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SML 444

MOOLAWATANA

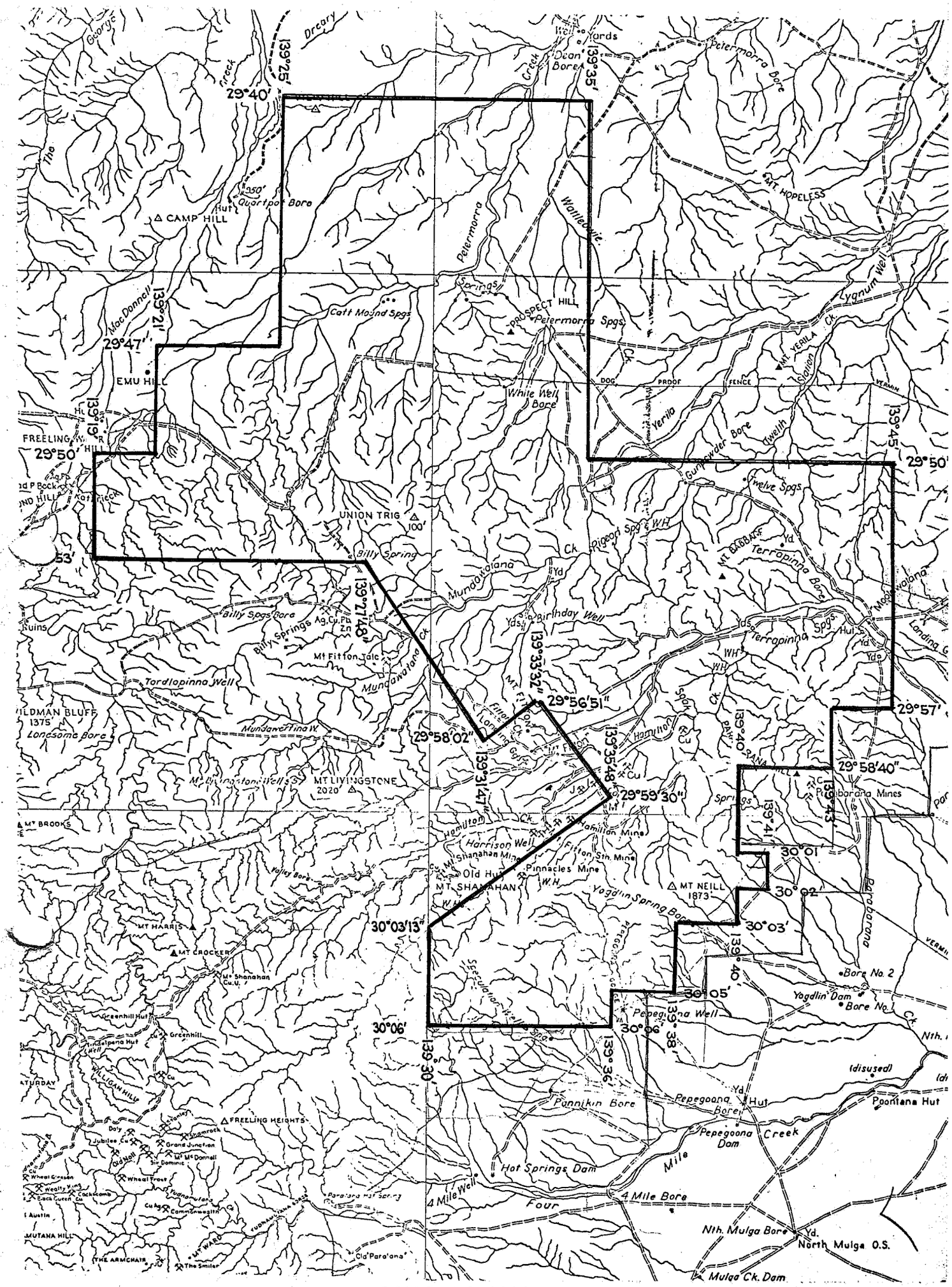
PROGRESS REPORTS TO LICENCE EXPIRY/RENEWAL FOR THE PERIOD 16/7/1970 TO 15/7/1971

Submitted by
North Flinders Mining NL
1971

Enquiries: Customer Services Branch
Minerals and Energy Resources
7th Floor
101 Grenfell Street, Adelaide 5000

Telephone: (08) 8463 3000
Facsimile: (08) 8204 1880

Government of South Australia
Primary Industries and Resources SA



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NORTH FLINDERS MINES N.L.

DOCKET D.M. 733/70 AREA ~~377~~ 354 SQ MILES

1:250000 PLANS : MARREE CALLABONNA
FROME

LOCALITY

S.M.L. No. 444 EXPIRY DATE 15.7.71

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McPHAR GEOPHYSICS PTY. LTD.

50-52 MARY STREET, UNLEY, SOUTH AUSTRALIA
POSTAL ADDRESS: P.O. BOX 42, UNLEY, SOUTH AUSTRALIA 5061

TELEPHONE 72 2133

CABLE
"PHARGEO" ADELAIDE
TELEX
"PHARGEO" AA82623

JR

MEMORANDUM TO: NORTH FLINDERS MINES N.L.

MEMORANDUM FROM: DR. P.R. DONOVAN, McPHAR GEOPHYSICS PTY. LTD.

SUBJECT: STREAM SEDIMENT RECONNAISSANCE SURVEY, MOOLAWATANA AREA, S.M.L. 444, SOUTH AUSTRALIA.

DATE: 13TH NOVEMBER, 1970.

