded.	50	
7.0 17.0	3.25	Deeply weathered light grey qtzite. Thin bands of soft mudstone and vein qtz.	32.5	
17.0 22.0	3.0	Light grey mudstone, some vein qtz and silicified mudstone fragment.	60	
22.0 27.0	2.5	Yellow brown pyroclastics and white clays.	50	
27.0 30.5	) 9.5	As above.		
30.5 33.5		Black graphitic and pyritic shale, with small qtz veins. Minor pyrite, fragmented core.	60	
33.5 42.5	) 1.5	As above.		
42.5 44.0		Black graphitic shale and thin bands of siltstone with contorted banding.	100	
44.0 44.5	1.5	As above with much primary pyrite - finely disseminated and in bands.	100	
45.5 47.25	) 4.0	Black graphitic shales. Fragmented core.		
47.25 48.25		Vein qtz.		
48.25 49.5	)	Black shales. Some vein qtz parallel to core axis. Core fragmented.	100	

E.L. 6/69

Location

Oonah Hill

Hole M 3

Records 525N
516W

1088'

Bearing 271° Mag.

Inclination

69°

Contractor: RIG:
 Dates: Start: Finish: Type of Drilling:

MINOPS PTY. LTD.

052

From	To	Core Recoverd.	Log	Recovery	To	Assays
49.5	53.5	4.0	Black shales. Some vein qtz parallel to core axis as above.	100		
53.5	62.0	7.5	As above. Occasional bands of qtz & limonitic material. Totally fragmented core.	100		
62.0	63.5	) 4.25	Black banded shales. Qtz veining parallel to core axis.	) 100		
63.5	66.25		Interbedded black shales and thin siltstones. Dissem. primary pyrite.			
66.25	70.75		Black graphitic shales with minor qtz veining. Core fragmented & disarranged (A.D.D.)			
70.75	75.5	5.0	As above. Dissem. primary pyrite. Bedding parallel to core axis.	100		
75.5	84.5		As above. Bedding 20° to core Axis. Occasional qtz veins - irregular. Mostly parallel to bedding.			
84.5	85.75		Black shales and siltstones.			
85.75	86.25		Qtz veining 50° to axis. Black shales & siltstones. Bedding parallel to core axis.			
86.25	89.25		As above.			

Oonah Hill

Hole No. M3

053

Contractor: ... Rig: ...
Dates: Start: ... Finish: ... Drilling: ...

MINOPS PTY. LTD.

	To	Core Recevd	Log	Recovery	To	Assays
9.25	90.0		Black graphitic slatey shales. Minor qtz veining. Bedding 50° to core axis.			
0.0	91.5	)	As above.			
1.5	97.0	) 3.5	Dark banded, micaceous silt- stones contorted bedding. Minor qtz veining. Bedding 50° to core axis.	50		
7.0	98.5	)	Banded siltstones & shales. Minor qtz veining mostly parallel to bedding. Some at 20° to core axis.	80		
8.5	99.0	)	Black graphitic shales with irregular qtz veining. Very broken core.			
9.0	102.0	)	Banded micaceous siltstones, thin shales. Primary pyrite on bedding surfaces.			
02.0	103.0	)	Siltstones with much banded primary pyrite, qtz veins with secondary pyrite. All surfaces 50° to core axis.	80		
03.0	111	) 7.25	Interbedded banded siltstones & shales. Minor qtz veining parallel to bedding.	80		
11	113.5	2.5	As above. Qtz veining at 10° to core axis.	100		

Oonah Hill

Hole No. M3

054

925055

054

Contractor: Rig:
Date: Start Finish Type of Drilling:

MINOPS PTY. LTD.

From	To	Core Recovd.	Log	% Recovery	To	Assays
113.5	114.5	)	As above			
114.5	116.0	)	As above. Bedding 50° to core axis.	100		
116.0	119	)	Black shales with qtz veining Bedding 40° to core axis. Veins parallel to core axis. Some at 30° to core axis.			
119.0	121.5	)	Interbedded black shales and siltstones with irregular qtz veining. Primary pyrite.	50		
121.5	122.5	)	Irregularly veined qtz			
122.5	131.5	)	Black shales and siltstones. Irregular qtz veining.			
131.5	132.25	)	Tectonic breccia. Fragments of qtz in a deformed sequence of shales and micaceous siltstones. Primary pyrite.			
132.25	133.75	)	As above in qtz arenite with much irregular qtz & siderite veining.	64		
133.75	134.25	)	Black shales. Poor recovery.			
134.25	138.5	)	Predominantly grey qtz arenite siltstone with much qtz & siderite veining. Veining 50-60° to core axis. Primary pyrite.			

Oonah Hill

Hole No. M3

055

925056

055

Contractor: ...
Dates: Start: ... Finish: ...
Type of Drilling: ...

MINOPS PTY. LTD.

To	Core Recovd.	Log	Recovery	To Depth	Assays				
					Cu ppm	Ag oz/ton	Pb ppm	Zn ppm	Sb ppm
8.5	142.25	3.3							
2.25	142.50	)	86						
)							
		)	47						
)							
2.5	142.7)							
2.7	143.0	)		142.5-					
		)		143.75	20	0.55	8300	995	100
)							
3.0	143.25)							
		)	2.3						
)							
3.25	143.5)							
)							
3.5	143.75)							
)							
)							
3.75	144.25)							
4.25	147.0	)	0.35	143.75-					
		)		145.75	35	0.25	890	230	100
		)		145.75-					
7.0	148.5	)		146.45	20	0.15	200	200	100
		)		146.45-					
		)		148.45	165	0.65	350	3.16%	100

Oonah Hill

Hole No.M3

057

Rig

Type of Drilling

MINOPS PTV. LTD.

From	To	Core Record	Log	Recovery	To
159.0	160.3	)	Grey qtz arenite with irreg. qtz veining.		
160.3	161.3	)	Grey shale with small siderite veing. Bedding 30° to core axis.		
161.3	162.0	)	Grey shale with qtz & siderite veining. 20° to core axis.		
162.0	163.0	)	Qtz arenite with brecciated vein qtz and siderite with trace galena. Bedding 30° to core axis.	93	
163.0	167.0	)	Black shales with thin siltstone bands, often contorted. Much irregularity veined qtz & siderite veins. 10° to core axis.		
167.0	168.5	)	Black shale. Broken core. Bedding 10° to core axis, often contorted.	42	
168.5	172	)	As above with much thin qtz and siderite veining, very irreg.		
172.0	173.6	)	Black shale with thin siltstone bands. Minor qtz veining 40° to core axis, parallel to bedding.		
173.6	174	)	Silicified siltstone. Broken core.	100	

Property _____ Location _____ Oonah Hill _____ Hole No. M3

Records _____ R L _____ Bearing _____ Inclination _____ Page 7

058

Contractor:
 Date Start:
 Project:

MINADE PTV LTD.

Top	Bottom	Core Recovd.	Log	Remarks
174.0	175.75	)	Grey shale, minor qtz veining.	
175.75	176.5	)	Interbedded siltstone & shale.	
176.5	177.5	)	Grey shale.	
177.5	179	)	Grey siltstone with some qtz and siderite veining.	
179	185	6.0	Dark shales & qtz arenite with v. irreg. qtz veining. Deformation often with ptigmatic qtz veins. Broken core.	100
185	186.75	)	Banded grey qtz arenite, micaceous. Bedding 50° to core axis.	100
186.75	187	)	Vein qtz	
187.0	190.75	4.5	Black shale with irreg. qtz & siderite veins. Pyrite & qtz in small vesicles. Micaceous shales. Veins approx. 40° to core axis.	100
190.75	191.5	)	Micaceous siltstones with qtz and siderite veining.	
191.5	192	)	As above. Much siderite veining 90° to core axis.	
192	192.25	)	Black shale. Contact with siltstone faulted, but at 15° to core axis.	
192.25	193.75	)	Micaceous siltstones with qtz & siderite veining. Pyrite in siderite veins.	

Oonah Hill

Ho#e No. M3

Remarks:
 N L. Bearing:
 Inclination:

MINOPS PTY. LTD.

059

From	To	Core Recovery %	Log	Recovery	TO				
193.75	196.25	)	Micaceous siltstones. Qtz veins						
		)	25° to core axis.						
196.25	197.5	)	Predominantly qtz with pyrite in						
		)	siltstone & minor shale. Qtz						
		)	veining dipping 25° to core						
		)	axis. Minor siderite.						
197.5	199.5	)	Micaceous siltstone with qtz						
		)	& siderite veining. Siderite						
		)	veins 35° to core axis, mostly						
		)	with pyrite.						
199.5	200.25	)	As above, with more finely						
		)	dissem pyrite.						
200.25	201.25	)	As above, with graphitic shales.						
201.25	201.80	)	16.4 Grey siltstone with much qtz	82					
		)	veining. Minor pyrite.						
201.80	202.25	)	Grey siltstone, with qtz &						
		)	siderite veining containing						
		)	globular masses of pyrite.						
		)	Qtz veins parallel to core						
		)	axis. Siderite veins 90° to						
		)	core axis.						
202.25	202.75	)	Grey siltstone with minor veining						
		)	Qtz & siderite, primary pyrite.						
202.75	206	)	Grey to black shale with intense						
		)	veining - irreg. - mostly qtz						
		)	& some siderite, 20° to core axis						
		)	Qtz 50° to core axis. Shales very						
		)	deformed.						
206.0	207.9	)	Grey micaceous siltstone						
207.9	208.1	)	As above with qtz & siderite veins	100					
		)	45° to core axis.						

Oonah Hill

060

Date Start Finish Type of Drill

From	To	Core Recovery %	Log	Recovery To	Assays
208.1	209.25	)	As above, with minor qtz & siderite veins.		
209.25	210.25	)	As above. Banded pyrite & leached qtz & pyrite.	100	
210.25	212.50	6.5)	As above, grey micaceous siltstone grading imperceptibly into qtz arenite. Qtz & siderite veining with minor pyrite. Qtz veins parallel to core axis.		
212.50	212.75	)	Broken core. Vein qtz..		
212.75	219.0	6.5)	Dark fine qtz arenite banded 35° to core axis. Minor qtz veining causing core breakage.	100	
219.0	220.0	)	As above		
220.0	220.25	7.75)	Vein qtz		
220.25	227.5	)	Dark fine qtz arenite, with qtz & siderite veining with minor pyrite. Siderite veins 10-20° to core axis. Qtz 55° to core axis.	98	
227.5	229.5	)	As above.		
229.5	230.5	)	Predominantly qtz veining in arenite. Siderite veins cutting qtz. Qtz & siderite 20° to core axis.	100	
230.5	233.25	)	Dark fine qtz arenite with qtz & siderite veining.		
233.25	235.0	)	Dark fine qtz arenite with qtz & siderite veining. As above.		
235.0	238.5	)	More siderite, parallel to core axis. Minor pyrite, qtz 40° to core axis. From 237.25-238, more siderite with pyrite.		

Property Location Oonah Hill Hole No M3

1061

MINOPS PTY. LTD.

238.5	243.0	)	Dark fine qtz arenite with qtz
		)	6.0' & siderite veining.
243.0	243.3	)	Qtz with pyrite.
243.3	245.0	)	Coarser, light grey, qtz arenite
			with qtz & siderite veining.
245.0	246		As above. Increased qtz &
			siderite veining. Minor pyrite.
246.0	247.75	)	Predominantly qtz & siderite
		)	veining in qtz arenite.
		)	Abundant siderite with minor
		)	galena & pyrite.
247.75	249.0		Dark fine qtz arenite with qtz
			& siderite veining. Minor pyrite.
249.0	251.0	)	As above.
251.0	252.0	)	As above with a band of finely
		)	dissem. pyrite at 251.5, 0.1'
		)	5.8 thick, associated with siderite.
252.0	252.5	)	Banded dark, fine qtz arenite.
252.5	254.5	)	As above with much qtz veining.
254.5	257	)	As above, qtz veining & siderite
		)	with pyrite.
257.0	259.5	)	As above, qtz veining with
		)	siderite & bands of pyrite,
		)	8.75) especially at 257.4' & 258.4'
		)	in veins dipping 30° to core
		)	axis.
259.5	260.25	)	As above, with a band of finely
		)	dissem. pyrite. 0.1' wide.

100

Oonah Hill

Hole M 3

Records R L Bearing Inclination

062

Director: Rig:
 Start: Finish: Type of Drilling:

MINOPS PTY. LTD.

From	To	Core Retrieved	Log	% Recovery	To
260.25	262.25	)	Dark fine, qtz arenite, qtz & siderite veining with pyrite.		
262.25	262.40	) 8.75			
262.40	264.0	)	Qtz with 20% sulphides, all pyrite, dipping 50° to core axis.		
264.0	265.0	)	Dark fine qtz arenite with minor qtz veining & bands of pyrite.		
265.0	265.75	)	As above.		
		)	As above with irregular qtz veining & much pyrite distributed through the qtz. Bedding & veining parallel, 10° to core axis.	100	
		) 10.0			
265.75	274.0	)	Fine micaceous qtz arenite with minor qtz & siderite.		
274.0	274.6	)	As above. Pyrite in siderite veins.		
274.6	275.35	)	Qtz arenite, with much irreg. qtz & siderite, 10° to core axis. Pyrite in qtz & siderite.	100	
275.35	276.50	) 3.75	Qtz arenite with irreg. qtz veining.		
276.50	276.75	)	Predominantly irreg. qtz & siderite with pyrite.		
276.75	277.75	)	Contorted bedded qtz arenite & black siltstone with irreg. qtz & siderite veining with pyrite.		

Oonah Hill

Hole No. M3

Remarks:
 Dip: Bearing: Inclination:

063

Contracted by Rig
 Start Finish
 MINOPS PTY. LTD.

From	To	Core Recvd	Tag	Remarks
277.75	278.25	)		Contorted bedded qtz arenite with graphitic shaly partings. 80
278.25	278.60	)	2.0	
278.0	279.0	)		Pyrite & qtz - 20% sulphides Dip 50° to core axis.
279.0	280.25	)		Qtz. Broken core.
280.25	282.25	)		Qtz arenite with much qtz veining & thin bands of pyrite
282.25	283.75	)		As above. Broken core.
283.75	286.25	)	5.75	Light qtz arenite with qtz & siderite veining. Thin bands of pyrite at 282.75. 96
286.25	287.50	)		As above, less veining.
287.50	287.95	)		Graphitic partings.
287.95	288.58	)		Light qtz arenite with irreg. qtz & siderite veining
288.58	289.73	)	2.55	Qtz arenite, minor qtz veining at 60° to axis. 89
289.73	290.3	)		Qtz arenite, major qtz & siderite veining, 10% pyrite.
290.3	291.3	)		Qtz arenite, major qtz & siderite veining graphitic slate with qtz veins.
291.3	293.1	)	6.8	Broken core - graphitic slates, pyrite bearing qtz. 96
293.1	293.6	)		Banded slates, minor siderite & qtz veining.
		)		40% Qtz veining in banded slates.

Property

Location

Oonah Hill

Hole No.3

Records K L Bearing Inclination

064

925065

Contractor:

Rig:

Dates: Start: Finish:

Type of Drilling:

MINOPS PTY. LTD.

064

From	To	Core Recvd	Log	Recovery	To	Assays
293.6	295.2	)	Slates minor qtz veins.			
295.2	296.75)				
296.75	297.35	)	Banded slates, minor qtz & siderite veining.			
297.35	297.45)				
297.45	303.8	)	As above.			
303.8	303.9)				
303.8	303.9	)	Banded slates, pyrite in siderite veing.			
303.9	311.6	8.0				
303.9	311.6	8.0	Banded slates, minor qtz & siderite.	96		
311.6	313.2	1.58				
311.6	313.2	1.58	Banded slates, pyrite in siderite vein.			
313.2	317.7	6.66				
313.2	317.7	6.66	Banded slates, minor siderite & qtz veins.	96		
317.7	323.0	6.66				
317.7	323.0	6.66	As above	99		
323.0	323.37)				
323.0	323.37	)	As above & slates in one band parallel to axis have dissem. pyrite.	67		
323.37	323.42)				
323.37	323.42	)	As above.			
323.42	325.77	3.9				
323.42	325.77	3.9	Siderite vein with pyrite at 35° to axis.			
325.77	325.82)				
325.77	325.82	)	Banded slates, minor veins of pyrite.	98		
325.82	326.72)				
325.82	326.72	)	Siderite vein with pyrite at 35° to axis.			
326.72	326.75)				
326.72	326.75	)	Banded slates, dissem. pyrite.			
326.75	327.0)				
326.75	327.0	)	Pyrite vein.			
327.0	327.0)				
327.0	327.0	)	Banded slates, dissem. pyrite.			

Oonah Hill

Hole No.3

Contractor: Rig: 065
Dates: Start: Finish: Type of Drilling:

MINOPS PTY. LTD.

065

	To	Core Recovd	Log	Recovery	To	Assays
327.0	330.75	)	Banded slates			
330.75	330.95	)	As above + dissem. pyrite.			
330.95	331.45	)	As above & pyrite in siderite.	100		
331.45	332.82	) 10.9	Banded slates. dissem pyrite.			
332.82	332.85	)	Pyrite vein at 50° to axis.			
332.85	337	)	Banded slates, some dissem. pyrite.			
337	339.28	)	Banded slates			
339.28	339.3	)	Siderite vein with pyrite.			
339.3	339.7	)	Banded slates, dissem pyrite			
339.7	341.2	)	As above.			
341.2	343.0	) 9.4	As above.			
343.0	343.7	)	As above + large irreg. qtz veins.			
343.7	346.0	)	Banded slates, qtz & siderite veins.			
346.0	351.0	)	Banded slates.			
351.	351.9	)	Banded slates, bedding at 20° qtz veins at 40°.	100		
351.9	354.5	)	Banded slates, minor qtz veins bedding as above.			
354.5	354.85	) 5.26	Banded slate, siderite vein at 30° containing pyrite.	94		
354.85	357.5	)	Banded slates, qtz & siderite veins.			
357.5	359.9	)	Banded slates, minor pyrite veining in first 0.25'.	100		

Oonah Hill

Hole No. M3

066

Factor: Start: Finish: Type of Drilling:

MINOPS PTY. LTD.

Depth	Core Record	Log	Recovery
359.9	361.65)	
361.65	361.68	8.4)	100
361.68	361.71)	
361.71	362.86)	
362.86	363.06)	
363.06	365.25)	
365.25	365.93)	
365.93	367.28)	
367.28	369.98)	
369.98	371.61	11.6)	100
371.61	374.97)	
374.97	375.22)	
375.22	376.3)	
376.3	381.3)	
381.3	381.5)	
381.5	382.2)	

Major qtz vein system with pyrite.
 Banded slates, minor qtz veins.
 Band of pyrite in banded slates at 10°.
 Banded slates.
 Pyrite veins in slate (max. vein width 0.08')
 Banded slates, minor pyrite veins, pyrite in band in slates.
 Banded slates.
 Banded slates major qtz & siderite vein system with minor pyrite in one vein.
 Banded slates, minor veins of qtz & siderite.
 Qtz & siderite vein complex, pyrite in one band of slates.
 Banded slates, minor qtz & siderite veins.
 Qtz vein, no mineralisation.
 Broken core - slates.
 Banded slates, qtz & siderite veins.
 Siderite & qtz veins (max. 0.08') at 85°.
 Banded slates, minor qtz & siderite veins.

Oonah Hill

Hole No.3

Records: R L Bearing Inclination

067

925068

067

MINOPS PTY. LTD.

382.2	382.28	)	Qtz vein at 75°.	100
382.28	382.63	)	Siderite vein with pyrite & galena at 20° in banded slates.	
		) 6.1		
382.63	387.0	)	Banded slates, minor qtz & siderite veins.	
387.0	387.6	)	As above.	
387.6	390	)	Banded slates, minor mineralisation, qtz & siderite veins.	
)		
390.0	390.07	) 11.2	Siderite, qtz vein with massive pyrite at 40°.	100
390.07	398	)	Banded slates, minor qtz & siderite veins.	
)		
398	399.7	)	Banded slates, major siderite vein at 25°.	100
		) 10.3		
399.7	400.8	)	As above + bands of pyrite.	
400.8	408	)	Banded slates, minor qtz & siderite veins.	
)		
408	416.5	)	Banded slates, qtz veins larger than previous.	100
		) 10.0		
416.5	418	)	Banded slates, minor pyrite veins.	
418	419.4	)	Broken core - banded slates.	
419.4	419.95	)	Banded slates, minor pyrite	96
		) 4.6		
419.95	422.8	)	Banded slates, minor diss. pyrite in several bands.	
422.8	425.8	)	Banded slates, qtz veins at 20° & 25°. Several have pyrite.	
)		

Property

Location

Oonah Hill

Hole No.3

Records

N L

Bearing

Inclination

068

068

BINOPS PTY. LTD.

Top	Base	Depth	Remarks	Notes
425.8	426	8.8	Band of pyrite in slates.	100
426	431		Banded slates, some bands have diss. pyrite.	
431	441	11.5	Banded slates, diss. pyrite in bands, qtz & siderite veins.	100
441	441.5		Massive pyrite in qtz veins in slate 5% mineralisation.	
441.5	442.5		Banded slates mineralised with pyrite.	
442.5	443.3	5.0	As above.	100
443.3	446.2		Banded slates, diss. pyrite in bands, pyrite in qtz vein.	
446.2	446.7		Qtz vein complex - mineralised with pyrite.	
446.7	447.5		Banded slates, dissem pyrite.	
447.5	447.6	7.6	Vein of pyrite at 60°.	100
447.6	450		Banded slate, diss. pyrite.	
450	454		Mineralised qtz veins at 30° diss. pyrite in slates.	
454	454.5	4.8	Heavily mineralised qtz veins (pyrite)	100
454.5	455		As above.	
455	458.75		Banded slates, diss. pyrite, mineralised qtz & siderite veins.	
458.75	459.25		Graphitic slates, diss. pyrite.	

Location: Oonah Hill Hole No. M3

069

925070

069

MINOPS PTY. LTD.

Depth	Time	Remarks	Quantity
459.25	459.28	) 2.95 Pyrite band at 40°. Banded slates, diss. pyrite in some bands, pyrite in some qtz veins, banding at 40°.	
459.28	461.5		
461.5	463.5	2.0 As above.	100
463.5	466.25	3.0 Banded slates, fine qtz & sider- ite veins, dissemination diminishing .	100
466.25	475.25	9.0 Banded slates, fine & medium qtz & siderite veining, banding at 60°.	100
475.25	380.75	6.0 Banded slates at 60° alter- nating with qtzites, minor dissem. fine & medium qtz & siderite veins.	
480.75	483.25	) Banded slates.	
483.25	484) 3.9 Qtzites with dissem pyrite. Banded slates.
484	484.5) 2.6 Brecciated zone of slate & qtzite, medium qtz veining, secondary siderite.	
484.5	487		
487	489.05	) As above.	
489.05	490.05) Qtzite, medium & fine qtz, siderite veins.
490.05	490.85) 4.9 Breccia zone	
490.85	491.75		Qtzite medium-large qtz veining, fine veins pyrite & qtzite.

