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EL34/85

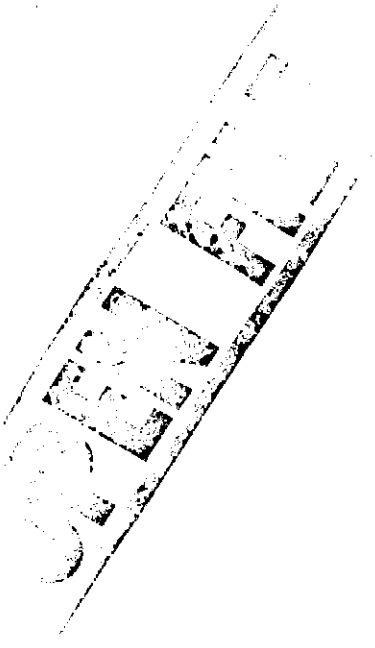
LETTER DATED 5.4.'88 REFERS.

EXPLORATION PROGRAMME, NORTH WEST TASMANIA

FOR

MONIER LIMITED

EL 34/85



Longworth & McKenzie Pty. Limited
YGT0531/RH/CD/d4
March 1988

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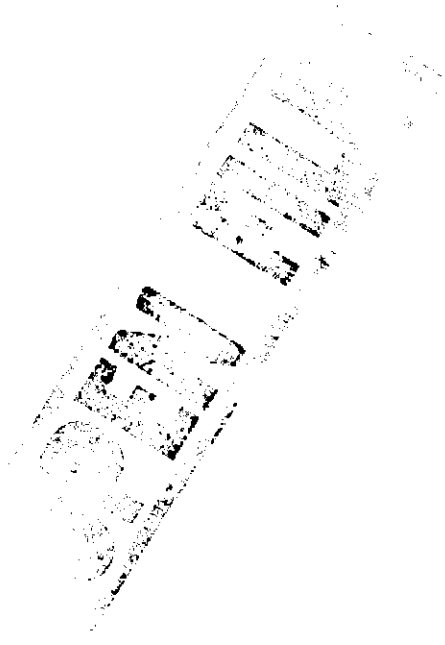

1.0 INTRODUCTION

Longworth & McKenzie Pty. Ltd., was engaged by Monier Limited to carry out a sampling program in the Savage River area of north western Tasmania. The program was implemented between the 21st and the 26th of February 1988 in an area approximately 10 kilometres north west of Savage River.

2.0 EXPLORATION PROGRAM

2.1 Aims

- To carry out a stream sediment and rock chip sampling program.
- To determine the lithologies within the exploration area.
- To locate any mineralisation with the assistance of air photo interpretation and aerial reconnaissance techniques.

2.2 Exploration Area

The exploration lease area covers approximately 70 square kilometres north west of Savage River, located between:-

5405.000 km North to 5416.600 km North

and

337.000 km East to 343.350 km East.

After the conclusion of the air photo interpretation it was decided to enlarge the exploration area to include an extra 90 square kilometres, adjacent to the lease area on the western boundary, as favourable environments for the occurrence of mineralisation appeared to exist. The total area of exploration is located between:-

5402.000 km North to 5418.000 km North

and

329.000 km East to 347.000 km East

329000E

ARTHUR RIVER 797004

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Scale 1 : 42 000 (approx.)

5419000N

LOCATION MAP

No.11.
No.10.
No.9.
No.12.
No.7.
No.6.
No 29(N)
No 29(NE)
Gossan G2
No.45
No.4.
No.28.
Gossan G1
Gossan G3
No.31.
No.32.
No.30.
No.13.
No.27.
No.26.
No.14.
No.37
No.38.
No.39.
No.25.
No.43
No.36.
No.35
No.33.
River
5 cm
Donaldson
346000E.
No. 5.
No.19.
Toner River
No.18.
No.20.
Little
Lagoon
No.40.
No.21.
No.16.
No.15.
No.41.
Donaldson River
No.24.
No.23.
No.22.
No.4
No.3.
River
No.17.
No.2.
No. 42
No. 1.
5402000N

Arb co-ords very approx
No GRID (Arb) references.

-Exploration Area

TASMANIA

GN MN

grid / magnetic angle 11·0° (1977)

LEGEND

Location No. No.23.●

Gossan (assumed)

Rivers, Creeks

Lease Boundary

Fault

" (assumed) — — —

Dip of Bedding

SOURCE

Tasmanian Lands Dept.
Air Photographs 1:42,000
Runs 13 and 14.