INTRODUCTION

S.M.L. 444, located at the extreme northern tip of the Flinders Ranges in South Australia, comprises approximately 377 square miles, of which 178 square miles were selected for the current stream sediment reconnaissance survey, partially on previous work by Anaconda Australia Inc. (S.M.L. 112), partially on the basis of previous work by Mid-East Minerals N.L. (See Summary Report on Regional Stream Sediment Sampling, S.M.L. 196, Mt. Fitton, South Australia by G.A. McLellan dated October 20th 1969), and partially on the basis of previous stream sediment work by North Flinders Mines on contiguous S.M.L.s 295, 296 and 297 (See memoranda by writer dated 24/7/70, 16/2/70 and 18/2/70).

In all 1672 samples were collected over the area, yielding a sample density of approximately 9.4 samples per square mile.

The area is covered by parts of three one-mile geologic sheets - Gardiner, Moolawatana and Paralana - and lies entirely on the Mt. Painter Province 1:250,000 geologic sheet.

/....2

The area may be divided into a northern and a southern section, divided by Hamilton Creek. This also corresponds with a structural break - the Terrapinna Corridor.

The northern section has several square miles of Jurassic, Cretaceous, Tertiary and Quaternary sediments which have been partly sampled under the present programme, although this was not the intention at the outset. The southern section has a few patches of Quaternary deposits which have also been partially inadvertently sampled.

PREVIOUS WORK

(1) Anaconda Australia Inc. covered an enormous area of the Northern Flinders Ranges by stream sediment reconnaissance in 1965-66. No written report has been seen on this work. Metal maps, based on Anaconda's sample location map and analytical results, have been redrawn by North Flinders Mines N.L. for their own use. The analytical method is thought to be AAS following a hot perchloric acid leach on minus 80-mesh.

(2) Mid-East Minerals N.L. (MEM) (S.M.L. 196) spent a week in September 1969 collecting 770 sediment samples somewhat unsystematically, mainly over the northern section. Using the minus 80-mesh fraction, samples were analysed for Cu, Pb and Zn. The method of determination was AAS but the acid leach is unknown.

MEM used a system of two thresholds for the Archaean and Proterozoic. These were Cu 55/60 ppm, Pb 125/105 ppm and Zn 150/195 ppm respectively. It is not certain what is meant by Archaean in this context, but this term appears to refer to Mt. Painter Complex sediments and intrusives.

Their sampling afforded a better coverage in the northern section than in the southern section.

/.....3

Anomalies found during these two programmes are indicated on North Flinders Mines maps G.C. 4095A - 4097A and are referred to in the text below.

ANALYSIS

All samples were sieved to minus 80-mesh and analysed by AAS for Cu, Pb and Zn following a hot 25% HNO_3 leach on 0.25 g. sample.

The results are given in Batches CH 0409 (17/9/70) and CH 0499 (8/10/70). In addition, 14 samples, in which there was insufficient minus 80-mesh material for analysis, were sieved to minus 40-mesh and pulverized prior to analysis as above (Batch CH 0784 - 6/11/70). Their values are distinguished on the metal maps by circles.

All anomalous samples have been checked by reanalysis.

RESULTS

The sample locations and metal values are shown on DWGs. G.C. 4094A - 4097A.

Copper (DWG. G.C. 4095A)

Values ranged from 5 - 170 ppm. A value of 35 ppm Cu was selected as threshold. In all there were 67 samples, of which 54 were possibly anomalous (35 - 65 ppm), 12 were probably anomalous (70 - 100 ppm) and 1 was definitely anomalous (105 ppm and upwards).

Although this group of anomalous samples is large, forming 4 percent of the total, it is felt that a threshold of 35 ppm is justified based on experience in adjacent areas. For example, in S.M.L. 295 visible virgin copper mineralisation was located above several values of 35ppm Cu.

In the northern section there were three one-sample anomalies.

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Sample 440595 (70 ppm), a probable anomaly, drains the Yerilla Granite approximately 1 mile north of Birthday Well.

Samples 440862 and 440866 (50 and 40 ppm) occur 2 miles east of Mt. Babbage, but are not related drainage-wise. They both appear to drain Wattleowie Granite. although 440866 may be related either to an amphibolite or an E-W fault.

Of these three anomalies, none were found by MEM, although sampling was absent in two of these creeks, and in the third (440595) the sampling point was situated differently.

On the other hand MEM located ten anomalies which were not found by North Flinders Mines N.L. (NFM). The locations of the MEM anomalies are shown by red crosses on DWG. 4095A.

Two miles west of Mount Babbage, six anomalous Cu values were found, mostly in small creeks which were not sampled by NFM with the exception of one, 441125, which gave a background value of 10 ppm. It should be noted that the four northernmost anomalies apparently occur on a patch of Quaternary deposits.

MEM also located three Cu anomalies in small creeks near Prospect Hill. Two of the anomalies were in small creeks which were not sampled by NFM, but the third, was sampled and gave a background value (441361 - 20 ppm). There was another isolated anomaly north of Wattleowie Hut.

Anaconda located no Cu anomalies in the northern section. There is no known Cu mineralisation here at this stage.

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In the southern section there are four known copper workings at Brindana Gorge, Con Bore, the Peg Workings and the Pinnacles Mine. Con Bore and the Peg Workings were not located by the present survey, but the sampling is not particularly close in these areas. However, stronger anomalies were located away from these known mineralisations.

In the southwest corner of the S.M.L. NW of Mt. Adams, there is an impressive group of anomalies, (Area A). The main source appears to be within the Radium Hill Metamorphics, possibly in an aureole around the Ordovician Mudnawatana Granite, although part of the source may be within the diapir or faults associated with it. This anomaly probably extends into S.M.L. 457, also held by North Flinders Mines N.L. Area A includes seven possible, five probable and the one definite anomaly (440485 - 170 ppm).

Further north, southwestwards from the Pinnacles Mine, there is a group of anomalies within the Terrapinna Granite (Area B). This anomaly shows four possible and four probable anomalies. It continues northwards into S.M.L. 295, also held by North Flinders Mines N.L., where it has already been outlined by stream sediment reconnaissance and follow-up surveys (see Memorandum by writer dated 24/7/70 and by R.W. Fidler dated 11/70).