Oonah Hill

Hole No. M3

070

070

MINOPS PTY. LTD.

491.75	493.75	)	2.7	Graphitic slates, minor fine
		)		qtz veining.
493.75	494.5	)		Graphitic slates.
494.5	496.15	)		As above.
496.15	496.20	5.3	)	Band of pyrite at 40°.
496.20	500	)		Graphitic slates, minor bands
		)		of pyrite.
500	505.2	)	6.8	Banded graphitic slates, minor
		)		pyrite, qtz veins.
505.2	506.1	)		Qtz vein complex, mineralised
		)		with pyrite
506.1	507	)		Qtzite, qtz veins, heavily
		)		dissem. pyrite.
507	512.25	)	6.5	Qtzite, dissem, pyrite, major
		)		qtz veining, multiple siderite
512.25	512.75	)		veining. Graphitic slates,
		)		containing one band
		)		heavily pyritized.
512.75	514.25	)		Graphitic slates, contact at
		)		50° with following:-
514.25	516.85	)	5.3	Qtzite, heavy qtz & siderite
516.85	517.67	)		veining, contact at 25° with
		)		graphitic banded slates.
517.67	517.75	)		Qtz & siderite vein complex.
517.75	520.0	)	10.37	As above, general tendency
		)		at 45°.
520.0	527.5	)		Banded slates, heavy qtz veining.

Property

Location

Oonah Hill

Hole No. M3

Records

R L

Bearing

Inclination

071

925072

071

MINOPS PTY. LTD.

				xxxxxxx		xx					
				From	To	Cu ppm	Ag oz/ton	Pb %	Zn %	Sb ppn	Sn %
527.5	528.1	)	Qtzite								
528.1	528.6	)	Vein complex in qtzite, pyrite.								
528.6	529.9	)	Alternate qtz & slate bands								
		)	minor mineralisation.								
529.9	530.15	)	8.65 Qtzite								
530.15	534.45	)	Qtzites, major qtz veining,								
		)	minor siderite, traces of								
		)	pyrite.								
534.45	534.75	)	Banded slate, band of pyrite.								
534.75	536.0	)	Qtzites, trace of diss. pyrite.								
536.0	541.3	)	Qtzites, qtz & siderite vein,								
		)	traces of diss. pyrite.								
541.3	542.1	8.65	) Qtz vein complex 1% pyrite.								
542.1	543.15	)	Qtz vein, qtzite trace of pyrite.								
543.15	543.25	)	1% dissem. pyrite in qtzite, little chalcopryrite.								
543.25	543.75	)	Qtz veined qtzite.								
543.75	547.0	4.0	Qtzite, heavily qtz veined								
		)	pyrite, chalcopryrite <1%								
547.0	548.4	)	Qtzite, major qtz veins, traces								
		)	of pyrite.								
548.4	548.7	)	Major qtz vein at 35°								
548.7	549.5	)	Qtzite, qtz veins, some pyrite in								
		)	fine siderite veins.								
549.5	549.85	10.15	) 1% chalco. in qtzite, one vein.	549.5"	550.05	25	0.1	0.0310.008	<30	0.05	
549.85	550.05	)	Qtzite	550.05	555.3	35	0.150.1570.008	30	<0.02		
550.05	555.3	)	Heavy qtz veining (lode) minor	558.0	559.0	25	0.150.1180.008	<30	<0.02		
		)	traces of chalco. pyrite.	559.6	561.5	40	T 0.031	T <30	0.25		

Oonah Hill

hole No.3

Records R L Bearing Inclination

Contractor

Rig 072

Dates: Start Finish

Type of Drilling

MINOPS PTY. LTD.

072

From	To	Core Recovd	Log	xx		Assays						
				xxxxxxx From	To	Cu %	Ag oz/ton	Pb ppm	Zn ppm	Sb %	Sn %	
555.3	557	)	Qtz veined qtzite.									
557.0	558.0	)	As above.									
558.0	559.0	1.9)	Massive qtz veins.									
559.0	559.6	)	Graphitic slates.									
559.6	561.5	) 2.5	Heavy qtz veining (lode)									
561.5	565.0	)	Graphitic shales traces of	561'6"	588'	0.0025	<0.1	<50	20	T	0.03	
		4.92)	pyrite.									
565.0	567	)	As above.									
567	574	)	As above									
574	576.25	)	As above.									
576.25	577.5	)	Qtzites									
577.5	584	)	Qtzites - traces of mineral-									
		)	isation.									
584	587.5	)	As above.									
587.5	588	)	Graphitic slates									
588	592	)	As above.									
592	594	)	As above + qtz veining 1%	588'-596'	596'	0.01	0.1	120	45	<0.03	0.16	
		)	mineralised.	596'	597'6"	0.032	0.3	330	50	<0.03	0.12	
594	600.5	)	As above at 596', mineralis-	597'6"	602'6"	0.087	0.3	140	50	T	0.87	
		)	ation increased to 50% (for	602'6"	606'	0.005	<0.1	80	20	<0.03	0.565	
		)	1.5')									
600.5	605.25	)	As above with zones of 50%									
		)	mineralisation.									
605.25	606	)	Graphitic slates.									
606	607.5	) 2.25	As above.									
607.5	611.5	)	As above + small vein of pyrite.									
611.5	614	)	Graphitic slates.									

Oonah Hill

Hole No.3

073 073

MINOPS PTY. LTD.

DRILL LOG

073

From	To	Core Recovered	LOG	Recovery	To	Remarks
614	615.5		As above.			
615.5	617.5		As above.			
617.5	618.41	)	As above.			
618.41	620.07	) 4.25	Qtz + Qtzite, minor mineralisation			
620.07	621.5	)	Graphitic slates.			
621.5	625.08	)	As above.			
625.08	626.25	) 5.66	50% mineralisation - pyrite vein at 25°.			
626.25	627.25	)	Qtzites.			
627.25	632	) 5.0	As above, minor mineralisation			
632	633.25	) 1.25	Qtzites			
633.25	636.25	) 3.0	As above.			
636.25	639.42	)	As above.			
639.42	639.92	) 9.5	As above.			
639.92	640.34	)	Vein of galena & pyrite.			
640.34	646.25	)	Graphitic slates.			
646.25	652.91	)	As above.			
652.91	653.74	) 10.0	Disseminated pyrite in graphitic slates.			
653.74	656.25	)	Graphitic slates.			
656.25	662.08	)	As above.			
662.08	663.08	) 10.0	Mineralised vein in Qtzites.			
663.08	666.25	)	Qtzites.			
666.25	667.08	)	Qtzite, contact with slates @ 10°.			
667.08	675.43	) 10.0	Graphitic slates.			
675.43	676.25	)	As above.			
676.25	690	) 13.0	Interbedded Qtzites & slates.			

Hole completed at 690 feet.

Oonah Hill

Drill Contractor: ASSOCIATED DIAMOND DRILLERS

MINOPS PTY. LTD.

925075

Start: 11/5/70 Finish: 1/7/70

Rig: A 3000

Type of Drilling: ROTARY CORE

074

Depth (ft)	Core Recovered (ft)	Log	Recovery (%)
COLLAR (N X CORE)			
3.75	3.75	Black graphitic shales. Bedding 30° to core axis.	
4.25	4.25		
4.25	19.5	As above with minor siderite veining, traces of galena. Veining parallel to core axis	48
19.5	20.0	As above. No siderite. Small dip-slip faults - throw of 3". Minor siltstone bands. Bedding 40° to core axis.	
20.0	23.0	As above.	100
23.0	23.75	As above. Contorted bedding.	58
23.75	25.10	As above. Finely disseminated primary pyrite.	
25.10	30.5	As above. Bedding 30° to core axis. Minor quartz veining 25° to core axis. Primary pyrite. Siltstone bands.	
		As above. Distinct slaty cleavage developing. Some penecontemporaneous deformation. Banded primary pyrite.	64

Property	E.L. 6/69		Location	OONAH HILL		M4
Records	84N 151E	Bearing 958	Inclination 260°	70°		1

ASSOCIATED DIAMOND DRILLERS

A. 3000

11/5/70

ROTARY CORE

075

To	Core Recevd.	Log	
30.5	45.0	14.25	As above. Black slate. Banding 30° to core axis. Minor leached quartz veining 80° to core axis. Minor banded primary pyrite.
45.0	46.25)	3.25	As above
46.25	46.55)		Banded micaceous dark quartz arenite with quartz veining
46.55	60.0)		Black banded slate
60.0	60.75)		Grey micaceous quartz arenite with quartz veining - irregular.
60.75	63.75)		Black banded slate. Banding 35° to core axis. Minor siderite veining. Disseminated primary pyrite.
63.75	64.0)	7.5	Banded grey micaceous quartz arenite. Irregular quartz veining. Broken core.
64.0	80.0)		As above. Bedding 70° to core axis. Quartz veining at 30° to core axis.
80.0	93.0	0.5	Banded grey micaceous quartz arenite. End NX core.
93.0	99.5	6.5	As above. Bedding 50° to core axis. Minor quartz veining parallel to core axis.

22

38

4

100

Oonah Hill

M 4

Records R L Bearing Inclination

11/5/70

070

From	To	Core Record	Log	Remarks	Loc
99.5	102.25)		As above. Minor shale bands contorted bedding.		
102.25	103.75)		Black shales with some quartz arenite.		
103.75	104.25)		Quartz veins 40° to core axis with shale and contorted quartz arenite.		
104.25	105.5)	9.5	Black shale and quartz arenite		
105.5	107.0)		Black shale		
107.0	109.0)		As above.		
109.0	116.75)		As above. Minor quartz veining		
116.75	117.5)		As above. Bedding parellel to core.		
117.5	118.0)		Dark micaceous quartz arenite. Bedding 70° to core axis.		
118.0	119.5)		Black shales. Broken core.		
119.5	119.75)	10.0	Dark micaceous quartz arenite.		
119.75	120.5)		Black shales.		
120.5	121.5)		Dark micaceous quartz arenite with quartz filled tension gashes 40° to core axis.		
121.5	127.5)		Interbanded black shales and siltstones.		
127.5	128.0)		As above.		
128.0	128.5)		Banded dark quartz arenite, slightly contorted bedding.		
		9.5	Some cross - bedding.		

Property

Location

Oonah Hill

Date

M 4

Records

R L

Bearing

Inclination

Page

3

Contractor ASSOCIATED DIAMOND DRILLERS.

Rig A. 3000

925078

11/5/70

077

077

From	To	Core Recoverd	Log	% Recovery	To	Assays
128.5	130.5)		Interbanded black shales, siltstones, and dark quartz arenites.	100		
130.5	131.25)			Light grey quartz arenites with leached quartz veining at 10° and 30° to core axis. Bedding 50° to core axis.		
131.25	137.0)		Interbedded black shale (graphitic) and light siltstone.	100		
137.0	140.75)		Well bedded black shales graphitic. Probably slaty cleavage 20° to core axis.			
140.75	141.75)			Dark quartz arenite with some black shales. Minor quartz and siderite veining parallel to bedding. 50° to core axis	60	
141.75	142.25)		Black graphitic slate with minor siderite veining.			
142.25	142.50)		Dark siltstone siderite veining with pyrite.			
142.50	145.0)			Black graphitic slate.		
145.0	147.5)		As above. Cleavage 30° to core axis.			
147.5	149.25)			Interbedded black slate and grey siltstone.	100	
149.25	149.50)	6.0	Grey siltstone with quartz and siderite veining, 40° to core axis.			

Property	Location			Oonah Hill	Scale	M 4
Records	R L	Bearing	Inclination		Page	4

ASSOCIATED DIAMOND DRILLERS
11/5/70

Rig. A.3000

078

078

From	To	Core Recovd.	Log	Secondary	Depth	Assays				
						Cu	Ag	Pb	Zn	Sb
149.50	151.0)		Interbanded slate and siltstone. Broken core.							
151.0	152.0)		Interbanded slate and siltstone.	100						
152.0	152.25)	5.0	Quartz veining in siltstone.							
152.25	156.0)		Black graphitic slate.							
156.0	159.0)		Interbanded slate and fine quartz arenite.							
159.0	161.0)		As above. Minor quartz veining.							
161.0	162.0)		As above. Much irregular quartz veining.							
162.0	162.5)	10.0	Predominantly irregular quartz veining.	100						
162.5	164.5)		Black slate with slickensided partings.							
164.5	166.0)		Dark fine quartz arenite with minor quartz veining & black graphitic slate.							
166.0	172.75)	10.0	Deformed banded black graphitic slate.	100						
172.75	176.0)		Light grey, coarse, graded crystal tuff.							
176.0	178.0)		Light grey defomed tuff with irregular banding. Leached siderite veining.							
178.0	178.75)	8.3	Grey tuff with sideritic amygdales Also siderite veining.	83						

Property

Location

Oonah Hill

M4

Records

R L

Bearing

Inclination

Contractor ASSOCIATED DIAMOND DRILLERS

Big A 3000

925080

Date: 11/5/70

Type of Drilling

079

079

From	To	Core Recovery	Log	Recovery
178.75	180.25)		Grey tuff grading down into banded volcanic mudstone.	
180.25	182.25)		Dark slate.	
182.25	183.25)		Broken vein quartz.	
183.25	186.0)		Quartz in vein clay	
186.0	186.5)		Vein quartz.	
186.5	187.25)		Grey siltstone with much siderite veining with sphalerite and minor pyrite veins 30° to	
		10.4	core axis.	
187.25	189.50)		Grey siltstone with some quartz and siderite veining.	100
189.50	190.25)		Light grey tuff sharp contact with pyrite.	
190.25	196.0)		Grey green tuff	
196.0	201.0	6	As above.	100
201.0	211.0	5	Grey green tuff with fine chlorite crystals	50
211.0	218.9)		As above	100
218.9	220.9)	10.25	Fine grey tuff	
220.9	220.96)		Siderite vein @ 60° to axis	
220.96	221.0)		Fine grey tuff.	
221.0	223.2)		Grey tuff quartz & siderite veins.	
223.2	227.0)		Grey-green tuff, chlorite crystals	
227.0	228.25)		minor veining as above, siderite veins @ 30°, 20°.	
Property		Location		
		Oonah Hill		M 4
Records	R L	Bearing	Inclination	6

Factor: ASSOCIATED DIAMOND DRILLERS Rig: A.3000
 Date: Start: 11/5/70 Finish: Type of Drilling:

080

From	To	Core Recovd.	Log	% xxxxxxx From	To Depth To	Assays					
						% Cu	oz/ton Ag	% Ph	% Zn	% Sb	% Sn
228.25	228.55)	10.9	Altered galena? and siderite vein.	229.75	231.55						
228.55	229.75)		Coarse grey green tuff, chlorite crystals.			0.012	3.25	4.2	1.09	<100	
229.75	230.05)		Massive galena & minor pyrite parellel to axis, 10% mineralisation.	68							
230.05	230.40)		Green tuffs (serpentine? look in places) and 5% galena veins.								
230.40	231.0)		Massive galena in tuffs pyrite, sphalerite in quartz - 80% mineralization. Pyrite vein in sphalerite (.08') @ 30°.								
231.0	231.5)		Galena & Pyrite in quartz - 50% mineralisation.								
231.5	231.95)		Tuffs & quartz, veins of galena in quartz 5% min.	231.55	233.15	0.03	9.0	7.3	6.7	150	
231.95	232.40)		Grey tuff, siderite & quartz veins, traces of galena & pyrite.								
232.40	234.4)		Grey green tuff, coarse crystals of chlorite, veins of siderite.								
234.4	235.15)		As above.								
235.15	237.0)		Grey tuff, large crystals of chlorite, veins of quartz with traces of galena.								
237	238	0.85	Grey green tuff, veins of quartz, no mineralisation.	85							

Property: E.L. 6/69 Location: OONAH HILL Hole No. M 4

Records: 84N R L Bearing: 958 Inclination: 260° 70° Page: 7

ASSOCIATED DIAMOND DRILLERS

11.5.70

A.3000

MINOPS PTY. LTD.

925082

081

081

From	To	Core Revised	Log	Recovery
238.0	240.0	)	As above.	
240.0	241.3	)	Grey green tuff- chlorite crystals	
		)	increased to 50%.	
241.3	242.4	)	Grey green tuff, several siderite	
		)	& quartz veins	
242.4	243.2	)	11.35 Siderite and quartz vein complex.	100
243.2	244.25	)	Grey green tuffs, siderite &	
		)	quartz veins @ 60°.	
244.25	248.0	)	Green grey tuff, siderite & quartz	
		)	vein, chlorite & siderite	
		)	crystals.	
248.0	258.0	)	10.7 As above.	100
258.0	258.5	)	As above.	
258.5	259.1	)	Qtz. and chlorite vein complex.	
259.1	263.65	)	8.5 Grey green tuff, chlorite &	
		)	siderite crystals.	95
263.65	264.65	)	Quartz and siderite vein	
		)	complex.	
264.65	267.0	)	Grey green tuff, chlorite &	
		)	siderite crystals, veining.	
267.0	268.7	)	As above.	
268.7	269.0	)	Quartz vein.	
269.0	269.5	)	Grey tuff.	
269.5	269.7	)	8.7 Quartz & siderite vein.	
269.7	270.8	)	Fine grain grey green chloritic	
		)	tuff, minor vein of galena, major	
		)	quartz vein @ 50°.	

Oonah Hill

M 4

8

Contractor: ASSOCIATED DIAMOND DRILLERS

A.3000

Start: 11/5/70

082

082

From	To	Core Recovd.	Log	xxxxxxx From,	To Depth	ppm oz/ton %			ppm %		
						Cu	Ag	Pb	Zn	Sb	Sn
270.8	271.1)		Massive pyrite, galena, not full recovery.	270.8	271.67	910	11.4	3.07	0.68	250	<0.02
271.1	271.47)		Fine grain grey-green chlorite tuff.								
271.47	271.67)		Massive galena, minor pyrite.								
271.67	275.0)		Medium-coarse grey-green chloritic tuff, quartz & siderite veining, minor galena vein.								
275.0	276.2)		As above, no mineralisation.								
276.2	278.0)	6.7	Fine grain chloritic tuff.								
278.0	282.0)		Medium grain chloritic tuff, quartz and chlorite veining, minor galena.								
282.0	292.0	10	Medium fine grain chloritic tuff, heavy siderite veining also quartz.								
292.0	297.6	4.45	Medium grain chloritic tuff.								
297.6	301.5	4.8	Light green fine chloritic tuff, chloritic veining.								
301.5	306.0	4	As above, shows bedding @ 50°.								
306.0	306.75	7	As above.								
306.75	314.7)		As above, bedding @ 50°, quartz and siderite veining.								
314.7	316.0)	9.15	As above								

Property: Location: Oonah Hill

M 4

Records: N L Bearing Inclination 9

11/5/70

083

			From	Depth To	ppm Cu	oz/ton Ag	% Pb	% Zn	ppm Sb	% Sn
316.0	319.2)		318'0	320'0	70	0.3	0.118	0.40	50	<0.02
)									
319.2	319.8)	7								
)									
)									
319.8	322.67)									
)									
322.67	323.87)									
323.87	323.92)	7.35								
)									
)									
323.92	329.0)									
329.0	329.15)									
329.15	329.35)	2.25								
)									
329.35	329.67)									
329.67	331.1)		329.15	331.1	220	0.33	0.18	0.391	40	0.16
)									
)									
331.1	335.4									
335.4	338.7									
338.7	339.2									

Location Oonah Hill

M 4

Contractor: ASSOCIATED DIAMOND DRILLERS

Rig: A.3000

Date: Started: 11.5.70

Type of Drilling:

084

From	To	Core Recovd.	Log	Recovery	Bearing
339.2	341.8		Medium grain chloritic tuff.		
341.8	342.55		Bedded tuff @ 40°.		
342.55	343.75		Fine grain chloritic tuff.		
343.75	344.0		Bedded tuff.		
344.0	355.0		Medium grain chloritic tuff.		
355.0	359.0		Medium coarse grain tuff, some bedding, trace of galena.		
359.0	360.3		Siliceous tuff, quartz vein complex, trace of sphalerite.		
360.3	365.4		Fine grain chloritic tuff.		
365.4	375.5		Medium grain chloritic tuff.		
375.5	381.7		As above and small pyrite veins.		
381.7	385.0		Coarse chloritic tuffs quartz veining, siderite.		
385.0	388.5		As above.		
388.5	391.0		As above.		
391.0	394.4		As above.		
394.4	394.9		Quartz vein complex, chlorite, siderite.		
394.9	400.15		Coarse grain chlorite tuff, quartz and siderite veins.		
				OonahHill	Hole M ₄
Records	R L	Bearing	Inclination		

Contractor: ASSOCIATED DIAMOND DRILLERS

A.3000

Date: Start: 11/5/70

085

085

From	To	Core Recovd	Log	Recovery
400.15	401.95		Fine grain chloritic tuff with heavy veining, water worn quartz veins.	
401.95	402.75		Fine grain chloritic tuff.	
402.75	402.78		Vein of galena in siderite @ 40°.	
402.78	405.68		Fine grain chloritic tuff - grey in colour.	
405.68	405.80		Vein of pyrite, chalco - quartz gangue mineral, 50% mineralisation.	
405.80	409.05		Fine grain grey tuff.	
409.05	409.45		Vein of galena and pyrite in quartz @ 40°.	
409.45	411.05		Fine grain grey-green chloritic tuff.	
411.05	411.98)		As above.	
411.98	413.18)		Quartz, chlorite, siderite vein complex.	
413.18	420.08)	9.3		Medium - coarse grain grey-green chloritic tuff, quartz and siderite veining.
420.08	423.0		Medium grain grey chloritic tuff.	

Property: Location: Oonah Hill Hole: M₄

Records: R L Bearing: Inclination: 12

ASSOCIATED DIAMOND DRILLERS

A.3000

11/5/70

086

423.0	424.1)	3.45	As above.
424.1	427.0)		Fine grain grey tuff.
427.0	429.0	2	As above.
429.0	440.0		Sludge samples
440.0	442.0	0.8	Grey, unconsolidated tuff.
442.0	445.0	1.5	Grey bedded tuff parellel to axis.
445.0	451.0	1.1	Light grey tuff.
451.0	453.0	0.9	do.
453.0	454.2)	1.9	do.
454.2	455.0)		do.
455.0	465.0	2.5	do.
465.0	471.0	4.5	Grey yellow tuff, some bedding.
471.0	472.0)		Yellow tuff.
472.0	472.5)		Grey quartz and quartzite.
472.5	473.45)	2.9	Coarse grain yellow tuff.
473.45	475.0)		Grey quartzite.
475.0	480.0	4	Grey green slates @ 55°, Pyrite in vein siderite.
480.0	484.0	4	As above, at 35°.