2.3 Regional Geology

Only a basic reconnaisance of the regional geology was practicable due to the limited time available, as most of the field time was allocated to the collection of 'stream' and 'chip' samples, and not to the detailed mapping required to adequately determine the regional geology. The regional geology was thus outlined using air-photo interpretation and chip samples collected in the field.

Examination of air photographs, relevant to the exploration area, revealed faulting trending approximately 035^{o} (mag.) which intensifies westward where it is intersected by faulting trending approximately 080^{o} (mag.) and 170^{o} (mag.). This area of intersecting faults is associated with minor folding with fold axes plunging towards 330^{o} (mag.) approximately.

The regional bedding of the strata strikes approximately 030^{o} (mag.) generally dipping eastwards and comprises light grey to grey, thinly laminated siltstones and meta siltstones (some phyllite), interbedded with white to pale grey fine grained quartzites. These are also associated with abundant ridge-forming outcrops of white quartz (up to 2.0 metres) within the bedded sequence. The regional dip of the bedding varies from approximately 30^{o} to subvertical throughout the exploration area with steepest dips occurring in the regions associated with intense faulting and folding.

Limonite staining of topsoils and outcrop with minor iron capping occurs in localised areas in the western, north western and south western regions of the exploration area. These areas show moderate orange, yellow and red discolouration and are in some cases associated with poor vegetation and ridges. These features are thought to be associated with weathering of sulphides. Mineralisation located in several of these areas indicates 'vein deposits' of copper and associated minerals (locations G1, G2 and G3; see location map).

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2.4 Geochemical Exploration Techniques

Three types of sampling techniques were implemented in the exploration program. These consisted of 'stream sediment sampling', 'subsoil sampling' and 'chip sampling'.

Stream sediment samples were taken at 26 sites throughout the exploration area which were selected to ensure an adequate coverage of the drainage systems and also to sample sediments originating from features which may be associated with mineralisation. Stream sediments were sieved and the material passing the 600 micron sieve were retained for analysis (see tables 2.4 a and b, also 'location map'). -25 to 30#

Four subsoil samples were collected from the B1 horizon of the illuvium in areas adjacent to limonite staining of topsoil and outcrop, the aim being to detect possible sources of mineralisation (see tables 2.4 a and b, also 'location map').

Chip sampling was implemented throughout the exploration area, with samples taken at 43 sites. This method of sampling was used to determine the lithologies and to detect any variation in mineralogy within the lithologies. Chip samples of siltstone were also necessary for gold analysis. (See tables 2.4 a and b, also 'location map').

The samples for chemical testing were anlaysed by S.G.S. Australia Limited using 'Inductively Coupled Plasma' (I.C.P.) and 'Atomic Absorption Spectroscopy (A.A.S.) methods. A list of elements determined is contained in Table 2.4(a).

Where results of 43 chip samples?

TABLE 2.4(a)

GEOCHEMICAL ANALYSIS

SAMPLE TYPE				
Mineralised Rock Samples	Chip Samples (Siltstone)	Soil Samples	Stream Sediments -600 µm	ELEMENT
x		x	x	Cu
x	x	x	x	Au
x		x	x	Ag
x		x	x	Pb
x		x	x	Zn
x		x	x	Sn
x		x	x	Ni
x		x	x	Cd
x		x	x	W
		x	x	Bi
		x	x	Ce
		x	x	La

TABLE 2.4(b)

LIST OF SAMPLES

Location	Stream	Chip	Soil	Location	Stream	Chip	Soil
1		1		24	1		
2		1		25	1	1	
3		1		26	1	1	
4	1			27		1	
5	1	1		28	1	1	
6		1		(G2) 29	2	1	
7		1		30		1	
8	1			31		1	
9	1	1		32		1	
10		1		33		1	1
11	1	1		(G3) 34		1	
12	1	1		35	1	1	
13	1	1		36	1	1	
14		1		37		1	
15	1	1		38		1	
16		1		39		1	
17	1	1		40	1	1	
18		1		41	1	1	
19	1	1		42	1	1	
20		1		43	1	1	
21	1	1	1	44		1	
22		1		45	2	1	
23	1			(G1)	1	2	2

The major problem encountered in this exploration program was accessibility. Approximately 70% of the lease area is considered inaccessible due directly to the presence of extensive areas of tall timber. Sampling of streams and outcrops in these areas was only possible where the streams were wide enough to land the helicopter (see location map). The total exploration area consists of approximately 20% tall timber, 40% ti tree scrub and low trees and 40% stunted ti tree and grasslands. Sampling was confined to areas accessible by air or on foot. Sample locations are marked on the 1:42000 location map.