Area C shows three possible and one probable anomaly with an indicated source within the Brindana Schist. There is apparently a mile long dispersion train below sample 440748.

/....6

Area D shows four possible anomalies within the Pepegoona Porphyry. Their anomaly probably extends through open ground into S.M.L. 297 also held by North Flinders Mines N.L., but there was only one possible anomaly in the latter S.M.L. in this vicinity.

Area E shows three possible and one probable anomaly along the fault between the Terrapinna Granite and the Mount Neill Granite Porphyry. This anomaly continues into S.M.L. 297 where it has already been outlined by a stream sediment reconnaissance survey (See memorandum by writer dated 18/2/70).

Area F, around the Brindana Gorge mineralisation, is where Zimmerman (23rd October 1969) described a shear zone over a mile long with widths of copper mineralisation up to 10 feet. There are five possible anomalies, but MEM obtained another anomalous value in a small creek in this area and the mineralisation may be more widespread than indicated by NFM's results. MEM also obtained a single anomalous value one mile WNW of Area F.

There are numerous one- and two-sample anomalies which will be mentioned only briefly below.

Samples 440002 and 440003 (35 and 40 ppm) appear to be related to the western end of a large WNW-ESE trending amphibolite dyke.

Sample 440192 (45 ppm) is probably related to the Terrapinna Granite, as is sample 440682 (35 ppm). Sample 440695 (35 ppm) is apparently derived from the same granite, but the sample may have been located on a small patch of Quaternary alluvium.

Samples 440447, 440448 (both 35 ppm), 440398 (40 ppm) and 440406 (35 ppm) are derived from the Pepegoona Porphyry as is 440390 (45 ppm).

Samples 440778 (35 ppm), 440781 (35 ppm) and 440786 (50 ppm) appear to be related to faulting between the Pepegoona Porphyry and the Radium Hill Metamorphics. There may be a larger anomalous zone here as both Anaconda and MEM obtained anomalies in creeks that NFM found to be background.

/....7

Samples 440707 (40 ppm), 440721 (40 ppm), 440727 (40 ppm) and 440797 (65 ppm) are all within the Radium Hill Metamorphics.

Sample 440532 (35 ppm) is within the pC_2 microgranite.

Sample 440560 (35 ppm) is within the Mt. Neill Granite Porphyry, as is sample 440348 (35 ppm).

Samples 440507 (50 ppm) and 440508 (55 ppm), one mile east of Mt. Adams, are either related to an amphibolite or a fault. This anomaly may continue into the open ground to the south.

Anaconda located approximately 47 Cu values of 40 ppm and over in the southern section, where their coverage was satisfactory. These anomalies are shown on DWG. G.C. 4095A. Overall there is good agreement between the anomalies of NFM and Anaconda, although both companies found some anomalies which the other did not.

In the southern section, MEM located anomalous areas, near the Pinnacles Mine and near sample 440786, at Con Bore and within and near Area F. Most of these were picked up by NFM., although the exact location is slightly different in some cases.

Lead (DWG. G.C. 4096A)

Values ranged from < 20 to 60 ppm.

None of these are considered to be anomalous.

Anaconda found no Pb anomalies in the areas sampled.

MEM found no anomalies on the Gardiner or Paralana Sheets, except for one value below the Con Bore workings.

/....8

On the Moolawatana Sheet, however, they found numerous anomalous values ranging up to 930 ppm Pb. Some of these are suspect, in that two anomalous values have background values side-by-side, indicating that repeat sampling or repeat analysis had been carried out unsuccessfully. Some of these Pb anomalies are in the same position as some of MEM's Cu and Zn anomalies near Mt. Babbage. Several of the anomalies are in small creeks that were not sampled by NFM.

Zinc (DWG. G.C. 4097A)

Values ranged from 10 - 560 ppm. A value of 90 ppm was selected as threshold and there were 24 anomalous samples of which 23 were possibly anomalous (90 - 175 ppm), and 1 was definitely anomalous (270 ppm and upwards).

In the northern section there is a broadly anomalous area, G, where the bedrock is partly Terrapinna Granite, partly Wattleowie Granite, and partly Radium Creek Metamorphics. Some of this area is coincident with the aero-radiometric anomaly discovered by MEM and there is a possibility that these Zn anomalies may be a pathfinder for another type of mineralisation, such as uranium.

Sample 441021 (90 ppm) just north of the Wattleowie Hut and Well could be due to contamination. The area is underlain by Terrapinna Granite, and there is also a small pegmatite in the area. Sample 441045 (100 ppm) is also underlain by Terrapinna Granite, while a two-sample anomaly 440843/844 (120 - 100 ppm) is also underlain by the same rock type. As in the case of Area G, the Zn could be a pathfinder for some unknown type of mineralisation.

In the southern section, Area H is located along the northern edge of S.M.L. 297, and the source may be partially within this S.M.L. There is, in fact, one anomalous Zn value in this corner of S.M.L. 297. The bedrock is again Terrapinna Granite.

/....9

There are several isolated one-sample anomalies

Sample 440491 (140 ppm), in the south-western corner of the S.M.L. , is also anomalous in Cu (80 ppm) (see above). Sample 440385 (560 ppm) is located near the contact of $p\epsilon_2$ microgranite and Pepegoona Porphyry.

MEM found no Zn anomalies on the Paralana Sheet. They found one anomaly on the Gardiner Sheet, and several on the Moolawatana Sheet. There are four anomalies west of Mt. Babbage, one south of the Wattleowie Hut and Well, and four near Prospect Hill, none of which were detected during the present survey. Some of these anomalies were coincident with MEM's Cu and Pb anomalies.

Using a threshold of 125 ppm Zn, Anaconda located four anomalies in the northern section, none of which were substantiated by either the work of NFM or MEM. In the southern section there are two isolated anomalies, and a cluster of anomalies a mile or so southwest of Moolawatana. Again none of these were confirmed by NFM or MEM.

RECOMMENDATIONS

1. An approach should be made to the Mines Department to secure the two small portions of open ground, (1) between the southern boundary of S.M.L. 297 and S.M.L. 444, and (2) between the northern boundary of S.M.L. 296 and S.M.L. 444. There are indications that both areas are anomalous in copper.

2. The three one-sample Cu anomalies (440595, 440862 and 440866) in the northern section should be followed up by 100 foot sediment samples to the head of the creek.

3. The ten copper anomalies located by MEM in the northern section should be carefully resampled and prospected.

4. The Peg Workings and the Con Bore mineralisations should be visited and assessed by a geologist-geochemist. The reasons for their non-detection should be established

/.....10

5. Area A requires a close geological study, preferably with the aid of aerial photographs. There is no known copper mineralisation in this area at present, and sources should be found during the mapping.

6. Area B, around the Pinnacles Mine should be followed-up by closely spaced sediment sampling and any visible copper mineralisation located. This area should then be treated as a whole with the newly discovered copper mineralisations in the Terrapinna Granite in S.M.L. 295. Alteration and dykes should be looked for in this area. The type of mineralisation in the Pinnacles Mine should be determined and the old workings, if any, mapped.

7. Areas C,D, E, and F should be followed-up by closely spaced sampling and any visible copper mineralisation located. Areas D and E should be treated in conjunction with S.M.L. 297.

8. All other one and two-sample anomalies in the southern section should be followed-up by 100 foot sediment sampling to the heads of the creeks (see pages 6-7).

9. For sake of completeness, those 15 Cu anomalies of Anaconda marked by an asterisk in the southern section should be followed-up by resampling with one or two additional samples upstream.

10. The creeks with anomalous Pb values located by MEM in the northern section should be checked by two or three samples.

11. Zinc anomaly H should be followed-up by closely spaced sampling (200 foot intervals) including the adjacent area in S.M.L. 297. A few peak Zn values from the follow-up should be investigated by an emission spectrographic scan. A scintillometer should be carried during the follow-up.

12. Zinc anomaly G should be followed up as in (11) above.

/...11

13. The six one-sample Zn anomalies found by NFM should be followed-up by 100 foot sampling to the heads of creeks.

14. The Zn anomalies found by MEM and Anaconda should be checked by resampling with one or two additional samples upstream.

15. In all cases where MEM or Anaconda anomalies are being investigated, the original company maps should be taken into the field.

CONCLUSIONS

It is felt that a slightly denser sampling programme by North Flinders Mines, say 12-15 samples per square mile, would have obviated up some of the discrepancies between their results and those of MEM and Anaconda in some cases. Whether these discrepancies are real or serious will depend on the results of the resampling outlined above.

Several areas of interest have been located during the present survey, particularly in the southern section, where there are some large copper zones. In particular Area A appears to be in a new and promising geologic environment.

The multiplicity of environments in which copper anomalies have been found, particularly in the southern section, suggests a metallogenic province for this metal.

/...12

Zinc anomalies found during the stream sediment reconnaissance survey suggest that this element is a pathfinder for other types of mineralisations in the area, particularly uranium - thorium.

SIGNED
McPHAR GEOPHYSICS PTY. LTD.

P.R. DONOVAN Ph.D.

McPHAR GEOPHYSICS PTY. LTD.

29°47'
139°22'30"
29°50'
139°35'
29°53'
139°27'48"
29°56'51"
139°33'32"
29°58'02"
139°31'47"
29°59'30"
139°30'48"
30°00'
30°01'
30°02'
139°41'
30°03'
139°40'
30°05'
139°38'
30°06'
139°36'
29°57'
29°58'40"
139°43'
30°03'13"

714'
PROSPECT HILL

UNION TRIG
1048'

1210'
MT BABBAGE

1873'
MT NEILL

MT ADAMS

Wattleowie Hut & Well

Birthday Well

"Moolawatana"

Hamilton Creek

Terrapinna Springs

BARLOANA GORGE Creek

PEPEGOONA GORGE

MINE I
MINE J
MINE M
MINE D
MT FITTON STH. MINE
MINE A
MINE K
HAMILTON MINE
PINNACLES MINE
CON BORE
PEG WORKINGS (PD)
Cu

S.M.L. 82 B

S.M.L. 295

S M L. 297

S.M.L. 296

OPEN

OPEN

GARDINER
MOOLAWATANA
PARALANA
ONE MILE GEOLOGICAL SHEETS

606 = 440606 etc

North Flinders Mines N. L.

MOOLAWATANA AREA

S.M.L—444

STREAM SEDIMENT RECONNAISSANCE SURVEY

SAMPLE LOCATION MAP.

DRN:- I.S.	DATE:- 19·10·70	SCALE:- 60 chains = 1 inch

ENV 1442—1

DWG G.C. 4094A

McPHAR GEOPHYSICS PTY. LTD.

714'
PROSPECT HILL

UNION TRIG
1048'

Wattleowie Hut & Well

MT. BABBAGE
1210'

Birthday Well

Hamilton Creek

"Moolawatana"

Terrapinna Springs

Billy Springs Creek

Mundowdna

Brindana Gorge Creek

Cu

MINE I
MINE J
MINE M
CON BORE
PEG WORKINGS (P.D.)
HAMILTON MINE
MINE D
MT. FITTON STH. MINE
MINE A
MINE K
PINNACLES MINE

MT. NEILL
1873'

MT. ADAMS

Pepegoona Gorge

29°47'
139°25'
29°50'
29°53'
139°27'48"
29°56'51"
139°55'52"
29°58'02"
139°31'47"
29°57'
29°58'40"
139°43'
29°59'30"
139°35'48"
30°00'
30°01'
30°02'
139°41'
30°03'
30°03'13"
30°05'
139°38'
30°06'
139°36'

S.M.L. 82B
S.M.L. 295
S.M.L. 297
S.M.L. 296

Area A
Area B
Area C
Area D
Area E
Area F

OPEN
OPEN

GARDINER
MOOLAWATANA
PARALANA
ONE MILE GEOLOGICAL SHEETS

- Mid-East Minerals anomalies (≥ or = 55 ppm Cu)
- Anaconda anomalies (≥ or = 40 ppm Cu).

Cu by AAS following hot 25% HNO3 leach
for 1 hour on 0·25 gm. sample of minus 80 mesh.
30 = 30 ppm Cu on minus 80-mesh. (30) = 30 ppm Cu on pulverised minus 40-mesh

RECEIVED
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NFM North Flinders Mines N.L.

MOOLAWATANA AREA

S.M.L—444

STREAM SEDIMENT RECONNAISSANCE SURVEY

COPPER RESULTS p.p.m.

DRN:- I.S. | DATE:- 19·10·70 | SCALE:- 60 chains = 1 inch

ENV. 1442-2

DWG: G.C. 4095 A

McPHAR GEOPHYSICS PTY. LTD.

PROSPECT HILL 714

UNION TRIG. 1048'

Wattleowie Hut & Well

Birthday Well

M^T SHEPHARD 1210'

Hamilton Creek

"Moolawatana"

BRINDANA GORGE

29°47'

29°53'

29°56.5'

29°58'02"

29°57'

29°58'40"

30°00'

30°01'

30°02'

30°03'

30°03'13"

30°05'

30°06'

SML 82B

SML 295

SML 297

S.M.L. 296

OPEN

OPEN

MINE I

CON BORE

MINE J

MINE M

HAMILTON MINE

MINE D

MT FITTON STH MINE

MINE A

MINE K

PEG WORKINGS (P.D.)

PINNACLES MINE

M^T NEILL 1873'

PEPEGOONA GORGE

MT ADAMS

GARDINER — MOOLAWATANA

ONE MILE GEOLOGICAL SHEETS

PARALANA

• Mid - East Minerals Anomalies (≥ or = 125 ppm Pb)

Pb by AAS following hot 25% HNO3 leach for 1 hour on 0.25 gm sample of minus 80 mesh

20 20 ppm Pb on minus 80 mesh (20) = 20ppm Pb on pulverised minus 40-mesh

NFM North Flinders Mines N.L.

MOOLAWATANA AREA

S.M.L—444

STREAM SEDIMENT RECONNAISSANCE SURVEY

LEAD RESULTS p.p.m.

DRN · I.S. | DATE · 19·10·70 | SCALE · 60 chains = 1 inch 1442

EN. 1442-3

DWG: G.C. 4096 A

McPHAR GEOPHYSICS PTY. LTD.

PROSPECT HILL 714'

UNION TRIG 1048'

Wattleowie Hut & Well

Brindaby Well

MT BABBAGE 1210'

Hamilton Creek

"Moolawatana"

Terrapinna Springs

BRINDANA GORGE

Area G

Area H

S.M.L. 82B

S.M.L. 295

S.M.L. 297

S.M.L. 296

MINE I

MINE J

MINE M

CON BORE

PEG WORKINGS (P.D.)

HAMILTON MINE

MINE D

MT. FITTON STH. MINE

MINE A

MINE K

PINNACLES MINE

MT NEILL 1873'

PEPEGOONA GORGE

MT. ADAMS

OPEN

OPEN

29°47'

29°50'

29°53'

29°56'51"

29°58'02"

29°59'30"

30°00'

30°01'

30°02'

30°03'

30°03'13"

30°05'

30°06'

29°57'

29°58'40"

139°25'

139°27'48"

139°30'

139°32'

139°34'47"

139°35'48"

139°37'

139°39'47"

139°40'

139°41'

139°43'

139°45'

139°46'

139°48'

GARDINER — MOOLAWATANA — PARALANA

ONE MILE GEOLOGICAL SHEETS

- Mid East Minerals anomalies (≥ or = 150 ppm Zn)
- Anaconda anomalies (" or = 125 ppm Zn)

Zn by AAS following hot 25% HNO3 leach for 1 hour on 0.25 gm sample of minus 80 mesh

40 = 40 ppm Zn on minus 80-mesh (40) = 40 ppm Zn on pulverised minus 40-mesh

North Flinders Mines N.L.

MOOLAWATANA AREA

S.M.L—444

STREAM SEDIMENT RECONNAISSANCE SURVEY

ZINC RESULTS p.p.m.

DRN: A.S. | DATE: 19.10.70 | SCALE: 60 chains = 1 inch

ENV. 1442-4

DWG: G.C. 4097A

015

SUMMARY FINAL EXPLORATION REPORT

S.M.L. 444

NORTH FLINDERS RANGE, S.A.

by R.B. WILSON

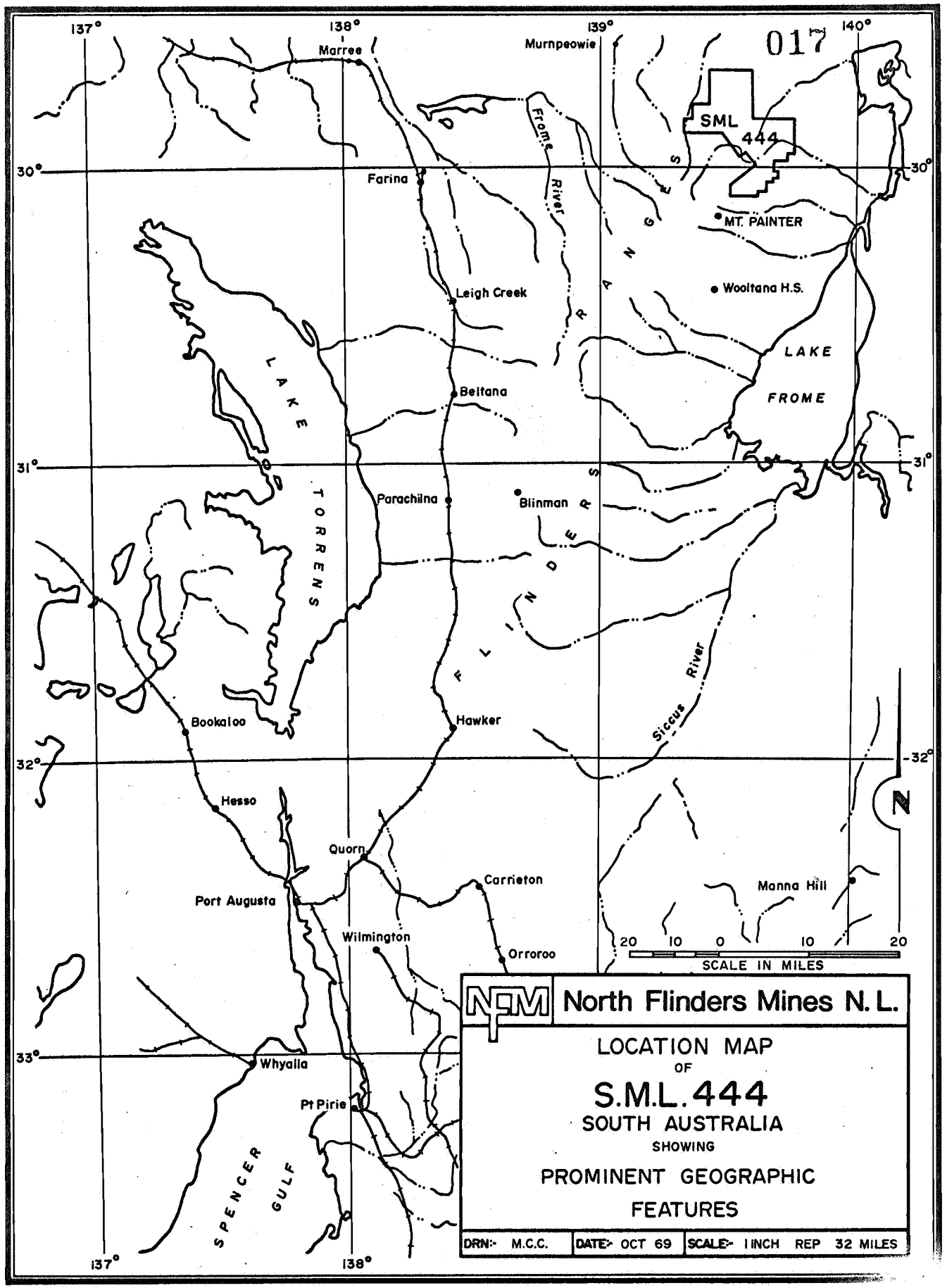
NORTH FLINDERS MINES N.L.

C O N T E N T S :

I INTRODUCTION AND PREVIOUS WORK

II SUMMARY OF EXPLORATION

III FUTURE PROGRAMMES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137°
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139°
140°
30°
31°
32°
33°
Marree
Murnpeowie
Farina
Leigh Creek
Beltana
Parachilna
Blinman
Bookaloo
Hawker
Hesso
Quorn
Port Augusta
Carrieton
Wilmington
Orroroo
Manna Hill
Whyalla
Pt Pirie
SML 444
MT. PAINTER
Wooltana H.S.
Frome River
FLINDERS RANGES
LAKE FROME
LAKE TORRENS
Siccus River
SPENCER GULF
N
20 10 0 10 20
SCALE IN MILES
North Flinders Mines N.L.
LOCATION MAP
OF
S.M.L. 444
SOUTH AUSTRALIA
SHOWING
PROMINENT GEOGRAPHIC
FEATURES
DRN:- M.C.C.
DATE:- OCT 69
SCALE:- 1 INCH REP 32 MILES

DWG 444-1

I INTRODUCTION AND PREVIOUS WORK

Special Mining Lease 444, in the northern Flinders Ranges of South Australia, covers an area of approximately 377 square miles.

The area has previously been recently explored by Anaconda (Aust) and Mid-East Minerals.

One Exploration Report has been previously submitted by North Flinders Mines to the Director of Mines:-

1. Exploration Report S.M.L. 444 for Period July 1970 to October, 1970

   This report, in the form of letter, was accompanied by a report 'Stream Sediment Reconnaissance Survey, Moolawatana Area, S.M.L. 444, South Australia by P.R. Donovan (McPhar Geophysics Pty. Ltd.)'

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II SUMMARY OF EXPLORATION (S.M.L. 444 - Period ending 31.1.71) 019

The compilation of the Anaconda stream-sediment sampling was carried out by Geosurveys of Aust. Pty. Ltd., prior to the establishment of North Flinders Mines Ltd., office.

Dr. P.R. Donovan after a review of previous Anaconda and Mid-Eastern geochemical programmes, recommended S.M.L. 444 should be completely re-sampled. This was due to sample density problems, rather patchy coverage and uncertainty of analytical methods.

Several anomalous copper zones and several one-sample anomalies are apparent from the results. The most important of these are:-

1) Area A (Southwestern corner of S.M.L. 444)

This zone is underlain by Radium Creek Metamorphies near the northeastern contact of the Mudnawatana Granite. Rapid geological inspection of one locality revealed copper staining associated with jointing in quartzitic meta-sediments and also to granitic-breccias associated with possible diapiric breccias.

2) Area B (Pinnacles Mine Area)

This may be a northeastward extension of low-grade 'dusted' mineralization associated with the Terrapinna Granite, as reported by R.W. Fiddler from the vicinity of the Mt. Shanahan Mine. (S.M.L. 295)

3) Area C ($2\frac{1}{2}$ miles west of Mt. Neill)

Three possible and one probable copper anomaly are indicated in this area, associated with the Brindana Schist.

4) Area D (South of S.M.L. 297 - Parabarana)

This area contains four possible copper anomalies within the Pepegoona Porphyry.

...../3

5) Area E (West of S.M.L. 297 - Parabarana)

Area E shows three possible and one probable anomaly along a fault contact between Terrapinna Granite and Mt. Neill, Granite Porphyry.

6) Area F (Brindana Gorge Area)

Five possible anomalies are apparent in the area described by Zimmerman (Consultant to Mid-Eastern Minerals) where copper mineralization is associated with a shear zone up to 1 mile in length.

The disparity of results in some areas between Anaconda, Mid-Eastern Minerals and North Flinders Mines sampling, needs explanation by a geochemist.

Two main areas of anomalous zinc values, one immediately north of Parabarana and the other to the east of Mt. Babbage require follow-up surveys.

Results of uranium and base-metal exploration conducted in the area of Mid-East Minerals have been compiled and assessed. In general the uranium results of the areas tested are disappointing, although Area C, to the north of Mt. Adams, has as yet been only scantily prospected.

Actual Expenditure for S.M.L. 444 in the Period July 1970 to January 1971 is $19,900. This includes compilation of previous data, assessment, geochemical surveys, access road-construction etc.

...../4

III FUTURE PROGRAMMES (as portion of the larger S.M.L. currently under application)

The principal initial programmes for the area include the follow-up of the reconnaissance stream-sediment anomalies as per recommendations of Dr. P.R. Donovan (See 'Steam Sediment Reconnaissance Survey, Moolawatana Area, S.M.L. 444 by P.R. Donovan). This may include some initial denser sampling of anomalous areas.

Although several areas of interest were located by the stream sediment survey, further programmes depend largely on the results of the initial follow-up surveys.

R.B. Wilson

R.B. WILSON

NORTH FLINDERS MINES

McPHAR GEOPHYSICS PTY. LTD.

TELEPHONE 72 2133

50-52 MARY STREET, UNLEY, SOUTH AUSTRALIA
POSTAL ADDRESS: P.O. BOX 42, UNLEY, SOUTH AUSTRALIA 5061

CABLE
"PHARGEO" ADELAIDE
TELEX
"PHARGEO" AA82623

MEMORANDUM TO: NORTH FLINDERS MINES N.L.

MEMORANDUM FROM: DR. P.R. DONOVAN,
McPHAR GEOPHYSICS PTY. LTD.

SUBJECT: FOLLOW-UP SEDIMENT SURVEY, MOOLAWATANA AREA, S.M.L. 444, SOUTH AUSTRALIA.

DATE: 30TH MARCH, 1971.

INTRODUCTION

A McPhar crew, led by Mr. G. Rogers, carried out recommendations 2, 8 and 13 of the follow-up listed in the writer's memorandum on this area dated 13th November, 1970.

ANALYSIS AND PRESENTATION

The analytical results are given in Batch CH 1644 dated 3/3/71 and are presented on DWGs G.C. 4130A - 4132A, which show the sample locations, Cu and Zn results respectively.

RESULTS

(a) Recommendation (2) - Copper anomalies (northern section).

Anomalies 440595, 440862 and 440866 were not confirmed.

(b) Recommendation (8) - Copper anomalies (southern section).

Anomaly 440002 was not confirmed.

Anomaly 440003 was confirmed to the head of the creek. There may be two sources, one from the amphibolite dyke and one from the Terrapinna Granite. Sources lie above samples 440003/1 and 4.

. . . . /2

Anomaly 440192 was not confirmed.

Anomaly 440682, near the Pinnacles Mine, was confirmed to the head of the creek. This area should now be included into Area B for further work.

Anomaly 440695 showed anomalous values up to 75 ppm with a cut-off half-way along the creek at sample 440695/26. There are also two sporadic possible anomalies nearer the head of the creek which are probably part of the dispersion train from the Pinnacles Mine. This creek needs careful prospecting as there is quite a large amount of alluvium in the lower reaches. There is a good chance of locating a source independent of the Pinnacles mineralization.

Anomalies 440447, 440448: although it at first appeared that 440447 was derived from 440448, detailed sampling indicated that there may be two sources, one above 440447/14 and the other at the head of the creek, above 440448/6, 8, 22, and 23. The source lies at the contact of the Brindana Schist and the Terrapinna Granite, not the Pepegoona Porphyry as stated in the earlier memorandum. It could be of some size.

Anomaly 440398: this anomaly within the Pepegoona Porphyry was substantiated, but no clear indication of the position of the source was obtained. There may be two sources, above 440398/2 and 440398/13 respectively.

Anomaly 440406 was confirmed to the head of the creek. The mineralization could be related to a NE-SW fault between the Pepegoona Porphyry and the Mount Neill Granite Porphyry.

. . . /3

Anomaly 440390 was confirmed with sporadic possible anomalies within the Pepegoona Porphyry.

Anomalies 440778 and 440781 were confirmed with anomalies near the confluences. The geology in this area is complex and warrants careful attention. The configuration of the anomalies suggests that they may be due to faulting. Anomaly 440786 in the same general area was not confirmed.

Anomalies 440707 and 440721 were not confirmed. Anomaly 440727 showed only one anomalous value at the confluence. Anomaly 440797, however, showed a cut-off above sample 440797/5. The host rocks are Radium Creek Metamorphics.

Anomaly 440532 was not confirmed. This was also an Anaconda anomaly.

Anomaly 440560 was confirmed to the head of the creek, and sources are indicated above 440560/1, 8 and 9 within the Mt. Neill Granite Porphyry.

Anomaly 440348 was also confirmed to the head of the creek, with possible sources above 440348/1 and 3.

Anomaly 440508 was confirmed with probable anomalies of 90 and 100 ppm Cu to the head of the creek. The source probably lies outside the southern boundary of the S.M.L. as shown but it is understood that North Flinders Mines N.L. now control this area. It is not clear at this stage whether the source is the amphibolite or not.

. . . . . /4

Anomaly 440507 showed two possible anomalies at the head of the creek and the source is indicated above 440507/2.

Anomalies 440741, 440749 and 440750A were also followed up although this was not recommended. The anomaly forms part of Area C.

(c) Recommendation (13) - Zinc anomalies.

In the northern section anomalies 441021 and 441045 were not confirmed. Anomalies 440843 and 440844 were confirmed however, stream 440844 being possibly anomalous throughout the entire length sampled.

As stated in the previous memorandum the Zn could be a pathfinder for another type of mineralization such as U-Th or even Au.

In the southern section anomaly 440385 was not confirmed. The original sample (560 ppm Zn) must have been contaminated in some way.

Anomaly 440491 was not followed up. It falls within copper area A.

CONCLUSIONS

Of the 33 minor (i.e. one and two sample) Cu and Zn anomalies followed-up in this phase of exploration, 21 were confirmed and 12 were not confirmed.

No visible mineralizations were reported.

. . . . /5

RECOMMENDATIONS

A. The confirmed anomalies are now ready for inspection by a geologist-geochemist. At the same time recommendations (4) and (5) (13/11/70) should be carried out.

B. A sampling crew should immediately begin to carry out recommendations 3, 6, 7, 9, 10, 11, 12, 14 and 15 (13/11/70).

A rough estimate of the time required for (B) is five weeks.

Signed
McPHAR GEOPHYSICS PTY. LTD.

P.R. DONOVAN Ph.D.

McPHAR GEOPHYSICS PTY. LTD.

PROSPECT HILL

29°50'

29°57'48"

29°58'02"

29°56'51"

29°59'30"

30°03'13"

30°05'

30°06'

30°02'

30°03'

30°01'

29°58'40"

29°57'

139°35'

139°34'47"

139°35'20"

139°35'48"

139°36'

139°36'40"

139°37'

139°38'

139°39'

139°39'43"

139°40'

MT NEILL

MT ADAMS

PINNACLES MINE

Cu

Peg Nurkings (P.L.)

HAMBLIN Sth MINE

MINE A

MINE K

RECEIVED
29 JUL 1971
DEPT. OF MINES
SECURITY

NFM	North Flinders Mines N.L.

MOOLAWATANA AREA

S.M.L—444

STREAM SEDIMENT FOLLOW—UP SURVEY

SAMPLE LOCATION MAP.

DRN:- I.S.	DATE:- 8·3·71	SCALE:- 60 chains = 1 inch

ENV. 1442-5

DWG. G.C. 4130A

McPHAR GEOPHYSICS PTY. LTD.

PROSPECT HILL

UNION THG

PINNACLES MINE
Cu

MT NEILL

29°47'
139°25'
29°50'
139°35'
29°53'
139°27'40"
29°56'50"
139°33'30"
29°58'20"
139°41'
29°59'30"
139°35'40"
30°03'15"
139°30'
30°05'
139°38'
30°01'
30°02'
139°40'
30°03'
29°57'
29°58'40"
139°43'

440695/26
440695
440447
440447/14
440448
440448/8
440448/6
440448/22
440447 440328
440003/4
440003/1
440003
440002
440398/13
440398/2
440398
440695
440392
440797/5
440797
440707
440741, 749, 750A
440727
440721
440682
440408
440507
440532
440560/1
440560/9
440560/6
440560
440786
440406
440340/1
440340/3
440390

Cu by AAS following hot 25% HNO3 leach
for 1 hour on 0.25 gm sample of minus 80 mesh

RECEIVED
29 JUL 1971
DEPT. OF MINES
SECURITY
1442

NFM North Flinders Mines N. L.

MOOLAWATANA AREA

S.M.L — 444

STREAM SEDIMENT FOLLOW — UP SURVEY

COPPER RESULTS p.p.m.

DRN: I.S.	DATE: 8·3·71	SCALE: 60 chains = 1 inch

ENV. 1442-6

DWG: G.C.4131A

McPHAR GEOPHYSICS PTY. LTD.

PROSPECT HILL

Wattleowie Hut & Well

MT BABBAGE
1210'

MT NEILL
1873'

Mt ADAMS

29°47'
139°25'
29°50'
139°35'
29°53'
139°27'48"
29°56'51"
139°33'22"
29°58'02"
139°31'47"
29°59'30"
139°35'48"
30°01'
30°02'
139°41'
30°03'
139°40'
30°03'13"
30°05'
139°38'
30°06'
139°36'
29°57'
29°58'40"
139°45'

MINE I
MINE L
MINE M
HAMILTON MINE
MINE J
MT FITTON Sth MINE
MINE A
MINE K
PINNACLES MINE
Cu
Peg Workings
(P.D.)
PEPEGOONA GORGE
Hamilton Creek
Serpentine Springs
Seddon Gorge

Zn by AAS following hot 25% HNO3 leach
for 1 hour on 0·25 gm sample of minus 80 mesh

RECEIVED
29 JUL 1971
DEPT. OF MINES
SECURITY
1442

North Flinders Mines N. L.

MOOLAWATANA AREA

S.M.L—444

STREAM SEDIMENT FOLLOW—UP SURVEY

ZINC RESULTS p.p.m.

DRN:- I. S.	DATE:- 8·3·71	SCALE:- 60 chains = 1 inch

ENV. 1442 — 7

DWG:G.C.4132A