Property

Location

Oonah Hill

Hole

M 4

Record

R L

Part

13

13

Contractor: ASSOCIATED DIAMOND DRILLERS

Rig: A.3000

MINOPS PTY. L

925088

Start: 11/5/70

Type of drilling: 087

087

From	To	Core No.	Log	XXXXXX XXXXXX		Depth					
				From	To	Cu %	Ag oz/ton	Pb ppm	Zn ppm	Sb %	Sn %
484.0	488.1)	6.75	As above @ 50°.								
488.1	488.43)		As above.								
488.43	493.0)		Light grey tuffaceous material, ash, much quartz veining, pyrite, traces of chalcopryrite.								
493.0	495.25)	4.33	As above.								
495.25	497.0)		Black graphitic slates, minor mineralisation.								
497.0	500.0	3.0	As above and heavy quartz veining @ 500'.								
500.0	506.0	6.0	Quartz veining for 6", banded slates, pyrite mineralisation - mainly vein, some dissemin- ated.								
506.0	507.15)	2.80	Grey tuff heavily quartz veined. chalco and pyrite.								
507.15	510.0)		Grey tuff grading into soft clay.								
510.0	511.0	61.6	Black graphitic slates, disseminated pyrite.	510'0	511'0	0.0085	0.15	200	20	<0.03	0.07
511.0	512.5		Black slates, quartz veining pyrite and chalcopryrite, disseminated in veins.	511'0	512'6"	0.059	0.5	180	30	T	0.16
512.5	513.6		Heavy quartz veining in slates, pyrite and chalco, trace of stannite.	512.6"	513'10"	0.92	3.05	480	75	0.03	0.44

Property

Location

Oonah Hill

File No. M4

Records

R L

Bearing

Inclination

Page 14

Contractor: ASSOCIATED DIAMOND DRILLERS Rig: A.3000

Dates: Start: 11/5/70 Finish: Type of drilling:

088

From	To	Core Recvd.	Log	Interval	Depth	Cu %	Ag oz/ton	Pb ppm	Zn ppm	Sb %	Sn %
513.6	514.0		Slates, veins of pyrite and chalcopryrite.	513'10"	514'1"	0.69	2.35	360	45	0.065	0.84
514.0	514.1		do.								
514.1	516.5		Chalcopryrite, pyrite in quartz veins in slates.	514'1"	516'6"	1.01	0.2	140	40	0.065	0.33
516.5	518.0		Slates with pyrite & chalco veining. Last foot has only a trace.	516'6"	518'0"	0.0115	0.2	140	35	T	0.16
518.0	520.5		Black graphitic slates, traces of pyrite & chalco. 1% mineralisation.	518'0"	520'6"	0.008	0.1	120	20	0.05	0.07
520.5	524.0		do.	520'6"	526'6"	0.005	0.1	140	25	0.04	0.11
524.0	526.5		do.								
526.5	527.5		do.	526'6"	527'6"	0.049	0.2	200	30	T	0.23
527.5	530.0		do.								
530.0	530.75		do.								
530.75	531.0		do. but no mineralisation.								
531.0	533.0		5% mineralisation - pyrite in light grey slate, quartz.	531'0"	533'0"	0.044	0.40	460	75	0.006	0.035
533.0	534.0		80% mineralisation - pyrite in quartz.	533'0"	535'27"	0.245	0.95	100	100	0.006	0.20

Property: Location: Oonah Hill

Records: R L Bearing Inclination

11/5/70

Rig: A.3000

MINOPS PTY. LTD.

925090

Finish

Type of Drilling

089

089

From	To	Core Recovd.	Log	xxxxxxx From	To Depth	Cu %	Ag oz/ton	Pb ppm	Zn ppm	Sb %	Sn %
534.0	534.1		As above.								
534.1	535.27)		30% mineralisation (pyrite) in quartz.	535'27	536'6	.95	3.00	200	110	0.007	0.40
535.27	526.6)	8.12	Disseminated pyrite in quartz.	536'6	537'26	1.09	2.80	150	295	0.007	1.00
526.6	537.26)		90% mineralisation (pyrite)								
537.26	540.26)		Quartz veined quartzite, 30%-5% mineralisation (pyrite chalco, stannite?)	537.26	541.05	0.049	0.30	100	35	<0.004	0.05
540.26	541.05)		50% mineralisation (pyrite, chalco, stannite? in quartz.								
541.05	542.0)		Pyrite veined quartzite - 1% mineralisation.	541.05	547.4	0.003	ND	ND	15	ND	<0.01
542.0	545.0	2.33	As above.								
545.0	547.0	2	As above.								
547.0	547.4)		As above								
547.4	547.66)	.66	90% mineralisation (pyrite, chalco, stannite?)								
547.66	547.86)		As above.	547.4	548.52	0.158	0.30	<100	35	<0.004	0.17
547.86	548.52)	2.16	5% mineralisation - pyrite veined quartz.								
548.52	550.0)		Grey quartzite with traces of pyrite.								
550.0	553.0	1.33	As above.								
553.0	553.58)	1.83	As above.								

Property Location Oonah Hill

M 4

Contractor: ASSOCIATED DIAMOND DRILLERS

Rig: A.3000

MINOPS PTY. LTD.

925091

Start: Finish: Type of Drilling: 090

090

From	To	Core Recovd.	Log	XXXXXXX From	To Depth	Assays					
						% Cu	oz/ton Ag	ppm Pb	ppm Zn	% Sb	% Sn
553.58	554.5)		As above.	553.0	544.5	0.009	T	<100	20	ND	<0.01
554.5	555.0)	1.5	As above.								
555.0	556.08)		Heavily quartz veined quartzite.								
556.08	556.5)		20% mineralisation (pyrite, chalco, stannite).								
556.5	558.58)	3.08	Contorted quartzites, quartz veining - 10-30% mineralisation	556.08	561.16	0.163	2.05	150	70	0.006	0.11
558.58	560.33)		Slates - 2% mineralisation disseminated (pyrite, chalco)								
560.33	561.16)	3.5	As above.								
561.16	564.66)		Mineralised quartzite - 4-10% mineralisation (pyrite, chalco, stannite)	561.16	564.66	1.04	3.40	150	155	0.01	0.31
564.66	565.86)	5'	20% mineralisation (pyrite, chalco, stannite).								
565.86	566.52)		Quartzite - 1% mineralisation.	564.66	566.75	0.84	1.05	100	50	0.006	0.10
566.52	566.75)		60% mineralised quartz vein @ 45°.								
566.75	568.0)		2% mineralisation in quartzite-pyrite, chalco, stannite) heavily quartz. veined.	566.75	570.08	0.59	0.95	<100	95	N.D.	0.36
568.0	570.08)	5.33	do.	570.08	574.41						
570.08	572.08)		70% mineralisation in quartz & quartzite - pyrite, chalcoppyrite, stannite also bornite.			↓	0.42	0.60	<100	75	<0.004	0.145

Oonah Hill

Hole No M 4

Records

R L

Bearing

Inclination

Page 17

Contractor:
Date: Start

ASSOCIATED DIAMOND DRILLERS

A.3000

091

MINOPS P. LTD.

925092

11/5/70

091

From	To	Core Record	Log	xxxxxxx		Depth To	%	oz/ton	ppm	ppm	%	%
				From	To								Cu	Ag	Pb	Zn	Sb	Sn
572.08	573.66)		5-10% mineralisation as above.									
573.66	574.41)		do.									
574.41	576.59)	3.75	90% mineralisation, last 0.5'	574.41	576.59		5.9	19.8	800	600	0.032	1.20
	)		5% mineralisation.									
576.59	577.42)		5% mineralisation in quartz.	576.59	579.84		1.49	4.40	200	435	0.007	0.49
577.42	579.84)		Heavily quartz veined quartzite.									
	)		2-30% mineralisation. Pyrite,									
	)		chalco, stannite.									
579.84	580.14)		90% mineralisation - pyrite,									
	)		chalco, stannite in siderite.									
580.14	580.46)		30% mineralisation as above.									
580.46	580.71)		Black graphitic material, 10%									
	)		mineralised. Last 5" is a									
	)		brecciated zone.	579.84	585.05		1.17	1.70	150	160	0.012	0.11
580.71	582.63)	9'	30% mineralisation - pyrite, chalco,									
	)		stannite in quartz and siderite.									
582.63	585.05)		Quartzite - 2% mineralised in									
	)		veins - pyrite and chalco.									
585.05	585.83)		60% mineralised in quartz and	585.05	586.75		7.1	29.9	1060	420	0.041	0.70
	)		siderite -chalco.									
585.83	586.33)		As above.									
586.33	586.75)	1.66	80% mineralisation.									
586.75	587.0)		80% mineralisation in quartzites.									
	)		Last 2' graphitic slates mineral-									
	)		ised.									

Property: Location: Oonah Hill

Records: R L Bearing Inclination Page

M 4 18

11/5/70

092

092

From	To	Depth	Description
587.0	587.33	8'	Interbedded quartzites and slates quartz veined, 2% mineralisation.
587.33	588.0		
588.0	594.5		Parellel quartz and siderite veins @ 60° in slates and quartzites. 2% mineralised. Quartz veined quartzites, minor mineralisation - disseminated, also minor veins.
594	599.5	4½	As above.
599.5	602.0	2.83	As above.
602.0	605.0	3	As above.
605.0	607.0	3	As above.
607.0	608.0		As above.
608.0	612.0	4	As above.

HOLE COMPLETED 612 FEET.

Property	Location			Scale	M 4
Records	R L	Bearing	Inclination	Page	19
				Oonah Hill	

093

Contractor: ASSOCIATED DIAMOND DRILLERS Rig: ~~FERS~~ E 1000
Dates: Start: 6/7/70 Finish: 6/8/70 Type of Drilling: Rotary Core
925094

MINOPS PTY. LTD.

093

From	To	Core Recovd.	Log	% Recovery	To	Assays						
100'	148'	48'	NO CORE RECOVERED UNTIL 100 FEET ROCK TYPE WAS SHALE. Alternating bands of qtzite & slate. Mildly contorted in places. Qtz vein & stringers distributed throughout, small amount of siderite in pockets in the qtz veins, cleavage at 45°. At 141' there is a very minute pocket of mineralisation in a qtz vein - the mineralisation is pyrite but there appears to be a few tiny specks of stannite? or galena? - core broken in lot of places.	100								
148'	159'3"	11'	Black graphitic slates with qtz/siderite veins and stringers, slightly sheared & contorted in places. At 155' there is a small sheared vein of qtz/siderite with minor amounts of pyrite.	98								
159'3"	182'6"	23'	Alternating bands of qtzite & slate contorted in places with qtz veins & bunches up	98								

Property	E.L. 6/69		Location		DONAH HILL		Hole No.	M 5	
Co-ords	343N 789W	R L	Bearing	1175	Inclination	250 mag.	50°	Page No.	1

Contractor: Rig:
 Dates: Start: Finish: Type of Drilling:

DRILL
LOG

094

MINOPS PTY. LTD.

From	To	Core Recovd.	Log	% Recovery	To	Assays					
159'3"	182'6"	23'	to 4", minor siderite veins Core broken.	98							
182'6"	202'7"	20'	Black graphitic slates, brecciated & sheared, qtz/ siderite veins & stringers. 2 very small pyrite veins between 193 & 194'.	100							
202'7"	212'8"	10'	Bands of qtzite & slate brecciated slightly in places & sheared, qtz/siderite veins & stringers.	100							
212'8"	220'6"	7'	Micaceous qtzites with qtz veins.	98							
220'6"	265'7"	45'	Black graphitic slates, brecciated & sheared in places but mainly uniformly bedded, qtz/siderite veins & stringers mainly in brecciated zones. Slate tends to be micaceous in a few places but these are minor. Cleav. at 45°.	100							
265'7"	268'	2'	As above but with small qtzite bands, very small area of pyrite at 265'6"	80							

Property		Location		Oonah Hill				Mole No.	M 5
Records	R L	Bearing	Inclination					Page No.	2

095

925096

DRILL
LOG

095

MINOPS PTY. LTD.

From	To	Core Recovd.	Log	% Recovery	To	Assays					
268'	282'2"	13'	Alternating bands of slate & qtzite with siderite/qtz veining & brecciated in some places, mainly in slates, very minor pyrite stringers in the qtzite.	90							
282'2"	304'	21'	Black graphitic slates sheared & brecciated in a couple of small areas. Siderite/qtz veining & stringers. Cleav 20°. Core Broken.	98							
			END OF HOLE.								
Property		Location			Oonah Hill					Hole No.	M 5
Records		R L	Bearing	Inclination					Page No.	3	

Contractor: ASSOCIATED DIAMOND DRILLERS

Rig: A 3000

925097

Date: Start: 6-10-70 Finish: 13-11-70

Type of Drilling: Rotary Core

MINOPS PTY. LTD.

036

From	To	Core Recovd.	Log	% Recovery	To	Assays			
0	53	1'6"	Intercolatèd slates & pyroclastics, mainly slates - weathered.	3					
53	88	10'	Black slates, sheared & with minor pyrite mineralisation. Intercolated slates & pyroclastics, mainly pyro - that have been sheared & mineralised at 83-84'6" shows cleavage & shear planes at 60° Weathered in highly sheared zone.	33					
88'	94'	4'5"	As above but mainly tuffs no mineralisation.	70					
94'	101'	5'	Fine grained tuffs with little slate. Mainly slates which have been sheared - micaceous cleavage at 20°.	70					
101'	102	1'	As above.	100					
102'	104'	1'6"	Brecciated slates with small amount of siderite.	75					
104'	107'	3'	Sheared micaceous slates with little siderite.	100					

Property: E.L. 6/69 Location: Oonah Hill Hole No: M6

Co-ords: 1S 20E Bearing: 953 258° mag Inclination: 68° Page No: 1

097

925098

097

MINOPS PTY LTD

From	To	Core Recovd.	Log	% Recovery	To					
107'	119'6"	3'	As above more qtz grades into sheared weathered tuffs for last foot.	25						
119'6"	125'	3'	Sheared weathered tuffs with siderite & min. - galena?	60						
125'	131'	5'	Fairly coarse brecciated pyroclastic, sheared & weathered in places.	75						
131'	139'6"	7'2"	Medium grained pyro with small inclusions of slate. siderite veins common at 50°	80						
139'6"	145'	5'6"	Medium grained pyro. brecciated in places. Galena/siderite vein at 20° to core axis. Large siderite vein (1") at 20° to core.	100						
145'	168'	23'	Finer grained pyro that has been slightly brecciated at odd places; small siderite veins & stringers.	100						

Property	Location			Oonah Hill				Table No.	M6
Records	R L	Bearing	Inclination					Page No.	2

Contractor..... Rig.....

925099

Dates: Start..... Finish..... Type of Drilling.....

MINOPS PTY. LTD.

098

From	To	Core Record.	Log	% Recovery	To	Assays					
168'	185'6"	16'	Strongly sheared & brecciated pyro. core broken & crumbly - main shearing between 181-182'	90							
185'6"	190'	3'6"	Vein of mineralisation - small amounts of pyrite & stannite(?); majority made up of dark grey, heavy metallic min. which seems to have replaced a siderite vein, has a reddish brown streak - hardness about #N.B. 3-4 probably sphalerite. Brecciated & sheared pyro - inclusions of slate.	80							
190'	194'6"	4'	Coarse pyro. with siderite veinlets & stringers.	80							
194'6"	197'	3'6"	Coarse pyro.	100							
197'	203'	6'	Band of very fine grained pyro. Fine grained pyro with occasional band of coarser pyro. Mineralised siderite vein, mainly pyrite some galena.	100							

Property		Location				Oonah Hill		Hole No.		M6	
Records	R L	Bearing		Inclination		Page No.		3			

Contract No.

Rig No.

DP 925100

Dates: Start.....

Finish.....

Type of Drilling.....

LOG

MINOPS PTY. LTD.

093

From	To	Core Recovd.	Log	% Recovery	To	Assays							
197'	203'	6'	(cont) Large siderite vein parallel to d.c.a.	100									
203'	213'	8'	Fine grained pyro intercolated with slates & slightly sheared in places.	80									
213'	214'	1'	Black slates.	100									
214'	235'	21'	Medium grained pyro, small bands of slates, a few siderite veins & stringers, cleav at 45°.	100									
235'	263'	20'	Medium to fine grained pyro slightly sheared & brecciated in places, with occasional bands of slate & qtzite - siderite/qtz veins quite common throughout. cleav at 45°.	80									
263'	282'	19'	As above but no qtzite - last foot is slate band.	100									
282'	296'	13'	Alternating bands of fine grained pyro & slate, slightly sheared in places & with small qtz/siderite veins.	90									

Property		Location				Oonah Hill		Hole No.		M6
Records	R L	Bearing	Inclination				Page No.		4	

MINOPS PTY. LTD.

100

From	To	Core Recovd.	Log	% Recovery	xx Depth	Assays		
						Cu ppm	Ag	Sn %
296'	300'	4'	Black very micaceous slate with siderite/qtz veins.	100				
300'	308'	8'	Brecciated & sheared pyro veinlets of siderite/qtz.	100				
308'	374'	66'	As above - pyro become more basic in character.	100				
374'	398'	9'	Drill went through old workings & core not obtained intercepted pyrite on foot wall - this was assayed.	42	396-399'	720	N.D	0.04
398'	412'6"	8'	Mineralised zone in slate - has been assayed. Slates brecciated & sheared Small amounts of pyrite.	65				
412'6"	419'6"	7'	Slates - sheared in places with qtz/siderite veins & stringers.	100				
419'6"	462'	42'	Brecciated & sheared slates with minor qtz'siderite stringers; minor pyrite at 461'.	98				
462'	471'	8'	Fine grained pyro. strongly sheared - weathered & crumbly.	85				

Property	Location			Oonah Hill	Hole No.	M6
Records	R L	Bearing	Inclination		Page No.	5

Contractor.....Rig.....

Dates: Start.....Finish.....Type of Drilling.....

DRILL LOG 925102
101

MINOPS PTY. LTD.

From	To	Core Recovd.	Log	% Recovery	To	Assays					
471'	549'	78'	Black slates slightly micaceous in some areas - slightly graphitic in others - sheared & brecciated in places with minor qtz/siderite veins & stringers & minor amounts of pyrite in stringers & bunches. cleav. 45°.	100							
549'	593'	43'	As above but with some inclusions of pyro.	98							
593'	635'	38'	Hard very fine grained pyro. slightly sheared in places, siderite/Qtz veins & stringers throughout, some areas more slate like in nature.	100							
635'	637'	2'	As above but no slaty areas.	100							
637'	638'	1'	As above but with more pyrite one vein 1/2" wide & at 50°. Very fine grained tuff with slate, siderite/Qtz.	100							
638'	684'	46'	Hard, fine grained pyro. brecciated & sheared in some places with qtz/siderite veins & stringers. Small pyrite vein at 676!	100							

Property	Location					Oonah Hill	Shole No.	M6
Records	R L	Bearing	Inclination				Page No.	6

102

Contractor: Rig:
 Dates: Start: Finish: Type of Drilling:
 MINOPS RTV ITR

From	To	Core Recovd.	Log	% Recovery	To	Assays			
684'	714'	30	Medium to fine grained pyro. sheared slightly in places with qtz/siderite veins & stringers.	100					
714'	720'	6'	As above.	100					
720'	746'	26'	Black slates with siderite/qtz veins & stringers little shearing. Cleav at 45°.						
746'	775'	29'	Fine grained hard pyro. with siderite/qtz veins & stringer small vein & stringers of pyrite at 758'6" contorted & sheared slightly.	100					
775'	776'6"	1'6"	As above - nopyrite.	100					
776'6"	779'	2'6"	Slate - core broken - sheared & crumbly - clayey.						
779'	783'	4'	Intercolated slates & pyro. with siderite/qtz veins & stringers.	100					
783'	789'6"	6'6"	Mainly slates with some inclusions of pyroclastics Qtz/siderite veins & stringers very minor pyrite stringers at 789'.						

Property	Location			Oonah Hill	Hole No	M6
Records	R L	Bearing	Inclination	Page	7	

Contract No.

Rig No.

DRU 925104

Start Date: Finish Date:

Type of Drilling:

L O C

MINOPS PTY. LTD.

103

From	To	Core Recovd.	Log	% Recovery	xx Depth	Assays		
						Sn %	Cu %	Ag oz/ton
789'6"	796'6"	10.0%	Fine grained pyro with siderite veins & stringers.	100				
796'6"	800'0	0.6"	As above but mineralisation developed (pyrite) core has been split.		796'9"- 800	0.22	0.005	0.05
800'	804'	4'	As above but mineralisation not as well developed - an 1" wide vein at 803'.	100	800- 804.8	0.14	0.007	N.D.
804'	808'	4'	Micaceous slate with very minor amount of pyrite -HAS BEEN SPLIT.		804.8 - 806.6 - 806.6 -	0.045	0.01	N.D.
808'	813'	5'	Slates with qtz/siderite/pyrite veins, stringers - BEEN SPLIT.	100	808.0 - 808.0 - 809.8 - 809.8 -	0.08	0.002	N.D.
813'	822'	9'	Slates with qtz/siderite/pyrite veins & stringers throughout - small amount of chalcopyrite. BEEN SPLIT.	100	809.8 - 813.1 - 813.1 - 815.2 - 815.2 -	0.07	0.002	N.D.
822'	830'	8'	As above.	100	818.2 - 818.2 - 819.2 - 819.2 -	0.13	0.121	0.15
830'	844'	14'	As above, pyrite content less. BEEN SPLIT.	100	815.2 - 818.2 - 819.2 - 822.2 - 822.2 -	0.03	0.31	0.25
844'	880'	36'	Slates, which have been sheared & contorted in places,	100	818.2 - 819.2 - 822.2 - 826 - 826 - 829.3	0.075	1.50	1.05
						<0.01	0.027	0.05
						<0.01	0.01	0.10
						<0.01	0.002	0.05
						<0.01	<0.002	N.D.

Property	Location			Oonah Hill	Hole No.	M6
Records	R L	Bearing	Inclination		Page No.	8

104

MINOPS PTY. LTD.

From	To	Cores Recevd.	Log	% Recovery	xx Depth	Sn %	Cu ppm	Ag oz/ton'
844'	880'	36'	(cont) qtz/siderite veining & minor pyrite stringers in a few places, cleav at 45°. BEEN SPLIT.	100	829.3 - 830.6 - 830.6 - 836.0 - 836.0 -	N.D.	30	0.10
880'	898'6"	18'6"	As above, small pyrite vein at 885 & 888'.	100	844.0 - 856.0 - 858.0 - 880.0 - 885.0 -	N.D. 0.03 0.05	<30 <30 <30	0.10 0.10 0.10
			END OF HOLE					

Property	Location			Oonah Hill	Hole No	M6
Records	R L	Bearing	Inclination		Page No	9

Contractor: ASSOCIATED DIAMOND DRILLERS Rig: F-25 E. 1000
 Dates: Start: 20/8/70 Finish: 25/9/70 Type of Drilling: Rotary Core

DRILL LOG 105

MINOPS PTY. LTD.

From	To	Core Recovd.	Log	% Recovery	To	Assays				
0'	81'	35'	Black slates with small bands of qtzites, some very minor pyrite in the qtzite; the slates have been sheared in places with qtz veining; cleavage at 45°, core broken.	40						
81'	115'4"	24'	Black slates, slightly contorted in places, with occasional veins - stringers of qtz/siderite. Cleav at 50°.	98						
115'4"	147'7"	32'	As above.	100						
147'7"	160'	12'	As above but more siliceous in nature.	98						
160'	187'	27'	Black slates with small bands of qtzite, qtz/siderite veining in both the slate & the qtzite but the majority of it in the qtzite, cleav at 50°.	100						
187'	198'9"	11'	More siliceous type of rock with qtz/siderite veins & stringers, cleav. at 30°.	98						
198'9"	232'7"	33'	Black slates, sheared in places with qtz/siderite veins & stringers, very minor amount	98						

Property	E.L. 6/69		Location		DONAH HILL					Hole No.	M 7
Co-ords Records	343N 789W	R L	Bearing	1175	250 mag.	Inclination	73°			Page No.	1

925107
3006

Contractor:
 Sites: Start: End:
 Name:
 HINDS PTY. LTD.

From	To	Core Recovd.	Log	% Recovery	To	Assays						
198'9"	232'7"	33'	of pyrite at 209', core broken over some of the length cleav at 50°.	98								
232'7"	242'11"	10'	Qtzite with occasional qtz/siderite vein. Barren qtz, with small amount of siderite in it. Qtzite with small alternating bands of slate.	100								
242'11"	245'6"	2'7"	Alternating bands of qtzite & slate, mainly qtzite, qtz/siderite veins (minor) cleav. 45°.	100								
245'6"	274'5"	28'	Mainly qtzite, but in places seems to be more a siliceous slate, qtz veins & stringers & small amount of siderite, cleav at 45°.	96								
274'5"	282'	7'	As above but sheared in places with more qtz & pyrite veins, stringers & bunches throughout.	98								
282'	293'4"	11'	Broken core of sheared slates & qtzite with qtz veins & bunches.	98								

Property	Location				Oonah H '11						Shole No.	M7
Records	R L	Bearing	Inclination							Page No.	2	

107

Contractor: Rig:
 Dates: Start: Finish: Type of Drilling:

MINOPS PTY. LTD.

From	To	Core Recovd.	Log	% Recovery	To	Assays					
293'4"	312'	18'	Uniform black slates small amounts of qtz/siderite, cleav at 45°.	98							
312'	330'	16'	Crumbled broken core of grey slates & some qtzite, sheared, with qtz/siderite veins & stringers & pyrite veins & bunches mainly from 312-320'.	90							
			END OF HOLE.								

Property	Location				Oonah Hill				Hole No.	M7
Records	R L	Bearing	Inclination					Page No.	3	

ASSOCIATED DIAMOND DRILLERS

E 1000

26-9-70

31-10-70

Rotary Core

DIAMONDS PTY. LTD.

925109

					xx Depth	Sn %	Cu %	Ag oz/ton
0'	80'	20'	Weathered pyroclastics - weathered to brown clay.	25	80-98'	N.D.	40 ppm	0.10
					98-100'	0.49	50 ppm	0.33
					100-105'	N.D.	30 ppm	0.20
80'	106'	8'	Weathered greyish green pyro. core crumbly & broken.	34	102'8"			
			Pyrite/galena vein - split.		103'2"	0.195	0.008	0.25
106'	107'11"	1'11"	Hard, fine grained pyro. with pyrite/galena veins & stringers.	100				
107'11"	122'10"	4'	Hard, fine grained pyro. weathered in places & core is broken. Fine veins & stringers of qtz.	25				
122'10"	143'		CORE HAS ALREADY BEEN SPLIT ALONG PART OF THIS FOOTAGE & HENCE CORE RECOVERY VALUES NOT OBTAINABLE.		124 -			
			Hard, fine grained pyros with pyrite/qtz/siderite veins & stringers.		124'5"	0.055	0.006	0.20
					126'4"-			
					126'10"	1.65	0.048	0.75
					126'10"-			
					127'2"	1.06	T	0.20
143'	195'	51'	Hard pyro, with qtz/siderite & very minor pyrite in places, core broken in places.	98	136'3"			
					136'9"	0.37	T	0.33
					136'9"-			
					137'5"	0.30	0.27	2.55
195'	210'		CORE SPLIT - CORE RECOVERY NOT OBTAINABLE		137'5"-			
			Hard pyro with pyritic/qtz/ siderite veins.		138'5"	0.015	T	0.20
					138'5"-			
					139'	1.16	0.018	0.425
					199.6"-			
					202'5"	0.47	0.022	0.25
					206' -			
					208'5"	0.36	0.035	0.25

108

E.L. 6/69

Oonah Hill

M8

Coordinates 353N 434W

1032

253 (mag)

70°

1

MINOPS PTY. LTD.
 505 ST. KILDA ROAD,
 MELBOURNE, 3004

DRILL 925110
 LOG

Contractor..... Rig.....
 Dates: Start..... Finish..... Type of Drilling.....

109

From	To	Core Recovd.	Log	% Recovery	To Depth	Assays					
						Sn %	Cu %	Ag oz/ton			
210'	271'	60'	Uniform pyro with qtz veinlets & occasional pyrite stringers. Core split - pyro with pyrite stringers. Fine pyro.	98	254'1"- 255'8"	0.36	0.164	2.00			
271'	287'7"		Fine grained pyro with qtz/siderite stringers. Core split - Core recovery not possible, pyro until 279' then slates until 287'7", qtz/siderite/pyrite veins & stringers in both.		276'7"- 279'2" 279'2" 286	0.24	0.011	0.10			
287'7"	296'		Hard grey slates with qtz/siderite veinlets.		296'1"- 299'4"	1.80	1.90	2.15			
294'	512'5"	OVER MOST OF THIS FOOTAGE THE CORE HAS ALREADY BEEN SPLIT HENCE CORE RECOVERIES ARE NOT OBTAINABLE NOR IS A VERY ACCURATE LOG.	The rock is all slate, quite micaceous & grey over most of the footage, but becoming more graphitic in certain places. There has been shearing to a moderate degree in certain areas & the pyrite mineralisation		299'4"- 302'10" 302'10" 305'10" 305'10" 307'11" 307'11" 309'9" 318'0" 324'0"	0.015	Nil	0.10			
Location										Hole No.	78
R L Bearing Inclinatoin										Page No.	2

Old Recorder: RIG:
 Dates: Start: Finish: Type of Drilling:

PREP
 3.00

MINOPS PTY. LTD.

110

From	To	Core Recvd.	Log	% Recovery	Depth	Assay		
						Sn %	Cu %	Ag oz/ton
294'	512'5"		varies as does the qtz/siderite content. The cleavage is fairly uniform throughout at about 45°.		324'0"-			
					328'10"	0.04	Nil	0.10
					328'10"-			
					330'0"	1.11	1.77	4.40
					330'0"-			
					332'0"	0.05	0.011	N.D.
					332'0"-			
					333'1"	0.33	0.785	3.20
					331'1"-			
					334'8"	0.25	0.29	0.75
					334'8"-			
					336'0"	0.01	0.012	0.25
					336-341'	0.14	0.43	0.95
					341'0"-			
					343'4"	<0.01	0.014	N.D.
					343'4"-			
					348'	0.135	0.042	0.25
					412'3"-			
					417'8"	0.065	0.56	0.26
					417'8"-			
421'6"	0.025	T	0.20					
421'6"-								
425'7"	0.53	T	0.10					
425'7"-								
431'6"	0.40	T	0.10					
431'6"-								
436'5"	0.27	0.17	0.20					

MAIN MINERALISATION: 327'-347', 365'-367',
 400'-408', 440'-450',
 MAIN AREAS OF GRAPHITIC SLATE 427'-436', 453'-473'
 MAIN AREAS OF SHEARING 347'-358'

Property	Location			Oonah Hill	Shale No.	M 8
Records	R L	Bearing	Inclination		Page No.	3

111

xxxxxxx		Sn	Cu	Ag
From	To	%	%	oz/ton
436'5"	440'	0.23	T	0.20
440'	445'8"	0.37	0.22	0.72
445'8"	447'	0.045	0.19	0.33
447'	449'8"	0.051		
449'8"	454'11"	0.53	0.14	0.82
454'11"	457'0"	0.76	0.80	12.50

Oonah Hill

M8

4

A. S. JAMES PTY LTD

EDECO

925113

18-10-70

26-11-70

ing

Rotary Core

MINOPS PTY. LTD.

				xx Depth	Cu ppm	Ag oz/ton	Sn %	Sb ppm
0	96'6"	40	Pyroclastics weathered to a crumbly brown clay.	45				
96'6"	102'6"	3	As above.	50				
102'6"	107'6"	5'	Slates weathered to grey, crumbly clay. Black slates with minor qtz veining.	100				
107'6"	113'6"	4'	Weathered slaty qtzites.	80				
113'6"	126'	10'	Black slates with minor qtz veins.	80				
126'	127'	1'	Hard grey qtzite.					
127'	145'	15'6"	Black micaceous slates with minor qtz veins, cleav. at 45° to core axis.	90				
145'	153'	5'	Grey slaty qtzites with qtz veins & stringers, core broken in places.	70				
153'	170'	16'	Grey banded arenaceous slates with minor qtz veins banding at 20° to core axis.	90				
170'	207'	30'	As above.	80				

E.L. 6/69

Oonah Hill

M9

Co-ords. 311S 57W

1055

251 (mag)

76°

1

112

113

MINOPS PTY. LTD.

From	To	Core Recovd.	Log	% Recovery	xx Depth	Cu	Ag	Sn	Sb
						ppm	oz/ton	%	ppm
207'	217'	2'6"	As above but with small galena vein at right angles to core axis - SPLIT. Grey arenaceous slates with minor qtz stringers.	25					
217'	232'2"	15'	Grey banded arenaceous slates with qtz & siderite stringers. As above but with small pyrite stringer. Grey banded arenaceous slates with qtz & siderite veins & stringers, banding at 45° to core axis.	98					
232'2"	254'	17'	Grey slates with arenaceous banding & qtz siderite veins slightly sheared 45° to core axis.	70					
254'	258'	4'	As above. As above but with very small pyrite vein. As above - no pyrite.	100					
258'	262'	4'	As above.	100	261'9"- 262'3"	70	0.20	N.D.	N.D.

Property	Location	Oonah Hill				Sheet No.	M 9
Records	R L	Bearing	Inclination		Page No.	2	

Rig

DRILL LOG 925115

Start: Finish: Type of Drilling:
MINOPS PTY. LTD.

114

From	To	Core Recvd.	Log	% Recovery	xx Depth	Assays			
						Cu ppm	Ag oz/ton	Sn %	Sb ppm
262'	263'	1'	As above but with large pyrite vein 6" wide - SPLIT	100					
263'	274'6"	11'6"	Slates with grey arenaceous bands & qtz veins & minor siderite stringers at 50° to core axis.	100					
274'6"	282'	7'	As above.	70					
282'	283'	1'	As above but with qtz/siderite vein 3" wide with minor pyrite & galena specks.	100					
283'	286'6"	3'6"	Grey slates with arenaceous bands & qtz/siderite veins & stringers. Fault gouge at 285' & pyrite mineralisation in veins & stringers each side - SPLIT.	100	283.0 - 286.6"	20	N.D.	<0.01	N.D
286'6"	289'	3'	Grey slates with arenaceous banding & qtz/siderite veins & stringers, contorted - sheared at 287'.	80					
289'	337'	48'	Slates with arenaceous banding qtz veins & siderite stringers - rock type is uniform throughout as is cleav. at 45° to core axis.	100					

Property	Location			Oonah Hill	Site No.	M9
Records	R L	Bearing	Inclination		Page No.	3

Contractor:

DRILL

Dates: Start: Finish: Type of Drilling:

LOG

RINOPS PTY. LTD.

115

From	To	Core Recovd.	Log	% Recovery	To	Assays						
337'	345'	8'	As above.	100								
345'	356'	10'	As above.	80								
			Fault gouge with broken core each side.									
356'	377'	21'	Grey slates with arenaceous bands, qtz veins & stringers, contorted mildly, cleav at 50° to core axis.	100								
377'	445'	68'	Grey-black slates with arenaceous bands & small qtz veins & stringers, occasional siderite stringers, cleav 25° to core axis. There is mild contortion in few small areas.	100								
455'	465'6"	10'	Grey-black slates with arenaceous bands, sheared & contorted with fault gouge at 461', qtz-siderite veins & stringers.	90								
465'6"	506'6"	40'	Massive greyish black slates with minor contortion in small areas, qtz veins & stringer & minor siderite	98								

Property		Location		Oonah Hill						Shale No.	M 9
Records	R L	Bearing	Inclination							Page No.	4

Contractor:

Dates: Start: Finish: Type of Drilling:

MINOPS PTY. LTD.

116

From	To	Core Recovd.	Log	% Recovery	To	Assays							
465'6"	506'6"	40'	stringers at odd spots, cleav 50° to core axis.	98									
506'6"	517'	8'	Broken core of grey slate with arenaceous bands very mildly sheared & with minor qtz stringers.	80									
517'	537'6"	20'	Grey-black slates with arenaceous bands & small qtz/siderite veinlets & stringers, cleav 55° to core axis.	98									
537'6"	564'	36'	As above - core broken in places.	98									
564'	569'	3'	Grey-black slates with arenaceous bands sheared and contorted - core broken - with qtz/siderite veins & stringers.	70									
569'	581'	8'	Greenish, hard, fine grained pyroclastics with small bands of slate/qtzite & minor qtz/siderite stringers. As above but with small pyrite vein at 579' & small stringers & bunches, dissem, up to 581'	75									

Property	Location	Oonah Hill	Hole No.	M 9
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Records	R L	Bearing	Inclination	Page No.	5
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925118

Contractor..... Rig.....

BRILL

Dates: Start..... Finish..... Type of Drilling.....

L.O.C.

117

MINOPS PTY. LTD.

From	To	Core Recvd.	Log	% Recovery	To	Assays							
581'	584'6"	2'6"	Qtzite slates with qtz/siderite veins & stringers - minor pyrite in qtz/siderite veins.	80									
584'6"	593'6"	9'	Coarse pyroclastics, greenish in colour, which have lumps of pumice which have been silicified, this appears to have slumped down over the slates & hence there are some inclusions of qtzite type slates in the pyroclastics. Qtz/siderite veins & stringers present at 50° to core axis.	100									
593'6"	618'	18'	as above, core broken & appears to be more silicified. Qtz/siderite veins parallel to core axis.	75									
618'	645'	27'	As above - more slatey/qtzite inclusions.	100									
645'	652'6"	4'	Hard, fine grained pyroclastics with silicified pumice lumps & inclusions of qtzitic slate, small qtz/siderite veinlets & stringers.	98									

Property		Location		Oonah Hill						Hole No.		M 9
Records	R L	Bearing	Inclination							Page No.	6	

Contractor: Rig:
 Dates: Start: Finish: Type of Drilling:

DRILL
LOG

MINOPS PTY. LTD.

From	To	Core Recovd.	Log	% Recovery	To	Assays							
645'	652'6"	(cont)	As above but with small amount of pyrite in qtz/siderite vein.										
652'6"	667'	11'	Fine to medium grained pyroclastics, core broken in places, silicified pumice lumps & inclusions of qtzitic slate. Qtz/siderite veinlets & stringers.	75									
667'	672'	5'	As above but brecciated & with air holes.	100									
672'	707'	33'	Fine to medium grained pyroclastics, with silicified pumice lumps & inclusions of qtzitic slate, qtz/siderite veinlets & stringers at 30° to core axis.	90									
			END OF HOLE.										

Property		Location		Oonah Hill		Hole No.	M 9
Records	R L	Bearing	Inclination			Page No.	7

Contractor

A. S. JAMES

ACKER

925120
DRILL LOG

Date Start 11-11-70

Finish 3-12-70

Type of Drill

Rotary Core

MINOPS PTY. LTD.

119

From	To	Core Recov'd	Log	Recovery %	xx Depth	Assays				
						Cu ppm	Ag oz/ton	Sn %	Sb ppm	
0	83'6"	14'	Weathered pyroclastics. Weathering to light brown broken material.							
83'6"	93'	5'4"	Light grey partly weathered pyroclastics.	75						
93'	96'6"	2'	Weathered pyroclastics, small veins of qtz & coarse pyrite crystals approx at right angles to core.							
101'	104'6"	3'	Pyroclastics massive.	98						
104'6"	107'6"	1'6"	Qtz/pyrite bunches - plentiful	50						
107'6"	111'6"	3'	Pyrocasltic with minor qtz cleavage at 50°. Cellular qtz/pyrite galena?	80						

E.L. 6/69

Location

Oonah Hill

File No

M10

439N 505W

1070

Heading

253 (mag)

Dip

50°

Page No

1

Contractor: Rig:
 Dates: Start: Finish: Type of Drilling:

DRILL 025121
 LOG

MINOPS PTY. LTD.

120

From	To	Core Recovd.	Log	% Recovery	Rx Depth	Assays			
						Cu	Ag	Sn	Sb
						ppm	oz/ton	%	ppm
114'6"	125'6"	9'	Massive pyro.	80					
125'6"	135'6"	3'	As above.	30					
135'6"	141'	1'6"	Pyro very broken.	30					
141'	146'	6"	Broken slaty material with bunches of qtz.	25					
146'	151'	6"	As above	25					
151'	154'	9"	As above	30					
154'	156'5"	6"	As above.	30					
156'8"	159'	2'3"	Black slates cleav. 45°.	80					
159'	175'3"	16'	Minor qtz/siderite/pyrite veins	98					
175'3"	176'3"	1'	Heavily ^{pyrite} min. qtz'siderite veins in slate.	100	175'3"- 176'3"	1640	2.71	0.08	100
176'3"	179'9"	3'	Broken slate with qtz/siderite veins.	98					
179'9"	187'	7'	Slate with qtz/siderite/pyrite veins.	98	183-188'	1610	2.87	0.07	
187'	188'	1'	As above.	100					
188'	198'	10'	Slate with few small qtz/siderite/pyrite veins.	100					
198'	206'	8'	As above.	100					

Table No. n 10
 Page 2

Contractor..... Rig.....
 Dates: Start..... Finish..... Type of drilling.....

DRILL
LOG

MINOPS PTY. LTD.

121

From	To	Core Recovd.	Log	% Recovery	To	Assays							
198'	206'		From 204'206 min is heavier.										
206'	222'6"	14'	Slate - slightly more micaceous - occasional qtz/siderite veins - no pyrite.	85									
222'6"	224'6"	1'10"	As above. No siderite or pyrite core broken.	90									
224'6"	225'6"	1'	Qtzite - micaceous very minor amount of pyrite disseminated throughout.	100									
225'6"	238'	12'	Black slate with qtz veins occasional veins & bunches of pyrite - no siderite.	98									
238'	240'6"	2'6"	Contorted slates with qtz & siderite & reasonable amounts of pyrite.	100									
240'6"	251'2"	10'	Slates with patches contorted having qtz/siderite/pyrite veins & bunches. Black slates brecciated in places with small veins & bunches of qtz/siderite & very fine pyrite, cleav 25°.	90									

Scale 1:10
 Page 3

Contractor: Rig:
 Dates: Start: Finish: Type of Drilling:

DRILL
LOG

MINOPS PTY. LTD.

122

From	To	Core Recovd.	Log	% Recovery	To	Assays						
251'2"	253'10"	2'6"	Brecciated graphitic slate with qtz/siderite/pyrite veins & stringers, at 252 pyrite vein 3/4" wide.	90								
253'10"	258'	4'	Graphitic slate grading into a more micaceous variety small veins & bunches of qtz/siderite/pyrite.	98								
258'	261'	3'	Micaceous slate with small veins & bunches of qtz/siderite/pyrite - pyrite is very fine.	100								
261'	271'9"		Slightly micaceous slate with veins of qtz/siderite/pyrite at 45° one pyrite vein about 1" wide. Some quite large vugs in the qtz veins.									
271'9"	282'6"	10'	As above.	98								
282'6"	300'	18'	Quite massive slates occasional stringer of pyrite & siderite, a few qtz veins. Cleav at 40°.	100								
300'	301'10"	1'10"	Slates with pyrite/siderite/ qtz in veins & disseminated through some of it.	100								

M 10

4

123

Contractor: Rig:
 Dates: Start: Finish: Type of Drilling:

DRILL
LOG

MINOPS PTY. LTD.

From	To	Core Recovd.	Log	% Recovery	Xr Depth	Assays			
						Cu ppm	Ag oz/ton	Sn %	Sb ppm
301'10"	311'7"	9'6"	Massive slates with occasional qtz/siderite vein.	90					
311'7"	316'	4'3"	As above	95					
316'	348'	32'	As above. Very minor pyrite veins with stringers.	100					
348'	353'	5'	As above.	100					
353'	357'6"		Slate becomes more silicified & contorted with more pyrite one vein of massive pyrite 1" wide.						
357'	365'	8'6"	Slate subjected to brecciation & pyrite veins & stringers more prominent.	100					
365'	368'	2'6"	Slate is more micaceous.						
368'	378'	10'	Slate has few large veins of qtz with fine pyrite dissem. through it at odd spots. Qtz & pyrite content of slate increases with veins of pyrite up to 2". Siderite content not as high as in other min. areas.	100	368-373 373-378 378-383	920 160 3500	1.45 0.10 0.83	0.23 0.12 0.43	
378'	388'	10'	As above. cleav. 50°.	100	383-388	40	0.20	0.08	

Location	Date	M 10
Latitude	Page No.	5

Contractor: Rig:

Dates: Start: Finish: Type of Drilling:

DRILL
LOG

12A

MINOPS PTY. LTD.

925125

From	To	Core Recovd.	Log	% Recovery	EX Depth	Assays			
						Cu ppm	Ag oz/ton	Sn %	Sb ppm
388'	398'	10'	As above. Not quite as much mineralisation.	100	388-393'	40	0.20	0.10	
					393-398'	1350	0.39	0.17	
398'	407'6"	9'6"	Core has been split, slate has more min. - chalcopyrite evident in few places.	100	398'0 -				
					400'8"	0.006%	0.23	0.88	
					400'8"-				
					403'4"	3.07%	13.85	2.42	630
407'	417'6"	10	As above no chalcopyrite & less mineralisation.		403'4"-				
					407'	0.42%	0.825	0.38	N.D.
417'6"	421'6"	2'	Black slates minor qtz/siderite/pyrite veins. Cleav 60°.	50	407-417'	0.015%	0.23	0.12	N.D.
					417'0 -				
421'6"	441'	19'	Massive slates very little mineralisation thin qtz/siderite veins quite common Cleav at 20°.	98	421'6"	50	N.D.	N.D.	
					421'6"-				
					427'	30	N.D.	N.D.	
					427' -				
					433'6"	30	N.D.	N.D.	
441'	448'	7	Core has been split. Mineralisation in slates heavy.	100	433'6"-				
					438'	30	N.D.	< 0.01	
					438-442'	230	N.D.	0.03	
448'	453'	5'	Massive black slates with veins & stringers of pyrite & qtz. Stannite evident at 452' Not much siderite.	100	442-448'	0.076%	0.595	T	
					448-453	50	0.10	0.06	

Scale No. M 10
Page No. 6

DIAMOND DRILL CORE RECORD

925126

450

Hole No. CLUTHA OONAH NO. 1.

Area of Operation ZEEHAN, TASMANIA

Reduced Level of Site ✓

Drilled by ASSOCIATED DIAMOND DRILLERS PTY. LTD. Location of Site OONAH MINE — BRADSHAW HOLE

Bearing of Hole 261° 30' Magnetic

Core Recovery + 95%

Date Commenced 25th July, 1963.

Dip of Hole 60°

Geological Logging by—

Date Completed 18th August, 1963.

Bore Depth 456 feet.

A.B. CLARK

Site: B.M.R. Geophysical Grid 910S, 910W. *Revised 1964/35.*

DRILL RECORD				GEOLOGICAL LOG			GEOLOGICAL SECTION			ASSAY RESULTS							
Date	From	To	Core Recov.	From	To	Description	Core	Sample	Sample No.	From	To	Sn%	Cu%				
25/6	0'	3'	3'	0'	3'	Weathered volcanic rock	170'										
							173'	2'-9"	C1	179'	173'	.006	✓				Black pyritic shales.
26/6	3'	20'	17'	3'	20'	Spilite	173'-176'	2'-11"	C2	173'	176'	.023	✓				Massive sulphide.
27/6	20'	41'	20'	20'	41'	Spilite	176'-180'	3'-6"	C3	176'	180'	.020	✓				Black pyritic shales.
28/6	41'	56'	14'	41'	170'	Fine grain grey tuffaceous shales with some black pyritic-graphitic shales	180'-183'	3'-0"	C4	180'	183'	.017	0.97				Massive sulphide.
1/7	56'	79'	22'				183'-186'	2'-10"	C5	183'	186'	.017	0.48				Massive sulphide.
2/7	79'	121'	40'				186'-190'	2'-9"	C6	186'	190'	.009	0.11				Grey pyritic shales.
3/7	121'	153'	29'	170'	190'	Black graphitic black shales with sulphide mineralisation.											
4/7	153'	193'	38'														
5/7	193'	230'	36'	190'	282'	Fine grain grey tuffaceous shales interbedden. Black graphitic shale bends.											
8/7	230'	267'	37'														
9/7	267'	287'	20'														
10/7	287'	310'	23'	282'	456'	Fine grain grey tuffaceous shales interbedden with fine grain grey tuffaceous sandstone.											
13/7	310'	320'	10'														
14/7	320'	335'	15'														
15/7	335'	370'	35'														
16/7	370'	405'	35'														
17/7	405'	437'	32'														
18/7	437'	456'	19'														

125

DIAMOND DRILL CORE RECORD

Hole No. OONAH NO. 2

Area of Operation OONAH MINE, ZEEHAN

Reduced Level of Site 925127

Drilled by ASSOCIATED DIAMOND DRILLERS PTY. LTD.

Location of Site 10N, 440E, B.M.R. Geophysical Grid

Bearing of Hole 113° 30'

Core Recovery

Date Commenced 29/7/63

Dip of Hole 80°

Geological Logging by—

Date Completed 22/11/63

Bore Depth 1086 feet.

A.B. CLARK

BYR Run 126/25.

DRILL RECORD				GEOLOGICAL LOG			GEOLOGICAL SECTION			ASSAY RESULTS			
Date	From	To	Core Recov.	From	To	Description	Core	Sample	Sample No.	From	To	Cu %	Sn %
30/7	0'	22'	22'	0'	94'	Volcanic tuff	1'	1'	7	926'	927'	.005	0.163
31/7	22'	50'	28'	94'	102'	Fine grain tuffaceous sandstone	1'	1'	8	927'	928'	0.003	0.29
1/8	50'	87'	37'	102'	163'	Coarse tuff with tuff shale	6'	6"	9	928'	934'	Trace	0.75
2/8	87'	143'	56'	163'	535'	Coarse tuff with graduations	2'	2'	10	934'	936'	Trace	0.65
5/8	143'	183'	40'			into spilite	3'	3'	11	936'	939'	Trace	0.45
6/8	183'	218'	35'	535'	540'	Fine grain tuff shales	3'	3'	12	988'	991'	Trace	Trace
7/8	218'	253'	35'	540'	556'	Black graphitic shales with	2'	2'	13	991'	993'	Trace	Trace
8/8	253'	277'	24'			fine sulphide mineralisation.	2'	2'	14	993'	995'	Trace	Trace
9/8	277'	310'	33'	556'	642'	Fine grain grey tuffaceous shales	2'	2'	15	995'	997'	Trace	Trace
12/8	310'	351'	41'	642'	644'	Grey tuffaceous sandstone with	3'	3'	16	997'	1000'	Trace	Trace
13/8	351'	374'	23'			silicious pyritic vein.	4'	4'	17	1000'	1004'	Trace	Trace
15/8	374'	389'	15'	644'	651'	Green volcanic tuff and sheared	4'	4'	18	919'	923'	Trace	Trace
16/8	389'	399'	10'			spilite.	3'	3'	19	923'	926'	Trace	Trace
20/8	399'	430'	31'	651'	656'	Tuffaceous sandstone quartz veined	3'	3'	20	939'	942'	Trace	Trace
21/8	430'	491'	60'	656'	685'	tuff shale and spilite.	3'	3'	22	1059'	1062'	Trace	Trace
26/8	491'	520'	28'	685'	705'	Grey shales	3'	3'	23	1062'	1065'	Trace	0.165
27/8	520'	543'	23'	705'	706'	Spilite	3'	3'	24	1065'	1068'	Trace	Trace
28/8	543'	568'	25'	706'	724'	Black grey pyritic shales.							
29/8	568'	590'	22'	724'	725'	Spilite.							
30/8	590'	594'	4'	725'	919'	Grey tuff shales							
2/9	594'	612'	17'	919'	926'	Tuffaceous sandstone quartz veined.							
3/9	612'	626'	14'	926'	939'	Graphitic shales vein quartz and sulphide							
4/9	626'	644'	18'	939'	988'	Tuffaceous sandstone.							
5/9	644'	656'	12'	988'	1004'	Graphitic mineralised shales							
12/9	656'	662'	5'	1004'	1059'	Grey tuffaceous sandstone and shales							
13/9	662'	682'	18'	1059'	1068'	Graphitic shales and sandstone							
16/9	682'	702'	19'	1068'	1086'	Grey shales tuffaceous sandstone							

DRILL RECORD				GEOLOGICAL LOG			GEOLOGICAL SECTION		ASSAY RESULTS									
Date	From	To	Core Recov.	From	To	Description	Core	Sample	Sample No.	From	To							
17/9	702'	710'	6'															
18/9	710'	712'	2'															
19/9	712'	724'	9'															
20/9	724'	737'	13'															
23/9	737'	747'	6'															
24/9	747'	764'	11'															
25/9	764'	780'	11'															
2/10	780'	786'	6'															
3/10	786'	793'	7'															
4/10	793'	797'	4'															
7/10	797'	812'	14'															
8/10	812'	829'	16'															
9/10	829'	843'	13'															
10/10	843'	859'	16'															
11/10	859'	882'	23'															
12/10	882'	892'	10'															
14/10	892'	901'	9'															
15/10	901'	917'	16'															
16/10	917'	926'	9'															
17/10	926'	934'	4'9"															
22/10	934'	944'	8'															
23/10	944'	958'	14'															
24/10	958'	973'	13'															
25/10	973'	982'	9'															
26/10	982'	987'	5'															
28/10	987'	995'	8'															
30/10	995'	1003'	8'															
31/10	1003'	1006'	3'															
1/11	1006'	1014'	8'															
5/11D	1014'	1018'	4'															
5/11A	1018'	1024'	6'															
6/11	1024'	1030'	0'6"	N.B. 1026' - 1032½' - 6' core lost.														
13/11	1030'	1034'	2'															

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DIAMOND DRILL CORE RECORD

925129

Hole No. CLUTHA No. 3

Area of Operation ZEEHAN - COONAH MINE

Reduced Level of Site ✓

Drilled by ASSOCIATED DIAMOND DRILLERS PTY. LTD.

Location of Site B.M.R. Grid 310N, 313W

Bearing of Hole 254° Magnetic

Core Recovery +89%

Date Commenced 24/1/1963

Dip of Hole 65°

Geological Logging by—

Date Completed 7/1/1964

Bore Depth 692 feet

A.B. CLARK

B.M.R. GRID 1963.

JMA 1964 (25)

DRILL RECORD				GEOLOGICAL LOG			GEOLOGICAL SECTION		ASSAY RESULTS %								
Date	From	To	Core Recov.	From	To	Description	Core	Sample	Sample No.	From	To	Sn	Cu	Ag	Au	Pb	Zn
28/11	0'	25'	5'	0'	49'	Mine Dump hence spilite	3 (325' 328'	2'9"	C26	325'	328'	0.405	<0.1	197.1d	<0.1d	7.52	Tr
2/12	25'	49'	5'	49'	161'	Volcanic - spilite	3'0"	3'0"	C27	328'	331'	0.0015	-	4.8d	-	0.28	-
3/12	49'	78'	19'	161'	163'6"	Sulphide with lead (galena)	3'0"	3'0"	C28	331'	334'	0.23	-	5.2d	-	0.24	-
4/12	78'	108'	22'	163'6"	191'6"	Spilite with pyrite trace galena	2'0"	2'0"	C29	190'	192'	0.23	0.19	24.8d	-	2.17	0.14
5/12	108'	148'	32'	191'6"	193'	Sulphide with lead (galena)	1'0"	1'0"	C30	353'	354'	2.68	0.13	3.3d	-	0.03	-
6/12	148'	176'	28'	193'	194'	Spilite	2'0"	2'0"	C31	395'	397'	0.079	<0.1	3.1d	-	0.01	-
7/12	176'	194'	18'	194'	195'	Sulphide with lead (galena)	3'0"	3'0"	C32	397'	400'	0.001	-	2.6d	-	0.15	-
10/12	194'	234'	40'	195'	197'	Spilite	4'0"	1'0"	C33	410'	414'	1.25	.76	127.1d	-	0.33	-
11/12	234'	302'	68'	197'	208'	Spilite - (flow 80°S or 5°N)	4'0"	2'9"	C34	414'	418'	0.425	0.13	8.2d	-	0.02	-
12/12	302'	352'	50'	208'	208'6"	Sulphide	4'5"	2'0"	C35	418'	422'5"	0.500	0.48	87.3d	-	0.07	-
13/12	352'	397'	45'	208'6"	322'	Spilite with inch bands of sulphide	5'3"	2'6"	C36	422'5"	427'8"	0.411	0.26	7.6d	-	0.12	-
14/12	397'	427'	22'6"	322'	325'	Intraformational blue tuffaceous shales and flow material	2'4"	2'4"	C37	427'8"	430'0"	0.08	<0.1	2.2d	-	Tr	-
16/12	427'	455'	27'				2'4"	2'4"	C38	430'0"	432'4"	2.12	1.7	52.5d	<.1d	Tr	-
17/12	455'	493'	38'	325'	328'	Pyritic contact with 5" galena	2'4"	2'4"	C39	432'4"	434'8"	5.80	5.9	231.8d	-	0.035	0.11
18/12	493'	526'	33'	328'	331'	Pyritic contact	1'0"	1'0"	C40	554'	555'	0.0053	0.7	20d	0.2d	-	-
19/12	526'	564'	37'	331'	334'	Ex-solution quartz and silica-pyrite	4'1"	4'0"	C41	434'8"	438'9"	0.054	Tr	3.06d	0.15d	-	-
20/12	564'	599'	35'	334'	353'	Fine grain grey tuffaceous shales	3'0"	3'0"	C42	438'9"	441'9"	0.38	Tr	1.09	<0.1	-	-
23/12	599'	609'	9'	353'	354'	Silica band with sulphide	3'9"	3'3"	C43	441'9"	445'6"	0.14	<.01	0.37	-	-	-
24/12	609'	616'	6'	354'	397'	Grey banded tuffaceous shales	4'0"	1'0"	C44	445'6"	449'6"	0.125	Tr	0.50	-	-	-
30/12	616'	635'	19'	397'	449'	Grey tuffaceous sandstone black graphite with sulphide mineralisation											
2/1	635'	649'	14'	449'	554'	Tuffaceous sandstone and graphitic shales											
3/1	649'	686'	31'	554'	555'	Silica band with sulphide mineralisation											
7/1	686'	692'	4'	555'	692'	Tuffaceous sandstone and grey banded tuffaceous shales.											

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DIAMOND DRILL CORE RECORD

Hole No. OONAH No. 4.
 Drilled by ATLANTIC DRILLERS LTD.
 Core Recovery +95%
 Geological Logging by—
 A. B. CLARK

Area of Operation OONAH MINE
 Location of Site 305N, 320W. B.M.R. Grid
 Date Commenced 17/7/1964
 Date Completed 3/8/1964

925130
 Reduced Level of Site
 Bearing of Hole 255° Magnetic
 Dip of Hole 35°
 Bore Depth 420 feet.

DRILL RECORD				GEOLOGICAL LOG			GEOLOGICAL SECTION		ASSAY RESULTS								
Date	From	To	Core Recov.	From	To	Description	Core	Sample	Sample No.	From	To	Sn %	Cu %				
17/7	0'	10'	old dump	0'	309'	Pyroclastic and flow volcanics	4'	4'	CO96	245'	249'	0.036	0.012				
18/7	10'	90'	dump			Sulphide mineralisation on contact	2'	2'	CO97	249'	251'	0.116	0.003				
19/7	90'	115'	5'	309'	346'	Grey tuffaceous shale with	3'	3'	CO98	276'	279'	0.049	0.004				
20/7	115'	185'	55'			vein mineralisation	3'	3'	CO99	279'	282'	0.375	0.70				
21/7	185'	236'	50'	346'	370'	Sulphide mineralisation in black	3'	3'	CO100	282'	285'	0.172	0.013				
22/7	236'	246'	10'			graphitic shales	3'	3'	CO101	285'	288'	0.28	0.071				
23/7	246'	278'	32'	370'	420'	Grey tuffaceous sandstone some	3'6"	3'6"	CO102	306'	309'6"	0.305	0.011				
24/7	278'	290'	12'			graphitic bands	3'	3'	CO103	309'6"	312'6"	0.21	0.008				
25/7	290'	310'	20'				3'	3'	CO104	312'6"	315'6"	0.063	0.013				
28/7	310'	312'	2'				4'	3'	CO105	335'	339'	0.145	0.057				
29/7	312'	335'	23'				3'	3'	CO106	339'	342'	0.007	0.255				
30/7	335'	374'	38'				4'	2'6"	CO107	342'	346'	0.009	0.003				
31/7	374'	395'	21'				3'	3'	CO108	346'	349'	0.30	0.485				
1/8	395'	404'	5'				3'6"	3'	CO109	360'	363'6"	0.265	0.285				
3/8	404'	420'	14'				3'	3'	GO110	363'6"	366'6"	0.103	0.098				
							3'	2'	CO111	366'6"	369'6"	0.019	0.003				
							3'	3'	CO112	369'6"	372'6"	0.020	0.013				
							3'6"	3'	CO113	372'6"	376'	0.038	0.044				
							3'	2'6"	CO114	376'	379'	0.016	0.079				
							4'	4'	CO115	379'	383'	0.096	0.065				
							2'6"	2'6"	CO116	211'9"	214'3"	0.005	0.013				
							2'	2'	CO117	224'	226'	0.25	0.015				

N.B. Possible old stope
 399' - 404'

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DIAMOND DRILL CORE RECORD

925131 QSD

Hole No. OONAH No. 5.
 Drilled by ATLANTIC DRILLERS LTD.
 Core Recovery + 90%
 Geological Logging by—
 A. B. CLARK

Area of Operation OONAH MINE
 Location of Site 305N, 320W, B.M.R. Grid
 Date Commenced 4/8/1964
 Date Completed 9/9/1964

Reduced Level of Site
 Bearing of Hole 255° Magnetic
 Dip of Hole 85° uncorrected
 Bore Depth 689 feet.

DRILL RECORD				GEOLOGICAL LOG			GEOLOGICAL SECTION			ASSAY RESULTS				
Date	From	To	Core Recov.	From	To	Description	Core	Sample	Sample No.	From	To	Sn %	Cu %	Ag dwts.
4/8	0	63	-	0	121	Rubble weathered pyroclastic rock	2'5"	2'5"	118	538'	541' 8"	6.16	5.2	55.2
5/8	63	70	7	121	129	Carbonated spillite	1'8"	1'4"	119	541'	542'	6.6	5.4	
6/8	70	135	30	129	235	Spillite	3'10"	3'7"	120	542'	546'	.153	.013	2.17
7/8	135	177	42	235	236	Pyritic replacement and lead in spillite	3'	3'	121	546½'	549½'	Tr	Tr	Tr
9/8	177	213	36	236	388	Pyroclastic rock including spillite	3'	2'6"	122	549'	552'	Tr	.59	5.41
10/8	213	250	37	388	401	Fine grained grey tuff shales	3'6"	2'9"	123	552'	556'	Tr	Tr	1.93
11/8	250	292	42	401	410	Grey tuff sandstone	3'	3'	124	556'	559'	.26	Tr	4.73
13/8	292	332	40	410	427	Grey tuff shale	4'	4'	125	559'	563'	.1	Tr	Tr
14/8	332	346	14	427	433	Tuff sandstone	3'	3'	126	563	566	Tr	Tr	Tr
15/8	346	376	30	433	452	Shales	3'	3'	127	566	569	Tr	Tr	Tr
16/8	376	413	37	452	466	Grey and black shales	6'	6'	128	569	575	.1	Tr	Tr
17/8	413	422	9	466	501	Micacious tuff sandstone	5'	5'	129	575	580	.29	Tr	Tr
18/8	422	451	29	501	538	Shale sandstone	3'9"	1'6"	130	580	583'	Tr	Tr	Tr
19/8	451	471	20	538	581	Mineralised graphitic								
20/8	471	489	18	581	631	tuffaceous sandstone								
21/8	489	491	2	631	657	Grey tuff shale band								
24/8	491	500	9	657	689	Grey sandstone and shale bands								
25/8	500	511	11											
28/8	511	530	19											
31/8	530	547	17			(1) Departure from depression to be affixed later.								
1/9	547	584	35											
2/9	584	607	23											
3/9	607	619												
5/9	619	625	6											
6/9	625	648	23											
7/9	648	665	17											
8/9	665	682	15											
9/9	680	689	9											

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DIAMOND DRILL CORE RECORD

Hole No. OONAH No. 6.

Area of Operation. . . OONAH MINE

Reduced Level of Site. 925132

Drilled by ATLANTIC DRILLERS LTD.

Location of Site. . . 910S, 910W

Bearing of Hole 298° Magnetic

Core Recovery + 95%

Date Commenced . . . 16/9/64

Dip of Hole. 75°

Geological Logging by—

Date Completed . . . 7/10/1964

Bore Depth 280 feet.

A. B. CLARK

DRILL RECORD				GEOLOGICAL LOG			GEOLOGICAL SECTION			ASSAY RESULTS								
Date	From	To	Core Recov.	From	To	Description	Core	Sample	Sample No.	From	To	Sn						
16/9	0	10	10	0	54	Weathered spillite	4'9"	4'9"	141	111'	115'9"	Tr						
17/9	10	40	20	54	78	Black tuff shale pyritic mineralisation	6'6"	6'0"	140	174'6"	181	Tr						
18/9	40	68	28			at contact												
19/9	68	102	34	78	94	Black grey tuff shales												
20/9	102	130	25	94	101	Graphitic lode 99 - 100												
21/9	130	148	18	101	110	Pyritic graphite												
22/9	148	160	12	110	118	Quartz pyrite in graphite												
23/9	160	168	8	118	175	Grey black pyritic shales												
30/9	168	184	16	175	181	Graphitic quartz with graphite												
1/10	184	217	33	181	254	Tuffaceous sandstone												
2/10	217	233	16	254	280	Micaceous sandstone with shales												
5/10	233	253	20															
6/10	253	270	14															
7/10	270	280	10															

DIAMOND DRILL CORE RECORD

925133

Hole No. OONAH No. 7
 Drilled by ATLANTIC DRILLERS LTD.
 Core Recovery + 90%
 Geological Logging by—
 A. B. CLARK

Area of Operation OONAH MINE
 Location of Site 810S, 82SW
 Date Commenced 10/10/64
 Date Completed 16/12/64

Reduced Level of Site
 Bearing of Hole 280° Magnetic (Uncorrected)
 Dip of Hole 80° Uncorrected
 Bore Depth 747 feet.

DRILL RECORD				GEOLOGICAL LOG			GEOLOGICAL SECTION		ASSAY RESULTS									
Date	From	To	Core Recov.	From	To	Description	Core	Sample	Sample No.	From	To							
10/10	0	46	-	0	200	Weathered volcanic rock of spillite.												
12/10	46	96	35	200	204	Black pyritic graphitic												
13/10	96	126	30	204	242	Black grey tuff shales												
14/10	126	150	24	242	243	Tuff sandstone.												
15/10	150	200	50	243	312	Banded black grey tuff shales.												
16/10	200	228	27	312	366	Grey tuffaceous sandstone.												
21/10	228	258	30	366	389	Cherty grey shales												
22/10	258	308	50	389	451	Tuffaceous sandstone with graphitic bands.												
23/10	308	328	20	451	455	Quartz and graphite												
24/10	328	349	21	455	496	Tuffaceous sandstone with graphite.												
25/10	349	362	13	496	500	Pyritic quartz and graphite.												
26/10	362	370	8	500	520	Tuff sandstone and shale bands.												
27/10	370	390	20	520	539	Intense graphite and pyrite												
28/10	390	415	25	539	573	Fine grained tuff sandstone.												
29/10	415	427	12	573	609	Banded grey-black shales.												
30/10	427	447	20	609	667	Fine grained tuff sandstone.												
1/11	447	467	20	667	747	Banded shales and sandstone.												
3/11	467	487	20															
4/11	487	508	20															
6/11	508	521	13															
7/11	521	540	19															
8/11	540	554	14															
9/11	554	580	26															
10/11	580	600	20															
12/11	600	624	24															
12/12	624	636	12															
13/12	636	650	14															

1) This hole has not been corrected for departure for depression and azimuth, of the order departure from azimuth + 18° Magnetic; depression - 15°

2) Section 520' - 539' to be sampled. (No Sample)

3) Course of hole into ground graphitic lode host but out of plunge of metal

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ORE DRESSING INVESTIGATION

DEPT. OF MINES LABORATORY REPORT R.476

Launceston, 14th July, 1966.

ORE DRESSING INVESTIGATION.R.476.Placer Prospecting Pty. Ltd.Concentration Tests - Oonah Mine Ore - Zeehan.Introduction

Placer Prospecting Pty. Ltd. submitted two samples of sulphide ore from the Oonah mine, near Zeehan, for chemical analysis and metallurgical tests to assess the probable recoveries of the economic minerals. The samples bear Mines Department registered numbers 64/2402 and 64/2403.

The samples contained tin, occurring as stannite and cassiterite, and copper, occurring as stannite and chalcopyrite. A considerable quantity of silver was also present. These three elements represent the major values in the ore, but also present were small but probably significant quantities of lead, antimony and bismuth.

The analyses of the two samples have been published previously. The sample for metallurgical testing was obtained by combining roughly equal weights of the two samples submitted.

Mineralogy

Specimens of the samples and a selected stannite specimen were submitted to Mr. G. Everard, Mines Department Mineralogist and Petrologist for mineralogical examination. His report follows:-

"The specimen consists of mixed sulphides, stannite, pyrite and chalcopyrite being visible in hand specimen, together with veinlets of quartz and carbonate.

Cassiterite is visible in crushed fragments under the microscope.

In polished section the cassiterite appears as euhedral crystals averaging .1mm long. Pyrite is fine grained and massive with irregular borders suggesting replacement, but arsenopyrite is euhedral in lozenge shaped crystals up to .3 mm. long. Chalcopyrite and bismuthinite appear as irregular small strings, blebs and patches .05 - .5 mm. long, in the stannite.

Pyrite and arsenopyrite appear to have been the first formed sulphides, to be partly replaced by stannite from which chalcopyrite and bismuthinite separated.

(Signed) G. Everard,
Mineralogist & Petrologist

64258
135Sample for Research.

The composite sample was roll crushed to minus $\frac{1}{2}$ inch, and a head sample cut out. Analysis of the head sample is as follows:

Copper	3.18	Per Cent
Total Tin	4.50	Per Cent
Tin (as SnO ₂)	2.25	Per Cent
Lead	0.76	Per Cent
Arsenic	1.80	Per Cent
Antimony	0.48	Per Cent
Bismuth	0.50	Per Cent
Zinc	0.25	Per Cent
Iron	19.4	Per Cent
Sulphur	23.4	Per Cent
Acid Insoluble	40.0	Per Cent
Silver	24.0	Ozs. per ton.

This analysis approximates a mineral composition of the sample as follows:

Stannite	8.0	Per Cent
Chalcopyrite	2.0	Per Cent
Galena	1.0	Per Cent
Arsenopyrite	4.4	Per Cent
Stibnite	0.8	Per Cent
Bismuthinite	0.6	Per Cent
Pyrite	35.3	Per Cent
Cassiterite	2.9	Per Cent
Acid Insoluble	40.0	Per Cent

An examination of the grain size of the cassiterite and a vanning assay were also performed on the sample with the object of anticipating recoveries obtainable by gravity concentration of this mineral. In general, cassiterite, plus 20 microns in diameter, can be recovered by gravity concentration. This applies approximately to the vanning assay also.

Cassiterite Grain Size Analysis

<u>Fraction</u>	<u>Cassiterite Particle Diameter - Microns</u>	<u>Cassiterite Distribution Per Cent</u>	<u>Per Cent Cum.</u>
+100 mesh B.S.S.	+ 152	4.8	4.8
+200 mesh B.S.S.	-152 + 76	9.9	14.7
+300 mesh B.S.S.	- 76 + 53	7.6	22.3
E. F. 2	- 53 + 28	20.9	43.2
3	- 28 + 20	10.9	54.1
4	- 20 + 13	17.5	71.6
5	- 13 + 10	18.6	90.2
6	- 10	9.8	100.0

E. F. = Elutriation Fraction.

Vanning Assay

Tin present as Cassiterite	2.18 Per Cent
Tin recovered by Vanning	0.93 Per Cent
Van Tin recovery	42.7 Per Cent
The Van Tin concentrate assayed 53.0 Per Cent Tin.	

Investigation1. Preliminary Copper Flotation Tests

A series of preliminary flotation tests were carried out in an endeavour to establish a reagent combination to selectively floc the copper bearing sulphides from pyrite and gangue.

These tests were performed in a Denver D-1 laboratory flotation machine, using 500 gram charges. The charges were batch ground in a 12 inch diameter steel ball mill in a pulp of 70 per cent solids. Grinding time was generally about 10 minutes.

Reagents investigated were: Aerofloat 238 and Sodium ethyl Xanthate as promoters in pulps made alkaline with lime and with Sodium cyanide present as a depressant for pyrite. The effect of pre-aeration to oxidize pyrite surfaces before copper flotation was also examined. Frother used throughout was M.I.B.C., at a rate sufficient to maintain froth.

The results of these tests indicated that stannite behaves similarly to chalcopyrite in flotation and that good recoveries of the copper bearing sulphides could be obtained by the use of sodium ethyl xanthate in the presence of lime and sodium cyanide. Pre aeration enhances selectivity by depressing pyrite. pH of the pulp should be kept about 11. The lime and cyanide were added to the ball mill before grinding, promoter and frothers to the cell.

Aerofloat 238, pH 10 - 11, with lime and cyanide present showed good selectivity for the copper sulphides but recovery was not as high as that obtained with the xanthate.

The following results are typical of the best obtained during this series of tests.

Abbreviations Used in Tables of Results

Results for Tests H-10, H-11, and H-17 the following abbreviations have been used:-

- F Flotation
- C Concentrate
- T Tailing

Digits immediately after a symbol signify the stage of the operation or product which the symbol describes.

For example:- In Test H-17 the product described in the table as "F4C1 0-2 mins." means "Flotation Stage 4, Concentrate Fraction 1 which was taken during the first two minutes of flotation".

The following is the result of the best of the tests described above.

Test # 17

Flotation Conditions:

<u>Cycle</u>	<u>Reagent</u>	<u>Added to</u>	<u>Rate of Addition</u>	<u>pH</u>	<u>Time</u>
Ro Bulk Flot. } (P1)	NaEtX MIBC	Fl. Cell Fl. Cell	0.5 lbs./ton 3 drops	6.0	7 mins.
Cl Bulk Flot. } (P2)	NaEtX MIBC	Fl. Cell Fl. Cell	0.25 lb./ton 2 drops	6.0	5 mins.
Regrinding } P2C	CaO NaCN	Ball Mill Ball Mill	4 lbs./ton 4 lb./ton		10 mins.
Cu Ro Flot. } (P3)	NaEtX MIBC	Fl. Cell Fl. Cell	*0.5 lb./ton 2 drops	10.8	5 mins.
Cu Cl Flot. } (P4)	MIBC	Fl. Cell	3 drops	10.4	1/2 mins.
	No further reagents addition - Successive cuts of FC at 2 min., 3 min., and 4 min.				

* 0.25 lb/ton added initially with a further addition of 0.25 lb/ton after 2 minutes.

Metallurgical Results

<u>Product</u>	<u>Per Cent</u>			<u>Remarks</u>
	<u>Wght.</u>	<u>Concnr</u>	<u>Concnr Distribution</u>	
FLC1 0-2 min.	12.9	19.2	77.1	Copper concentrate fractions.
FLC2 2-3 min.	2.8	8.64	7.2	
FLC3 3-4 min.	1.4	4.96	2.1	
FLT	3.8	2.24	2.5	
F3T	30.1	0.76	6.8	Pyrite Concentrate
F2T	6.6	0.88	1.8	
F3T	42.4	0.20	2.5	
Comp. Head	100.0	3.35	100.0	

3.

Gravity Concentration of the Tin
Present as Cassiterite

Having established conditions for bulk desulphidizing of the ore and production of a copper-tin sulphide concentrate, a larger scale test was undertaken to investigate the gravity concentration of the cassiterite tin in the flotation tailing.

Closed circuit grinding is essential to avoid overgrinding of cassiterite. The grinding was done continuously in the pilot plant 12 inch x 12 inch ball mill in closed circuit with a 60 mesh hammer screen. The screen undersize was pumped to a 10 K.G. Agitair flotation machine. Bulk sulphides were reground for copper flotation as described previously.

Flotation tailings were fed to a three spigot Geco hydrozizer and the products from this unit tabled separately.

The attached flowsheet - Test N 21 - describes the test procedure in these operations.

During the test it was noted that the minus 60 mesh sulphides contained a high proportion of composite sulphide-insoluble silicate particles. It was therefore necessary to introduce a secondary grinding stage (Ball mill 2 in flowsheet) followed by bulk flotation (Flotation 2A), to separate these components. Flotation tailings from these operations were concentrated separately (Table 5) It is noteworthy that nearly half of the total tin recovery was obtained from this fraction. Sizing of Ball mill 2 discharge was 90 per cent minus 200 mesh.

Several sizings were made of products from this test namely the 60 mesh screen under size, the reground sulphides - No. 3 Flotation feed, and the first Copper Concentrate - Fl. C1. This latter sizing has been mentioned previously in section 1.

The results of this test indicate that:

(a) Recovery of tin present as cassiterite is unlikely to exceed 40 per cent under any circumstances involving gravity concentration processes. The cassiterite metallurgy of Test N 21 is confirmed in part by the grain size analysis and vanadium assay mentioned previously.

(b) While grinding to minus 60 mesh may be desirable to effect release of coarse cassiterite without overgrinding, further grinding to the order of 200 mesh is necessary to effect total or near total release of the finer grained fraction of this mineral.

(c) In commercial treatment of the ore, tilting decks and/or vanners would be preferred to tables for maximum cassiterite tin recovery by gravity means.

It will be noted in the tabulated results of Test N 21 that copper recovery is not as good as in the smaller scale tests quoted previously. This can be accounted for by the fact that different equipment has been used and flotation conditions could therefore require some slight modification.

Test N 21

Metallurgical Results.

Product	Wght.	Per Cent			Per Cent Distribution			
		Copper	Sol. Tin	Insol. Tin	Copper	Sol. Tin	Insol. tin	
Copper Conc. F4C1	10.26	19.5	10.4	0.86	58.0	47.5	4.4	
Copper Conc. F4C2	3.45	16.0	10.0	0.86	16.0	15.4	1.5	
F4T	11.10	4.5	2.3	0.89	14.5	11.4	18.4	
Pyrite Conc. F3T	30.83	0.93	0.76		8.3	10.4		
Gravity Tailings	(T1T)	2.33	0.12	0.60	1.2	9.4	1.5	
	(T2T)	6.88					0.98	3.3
	(T3T)	8.97					0.83	3.7
	(T4T)	16.77					2.10	17.4
	(T5T)	7.44					0.48	1.40	4.82	1.0	4.8	13.2
Gravity Concs.	(T1C)	0.33	1.20	1.20	0.4	0.5	42.6	
	(T2C)	0.21					36.8	3.8
	(T3C)	0.25					34.2	4.3
	(T4C)	0.33					33.8	5.5
	(T5C)	0.85					2.60	1.70	38.2	0.6	0.6	16.0
Composite Head	100.00	3.45	2.25	2.02	100.0	100.0	100.0	

Note: Sol. Tin = Tin present as stannite. Insol. Tin = Tin present as Cassiterite.

Summary of Concentrates Produced:

<u>Copper Conc.</u>	<u>Ozs./ton</u> <u>Silver</u>	<u>Per Cent</u>			<u>Per Cent Recovery of Metals</u>			
		<u>Copper</u>	<u>Sol. Tin</u>	<u>Insol. Tin</u>	<u>Copper</u>	<u>Sol. Tin</u>	<u>Insol. Tin</u>	<u>Silver</u>
FLC1 } + FLC2 }	196	18.6	10.3	0.86	74.0	62.9	5.9	61.0

<u>Cassiterite Concentrate : Table</u> <u>Concs. 1 - 5</u>	<u>Per Cent</u>			
	<u>Insol. Tin</u>	<u>Sol. Tin</u>	<u>Copper</u>	<u>Insol. Tin Recovery</u>
	37.6	0.56	0.51	36.7

The above results should be studied in conjunction with the attached flowsheet.

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SHEET No. R.476/11.

Analysis of the Copper Concentrate.

<u>Element</u>	<u>Flc1</u>	<u>Flc2</u>
Copper	19.5	16.0
Sol. Tin	10.4	10.0
Insol. Tin	0.86	0.86
Antimony	2.70	3.00
Arsenic	1.33	1.74
Lead	3.10	1.80
Bismuth	0.90	0.70
Zinc	1.10	1.0
Iron	24.0	27.2
Sulphur	31.6	32.61
Acid Insol.	4.0	4.1
Silver	192 Ozs./ton	207 Ozs./ton

Note

The ore is known to contain tetrahedrite and the antimony in the concentrate is probably present as this mineral. Tetrahedrite usually contains arsenic and the same conclusions apply to this metal also.

Sizing Analysis of Products from Test N21

<u>Fraction</u> (T.S.S.)	<u>Per Cent</u>							
	<u>60 Mesh Screen U/S</u>		<u>F3 Feed.</u>		<u>Flc1</u>			
	<u>Wght.</u>	<u>Cum. Wght.</u>	<u>Wght.</u>	<u>Cum. Wght.</u>	<u>Wght.</u>	<u>Cum. Wght.</u>	<u>Cum. Wght.</u>	<u>Cum. Wght.</u>
+ 85 Mesh	2.7	2.7						
100	4.4	7.1						
150	14.9	22.0						
200	12.5	34.5	1.8	1.8	1.2	1.2	8.5	
<u>Q.12.1</u>	19.0	53.5	19.2	21.0	10.4	11.6	19.2	
2	9.8	63.3	12.9	33.9	12.4	24.0	18.1	
3	9.5	72.8	16.5	50.4	19.6	43.6	17.6	
4	6.8	79.6	13.5	63.9	18.0	61.6	18.1	
5	3.3	82.9	7.2	71.1	9.6	71.2	18.1	
6	17.1	100.0	28.9	100.0	28.8	100.0		

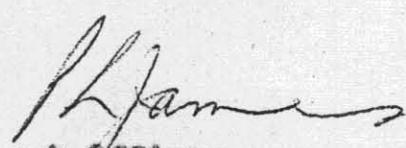
6428
145Summary.

In summarizing the results of this investigation, the preliminary nature of the test work must be stressed. Not much attention has been given to establishing optimum reagent combinations or additions for the various flotation stages and furthermore the use of Aerofloest 233 and other selective copper flotation reagents has not been studied to any extent.

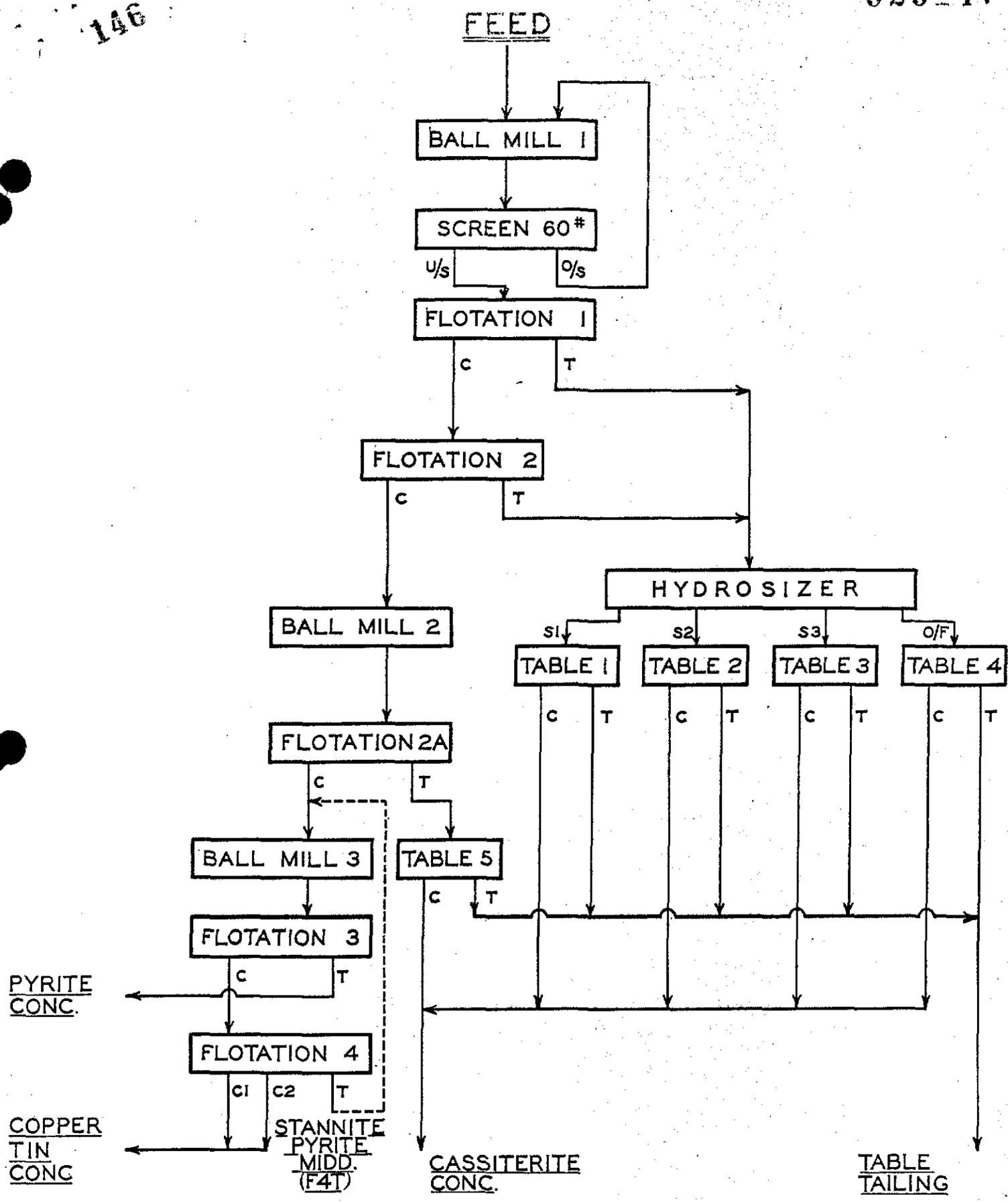
In addition, the degree of grinding required for release of cassiterite from gangue and sulphides and release of copper bearing sulphides from pyrite has not been firmly established, although it appears that grinding to minus 200 mesh would achieve both these functions.

However, the results have shown that it is feasible to produce from this type of ore a sulphide concentrate containing 19 per cent copper, 10 per cent tin and 200 oss./ton of silver plus significant amounts of other economically valuable metals. It is anticipated that a market could be found for such a concentrate.

In view of the fineness of the cassiterite grain size it would be unwise to anticipate recoveries much in excess of 40 per cent of the tin present as this mineral in concentrates of the grades shown.


Research Officer.

H.R. Wellington
Chief Chemist & Metallurgist.



R 476 FLOWSHEET OF TEST N-21
 PLACER PROSPECTING PTY. LTD. — OONAH MINE

MINERALOGY OF STANNITE ORE FROM OONAH MINE, ZEEHAN

Frank L. Stillwell, 6th September, 1930

STANNITE ORE FROM OONAH MINE, ZEEHAN

Ore from the "Stannite" lode in the Oonah Mine, Zeehan, has a complex composition and contains an exceptional number of elements. Its chemical composition is indicated by the following figures published in Bulletin No. 8 of the Geological Survey of Tasmania (p.53)

Silver	22	ozs per ton
Copper	5.5	per cent
Tin	4.5	" "
Bismuth	0.4-0.45	per cent
Iron	26-27	" "
Sulphur	29	" "
Silica	22-27	" "
Alumina	4.5	" "

An analysis of apparently pure stannite was made by J.H. Levings with the following result (Ann. Report of Sec. for Mines Tas. 1907, p.32)

Silver	0.298	97.3	ozs. per ton.
Tin	23.27		as sulphide.
	.64		as oxide
Copper	26.77		
Iron	12.11		
Bismuth	2.27		
Antimony	0.505		
Arsenic			
Zinc	0.475		
Sulphur	32.10		
Silica	1.40		
Oxygen	0.14		

100.278

These figures indicate the proportions of the main elements in the ore and show that even apparently pure stannite is contaminated by a number of minerals. The mineralogical composition and the relationships of the minerals to each other are therefore an important basis for any experimental work upon the metallurgical treatment of the ore.

Mineral Composition. The metallic minerals that have been observed in a sample of the ore are -- pyrite, arsenopyrite, cassiterite, stannite, chalcopyrite, tetrahedrite, bisumthinite and galena. The gangue minerals are chiefly quartz, with some siderite and occasional fluorite.

Twelvetrees and Ward (Bull.8.p.53) also record wolfram and antimonial lead.

The examination of polished sections of the ore shows clearly the existence of two generations of minerals. Pyrite, arsenopyrite and cassiterite belong to the earlier generation with quartz. Stannite and chalcopyrite with the smaller included amounts of tetrahedrite, bismuthinite and galena belong to a later generation. The earlier generation shows considerable replacement by the later generation, and the varying degrees of replacement partly account for the wide variations in mineral content in different specimens of ore. Wolfram is a common associate of cassiterite and, though not detected, in the polished sections, would undoubtedly belong to the earlier generation.

Pyrite Pyrite occurs in seams and bunches of crystals which are generally associated with the siliceous portions of ore. Isolated crystals in quartz are often idiomorphic but isolated crystals in stannite are generally corroded and often represent shapeless, unreplaced residuals. The edge of a mass of pyrite in contact with an area of the stannite group of minerals is often corroded and, in places, is transgressed by numerous veins of chalcopyrite, stannite, galena and bismuthinite. Of these the replacement by chalcopyrite is the most prominent.

Arsenopyrite. Arsenopyrite is much less abundant than pyrite, though in limited areas crystals of arsenopyrite may be more numerous. The crystals are often comparatively large and easily visible to the naked eye on the polished surface. They are generally idiomorphic in contact with quartz or pyrite but are extensively corroded and veined by the invading areas of the stannite group of minerals. Fig.2 illustrates a crystal of arsenopyrite which is for the most part embedded in quartz but is corroded where it comes into contact with stannite.

Cassiterite. Crystals of cassiterite occur within the main areas of pyrite, arsenopyrite and quartz. They appear more abundantly as bunches along the margin of quartz and stannite and in areas of chalcopyrite. They also occur embedded in stannite as illustrated in fig.6 where the outline of the crystal is much corroded. Large bunches of crystals may measure .87mm. x 1.15 mm. but many individuals in the residual groups in stannite may be as small as .002mm. in width. Inclusions of cassiterite in stannite tend to be more abundant in areas rich in chalcopyrite and they are often surrounded by a thin sheath of chalcopyrite. The average amount of cassiterite is greater than that indicated in Levings' analysis of stannite and approximates to his estimate that as much as 15% of the total tin occurs as oxide.

Cassiterite in polished sections is recognised by its hardness, grey colour in comparison with dark quartz and by its resistance to all etching agents. Though recognisable in the polished sections it is only identified with certainty by the preparation of a thin section and by examination in transmitted light. The cassiterite is then recognised by its high refractive index, high double refraction, straight extinction, uniaxial and positive character. These optical properties combined with its hardness which is similar to that of quartz and sometimes a little higher, establish the mineral as cassiterite beyond doubt.

Chalcopyrite. Chalcopyrite is an abundant constituent of all sections containing stannite and is readily recognised by its yellow colour. It is unevenly dispersed throughout the stannite as small inclusions of irregular shape and size. While these are numerous they are not comparable in abundance with the myriads of minute particles of chalcopyrite that are a feature of many stannites from other localities. It may perhaps be that the excess copper in the stannite solutions of the Conah deposit has been largely utilised in the replacement of pyrite and its conversion into chalcopyrite.

Some areas of stannite are comparatively free from inclusions of chalcopyrite, but there are other fields such as fig.1 where the amount of chalcopyrite approximates to that of stannite. Others again are more accurately described as large areas of chalcopyrite honey-combed with irregular inclusions of stannite. These larger areas of chalcopyrite are often studded with cassiterite particles. Moreover as many particles of cassiterite in stannite are surrounded with

a thin coating of chalcopyrite would appear that cassiterite, belonging to the earlier generation of minerals, has been more stable in contact with chalcopyrite of the later generation than in contact with stannite. Chalcopyrite also contains inclusions of tetrahedrite, galena and bismuthinite.

Stannite. Stannite is the most abundant mineral in the specimens of ore and is readily recognised in a polished section by its brownish-white colour. It is a very brittle mineral and the polished surfaces show pittings which appear as dark spots in the photographs. It is anisotropic and frequently shows traces of an imperfect lamellae twinning. It is attacked by HNO_3 with the development of an etched structure, showing the irregular outlines of the crystals and also at times the intermittent and impersistent twin lamellae.

Like chalcopyrite, it frequently shows evidence of the replacement and veining of pyrite, arsenopyrite, cassiterite and quartz. Residuals of these minerals appear as common inclusions in stannite. In addition stannite contains numerous small inclusions of chalcopyrite, tetrahedrite (fig. 5) bismuthinite (fig.3) and galena.

Tetrahedrite. Tetrahedrite is the important silver mineral in the ore. It is also probably the source of all the antimony in Levings' analysis of stannite. Its greyish-white colour on the polished surface enables it to be distinguished from the brownish-white stannite of similar hardness. It is unattacked by the standard etching agents and only affected by a mixture of HCl and CrO_3 .

An elongated area of tetrahedrite in stannite is illustrated in fig.5 when the contrast with stannite has been increased by etching the stannite with HNO_3 . Many particles are more irregular in shape than that in fig.5 and also much smaller. Sometimes inclusions of tetrahedrite occur in chalcopyrite while minute particles are often associated with the inclusions of bismuthinite and galena.

Bismuthinite. Bismuthinite occurs as irregular veinings and replacements in quartz, pyrite and arsenopyrite and also as minute inclusions dispersed throughout the stannite. Isolated crystals are generally prismatic in shape (fig.3) and some are as small as .001 mm. in width.

Bismuthinite in a polished section has a galena-white colour and is etched slowly by HNO_3 with the development of its prismatic structure. It resembles stibnite in being strongly anisotropic and pleochroic but is distinguished from stibnite by its resistance to KOH . Its identification has been confirmed from areas surrounded by quartz from which it can be dissolved by concentrated HNO_3 without contamination. The drop of solution so obtained is transferred to a glass slide and tested for bismuth by micro-chemical methods.

Many of the areas of bismuthinite in both quartz and stannite are composed of several crystals associated with particles of tetrahedrite and galena. Some of the individual crystals may also contain thin films of stannite along the cleavage planes of bismuthinite and at times a very intimate association of bismuthinite and stannite is presented.

Galena. Minute quantities of galena occur in the ore as inclusions in chalcopyrite and stannite. It is often associated with the inclusions of bismuthinite and is indistinguishable from bismuthinite in an untreated section. It is however readily distinguished by etching with HCl or FeCl_3 when the galena is rapidly tarnished. Galena is then seen in some cases to fill interstices between the prisms of bismuthinite and extends in other cases to amounts equivalent to or greater than the area of bismuthinite. Fig.4 illustrates a composite area of bismuthinite and galena in which the HCl and the white prisms of

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bismuthinite are clearly revealed. The tarnished surface of galena in this field of view is visually quite distinct from the neighbouring yellow chalcopyrite though unfortunately the contrast is not well marked in the photograph.

The minute inclusions in stannite may therefore be composed of galena, bismuthinite, tetrahedrite or chalcopyrite and many are minute composite aggregates of two or more of these four minerals. Galena is perhaps not so constant an associate of bismuthinite as tetrahedrite. It tends to be more frequently associated with chalcopyrite and appears to find its greatest development in areas of chalcopyrite.

Composition of Stannite Ore.

The comparison of the mineral constitution of the ore with Levings' analysis of stannite indicates that the tin content is derived from cassiterite as well as stannite. The proportion derived from cassiterite is less in apparently pure stannite than in the average ore sample.

The copper content is derived from stannite, chalcopyrite and tetrahedrite. In the apparently pure stannite possibly as much as 90% is derived from the stannite, perhaps 8% from chalcopyrite and the remaining 2% from tetrahedrite. In the average ore the percentage of copper derived from chalcopyrite materially increases.

Bismuth is wholly derived from bismuthinite and the silver and antimony come from tetrahedrite.

Iron is derived from pyrite, chalcopyrite, arsenopyrite and stannite. The presence of arsenopyrite indicates that the average mine ore contains a small percentage of arsenic. Small quantities of lead are also present, being derived from the galena. Zinc blende has not been detected in the stannite and it is probable that the zinc in Levings' analysis of stannite replaces part of the iron in the theoretical composition of stannite (Cu_2S, FeS, SnS_2). Zinc is sometimes present in the composition of tetrahedrite but the proportions of tetrahedrite are insufficient to account for the estimated amount of zinc in the stannite analysis.

signed
FRANK L. STILLWELL
September, 6th, 1930.

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Oonah & St. Dizier
Amely

File this

925153



WRIGHT ENGINEERS PTY. LIMITED

Cable: "Wrighteng"

SUITE 1403, 122-130 ARTHUR STREET,
NORTH SYDNEY, N.S.W. AUSTRALIA, 2060

TELEPHONE: 92-1721

APPENDIX IV

17th February, 1971

Mr. S. C. Pearce,
Minops Pty. Ltd.,
505 St. Kilda Road,
MELBOURNE, Victoria 3004

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Dear Sid,

Re: Oonah & St. Dizier
Our Project No. 7008

Further to our verbal report of 12th February, 1971 on the estimated costs developed for the above properties, we are now submitting a summary of our data.

Capital Costs

The breakdown of the estimated costs are presented on the computer print out sheets. These are summarised as follows in Australian funds.

	<u>Oonah</u>	<u>St. Dizier</u>
A. Mining	-	-
B. Site preparation	40,000	40,000
C. Crushing Plant	432,000	432,000
D. Concentration	1,310,000	1,225,000
E. Plant services	1,311,000	886,000
F. Overheads	1,073,000	975,000
Total	A\$4,166,000	A\$3,558,000

/2..

Mr. S.C. Pearce

17th February, 1971

<u>Operating Costs</u>	<u>A\$/ton</u>	<u>A\$/ton</u>
A. Crushing & Milling	2.80	2.70
B. Power	1.00	0.90
C. Tailing & Water	0.15	0.15
D. Administration	1.02	1.02
E. Concentrate Shipping		
Copper/tin	3.30	-
Tin	0.27	0.27
Total:	8.54	5.04
Per Annum	A\$850,000	A\$504,000

<u>Revenue per Annum *</u>	<u>Oonah</u>	<u>St. Dizier</u>
Copper/tin, 5833 tons @ \$272	1,586,000	0.00
Tin, 630 tons @ \$1235	778,000	
930 tons @ \$1235		1,111,500
Total:	\$2,364,000	\$1,111,500

*Basis :

Copper/tin, Copper Pass Smelter Schedule 1969
 Cu - 45¢/lb (U.S.)
 Sn - 1440 pounds sterling/metric ton

Tin, Sydney Smelter Schedule 1962

Indicated net annual revenue
exclusive of mining costs and
before taxes

A\$1,514,600A\$607,500

/3..



Mr. S.C. Pearce

17th February, 1971

Comments:

1. Capital Costs

While we believe these estimates are indicative when based on the method of computation, there are some estimates which could change with more detailed evaluation.

It will be noted that over half the costs are involved in plant services and project overheads. With more detailed study, these costs could be considerably modified especially if both properties could share facilities to some degree. It should be noted that power costs include mining requirements in each case.

2. Operating Costs

The freight cost for the copper/stannite concentrate is high and is based on export to the U.K. More favourable markets may be available.

Mining costs will naturally affect the overall financial picture, especially for the Oonah property.

3. Marketing

We feel that perhaps this could be a most critical factor and requires further study.

The marketing situation for cassiterite has changed in recent years, and lower grade concentrates are being accepted by the smelters.

It is important, therefore, that each property should establish its own optimum grade-recovery relationship.



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Mr. S. C. Pearce

17th February, 1971

Conclusion

The inclusion of mining costs can be expected to reduce the annual revenue amount to somewhere between half and three quarters of a million dollars per property. On this basis a mine life of 6-7 years appears to be marginal for a profitable operation.

However, from what has been stated in the above, a more detailed appraisal is probably justified.

To confirm some of the parameters we would suggest the following test work program.

1. Confirmation of the Launceston bulk flotation and copper separation test results. Cassiterite gravity and flotation concentration tests.
2. Effect of grind.
3. Mineralogical analysis and assays.
4. Effect of chlorite, magnetite, talc and graphite on St. Dizier cassiterite flotation.
5. Very preliminary heavy media tests.
6. Work Indices.

The above program would place emphasis on the grade-recovery relationships for cassiterite, utilising gravity and flotation techniques, because this phase is the key to the project economics.

The work index is valuable for evaluating the grinding and power equipment requirements which could affect capital costs considerably - the estimated budget for this work is \$2,500, and would be done at Lakefield Research, Ontario.



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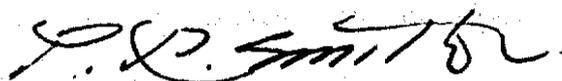
Mr. S. C. Pearce

17th February, 1971

Other aspects which require clarification to enable a more precise evaluation to be made include marketing and shipping costs, tax structure that would apply depending on methods of capitalization etc., climatic conditions affecting building specifications and mining costs which are to come.

We trust this preliminary report provides the necessary data at this time, and we would be pleased to discuss it's content when it is convenient.

Yours sincerely,
WRIGHT ENGINEERS PTY. LIMITED



P. R. Smith
Managing Director

WRIGHT ENGINEERS PTY. LIMITED

c.c. W.E.L., Vancouver
Mr. E.H. MacDonald

P. R. SMITH
Managing Director



PROJECT 7005 OONAH, ZEEHAN, TASMANIA

4 FEB. 1971

400. ^{SHORT} TONS PER DAY (350 LTPD)
1.4 YRS. PREPRODUCTION

PAGE 1 OF 2

A. MINING

1. MINE EQUIPMENT	\$	0.
2. MINE DEVELOPMENT	\$	0.
TOTAL MINING		\$ 0.

B.3. PLANT SITE EXCAVATION \$ 46000.

C. CRUSHING PLANT

4. CRUSHING EQUIPMENT	\$	246000.
5. CRUSHING EQUIP. INSTALLATION	\$	90000.
6. CRUSHING PLANT CONSTRUCTION	\$	158000.
TOTAL CRUSHING PLANT		\$ 494000.

D. CONCENTRATOR

7. ORE STORAGE AND RECLAIM	\$	87000.
8. CONCENTRATOR EQUIPMENT	\$	735000. 835,000
9. CONCENTRATOR EQUIP. INSTALL.	\$	219000. 250,000
10. CONCENTRATOR BLDG. CONSTR.	\$	298000.
TOTAL CONCENTRATOR		\$ 1339000. 1500,000



WRIGHT ENGINEERS LIMITED

1101 WEST PENDER ST.
VANCOUVER 1, B.C.

158

WRIGHT ENGINEERS LIMITED
QUICK CAPITAL COST ESTIMATE

925159

PROJECT 7005 OONAH, ZEEHAN, TASMANIA

4 FEB. 1971

^{SHORT}
400 TONS PER DAY (350 LTPD)
1.4 YRS. PREPRODUCTION

PAGE 2 OF 2

E. PLANT SERVICES

11. CONCENTRATE STORAGE AND LOADING	\$	66000.	
12. TAILING STORAGE	\$	112000.	
13. WATER SUPPLY	\$	419000.	250,000
14. ELECTRIC POWER DISTRIBUTION	\$	179000.	} Includes U'Grd. Minc. Power.
TOTAL INSTALLED H.P. - DIESEL		2620.	
15. POWER PLANT - DIESEL	\$	535000.	
16. SURFACE VEHICLES AND ACCESS RDS.	\$	54000.	
17. ANCILLARY BUILDINGS	\$	209000.	
18. EMPLOYEE HOUSING	\$	99000.	

TOTAL PLANT SERVICES \$ ~~1673000.~~ 1,500,000

F. OVERHEAD COSTS

19. INVENTORY	\$	80000.
20. ENGINEERING COSTS	\$	410000.
21. ADMINISTRATION COSTS	\$	207000.
22. INTEREST DURING PREPRODUCTION	\$	251000.
23. WORKING CAPITAL	\$	280000.

TOTAL OVERHEAD COSTS \$ 1228000.

TOTAL CAPITAL COST \$ ~~4780000.~~ 2,772,000 ÷ 1.1413

= A \$ 4,166,000



WRIGHT ENGINEERS LIMITED

1101 WEST PENDER ST.,
VANCOUVER 1, B.C.

Handwritten initials 'KC'

PROJECT 7005 ST. DIZIER, ZEEHAN, TASMANIA

4 FEB. 1971

159
 SHORT
 400 TONS PER DAY (350 LTPD)
 1.4 YRS. PREPRODUCTION

PAGE 1 OF 2

A. MINING

1. MINE EQUIPMENT	\$	0.
2. MINE DEVELOPMENT	\$	0.

TOTAL MINING	\$	0.

B.3. PLANT SITE EXCAVATION \$ 46000.

C. CRUSHING PLANT

4. CRUSHING EQUIPMENT	\$	246000.
5. CRUSHING EQUIP. INSTALLATION	\$	90000.
6. CRUSHING PLANT CONSTRUCTION	\$	158000.

TOTAL CRUSHING PLANT	\$	494000.

D. CONCENTRATOR

7. ORE STORAGE AND RECLAIM	\$	87000.
8. CONCENTRATOR EQUIPMENT	\$	792000. 760,000
9. CONCENTRATOR EQUIP. INSTALL.	\$	242000. 232,000
10. CONCENTRATOR BLDG. CONSTR.	\$	321000.

TOTAL CONCENTRATOR	\$	1442000. 1,400,000



WRIGHT ENGINEERS LIMITED

1101 WEST PENDER ST.
 VANCOUVER 1, B.C.

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PROJECT 7005 ST. DIZIER, ZEEHAN, TASMANIA 4 FEB. 1971

400. TONS PER DAY (350 TPD) ^{SHORT} PAGE 2 OF 2
1.4 YRS. PREPRODUCTION

E. PLANT SERVICES

11. CONCENTRATE STORAGE AND LOADING	\$	9000.	
12. TAILING STORAGE	\$	112000.	
13. WATER SUPPLY	\$	70000.	
14. ELECTRIC POWER DISTRIBUTION	\$	112000.	} Includes Open Pit Mine Power.
TOTAL INSTALLED H.P. - DIESEL		1760.	
15. POWER PLANT - DIESEL	\$	334000.	
16. SURFACE VEHICLES AND ACCESS RDS.	\$	54000.	
17. ANCILLARY BUILDINGS	\$	171000.	
18. EMPLOYEE HOUSING	\$	99000. 150,000	
TOTAL PLANT SERVICES		\$	<u>961000.</u> 1,012,000

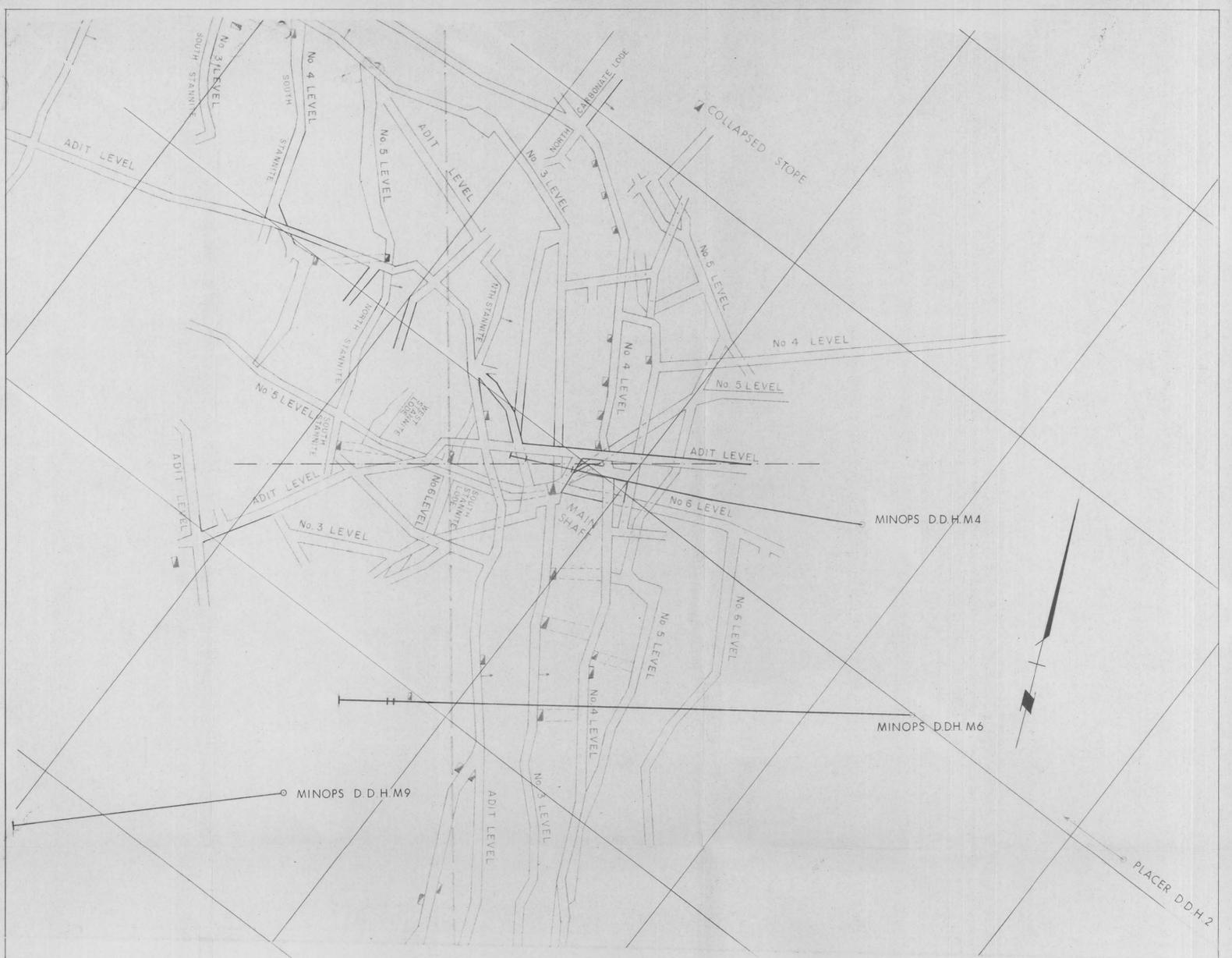
F. OVERHEAD COSTS

19. INVENTORY	\$	80000.	
20. ENGINEERING COSTS	\$	339000.	
21. ADMINISTRATION COSTS	\$	207000.	
22. INTEREST DURING PREPRODUCTION	\$	208000.	
23. WORKING CAPITAL	\$	280000.	
TOTAL OVERHEAD COSTS		\$	1114000.
TOTAL CAPITAL COST		\$	<u>4057000.</u> \$4,066,000 ÷ 1.143
			<u>= A \$ 3,568,000</u>

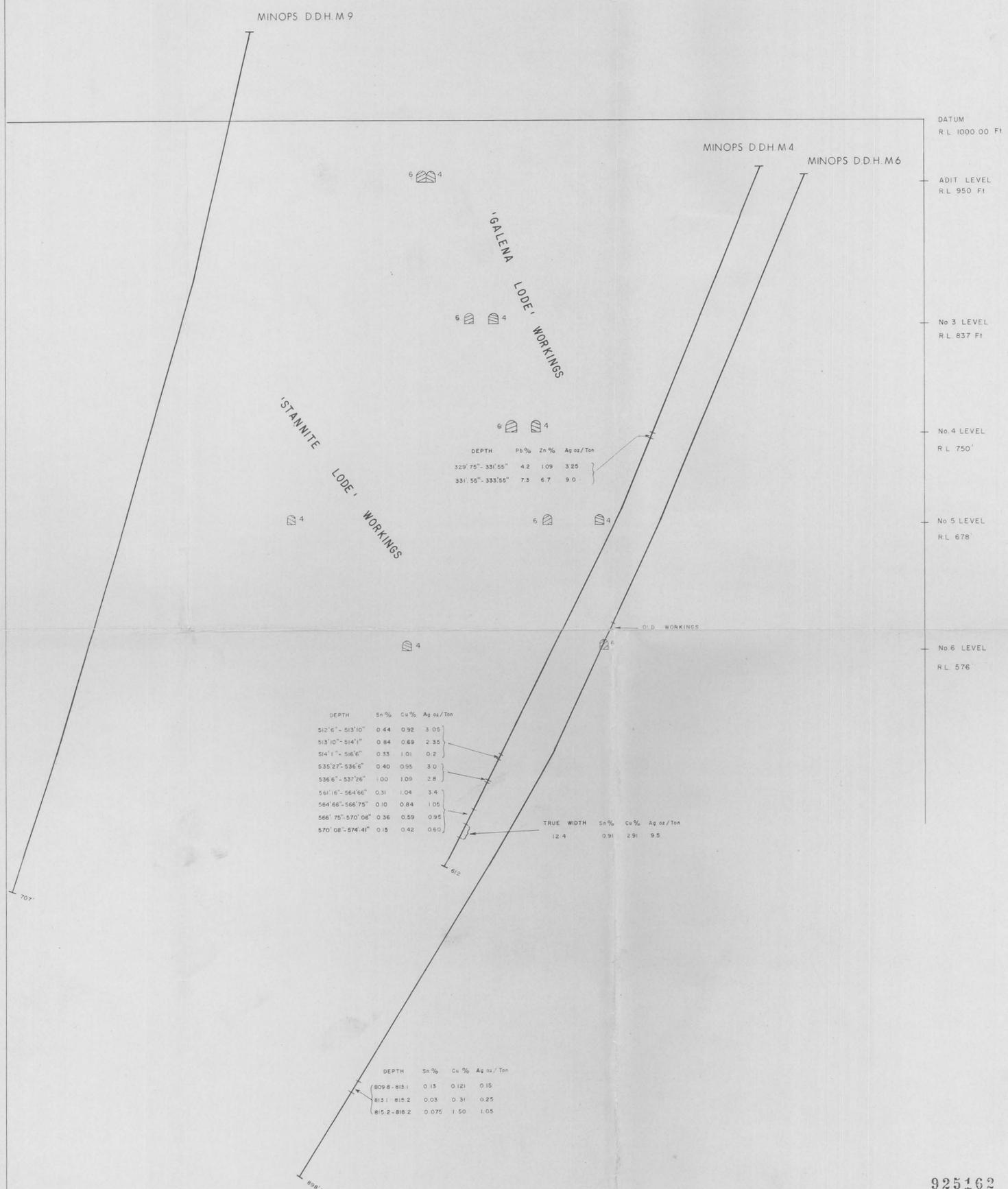


WRIGHT ENGINEERS LIMITED
1101 WEST PENDER ST.,
VANCOUVER 1, B.C.
VANCOUVER 1, B.C.

hb



PLAN OF WORKINGS AND DRILLING SOUTH OF SLIDE



DEPTH	Pb %	Zn %	Ag oz/Ton
329' 75" - 331' 55"	4.2	1.09	3.25
331' 55" - 333' 55"	7.3	6.7	9.0

DEPTH	Sn %	Cu %	Ag oz/Ton
512' 6" - 513' 10"	0.44	0.92	3.05
513' 10" - 514' 1"	0.84	0.69	2.35
514' 1" - 516' 6"	0.33	1.01	0.2
535' 27" - 536' 6"	0.40	0.95	3.0
536' 6" - 537' 26"	1.00	1.09	2.8
561' 16" - 564' 66"	0.31	1.04	3.4
564' 66" - 566' 75"	0.10	0.84	1.05
566' 75" - 570' 06"	0.36	0.59	0.95
570' 06" - 574' 41"	0.15	0.42	0.60

TRUE WIDTH	Sn %	Cu %	Ag oz/Ton
12.4	0.91	2.91	9.5

DATUM
R.L. 1000.00 FT

ADIT LEVEL
R.L. 950 FT

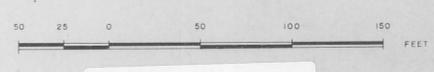
No 3 LEVEL
R.L. 837 FT

No 4 LEVEL
R.L. 750'

No 5 LEVEL
R.L. 678'

No 6 LEVEL
R.L. 576'

PROJECTED SECTION THROUGH D.D.H. M6 (ON BEARING 258° mag)



925162

MINOPS PTY LTD

OONAH PROSPECT
PLAN AND PROJECTED SECTION OF
MINE WORKINGS AND DRILLING
SOUTH OF SLIDE

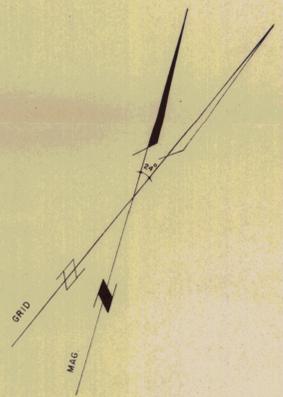
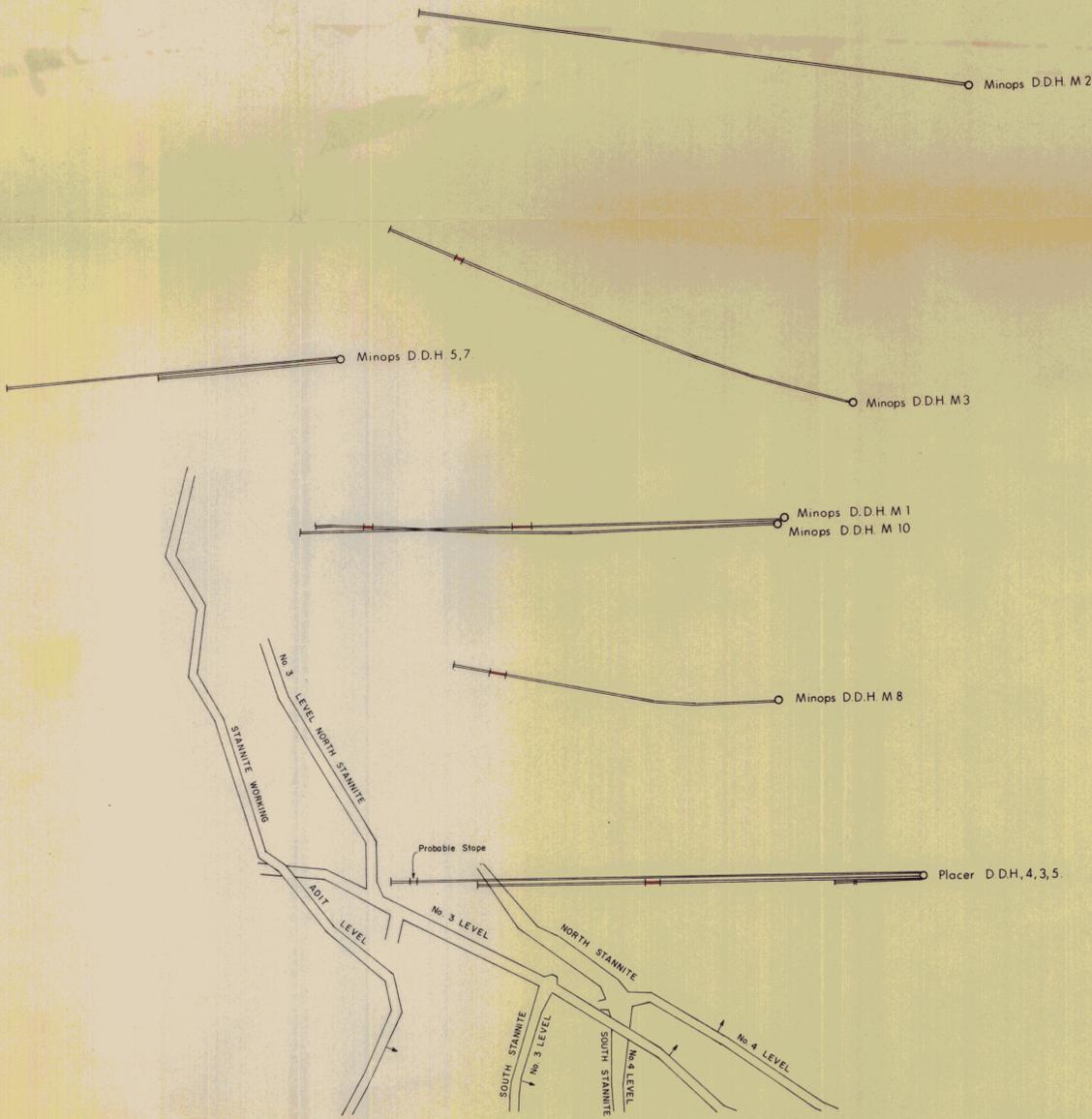
FIG. 1.

Scale : 1 Inch = 50 Feet
Date : 21. Jan. 1971

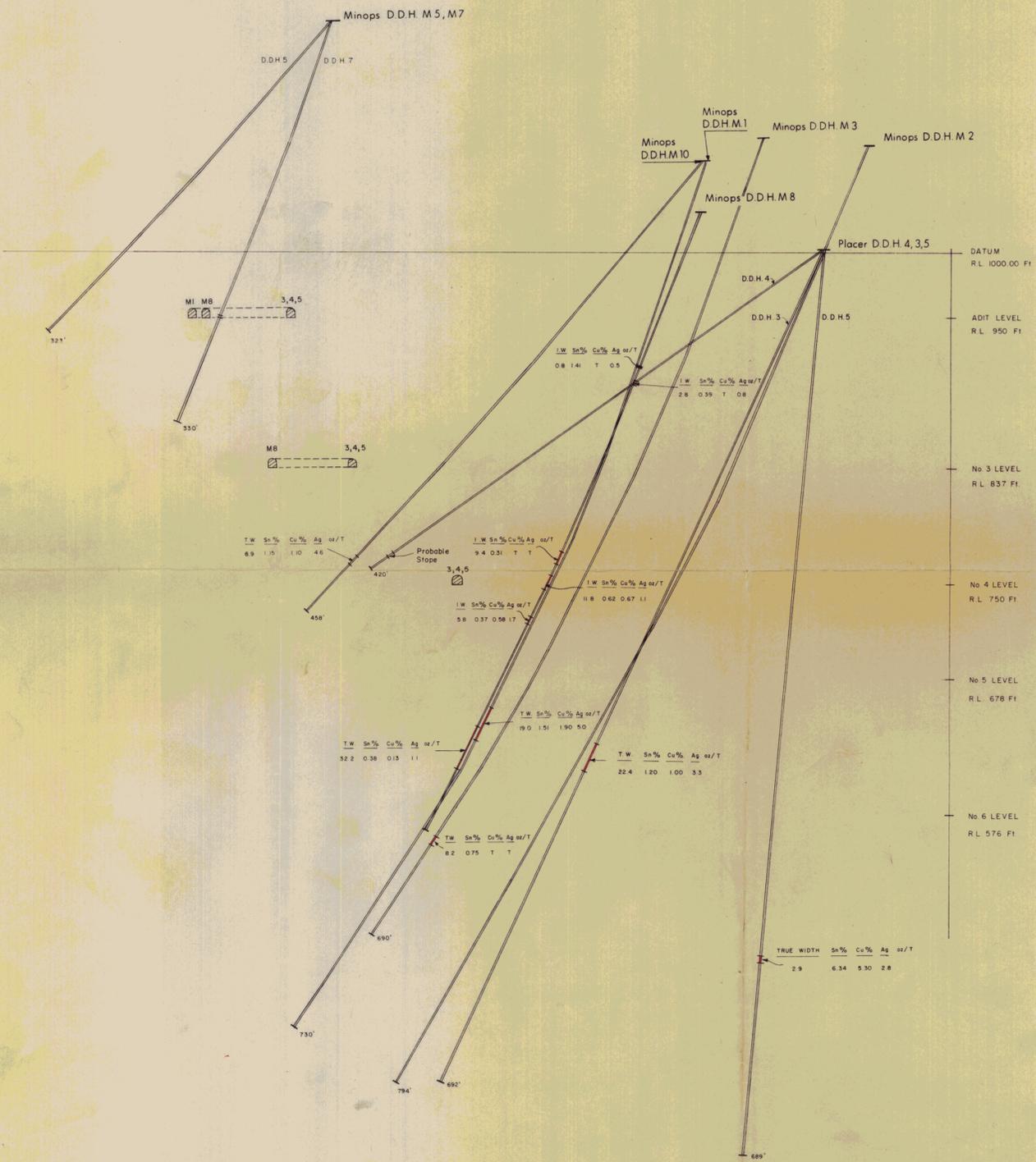
Author : S. Pearce
Drawn : S. Notari

6596

PLAN OF WORKINGS AND DRILLING NORTH OF SLIDE



PROJECTED SECTION THROUGH PLACER D.D.H. Nos. 4,3,5. (ON BEARING 253° mag.)



925163

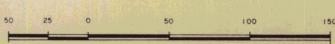
MINOPS PTY LTD

OONAH PROSPECT
 PLAN AND PROJECTED SECTION OF
 MINE WORKINGS AND DRILLING
 NORTH OF SLIDE

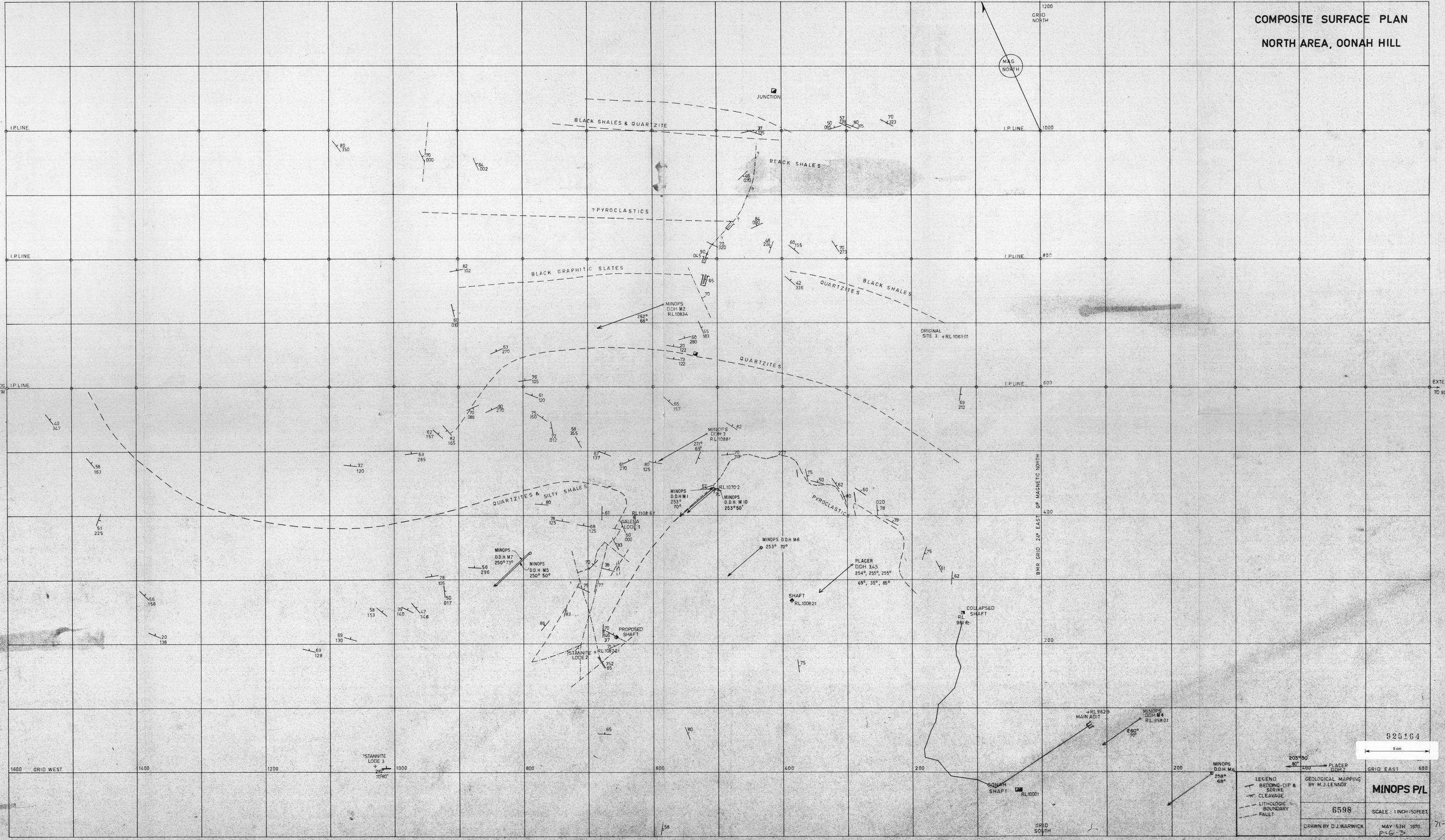
Scale 1 Inch = 50 Feet
 Date: 19 Jan 1971
 Author: S. Pearce
 Drawn: S. Notari

NOTES:
 T.W. TRUE WIDTH
 I.W. INTERSECTION WIDTH

SCALE OF FEET



COMPOSITE SURFACE PLAN
NORTH AREA, OONAH HILL



EXTENDS TO 1900W

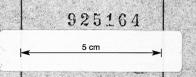
EXTENDS TO 900E

1600 GRID WEST 1400 1200 1000 800 600 400 200 1200 GRID EAST 1000 800 600

GRID SOUTH

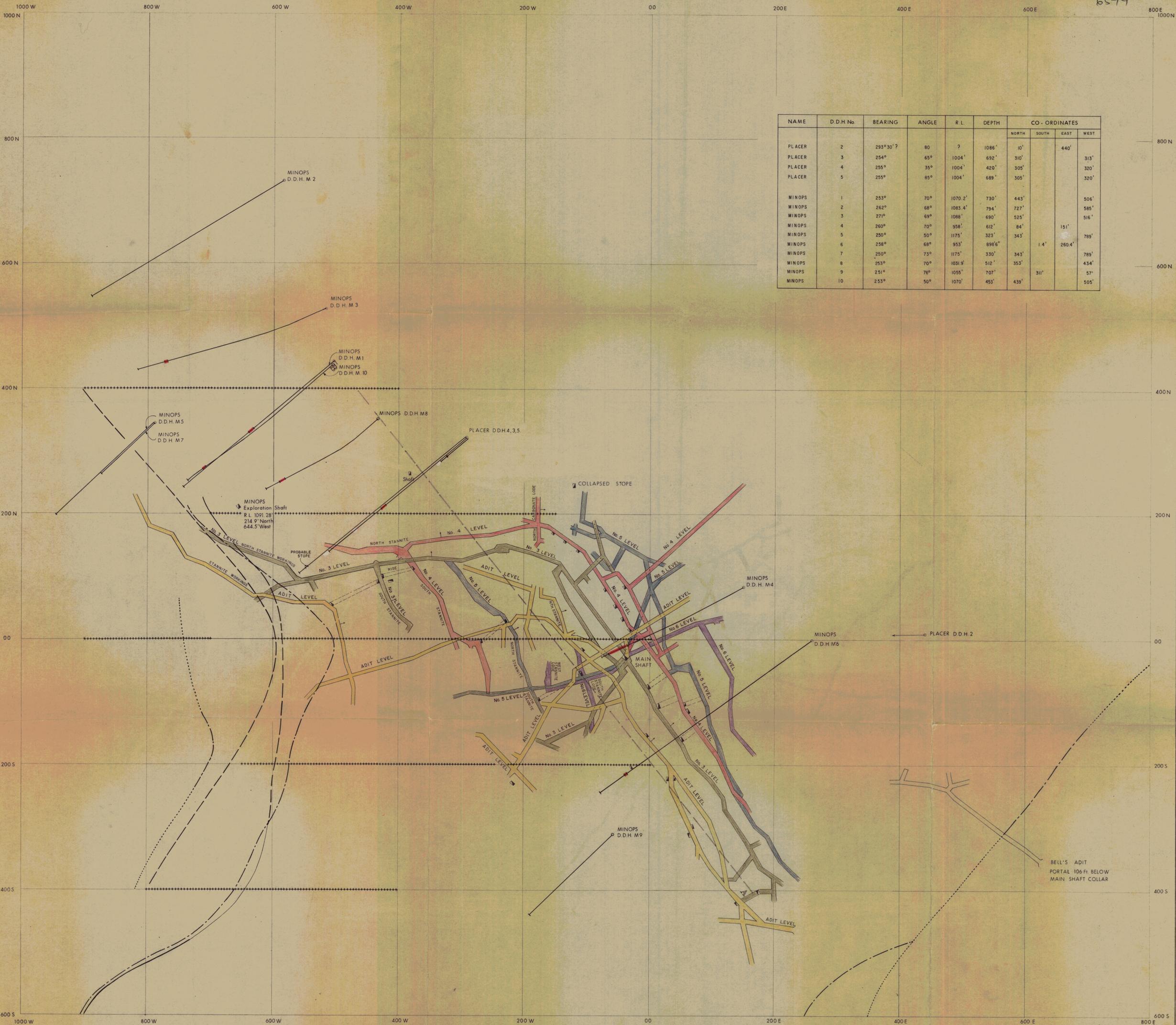
B.M.D. GRID 20° EAST OF MAGNETIC NORTH

<p>LEGEND</p> <p>— BEDDING-DIP & STRIKE</p> <p>--- CLEANAGE</p> <p>- - - LITHOLOGIC BOUNDARY FAULT</p>	<p>GEOLOGICAL MAPPING BY M.J.LENNOX</p>
	<p>MINOPS P/L</p>
<p>6598</p>	<p>SCALE: 1 INCH=50 FEET</p>
<p>DRAWN BY D.J. WARWICK</p>	<p>MAY 5TH 1970</p>



925164

71-205

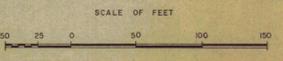


NAME	D.D.H. No.	BEARING	ANGLE	R. L.	DEPTH	CO - ORDINATES			
						NORTH	SOUTH	EAST	WEST
PLACER	2	293° 30' ?	80	?	1086'	10'		440'	
PLACER	3	254°	65°	1004'	692'	310'			313'
PLACER	4	255°	35°	1004'	420'	305'			320'
PLACER	5	255°	85°	1004'	689'	305'			320'
MINOPS	1	253°	70°	1070.2'	730'	443'			506'
MINOPS	2	262°	68°	1083.4'	794'	727'			585'
MINOPS	3	271°	69°	1088'	690'	525'			516'
MINOPS	4	260°	70°	958'	612'	84'	151'		
MINOPS	5	250°	50°	1175'	323'	343'			789'
MINOPS	6	258°	68°	953'	898.6'		1.4'	260.4'	
MINOPS	7	250°	73°	1175'	330'	343'			789'
MINOPS	8	253°	70°	1031.9'	512'	353'			434'
MINOPS	9	251°	76°	1055'	707'		311'		57'
MINOPS	10	253°	50°	1070'	453'	439'			505'

DEPTH BELOW SHAFT COLLAR

ADIT LEVEL	50 Feet
No. 3 LEVEL	163 Feet
No. 4 LEVEL	250 Feet
No. 5 LEVEL	322 Feet
No. 6 LEVEL	424 Feet

- E.M. ANOMALY Weak
- E.M. ANOMALY Medium
- E.M. ANOMALY Strong
- S.P. ANOMALY Medium
- S.P. ANOMALY Strong
- I.P. ANOMALY on Traverse Line
- Shaft
- Diamond Drill Hole



Notes:

- LEVEL DATUM CORNER CONCRETE BLOCK ADJACENT TO MAIN SHAFT COLLAR, CORNER PAINTED WHITE IS R.L. 1000 CO FEET.
- MAGNETIC NORTH IS 24° WEST OF GRID NORTH. ALL BEARINGS ARE MAGNETIC.

AMMENDED

DATE	NAME
11 November 1970	S. NOTARI
21 January 1971	S. NOTARI

925165

MINOPS PTY. LTD.

OONAH MINE

5cm

71-75 6599

Scale: 1 Inch = 50 Feet Drawing No. 6599-4
 Date: 5 August 1970 Drawn by: S. Notari