Sample sites were selected on the basis of air photo interpretation where conditions for the presence of mineralisation were thought to exist. These included locations in close proximity to fault intersections and fold axes and locations adjacent to a circular feature thought to be related to an intrusion where hydrothermal solutions may have circulated. An extensive examination of these areas proved to coincide with those of 'limonite staining' of the toposil and outcrop in some locations.

The limonite staining, although moderate, is associated with small areas of iron capping in locations G1, G2 and G3 (see location map) and are suspected to be gossans overlying sulphide vein deposits. The lack of extensive staining and iron capping is thought to be the result of the moderate to steep regional dip throughout the exploration area and/or the possible limited extent of the mineralisation.

2.5 Mineralisation

Aerial reconnaissance of the exploration area located several diggings. These were in the west and north west of the area and are thought to be old copper workings (labelled G1, G2 and G3 - see location map).

Gossan G2 was previously located by C.R.A. Exploration Pty. Ltd. and found to contain copper and gold. (Assay available from Monier

Ltd.). Examination of a magnetic survey by the Department of Mines - Tasmania revealed an adjacent magnetic anomaly. More gossans may be present, but as yet they have not been located due to dense low scrub and grasses. On-site examination of the gossan workings, measuring approximately 10 metres by 1.5 metres by 1.0 metre deep, revealed the presence of mineralisation in highly weathered rock. The mineralisation observed was in the form of a vein deposit consisting predominantly of pyrite and minor chalcopyrite within highly weathered pale grey siltstone and quartzite. No secondary copper minerals were observed.

Workings at gossan G1 are the most extensive of those located, consisting of two shafts (thought to be approximately 5 to 10 metres in depth) and a trench running across the strike measuring approximately 10 metres by 1.5 metres by 3.0 metres deep. These workings are located adjacent to a fault intersection and an anticlinal axis. The resulting mineralisation occurs in vertically bedded grey thinly laminated siltstone/phyllite and grey quartzite with minor quartz veins. A richly mineralised vein, approximately 50 to 80 mm wide, was located, on the side-walls of the trench, within a one metre wide vertical zone of limonite stained bedrock, striking about 080^{o} (mag.). Abundant pyrite and chalcopyrite were present within the vein and waste pile, with secondary malachite and limonite. Bedrock adjacent to the zone of mineralisation appeared to have minor alteration. Samples taken from the vein deposits and subsoil samples taken 30 metres downslope were collected for analysis.

Gossan G3 is located on a ridge approximately 500 metres along strike, east north east of gossan G1. A horizontal shaft has been driven into the side of the hill to a maximum vertical depth of 5 metres in grey siltstones/meta siltstones and quartzites with minor quartz veins, iron capping and limonite staining. The drive was not examined for mineralisation, but the waste pile revealed the presence of metalliferous minerals. Rock samples from the waste pile were collected for assay.

Examination of the area around gossans G1 and G3 shows areas of stunted grasses and discoloured topsoils, being most prominent 500 metres E.N.E. of G3. The extent of the mineralisation around gossans G1 and G3 is as yet undetermined but may cover an area of up to one square kilometre.

2.6 Analytical Results

The results obtained are shown in Table 2.6(a). It is seen that apart from the gossan samples - particularly G1 and G2 - most values are very low.

The Gossan samples G1 and G2 recorded much higher values for gold and copper, with lesser values of Lead, Zinc & Nickel. Soil samples associated with G1 did not record significant gold values, although copper was well above that found in other soil samples. A single stream sediment sample from the drainage path of G1 also showed no unusual values.

which?

TABLE 2.6(a)

ANALYTICAL RESULTS

Sample	Au*	Ag	Cu	Pb	Zn	Ni	Cd	W	Ce	La	Bi	Sn
Soil G1	2	-0.2	42 5	6	8	2	-1	3.0	120	51	-0.5	4
Soil G1	2	"	355	7	9	-2	"	3.0	140	54	"	2
Stream G1	1	"	13	3	12	-2	"	4.0	56	23	"	-2
Stream 4	3	"	2	-2	15	-2	"	-0.5	32	12	"	"
Stream 5	6	"	12	5	21	8	"	-0.5	71	30	"	"
Stream 8	2	"	5	11	11	3	"	2.5	200	80	"	"
Stream 9	2	"	6	13	9	-2	"	4.0	180	76	"	"
Stream 11	4	"	2	5	4	-2	"	0.5	140	56	"	"
Stream 12	4	"	3	7	5	-2	"	1.0	37	16	"	"
Stream 13	-1	"	3	3	3	-2	"	-0.5	22	8.9	"	"
Stream 15	10	"	4	3	4	-2	"	-0.5	140	60	"	"
Stream 17	2	"	8	4	17	5	"	1.0	85	35	"	"
Stream 19	3	"	3	3	5	2	"	1.0	45	19	"	"
Stream 21	3	"	2	-2	5	-2	"	-0.5	21	9.0	"	"
Soil 21	7	"	21	9	4	4	"	1.0	41	18	"	"
Stream 23	6	"	3	2	3	-2	"	-0.5	12	4.6	"	"
Stream 24	4	"	4	4	6	-2	"	1.5	32	14	"	"
Stream 25	3	"	4	3	3	-2	"	-0.5	8.6	3.8	"	"
Stream 26	4	"	2	2	3	-2	"	0.5	46	20	"	"
Stream 29(N)	2	"	4	3	5	-2	"	0.5	30	12	"	"
Stream 29(NE)	6	"	3	3	4	-2	"	3.5	130	57	"	"
Stream 35	2	"	2	-2	4	-2	"	-0.5	13	5.6	"	"
Stream 36	9	"	4	3	4	-2	"	-0.5	17	7.1	"	"
Soil 33	5	"	8	5	3	2	"	1.5	48	21	"	"
Stream 40	2	"	4	2	2	-2	"	-0.5	16	6.5	"	"

Note : All figures in ppm unless otherwise noted

* : ppb

TABLE 2.6(a) (continued)

	Sample	Au*	Ag	Cu	Pb	Zn	Ni	Cd	W	Ce	La	Bi	Sn
	Stream 41	5	-0.2	8	12	20	6	-1	1.0	130	51	-0.5	-2
	Stream 42	13	"	3	9	4	3	"	-0.5	28	12	"	"
	Stream 43	5	"	4	2	2	-2	"	-0.5	8.5	3.6	"	"
	Stream 45W	2	"	3	3	3	-2	"	0.5	11	4.5	"	"
	Stream 45E	17	"	6	6	4	-2	"	2.0	18	8.0	"	"
	Gossan G1	1680	22	12.6%	34	164	165	"	1.0	14	6.1	"	14
	Gossan G2	260	0.8	2670	10	9	12	"	-0.5	23	7.4	"	-2
	Gossan G3	43	-0.2	152	25	125	15	"	0.5	15	5.8	"	2
	Chip 33	17	"	82	17	44	8	"	1.0				4
	Chip 40	4	"	54	10	14	3	"	-0.5				-2
	Chip 5	10											
	Chip 9	6											
	Chip 10	5											
	Chip 11	5											
	Chip 12	3											
✓	Chip 15	9											
	Chip 17	15											
✓	Chip 18	4											
	Chip 25	2											
	Chip 27	2											
	Chip 30	8											
✓	Chip 32	1											
	Chip 36	-1											
	Chip 37	3											
✓	Chip 41	3											
	Chip 44	2											
	Stream 28	-1	-0.2	2	-2	3	-2	-1				-0.5	
	Stream 40	1	-0.2	3	2	2	-2	-1				-0.5	
✓	Chip 41	2											

3.0 CONCLUSIONS AND RECOMMENDATIONS

From the discussion of analytical results above, it appears possible that gold and copper occur in association in the in-situ rock, but during weathering and dispersion, only the copper remains as an indicator in the surrounding soil horizon.

Should further work be undertaken, the use of copper as a path-finder for gold should be checked by means of an initial orientation survey.

The gossans located should be the subject of further geochemical work, with sampling on a regular basis. Other gossans may well exist, although not yet located.

The circular feature thought to be related to an igneous intrusion (Section 2.4) should also be inspected in the field. Where?

The presence of relatively high values of Ce and La in stream sediment samples is noted, although at this stage the significance of such an occurrence is not known.

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CHEMICAL ANALYSIS 797015

TRIAL HOLE No.:
DEPTH:
SAMPLE No.:

CLIENT: Monier Ltd.

SAMPLE: White Quartz

METHOD: The lump of quartz was washed in hot concentrated aquaregia, washed, dryed, heated to 800 C and dropped into cold distilled water. After pulverising a portion in an agate mortar and pestle it was digested in concentrated HCl. The filtered solution was then analysed for Fe_2O_3

RESULTS:

23 mg/kg Fe_2O_3

88-2793

TESTED: J.S.	**MATERIALS LABORATORY**		
DATE: 14.3.88	3 EDEN STREET, CROWS NEST, 2065. TELEPHONE: 929 0122		
CHECKED:	LONGWORTH & McKENZIE PTY. LIMITED		
CERTIFIED BY: R J Longworth		JOB No.: YLT0531	DWG No.: