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EL 1645

NORTH WELL CREEK AREA

QUARTERLY, ANNUAL AND FINAL REPORTS FOR THE PERIOD 7/3/90 TO 6/3/94

Submitted by

Lynch Mining Ltd
1995

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PRIMARY INDUSTRIES AND RESOURCES SA

LYNCH MINING LIMITED

FIRST QUARTERLY REPORT ON EXPLORATION ACTIVITIES

EXPLORATION LICENCE NO. 1645

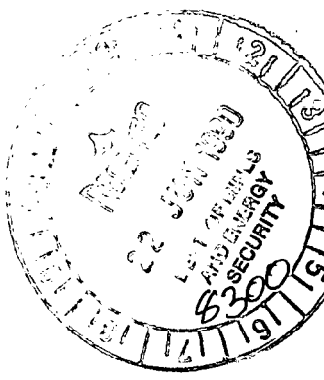
NORTH WELL PROJECT, SOUTH AUSTRALIA

FOR PERIOD 7.3.90 TO 7.6.90

Author: G.S. Teale

Date: May 1990

Distribution: Department of Mines & Energy, Adelaide
Lynch Mining Limited, Brisbane



C O N T E N T S

DISCUSSION OF EXPLORATION ACTIVITIES

APPENDICES:

Fig. 1: Location of Exploration Licence

Table 1: Ilmenorutile analyses from metasomatised sediments, The Needles area

PETROGRAPHIC REPORT: NORTH WELL-1

EXPENDITURE

DISCUSSION OF EXPLORATION ACTIVITIES:

Activities during this first quarter consisted of a review of previous exploration activities carried out by C.R.A. Exploration, Greenex, Union Oil Corporation and Aberfoyle Exploration. The only company to seriously address the Beryllium potential of the area was Aberfoyle Exploration who carried out a broadly spaced rock sampling programme. A brief field visit to the area in late March was also undertaken.

The leucogranites in the area have been considered previously to have potential for Sn, W, Nb and Ta. Teale (1985) noted the presence of phenacite, a beryllium silicate, in metasomatised country rocks and suggested the area had potential for Be. Further research by Teale and Lottermoser (1987) suggested the manner in which Be (and other elements) were introduced into the "country rock" adjacent to the granite bodies. Exploration by Lynch Mining Limited will be aimed primarily at Be-Rb± Ta mineralisation.

The results of minor petrographic and electron-microprobe investigations are contained in an appendix to this report. The results confirm the following:

a) Tantalum and niobium are confined to the granite bodies and the immediately adjacent, metasomatised wall rocks. Mangano-columbite is present in the granites and ilmenorutile (with up to 20% combined Nb_2O_5 + Ta_2O_5) is present in the immediately adjacent wall-rocks. Ta and Nb values drop dramatically away from the intrusives (Table 1).

b) Beryllium has been scavenged from the granites (via the breakdown of beryl) and redeposited away from the intrusives. Therefore, there is a separation of Be from Ta, with the former being deposited up to 100m away from granite intrusives. It should be noted that the petrographic study undertaken revealed abundant Be-bearing minerals (see appendix) in the sample collected well away from the eastern granite at The Needles locality.

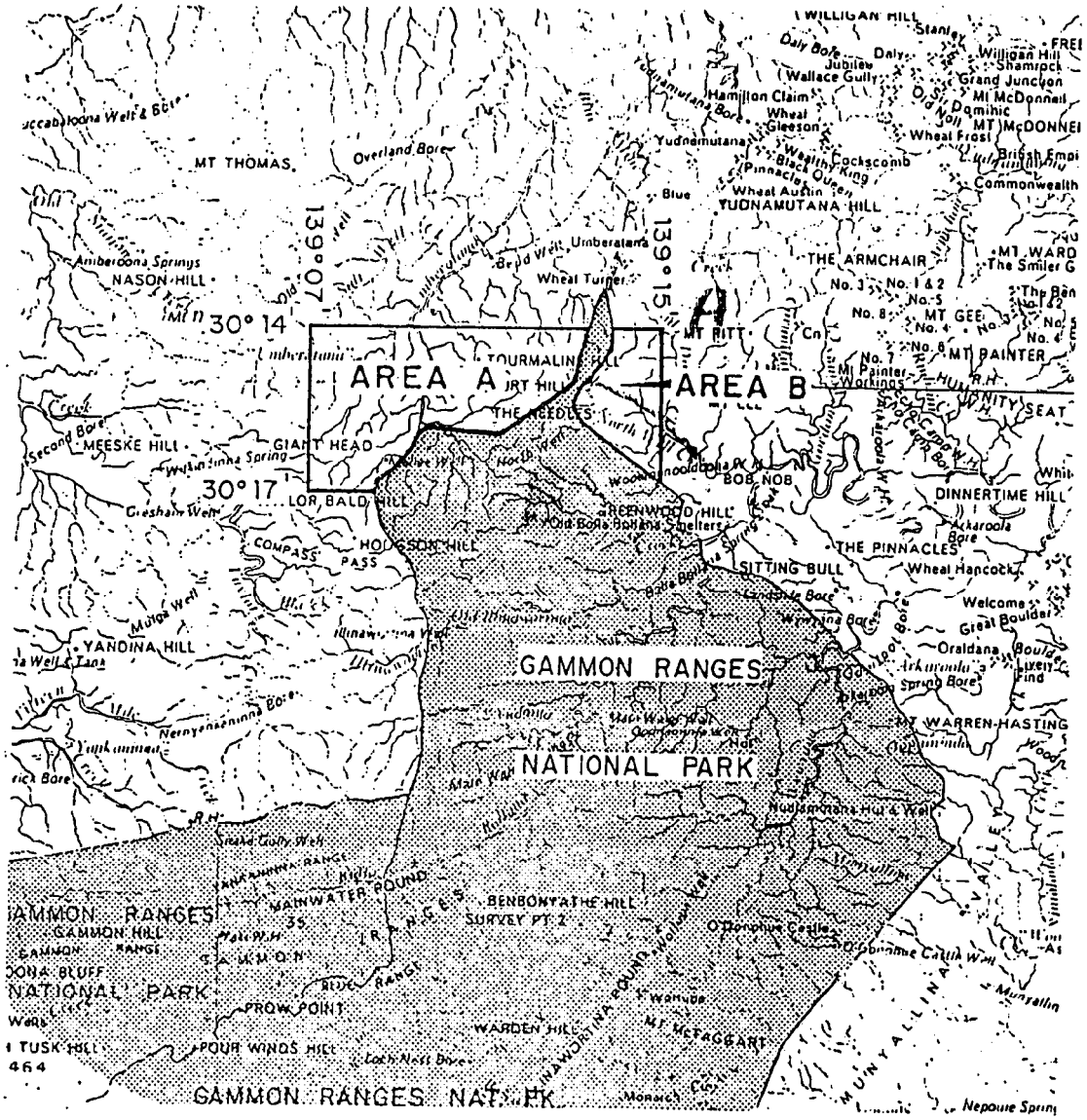
   It is considered that the most promising area for Be-Rb mineralisation is at the contact between the quartzo-feldspathic Early Proterozoic sequence and the hydrated, calcareous Late Proterozoic (Adelaidean) sequence. Drilling will be required to test this model.

A P P E N D I C E S

SCHEDULE A

FIGURE 1:

LOCATION OF EXPLORATION LICENCE No. 1645



Approx position Flinders Ranges A+B areas.

SCALE 1:250,000

KILOMETRES 5 0 5 10 15 20 25 KILOMETRES

T: LYNCH MINING LIMITED

/ 89 AREA: 47 square kilometres (approx.)

LANS: COPLEY

NORTH WELL CREEK AREA - Approx. 75 km east of Leigh Creek

NTED: DATE EXPIRED: EL No: 1645

TABLE 1: ILMENORUTILE ANALYSES FROM METASOMATISED SEDIMENTS, THE NEEDLES AREA.

	Ar-7		Ar-6		Ar-8		Ar-5	
Nb_2O_5	15.47	12.67	12.69	12.79	11.24	10.43	2.75	3.40
Ta_2O_5	2.40	0.85	7.54	6.44	1.48	2.02	0.22	0.55
TiO_2	74.08	79.78	69.06	68.88	79.88	80.14	95.23	94.39
Al_2O_3	0.15	0.12	0.16	0.17	0.04	0.04	<0.02	<0.02
V_2O_3	1.91	1.19	N.A.	N.A.	1.43	2.55	0.66	0.58
Cr_2O_3	0.60	0.72	N.A.	N.A.	0.94	0.96	0.24	0.19
FeO	5.50	4.14	6.23	6.22	4.31	4.38	0.90	1.18
TOTAL:	100.11	99.47	95.68	94.50	99.32	100.52	100.00	100.31

No ZnO, SnO_2, MgO and MnO detected.

Sample Location:

Ar-7: Included block of metasomatised sediment, The Needles.

Ar-8: Metasomatised calc-pelite, immediatey adjacent the most easterly granite outcrop of The Needles.

Ar-6: As above.

Ar-5: Metasomatised calc-pelite, containing abundant bertrandite and phenacite, ~55m ESE of the most easterly outcrop of granite at The Needles.

PETROGRAPHIC REPORT: NORTH WELL-1

PROJECT: North Well

SAMPLE NUMBERS: Ar-5 to Ar-8 inclusive

DATE: May 1990

WORK REQUIRED: Locate and describe Be and Ta-bearing phases.

Graham S. Teale
May 1990

SAMPLE NUMBER: Ar-5

SAMPLE LOCALITY: Approximately 55m ESE of the most easterly "Needle".

SAMPLE DESCRIPTION:

The sample contains abundant introduced albite bands which have been emplaced along bedding planes in a metasomatised calcareous meta-sediment. The sample is now dominated by fluor-phlogopite and albite. A visual estimate of the minerals present is:

Fluor-phlogopite	~47%
Albite	~28%
Quartz	~10%
K-feldspar	~ 5%
Bertrandite]	
? Gelbertrandite]	~ 9%
Phenacite	tr
Ilmenorutile	tr

Phlogopite tends to be fine grained (~0.05mm) and can be present as monomineralic bands or as phlogopite-albite ± quartz ± K-feldspar bands. Ilmenorutile is usually associated with these phlogopite-rich domains as is phenacite. The latter occurs as highly poikilitic grains up to 2mm in length, with the only included phase being phlogopite. Gelbertrandite and bertrandite occur in cavities and "vughs" along with rare chalcedony and fluorite.

SAMPLE NUMBER: Ar-6

SAMPLE LOCALITY: Immediately adjacent the eastern "Needle".

SAMPLE DESCRIPTION:

This sample is similar to Ar-5 but is more albitic, and coarser grained and does not contain observable Be-bearing phases, apart from rare, partially pseudomorphed beryl. A visual estimate of the minerals present is:

Albite	~66%
Fluor-phlogopite	~22%
Quartz	~11%
Tourmaline	tr
? Beryl	tr
Apatite	tr
Ilmenorutile	tr

Phlogopite grains can be up to 0.5mm in length and contain oriented inclusions of rutile. Analysed grains of phlogopite contain between 6%-7% of fluorine. Albite grains are often tabular and euhedral and can be up to 0.6mm in length. Rare tourmaline, apatite and ilmenorutile are scattered randomly throughout the sample. Rare beryl grains have been altered to clays and ? sericite.

SAMPLE NUMBER: Ar-7

SAMPLE LOCALITY: Included block of metasomatised sediment, from within the eastern needle granite outcrop.

SAMPLE DESCRIPTION:

This sample is almost identical to sample Ar-6, being composed of predominantly fluor-phlogopite and albite. The sample exhibits a pronounced banding with almost monomineralic bands of phlogopite intercalated with albite-phlogopite-rich bands. A visual estimate of the minerals present is:

Phlogopite	~45%
Albite	~44%
Quartz	~10%
Apatite	~tr
Ilmenorutile	tr

Phlogopite grains up to 1.5mm are present and are generally oriented parallel to the described banding. Albite grains are often choked with phlogopite inclusions, with albite grains varying dramatically in size from one band to another. Apatite grains up to 1mm in size are present.

SAMPLE NUMBER: Ar-8

SAMPLE LOCALITY: Immediately adjacent the eastern "Needle".

SAMPLE DESCRIPTION:

The sample is very similar to samples Ar-6 and Ar-7. Points of interest are:

a) Coarse grained (up to 1.2mm) mangan fluor-apatite is scattered randomly throughout the sample.

b) Ilmenorutile is often intergrown with phlogopite with the latter phase up to 2mm in length in some domains.

c) Clay-rich aggregates may represent former beryl which has been broken down by a HF-rich fluid phase. No other Be-bearing phase has been observed in this sample, although the phlogopite may be Be-bearing.

d) Some of the coarser albite grains (up to 0.8mm) contain intensely clay-altered cores suggesting probable Ca-rich plagioclase precursors.

EXPENDITURE:

GEOLOGY	$5150.00
SALARIES/WAGES	300.00
ANALYTICAL	250.00
CONSUMABLES	1350.00
TENEMENT CHARGES	350.00
ADMINISTRATION & OVERHEADS	1850.00
TOTAL:	$9250.00

QUARTERLY REPORT ON EXPLORATION ACTIVITIES

EXPLORATION LICENCE NO. 1645

NORTH WELL PROJECT, SOUTH AUSTRALIA

FOR PERIOD 7.6.90 TO 7.9.90

Author: G.S. Teale

Date: October, 1990

Distribution: Department of Mines and Energy, Adelaide
Lynch Mining Limited, Brisbane

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DISCUSSION OF EXPLORATION ACTIVITIES

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Fig. 2 North Well Creek, Sample Locations

Fig. 3 Channel chip sites, North Well Creek, ~1 km east of The Needles

Fig. 4 Detailed outline of channel chip sample locations, North Well Creek

Fig. 5 Locality of "test" pan concentrate sample sites, Needles area

ANALYTICAL DATA (AS REPORTED BY ANALABS, ADELAIDE)

PETROGRAPHIC-MINERAGRAPHIC SUMMARY OF PAN CONCENTRATE SAMPLES

EXPENDITURE

EXPLORATION LICENCE NO. 1645

DISCUSSION OF EXPLORATION ACTIVITIES

Reconnaissance rock chip sampling of tourmaline-rich "metasomatites" from the Needles area (Fig. 2) as well as the collection of three bulk samples (subsequently panned down to obtain a concentrate) was carried out during the quarter. Sample localities and analytical results are presented in the Appendices. Points of interest are:

a) Tourmaline (i.e. boron-rich zones)-rich metasomatites do not contain significant beryllium. Beryllium-rich domains are apparently confined to fluor-phlogopite-albite rocks.

b) Pan concentrate samples are dominated by coarse pyrite and magnetite (up to 1 cm diameter) which are partially to totally replaced by goethite and hematite respectively. Both phases contain inclusions of albite, tourmaline and fluor-phlogopite and have therefore developed in the metasomatic aureole of the granites.

c) Ilmenorutile is only present in significant amounts close to the granite.

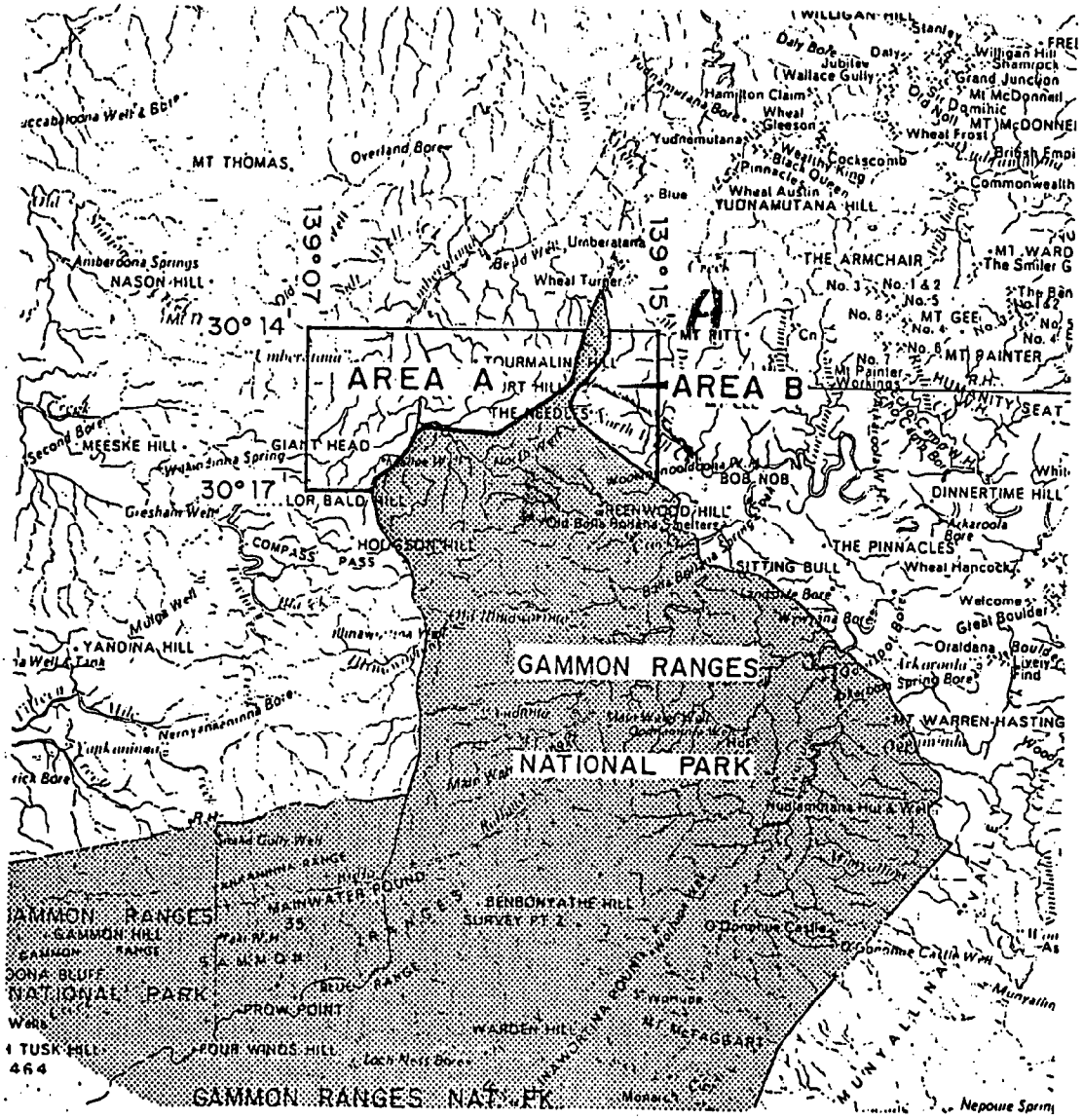
d) Be, Rb, Cs, Nb and Ta concentrations of the channel chip and pan concentrate samples were low (see Appendices). Only sample 13808, with 200 ppm Nb and 200 ppm Ta, could be considered anomalous.

e) The tourmaline-rich zone samples (see Figures 3 and 4) are dominated by altered mafic volcanics, with relict textures observed in thin section.

SCHEDULE A

FIGURE 1:

LOCATION OF EXPLORATION LICENCE No. 1645



Approx position Flinders Ranges A + B areas.

SCALE 1:250,000

KILOMETRES 5 0 5 10 15 20 25 KILOMETRES

APPLICANT: LYNCH MINING LIMITED

DME 401/89 AREA: 47 square kilometres (approx.)

1:250000 PLANS: COPLEY

LOCALITY: NORTH WELL CREEK AREA – Approx. 75 km east of Leigh Creek

DATE GRANTED: DATE EXPIRED: EL No: 1645

NORTH WELL CREEK

Sample locations Aug 1990.
(See Detailed plans too)

PART, 6737-III
ILLINAWORTINA
SHEET
1:50,000.

VORTINA
AUSTRALIA

SECOND EDITION

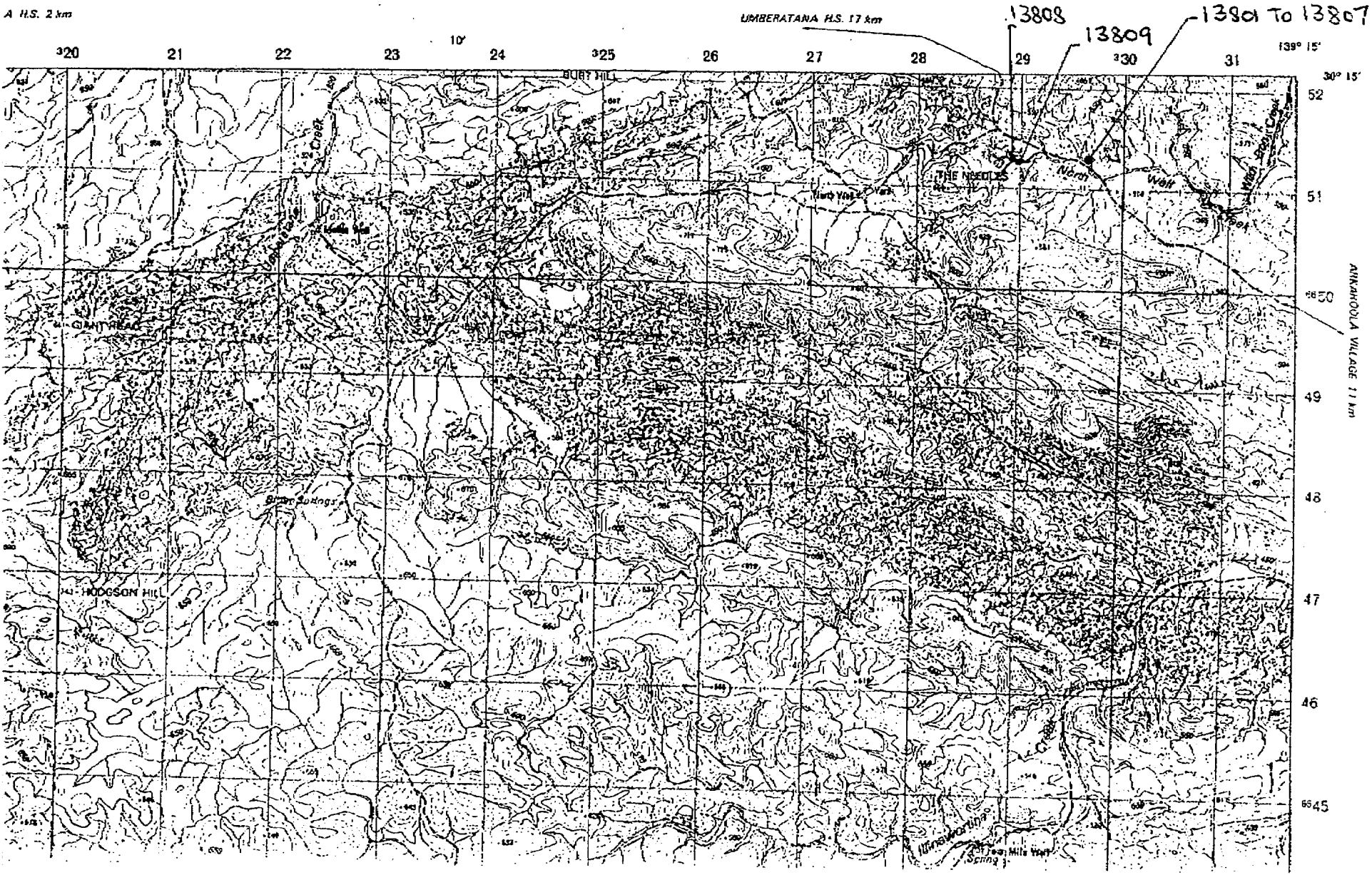


Fig. 2

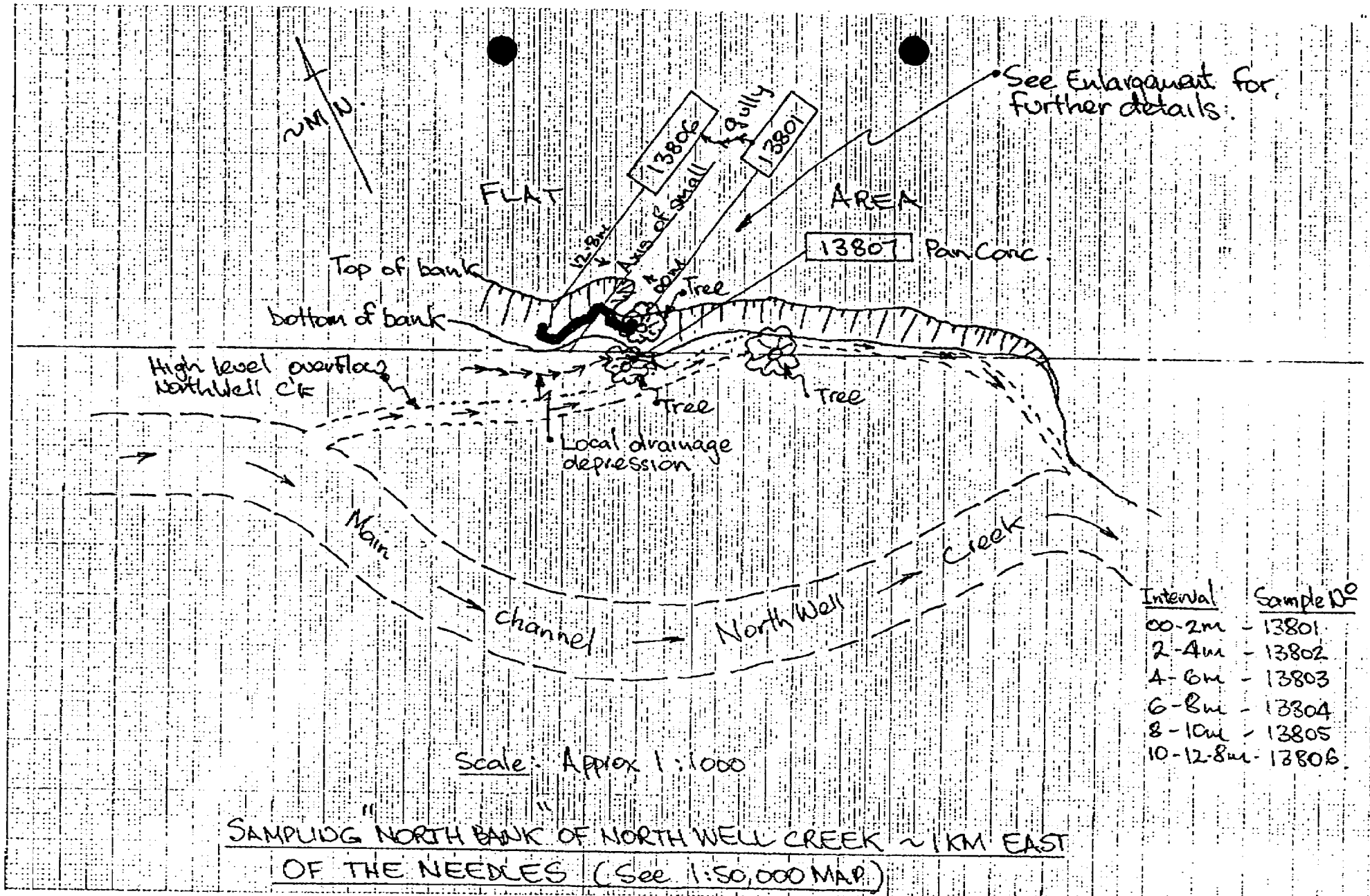

~M.N.
FLAT
AREA
13806
Gully
13801
See Enlargement for further details:
12-8m
Axis of small gully
13807 Pan Conc.
Top of bank
Bottom of bank
Tree
High level overflow Northwell C'k
Tree
Tree
Local drainage depression
Main channel
North Well Creek
Interval Sample No.
00-2m - 13801
2-4m - 13802
4-6m - 13803
6-8m - 13804
8-10m - 13805
10-12-8m - 13806.
Scale: Approx 1:1000
SAMPLING NORTH BANK OF NORTH WELL CREEK ~1KM EAST OF THE NEEDLES (See 1:50,000 MAP)

Fig. 3

NB: 00→4m ~vertical & distinct darker tourmaline zone.

Fig 4

SAMPLE LOCATION ENLARGEMENT NORTHWELL CREEK

(NOT TO SCALE)

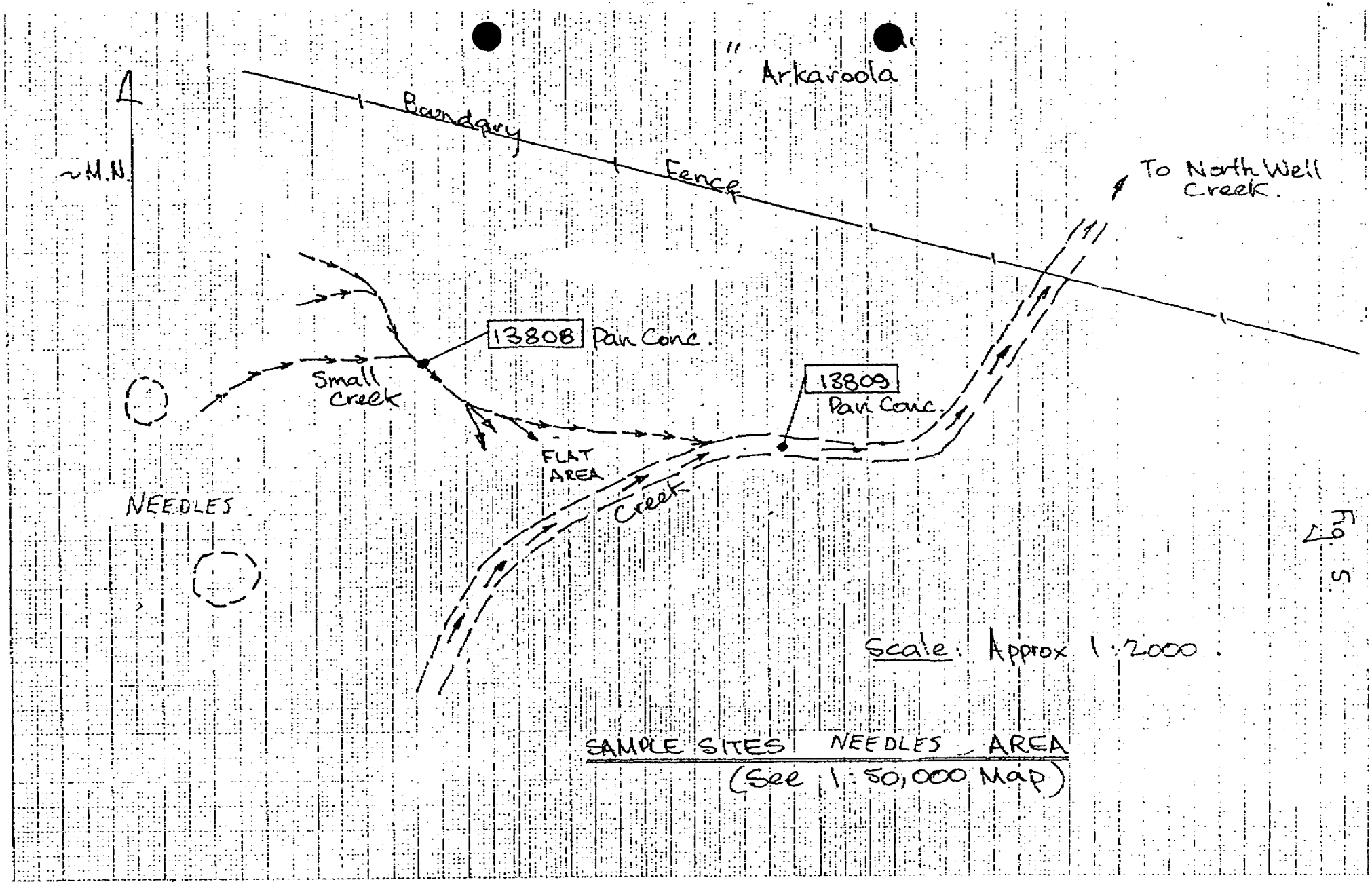


Fig. 5.

ANALABS

A Division of Inchcape Inspection and Testing Services Australia Pty. Ltd.

Phone (08)3365099

16 Sunbeam Road, Glynde, S.A. 5070

Fax (08) 3365564

ANALYTICAL REPORT No. 660.0.35.05531

THIS REPORT MUST BE READ IN CONJUNCTION WITH THE ACCOMPANYING ANALYTICAL DATA

INVOICE TO:

Lynch Mining Pty Ltd
GPO Box 444

Brisbane Qld 4001

ORDER No.	PROJECT
Graham 27.8.9	

DATE RECEIVED	RESULTS REQUIRED
10/09/90	ASAP

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES
8	26/09/90	1

TOTAL No. OF SAMPLES: 86

SAMPLE NUMBERS	SAMPLE DESCRIPTION	ELEMENT/METHOD
13801/9	ro Prep : 021	Be/119,Cs,Ga,Nb,Rb,Ta/401
13810/82,QC13820/80/20	ro Prep :	Cu,Pb,Zn,Ag/101
13810/82,QC13820/80/20	ro Prep :	Zn/104
13810/82,QC13820/80/20	ro Prep :	Sn,Y,W,As/401

REMARKS

RESULTS TO

G and R Teale
Lynch Mining Pty Ltd
PO Box 740

North Adelaide SA 5006

RESULTS TO

Lynch Mining Pty Ltd
GPO Box 444

Brisbane Qld 4001

RESULTS TO

AUTHORISED OFFICER

ANALABS

A Division of Inchcape Inspection and Testing Services Australia Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	660.0.35.05531	26/09/90	Graham 27.8.9	1 OF 8

TUBE No.	SAMPLE No.	Zn	Cu	Pb	Zn	Ag	Be	Cs	Ga	Nb
1	13801	–	–	–	–	–	5	11	19	9
2	13802	–	–	–	–	–	5	10	17	8
3	13803	–	–	–	–	–	5	4	6	7
4	13804	–	–	–	–	–	5	12	11	9
5	13805	–	–	–	–	–	<5	7	9	10
6	13806	–	–	–	–	–	5	6	10	9
7	13807	–	–	–	–	–	5	<3	11	5
8	13808	–	–	–	–	–	25	<3	8	200
9	13809	–	–	–	–	–	5	<3	8	10
10	~~13810~~	~~240~~	~~60~~	~~40~~	~~180~~	~~<0.5~~	~~–~~	~~–~~	~~–~~	~~–~~
11	13811	220	105	35	180	0.5	–	–	–	–
12	13812	205	60	105	185	0.5	–	–	–	–
13	13813	215	60	105	200	1.0	–	–	–	–
14	13814	510	280	355	450	0.5	–	–	–	–
15	13815	370	375	55	330	0.5	–	–	–	–
16	13816	255	75	40	210	0.5	–	–	–	–
17	13817	210	70	65	180	1.5	–	–	–	–
18	13818	200	25	185	170	1.0	–	–	–	–
19	13819	285	40	205	235	0.5	–	–	–	–
20	13820	175	130	90	160	0.5	–	–	–	–
21	13821	150	245	100	130	1.5	–	–	–	–
22	13822	225	200	80	185	0.5	–	–	–	–
23	13823	165	625	90	140	2.0	–	–	–	–
24	13824	365	115	80	275	0.5	–	–	–	–
25	~~13825~~	~~395~~	~~310~~	~~85~~	~~340~~	~~1.5~~	~~–~~	~~–~~	~~–~~	~~–~~

Results in ppm unless otherwise specified
T = element present; but concentration too low to measure
X = element concentration is below detection limit
– = element not determined

AUTHORISED OFFICER D.K. Rowley

ANALABS

A Division of Inchcape Inspection and Testing Services Australia Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No	PAGE
	660.0.35.05531	26/09/90	Graham 27.8.9	5 OF 8

TUBE No.	SAMPLE No.	Rb	Sn	Y	W	As	Sn	Ta		
1	13801	260	–	–	–	–	–	<20		
2	13802	220	–	–	–	–	–	<20		
3	13803	75	–	–	–	–	–	<20		
4	13804	280	–	–	–	–	–	<20		
5	13805	240	–	–	–	–	–	<20		
6	13806	270	–	–	–	–	–	<20		
7	13807	80	–	–	–	–	–	<20		
8	13808	100	–	–	–	–	–	200		
9	13809	75	–	–	–	–	–	<20		
10	13810	–	45	80	17	<2	–	–		
11	13811	–	47	74	19	4	–	–		
12	13812	–	61	37	23	6	–	–		
13	13813	–	269	66	19	5	–	–		
14	13814	–	1720	82	26	6	–	–		
15	13815	–	106	89	30	<2	–	–		
16	13816	–	251	71	16	2	–	–		
17	13817	–	90	87	17	<2	–	–		
18	13818	–	34	97	<10	<2	–	–		
19	13819	–	45	78	27	3	–	–		
20	13820	–	254	90	11	10	–	–		
21	13821	–	119	95	14	6	–	–		
22	13822	–	123	90	23	8	–	–		
23	13823	–	892	106	26	3	–	–		
24	13824	–	49	1240	25	3	–	–		
25	13825	–	144	64	27	4	–	–		

Results in ppm unless otherwise specified
T = element present; but concentration too low to measure
X = element concentration is below detection limit
– = element not determined

AUTHORISED OFFICER D.K.Rowley

PETROGRAPHIC REPORT: North Well - 2

PROJECT: North Well

SAMPLE NUMBERS: 13807, 13808, 13809, 13807A, 13808A. 13809A

DATE: September, 1990

WORK REQUIRED: Brief description only of major, minor and rare phases in coarse (0.3 cm) and fine-grained concentrates.

COARSE CONCENTRATES:	13807, 13808, 13809 (sample localities presented in Figure 2 of this report)
13807	Major - Goethite (replacing pyrite), pyrite Minor - Tourmaline, fluor-phlogopite Rare - Albite
13808	Major - Goethite (replacing pyrite), pyrite, magnetite Minor - Tourmaline Rare - Fluor-phlogopite
13809	Major - Goethite (replacing pyrite), pyrite Minor - Albite Rare - Magnetite
Fine Concentrates:	13807A, 13808A, 13809A (generally grains of less than 1.5 mm
13807A:	Major - Tourmaline, goethite, actinolite, fluor-phlogopite Minor - Quartz, diopside, carbonate, albite, microcline Rare - Sphene, rutile
13808A	Major - Garnet, goethite, pyrite, tourmaline, albite Minor - Garnet, rutile, diopside, carbonate, quartz Rare - Magnesioriebeckite, monazite, apatite, biotite
13809A	Major - Goethite, pyrite, carbonate, albite-rich rock fragments Minor - Rutile, diopside, actinolite, quartz Rare - Tourmaline, magnetite, K-feldspar, fluor-phlogopite, monazite, scapolite

EXPENDITURE:

		$
ASSAYING		2300.00
GEOLOGY		800.00
CONTRACT LABOUR		650.00
CONSUMABLES		800.00
ADMINISTRATION & OVERHEADS		1150.00
	TOTAL	$5700.00

ENV. 8300

QUARTERLY REPORT ON EXPLORATION ACTIVITIES EXPLORATION LICENCE NO. 1645 NORTH WELL PROJECT, SOUTH AUSTRALIA FOR PERIOD 8.9.90 TO 8.12.90

AUTHOR: G.S. TEALE

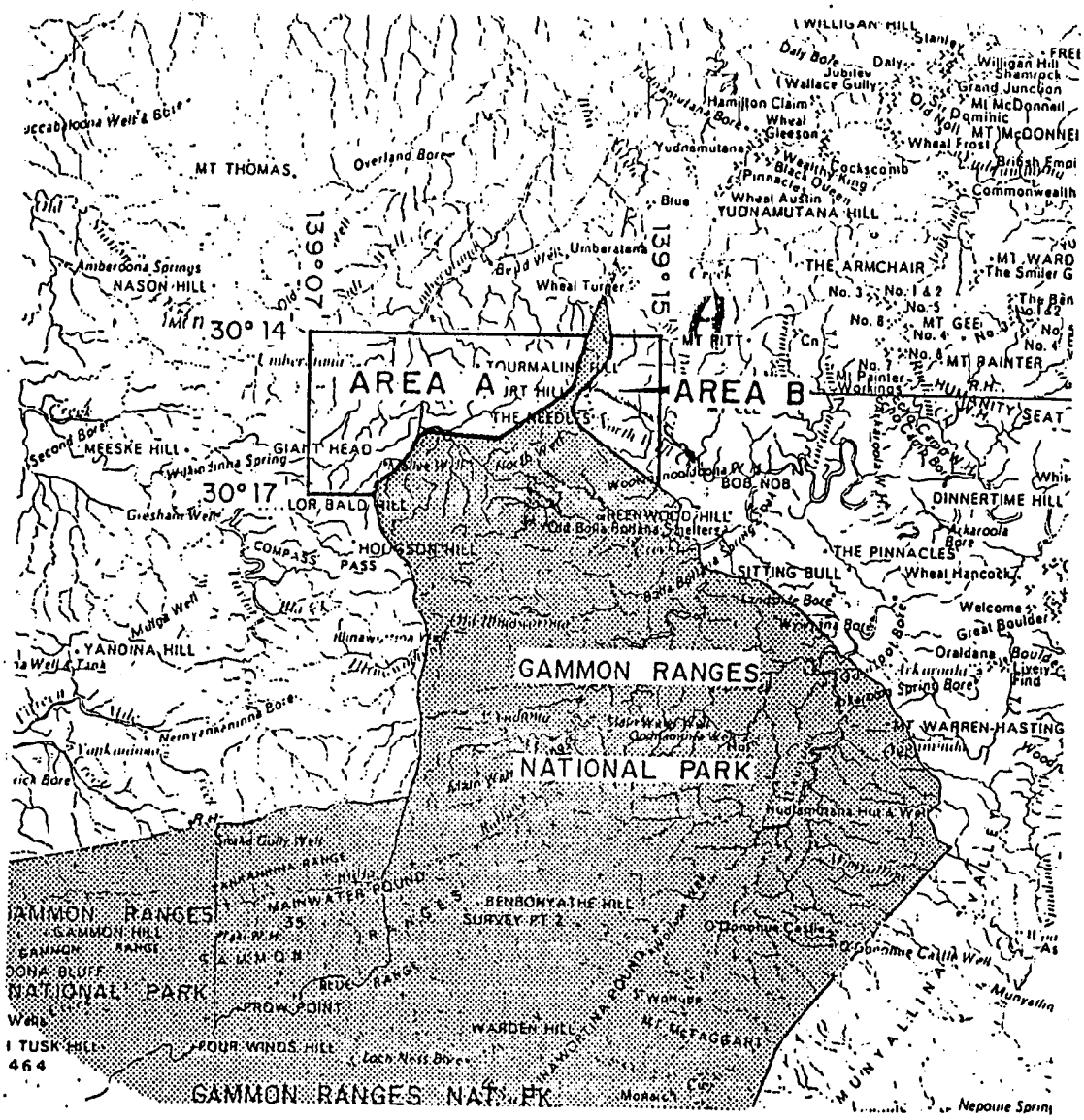
DATE: DECEMBER 1990

DISTRIBUTION: DEPARTMENT OF MINES AND ENERGY, ADELAIDE
LYNCH MINING LIMITED, BRISBANE

SCHEDULE A

FIGURE 1:

LOCATION OF EXPLORATION LICENCE No. 1645



Approx position Flinders Ranges A + B areas.

SCALE 1:250,000

KILOMETRES 5 0 5 10 15 20 25 KILOMETRES

APPLICANT: LYNCH MINING LIMITED

ME 401/89

AREA: 47 square kilometres (approx.)

250000 PLANS: COPLEY

OCALITY: NORTH WELL CREEK AREA - Approx. 75 km east of Leigh Creek

ATE GRANTED: DATE EXPIRED: EL No. 1645

EXPLORATION LICENCE NO. 1645

DISCUSSION OF EXPLORATION ACTIVITIES

Exploration during the quarter was confined to the collection of bulk stream sediment samples (6-8 kg) from the Tourmaline Hill and Giants Head areas. These have been panned down but no analytical or petrological information is available at present. Results from these, and other samples, will be presented next quarter.

EXPENDITURE:

	$
CONTRACT GEOLOGY	2255.00
CONTRACT LABOUR	800.00
VEHICLE EXPENSES	410.00
FREIGHT CHARGES	50.00
CONSUMABLES	190.00
DRAFTING & PLANNING	330.00
ACCOMMODATION/MEALS	180.00
ADMINISTRATION & OVERHEADS	1055.00
TOTAL:	$5,270.00

QUARTERLY REPORT ON EXPLORATION ACTIVITIES

EXPLORATION LICENCE NO. 1645

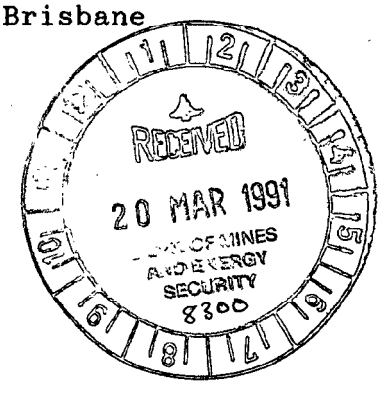
NORTH WELL PROJECT, SOUTH AUSTRALIA

FOR PERIOD 7.12.90 TO 7.3.91

Author: G.S. Teale

Date: March, 1991

Distribution: Department of Mines and Energy, Adelaide
Lynch Mining Limited, Brisbane



EXPLORATION LICENCE NO. 1645

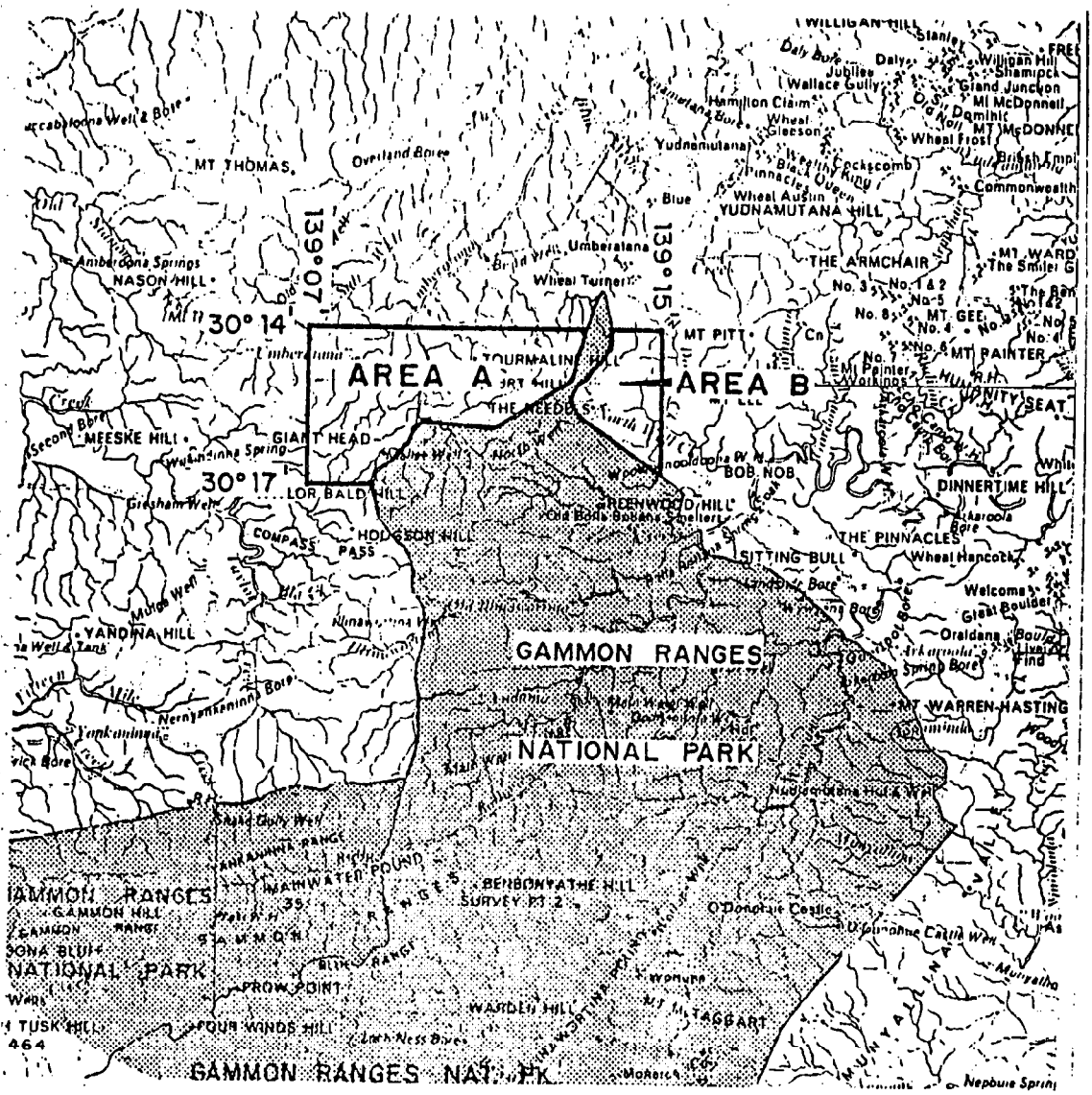
DISCUSSION OF EXPLORATION ACTIVITIES

Activities during the quarter were confined to the examination of panned concentrates from selected areas within the exploration licence. Polished thin sections (of grain mounts) have revealed the presence of course-grained (up to 1cm) titanomagnetite, ilmenite, monazite and apatite. Although the latter may have been derived from one of the numerous pegmatites of the area, the other three phases are somewhat "exotic" and may be related to carbonatitic intrusives. Analyses of the panned concentrates have not been finalised as yet.

Locations of samples and petrographic/mineragraphic descriptions will be presented in the next quarterly report along with analytical results.

SCHEDULE A

EXPLORATION LICENCE NO. 1645 "NORTH WELL CREEK"



NOTE: There is no warranty that the boundary of this Exploration Licence is correct in relation to other features on the map. The boundary is to be ascertained by reference to the Australian Geodetic Datum.

EXPENDITURE

Contract Geology	$1,620
Contract Labour	955
Vehicle Expenses	70
Metallurgy	2,430
Consumables	135
Drafting & Planning	15
Administration & Overheads	1,310
TOTAL	$6,535

8300

QUARTERLY REPORT ON EXPLORATION ACTIVITIES

EXPLORATION LICENCE NO. 1645

NORTH WELL PROJECT, SOUTH AUSTRALIA

FOR PERIOD 7.3.91 TO 7.6.91

AUTHOR: G.S. TEALE

DATE: JUNE, 1991

DISTRIBUTION: DEPARTMENT OF MINES AND ENERGY, ADELAIDE

LYNCH MINING LIMITED, BRISBANE

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EXPLORATION LICENCE NO. 1645

DISCUSSION OF EXPLORATION ACTIVITIES

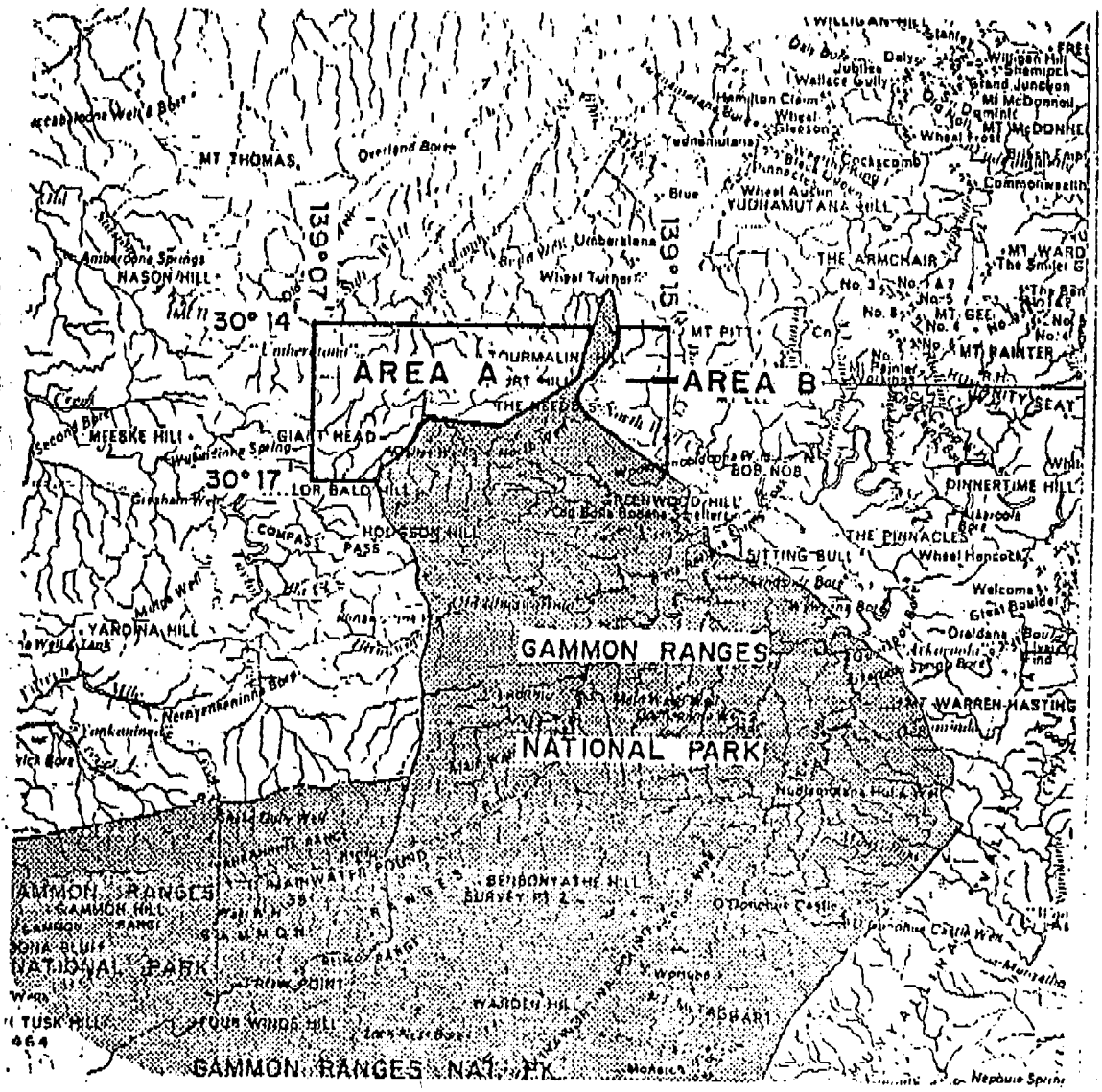
Analyses of numerous rock-chip and pan concentrate samples were received during the quarterly period under review (see Appendix One). Pan concentrate samples from the Tourmaline Hill area contained up to 1200 ppm Ta and 920 ppm Nb and those from the Giants Head area contained significant Bi (up to 230 ppm), Nb (up to 320 ppm) and W (up to 420 ppm). The anomalous pan concentrate sample from the Tourmaline Hill area was followed up during a recent field visit (prior to results being received). In this vicinity, brecciated albite-phlogopite metasomatites contain significant Ta (up to 135 ppm), Cs (up to 760 ppm), Rb (up to 0.37%), Li (up to 490 ppm) and Be (up to 300 ppm).

In the Giants Head locality, high Ta (up to 930 ppm) and Nb (up to 1,780 ppm) bearing samples appear to be confined to small pegmatoid lenses within the alkaline granites. There does appear to be a regional "zoning" with regard to Be, Rb, Cs, Nb, Ta and the rare earth elements. Beryllium and rubidium values in metasomatites are higher in the Needles and Tourmaline Hill localities, Ta is higher in the Tourmaline Hill and Giants Head localities and REE are higher in the Pinnacles area.

Further channel chip sampling is now required over delineated zones which are enriched in Rb, Be, Cs and Ta.

SCHEDULE A

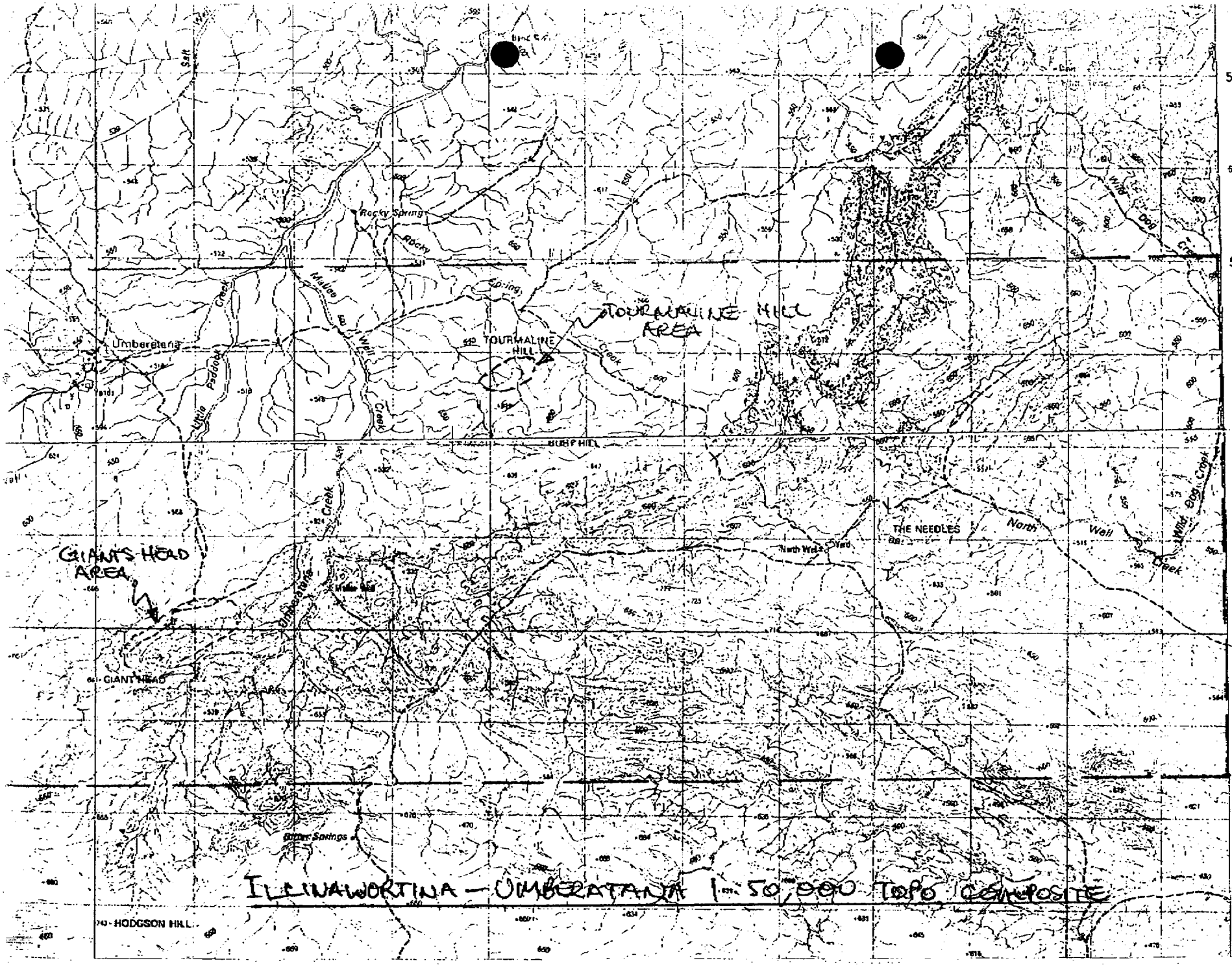
EXPLORATION LICENCE NO. 1645 "NORTH WELL CREEK"



SCALE 1:250,000

5 0 5 10 15 20 25 KILOMETRES

NOTE: There is no warranty that the boundary of this Exploration Licence is correct in relation to other features on the map. The boundary is to be ascertained by reference to the Australian Geodetic Datum.

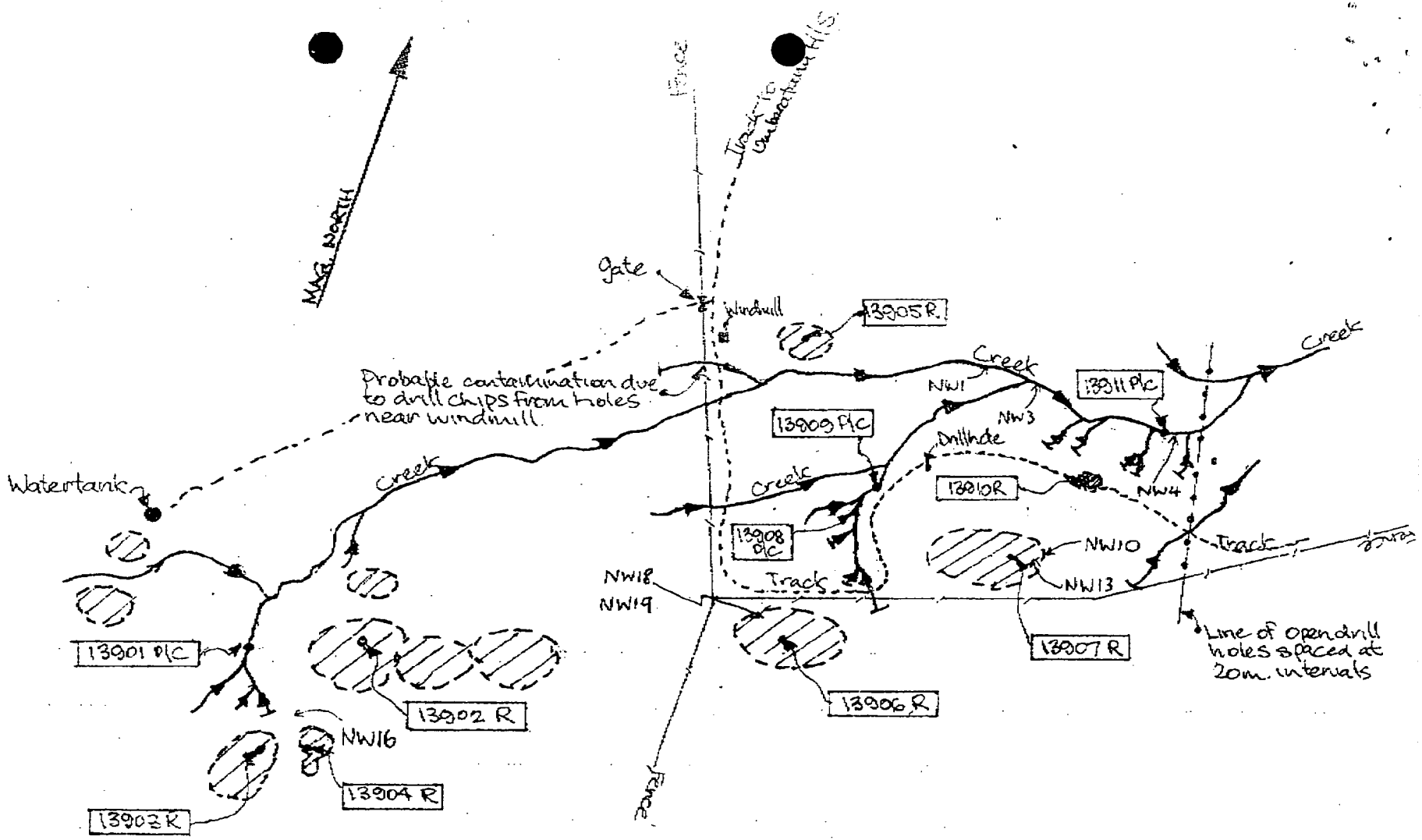


30° 14'

30° 17'

Fig. 2.

ILLINAWORTINA – UMBERATANA 1:50,000 TOPO COMPOSITE



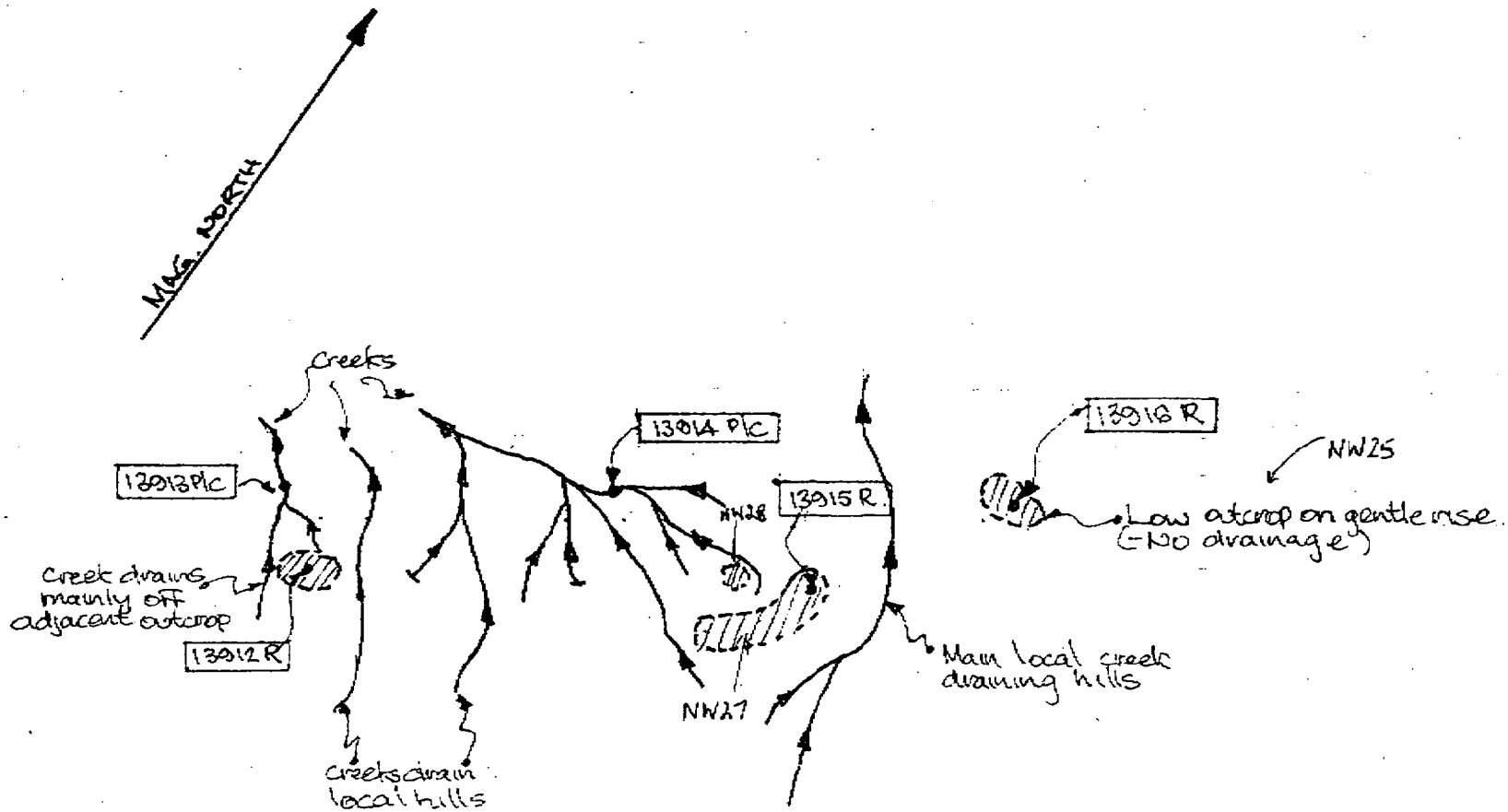
LEGEND:

▨: OUTCROP. (LIMITS ONLY APPROX)
P/C: PANNED CONCENTRATE SAMPLE
R: BULK ROCK SAMPLE

Fig. 3. SAMPLING, GIANTS HEAD AREA (DEC. 1990)

SCALE: APPROX 1:5000.

(see Umbaratana-Illinawortina 1:50000 Topo Map for overall area location.)



LEGEND:

▨ : OUTCROP (LIMITS ONLY APPROX)
P/C : PANNED CONCENTRATE SAMPLE
R : BULK ROCK SAMPLE

Fig. 4. SAMPLING, TOURMALINE HILL AREA (DEC 1980)
(See Umbarratana-Illinawarina 1:50,000 Topo Map)
SCALE: APPROX: 1:5000

TABLE 1

"NORTHWELL CREEK" PANNED CONCENTRATES

(DECEMBER, 1990)

	Weight of Bulk Sample (Approx)	Weight of Panned Concentrate (Approx)
13901	13.6 kg	290 gm
13908	16.5 kg	210 gm
13909	13.0 kg	230 gm
13911	15.5 kg	340 gm
13913	11.9 kg	280 gm
13914	13.4 kg	240 gm
13917	16.2 kg	1320 gm *
13918	19.5 kg	560 gm

* Lots of heavy minerals

EXPENDITURE:

	$
Contract Geology	4,000.00
Contract Labour	980.00
Vehicle Expenses	470.00
Metallurgy	745.00
Consumables	345.00
Administration and Overheads	1,635.00
TOTAL:	$8,175.00

APPENDIX ONE

CLASSIC LABORATORIES LTD

Job: 1AD1464
O/N: D 7101

ANALYTICAL REPORT

Sample	As	Bi	Ce	Mo	Nb	Sn	Ta
13911	26	<4	290	4	175	4	100
13913	38	42	450	9	70	<4	60
13909	20	8	70	<2	75	<4	15
13901	80	230	380	10	320	6	65
13908	28	88	150	7	170	6	45
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
DL	2	4	20	2	2	4	10
Scheme	XRF1	XRF1	XRF1	XRF1	XRF1	XRF1	XRF1

Sample	As	Bi	Ce	Mo	Nb	Sn	Ta
13914	60	145	720	<10	920	<40	1200
13918	17	<20	3000	<10	36	<40	<50
13920	18	<20	6100	<10	30	<40	<50
13921	75	<20	5400	<10	26	<40	<50
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
DL	10	20	100	10	10	40	50
Scheme	XRF1	XRF1	XRF1	XRF1	XRF1	XRF1	XRF1

CLASSIC LABORATORIES LTD

Job: 1AD1464
O/N: D 7101

ANALYTICAL REPORT

Sample	Te	W	Y	Zr
13911	<10	160	40	250
13913	<10	<10	70	68
13909	<10	35	30	195
13901	<10	20	42	125
13908	10	420	65	440
Units	ppm	ppm	ppm	ppm
DL	10	10	4	4
Scheme	XRF1	XRF1	XRF1	XRF1

Sample	Te	W	Y	Zr
13914	<50	135	80	135
~~13918~~	~~<50~~	~~<50~~	~~86~~	~~135~~
~~13920~~	~~<50~~	~~<50~~	~~170~~	~~86~~
~~13921~~	~~<50~~	~~<50~~	~~160~~	~~82~~
Units	ppm	ppm	ppm	ppm
DL	50	50	20	20
Scheme	XRF1	XRF1	XRF1	XRF1

CLASSIC LABORATORIES LTD

Job: 1AD1484
O/N: D 7101

ANALYTICAL REPORT

Sample	Au Avg	Au	Au Rpl	Au SSl
13911	0.02	0.02	--	--
13913	0.02	0.02	--	--
13909	<0.01	<0.01	--	--
13901	<0.01	<0.01	--	--
13908	0.03	0.03	0.03	--
13914	<0.01	<0.01	--	--
~~13918~~	~~0.03~~	~~0.03~~	~~0.02~~	--
~~13920~~	~~<0.01~~	~~<0.01~~	--	--
~~13921~~	~~<0.01~~	~~<0.01~~	--	--
Units	ppm	ppm	ppm	ppm
DL	0.01	0.01	0.01	0.01
Scheme	FA1	FA1	FA1	FA1

CLASSIC LABORATORIES LTD

Job: 1AD1464
O/N: D 7101

ANALYTICAL REPORT

Sample	Ce	Cs	Ga	Nb	Rb	Sn	Ta
NW-1	20	10	26	48	430	<4	<10
NW-3	20	<10	8	6	9	<4	<10
NW-4	<20	10	48	38	72	<4	70
NW-10	<20	20	32	24	710	<4	<10
NW-13	<20	15	32	210	650	4	<10
NW-16	70	<10	24	35	160	6	<10
NW-18	320	10	<4	1780	8	42	930
NW-19	120	<10	<4	690	<2	16	320
NW-25	<50	430	24	155	3200	10	110
NW-27	20	20	32	75	165	6	45
NW-28	<50	760	22	145	3650	8	135
~~NW-30~~	~~100~~	~~35~~	~~20~~	~~16~~	~~260~~	~~<4~~	~~<10~~
~~NW-31~~	~~120~~	~~<50~~	~~4~~	~~4~~	~~22~~	~~10~~	~~10~~
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
DL	20	10	4	2	2	4	10
Scheme	XRF1	XRF1	XRF1	XRF1	XRF1	XRF1	XRF1

CLASSIC LABORATORIES LTD

Job: 1AD1464
O/N: D 7101

ANALYTICAL REPORT

Sample	W	Y	Zr	Au Avg	Au	Au Rpl	Au SS1
NW-1	<10	34	18	<0.01	<0.01	--	--
NW-3	10	35	55	<0.01	<0.01	--	--
NW-4	<10	8	32	0.02	0.02	--	--
NW-10	<10	22	92	0.01	0.01	--	--
NW-13	<10	10	110	<0.01	<0.01	--	--
NW-16	10	24	145	0.03	0.03	--	--
NW-18	90	680	72	0.02	0.02	--	--
NW-19	10	240	40	0.01	0.01	--	--
NW-25	<10	4	160	0.01	0.01	--	--
NW-27	<10	10	185	0.01	0.01	--	--
NW-28	<10	<4	96	0.01	0.01	--	--
~~NW-30~~	~~<10~~	~~35~~	~~440~~	~~<0.01~~	~~<0.01~~	~~--~~	~~--~~
~~NW-31~~	~~30~~	~~80~~	~~8~~	~~0.01~~	0.01	--	--
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
DL	10	4	4	0.01	0.01	0.01	0.01
Scheme	XRF1	XRF1	XRF1	FA1	FA1	FA1	FA1

Job: 1AD1464
O/N: D 7101

ANALYTICAL REPORT

Sample	Be	Li
NW-1	9	<4
NW-3	<2	<4
NW-4	44	38
NW-10	140	260
NW-13	42	78
NW-16	6	26
NW-18	98	<4
NW-19	94	<4
NW-25	300	410
NW-27	13	105
NW-28	105	490
~~NW-30~~	~~5~~	~~35~~
~~NW-31~~	~~<2~~	~~<4~~
Units	ppm	ppm
DL	2	4
Scheme	AAS3	AAS3

QUARTERLY REPORT ON EXPLORATION ACTIVITIES

EXPLORATION LICENCE NO. 1645

NORTH WELL PROJECT, SOUTH AUSTRALIA

FOR PERIOD 7.6.91 TO 7.9.91

AUTHOR: G.S. TEALE

DATE: SEPTEMBER, 1991

DISTRIBUTION: DEPARTMENT OF MINES AND ENERGY, ADELAIDE

LYNCH MINING LIMITED, BRISBANE

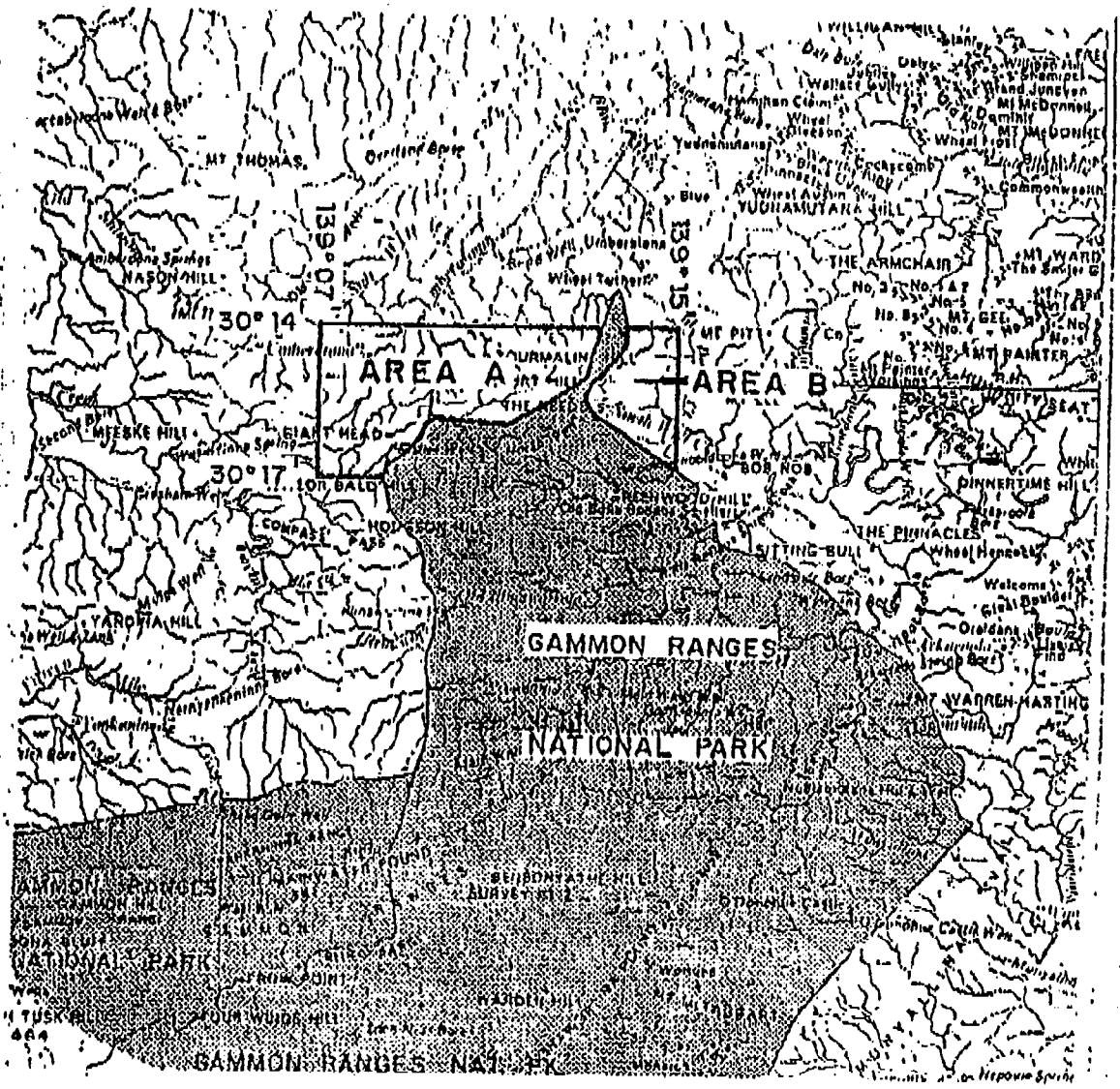
EXPLORATION LICENCE NO. 1645

DISCUSSION OF EXPLORATION ACTIVITIES

During the period under review no field work was undertaken. Petrological and mineragraphic investigations of "metasomatites" indicate that the Be is contained in phenacite (and possibly in phlogopite), the Cs, Rb, Li and F is contained in fluor-phlogopite, the light rare earth elements in monazite and the Ta and Nb in mangancolumbite. Bertrandite ($Be_4Si_2O_7[OH]_2$) is present in the Needles area but has not been observed in the Tourmaline Hill to Giants Head localities. Beryl is only observed within the granite pipes and significant Y concentrations are only found in fayalite granites at the Giants Head locality.

Electron microprobe investigations are at present being conducted on the Rb-Cs-rich metasomatites to ascertain the concentration of Rb and Cs in fluor-phlogopite.

EXPLORATION LICENCE NO. 1645 "NORTH WELL CREEK"



NOTE: There is no warranty that the boundary of this Exploration Licence is correct in relation to other features on the map. The boundary is to be ascertained by reference to the Australian Geodetic Datum.

EXPENDITURE

Assaying	$1,455.00
Contract Geology	4,200.00
Contract Labour	55.00
Metallurgy	485.00
Consumables	590.00
Administration and Overheads	1,745.00
TOTAL:	$8,720.00

8300

QUARTERLY REPORT ON EXPLORATION ACTIVITIES

EXPLORATION LICENCE NO. 1645

NORTH WELL CREEK PROJECT, SOUTH AUSTRALIA

FOR PERIOD 8.9.91 TO 7.12.91

AUTHOR: G.S. TEALE

DATE: DECEMBER, 1991

DISTRIBUTION: DEPARTMENT OF MINES AND ENERGY, ADELAIDE

LYNCH MINING LIMITED, BRISBANE

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Figure 1: Location of the Exploration Licence area

Table 1: Fluor-phlogopite analyses, Tourmaline Hill prospect area.

Table 2: Oxide analyses, North Well Creek project area

Expenditure

DISCUSSION OF EXPLORATION ACTIVITIES

EXPLORATION LICENCE 1645

During the period under review no field work was undertaken. Electron microprobe investigations of both granites and metasomatites were carried out to ascertain the location and concentration of Rb, Cs and F in fluor-phlogopite and Ta and Nb in titanium oxides. Representative analyses are presented in Tables 1 and 2. Rb_2O concentrations up to 0.8% were recorded in some phlogopites with Cs_2O concentrations variable and ranging up to 0.34%. Cs and Rb were not detected in phenacite. Rutiles (ilmenorutiles) have extremely variable Nb/Ta ratios and range in colour from yellow to black. No discrete Cs or Rb phases (e.g. pollucite) were located.

It has been noted that significant tonnages of vermiculite and fluor-phlogopite are present at various localities. This is currently being researched (i.e. re the commercial viability of creating a vermiculite and/or a fluor-phlogopite product).

TABLE 1: FLUOR-PHLOGOPITE ANALYSES, TOURMALINE HILL LOCALITY

	1	2	3	4
SiO_2	42.63	43.09	43.18	42.92
TiO_2	0.34	0.32	0.25	0.25
Al_2O_3	11.28	11.35	11.48	11.45
FeO	4.83	4.80	4.07	4.16
MnO	0.04	0.05	0.03	0.06
ZnO	<0.03	<0.03	<0.03	<0.03
MgO	23.67	24.24	24.96	24.98
CaO	<0.01	<0.01	<0.01	<0.01
Na_2O	0.06	0.10	0.07	0.06
K_2O	10.41	10.46	10.50	10.68
Rb_2O	0.72	0.67	0.32	0.37
Cs_2O	0.14	0.17	0.29	0.21
F	3.61	3.73	3.58	3.37
Cl	0.12	0.04	0.05	0.03
TOTAL	97.84	99.0	98.78	98.54

1: Approximately 180m East North East of Tourmaline Hill pegmatite outcrop (phlogopite-albite rock)

2: Similar area to above (phlogopite-albite rock)

3: Approximately 200m North East of Tourmaline Hill granite (phlogopite-albite breccia)

4: Similar area and rock-type to above.

TABLE 2: OXIDE ANALYSES, NORTH WELL CREEK PROJECT

	1	2	3	4	5
Nb_2O_5	4.92	11.04	6.02	4.13	3.03
Ta_2O_5	3.48	3.04	1.51	3.58	2.72
TiO_2	88.28	79.57	87.18	88.69	91.82
Al_2O_3	<0.02	<0.02	<0.02	<0.02	<0.02
FeO	3.14	5.67	3.25	2.34	1.94
MnO	<0.02	<0.02	<0.02	<0.02	<0.02
SnO	0.09	0.09	0.15	0.11	0.11
MgO	<0.02	<0.02	<0.02	<0.02	<0.02
TOTAL	99.91	99.40	98.10	98.86	99.62

1. Approximately 180m East North East of Tourmaline Hill pegmatite outcrop (from phlogopite-albite rock)

2 & 3. "Rutile" from fayalite granite, Giants Head (200m south-east of Giants Head water-bore).

4. Approximately 210m North East of Tourmaline Hill granite (phlogopite-albite-breccia).

5. Similar area to above

EXPENDITURE

Contract Geology	$1,800.00
Contract Labour	249.00
Metallurgy	293.00
Accommodation & Meals	134.36
TOTAL	$2,476.36

QUARTERLY REPORT ON EXPLORATION ACTIVITIES

EXPLORATION LICENCE NO. 1645

NORTH WELL CREEK PROJECT, SOUTH AUSTRALIA

FOR PERIOD 8/12/91 TO 7/3/92

Author: G S Teale

Date: April, 1992

Distribution: Department of Mines & Energy, Adelaide
Lynch Mining Limited, Brisbane

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APPENDIX 2: Sample Localities	A2-1
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SECTION 1.0: DISCUSSION OF EXPLORATION ACTIVITIES

Field work conducted in January, 1992 concentrated on the Giants Head to Tourmaline Hill area, with some geological mapping and sampling carried out on open ground, approximately 1½ km east of the exploration licence (see below). Laboratory studies involved petrographic/mineragraphic investigations, x-ray diffraction investigations (Appendix 1), preliminary grain size investigations of vermiculite-bearing material and preliminary studies of (modal) percentage vermiculite in a number of 'vermiculite-rich' samples. Points of note are summarized below:

(a) Granite outcrops in the Giants Head vicinity were mapped with special interest taken in immediately adjacent 'metasomatites'. This map will be presented in the next quarterly report. In brief, the granite bodies occur as lenticular (up to 1000 m in length), shallowly dipping 'sheets' which trend approximately 045° and appear to dip to the north at between 40° and 60°.

(b) The 'Bob Nob' leucogranite intrusive was mapped at a scale of 1:500 (Plate 1). This intrusive is located approximately 1.5 km east of the eastern boundary of the EL on the basement/cover contact. This area is currently 'open' and if results of rock-chip sampling prove encouraging the intrusive will be applied for (adding to the existing exploration licence).

This intrusive was also mapped in an effort to aid understanding of the mode of emplacement of not only the granite, but also the adjacent 'diapiric breccia material'. The area was mapped using a grid (25 m x 25 m spacing) which was constructed over an area of 250 m x 250 m.

SECTION 1.0: DISCUSSION OF EXPLORATION ACTIVITIES

The Bob Nob granite and associated 'breccia' occur in a valley and are 'structurally overlain' by Early Proterozoic greisses (see Plate 1). Observations here and at Giants Head suggest thrusting may be, in part, responsible for the breccias.

(c) The Bob Nob leucogranite is composed of quartz-albite-microcline-tourmaline, as well as a host of minor phases. Spessartine-rich garnet is present with pre-existing biotite totally pseudomorphed by alloite, phenacite, Mn-tantalo-columbite and an unknown Be-Na-Al-Si phase. The 'metasomatites' contain vermiculite, talc, hydro-biotite, chlorite and minor albite and carbonate. Both the granite and the metasomatites contain anomalous Be-Ta-Nb.

(d) Eleven samples (THV-1 to THV-8; GHV-1 to GHV-3) of possible vermiculite[1] bearing material (generally greater than 80% of micaceous material) were collected from various areas in the Giants Head and Tourmaline Hill region (Appendix 2). These samples were submitted to the CSIRO Division of Soils, Adelaide for identification of major phases via the use of XRD. The results are presented in Appendix 1. Most samples contained major vermiculite and/or rectorite (a vermiculite-like mineral) suggesting that a significant tonnage of vermiculite will be present in the area.

---

1 The vermiculite group represents a number of hydrated micaceous silicates containing approximately 20% H_2O^+ which are in part related to chlorites. A general formula is:

$$(Mg, Ca)_{0.7} (Mg, Fe^{3+}, Al)_6 [(Al, Si)_8 O_{20}] (OH)_4 .8H_2O$$

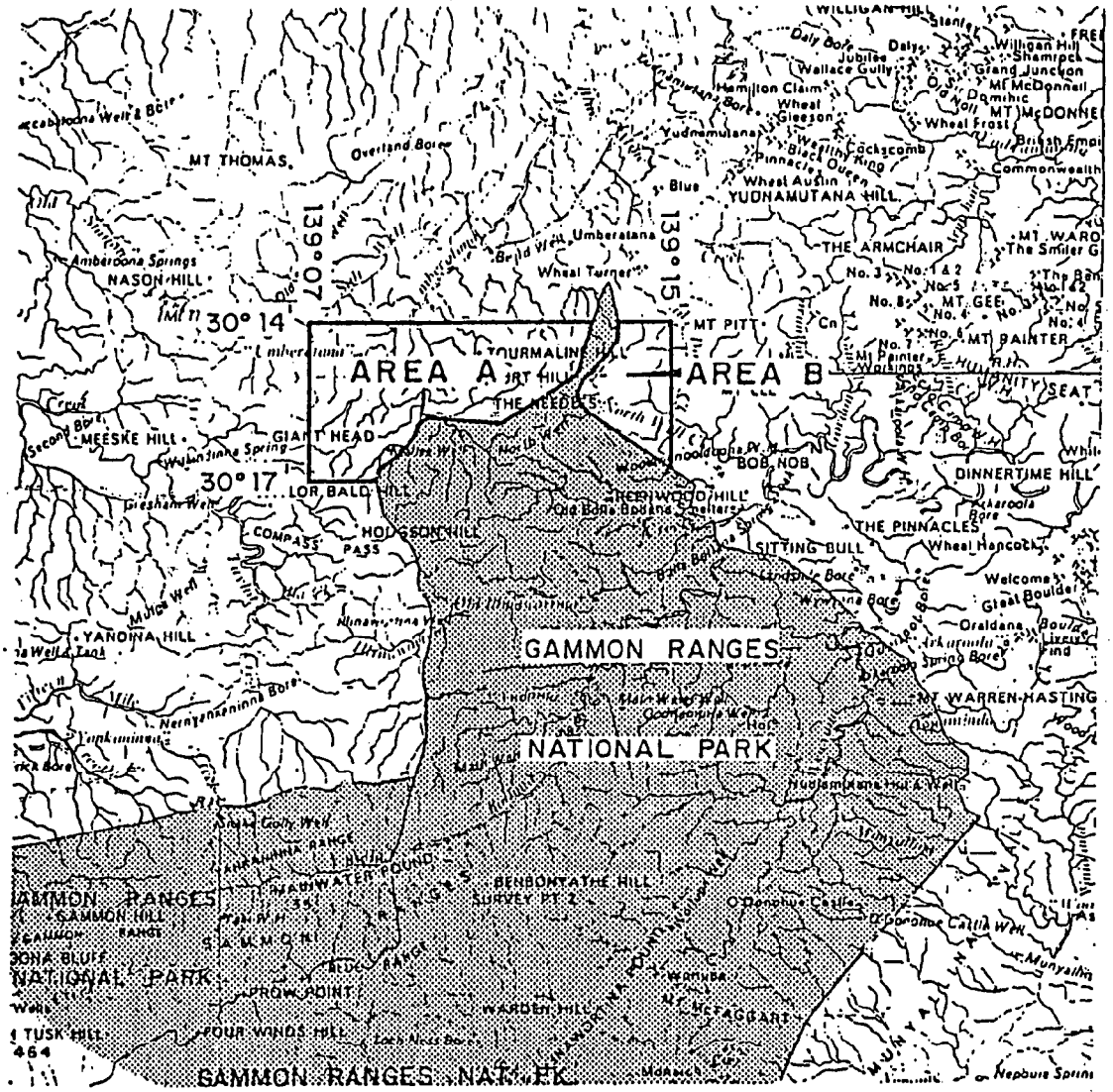
SECTION 1.0: DISCUSSION OF EXPLORATION ACTIVITIES

(e) To the north-east of Tourmaline Hill the breccias are composed of fragments/matrix which display a variety of colours (greys to greens). The matrix and clasts, even with the noticeable colour variations, are still composed of major vermiculite.

(f) Petrological investigation of a number of samples suggests a wide range in vermiculite grain size, with a range of from 0.05 mm to 2.5 mm. Investigated samples contained approximately 70%-80% vermiculite/rectorite/hydro-biotite.

During the next quarter bulk samples of vermiculite-rich material will be collected using a backhoe ("Notices of Entry" and "Use of Declared Equipment" forms will be forwarded to the relevant pastoralists/government departments) and additional testwork carried out (eg. chemical analyses, pH, cation exchange capacity, sizing, etc). Work will also continue on the known Be-Ta-Rb-Cs prospect areas.

FIGURE 1: LOCATION OF THE EXPLORATION LICENCE AREA



SCALE 1:250,000

KILOMETRES 5 0 5 10 15 20 25 KILOMETRES

APPLICANT: LYNCH MINING LIMITED

DME 401/89 AREA: 47 square kilometres (approx.)

1:250000 PLANS: COPLEY

LOCALITY: NORTH WELL CREEK AREA - Approx. 75 km east of Leigh Creek

DATE GRANTED: 7·3·90 DATE EXPIRED: EL No: 1645

APPENDIX ONE: XRD DATA FROM CSIRO DIVISION OF SOILS, ADELAIDE

FX160291.DOC

FACSIMILE MESSAGE

CSIRO AUSTRALIA

Division of Soils
Waite Road, URRBRAE,
Private Bag No. 2,
GLEN OSMOND, 5064,
SOUTH AUSTRALIA

Telephone (08) 274 9311
TLX 82406
FAX (08) 338 1636

Page 1 of 1 page(s)

To : Graham Teale **Fax Number :** 344 1636

From : Mr Mark Raven **Date :** 19 February, 1992

Dear Graham,

Identification of the minerals in the six THV samples you supplied are below.

Sample	Mineralogical Composition
THV-1	Major **vermiculite** and **rectorite.** Minor **quartz** and **feldspar.** Trace **talc.**
THV-2	Major **rectorite** and **phlogopite.** Minor **vermiculite.**
THV-5	Major **vermiculite** and **calcite.** Minor **quartz, feldspar** and **gypsum.**
THV-6	Major **vermiculite** and **talc.** Minor **quartz, calcite** and **dolomite.** Minor unidentified poorly crystalline clay mineral also present.
THV-7	Major **talc** and **phlogopite.** Minor **vermiculite** and **rectorite.** Trace **quartz, calcite** and **tremolite.**
THV-8	Major **talc, rectorite** and **phlogopite.** Minor **vermiculite** and **feldspar.** Trace **quartz** and **calcite.**

Regards,

M. Raven

Mark Raven,

APPENDIX ONE: XRD DATA FROM CSIRO DIVISION OF SOILS, ADELAIDE

FX260292.DOC

FACSIMILE MESSAGE

CSIRO
AUSTRALIA

Division of Soils
Waite Road, URRBRAE,
Private Bag No. 2,
GLEN OSMOND, 5064,
SOUTH AUSTRALIA

Telephone (08) 274 9311
TLX 82406
FAX (08) 338 1636

Page 1 of 1 page(s)

To : Graham Teale **Fax Number :** 344 1636

From : Mr Mark Raven **Date :** 26 February, 1992

Dear Graham,

Identification of the minerals in the five THV and GHV samples you supplied are below.

Sample	Mineralogical Composition
GHV-1	Major **phlogopite** and **vermiculite.** Minor **rectorite.** Trace **quartz.**
GHV-2	Major **talc** and **phlogopite.** Minor **rectorite** and **dolomite.** Trace **vermiculite** and **tremolite.**
GHV-3	Major **phlogopite** and **talc.** Minor **calcite, dolomite, vermiculite** and **rectorite.** Trace **quartz.**
THV-3	Major **vermiculite** and **rectorite.** Minor **talc.**
THV-4	Major **vermiculite** and **talc.**

John Keeling did a quick exfoliation test on sample GHV-1 before I had run the XRD. Unfortunately, what was thought to be fair sized vermiculite flakes was probably phlogopite. However, the vermiculite portion did expand giving about a 2X increase in volume over the whole sample. We would expect a much greater expansion with purer vermiculite samples.

Regards,

M. Raven

Mark Raven,

APPENDIX TWO: SAMPLE LOCALITIES

GHV-1 : Taken from creek bank approximately 1020 m ENE of Giants Head bore.

GHV-2 : Taken from the collar of an existing RAB hole (CRA Exploration), 360 m WSW of Giants Head bore.

GHV-3 : Taken from the collar of an existing RAB hole (CRA Exploration), 220 m east of the Giants Head bore.

THV-1 : Taken from a creek bank, 510 m NE of Tourmaline Hill; clast material in breccia.

THV-2 : Same locality as above; different coloured clast material (much finer grained).

THV-3 : Same locality as above; matrix material to above clasts.

THV-4 : Sample taken 320 m NE of Tourmaline Hill in bank of major creek.

THV-5 : Sample taken approximately 220 m ENE of Tourmaline Hill.

THV-6 : Sample taken from around the collar of a pre-existing RAB hole (CRA), 150 mm ENE of Tourmaline Hill.

THV-7 : Sample taken from an existing RAB hole (collar area); 30 m east of Tourmaline Hill.

THV-8 : Sample of 'talc-like' material taken 60 m east of the major Tourmaline Hill granite 'plug'.

EXPENDITURE

"NORTH WELL CREEK"

8/12/91 to 7/3/92

Assaying	510.00
Contract Geology	7,600.00
Contract Labour	139.00
Vehicle Expenses	483.00
Vehicle Hire	420.00
Mineralogy	310.00
Field Consumables	198.00
Postage/Telephone/Fax/Stationery, etc	280.00
Accommodation & Meals	495.00
Airfares	651.00
Rentals	221.00
Administration Overheads	$2,826.00
TOTAL	**$14,133.00**

1900E 1925N 1950E 1975E 2000E

GN = MN

1150N 1125N 1000N 1075N 1050N 1025N

scree

Schists; extremely sheared and contorted at fault margin

elluvium

soil cover

TO THE NEEDLES

TO BOB'S NOB

LEGEND

PALAEOZOIC

- Albitic, alkaline granite stock; tourmaline-rich and contains mangano-columbite, topaz and phenacite (~370 M.Y.)
- Metasomatised 'Wall Rock'; generally phlogopite, vermiculite, rectorite and talc-rich

LATE PROT.

- Brecciated and contorted Wywyana Formation (Late Proterozoic)

EARLY PROTEROZOIC

- Schistose meta-volcanics containing numerous 'quartz-eyes'
- Layered quartz-magnetite rock
- Quartz-feldspar schist and gneiss: probable deformed granite or volcanic

- Fault (known)
- Fault (inferred)
- S_0 (in Wywyana Fm.)
- S_3 (in Early Proterozoic schists)

8300-1

Geology of the Bobs Nob Alkaline Granite Intrusive, NORTH WELL CREEK AREA

0 10 20 30 40 50 METRES

SCALE 1:500

Drafted by GEODRAFTING, Adelaide S.A.

QUARTERLY REPORT ON EXPLORATION ACTIVITIES

EXPLORATION LICENCE NO. 1645

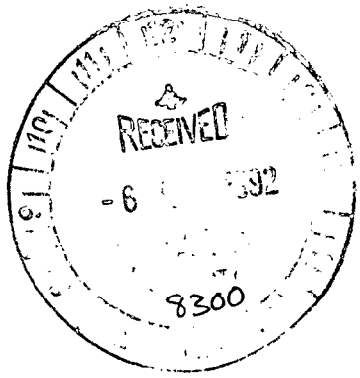
NORTH WELL CREEK PROJECT, SOUTH AUSTRALIA

FOR PERIOD 8.3.92 TO 7.6.92

Author: G.S. Teale

Date: July, 1992

Distribution: Department of Mines and Energy, Adelaide
Lynch Mining Ltd., Brisbane



EXPLORATION LICENCE 1645

NORTH WELL CREEK

TABLE OF CONTENTS

1. Discussion of Exploration Activities

Figure 1: Location of the Exploration Licence area

Plate 1: Geology of the Bob Nob Leucogranite Intrusive showing geochemical sample sites

Plate 2: Interpretive Geology of the Giants Head Area.

Appendix 1: Geochemical Data Sheets, Classic Laboratories, Adelaide

Appendix 2: Cation Exchange Capacity determinations for Tourmaline Hill Vermiculite - hydro-biotite samples (determined at C.S.I.R.O. Adelaide)

2. Expenditure

1. DISCUSSION OF EXPLORATION ACTIVITIES

Field checks and laboratory investigations were carried out during the quarter. A summary of activities and results is outlined below:

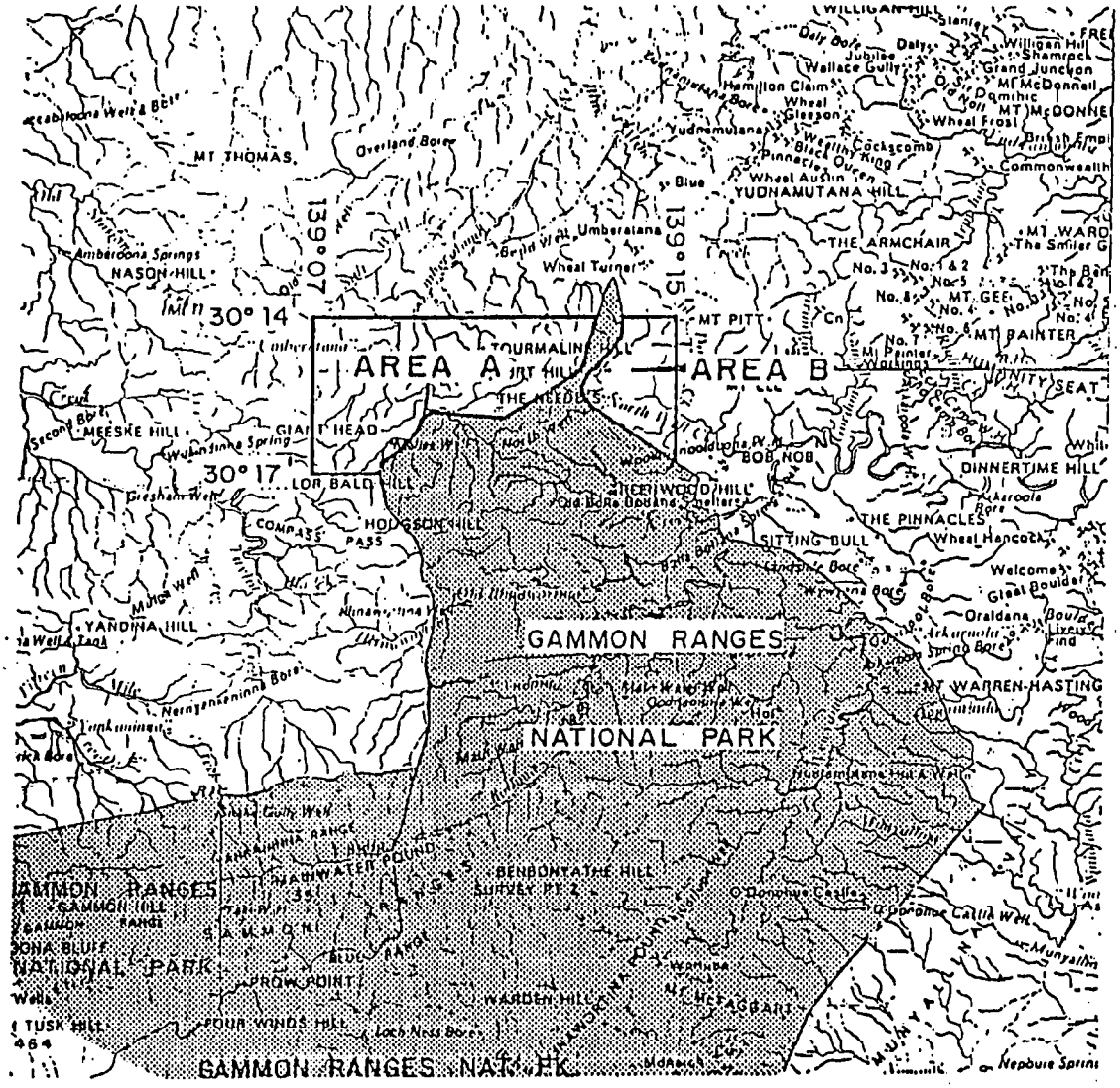
(a) Mapping of the Giants Head alkaline intrusives was finalised and is presented in Plate 2. The granites exhibit a wide range of granitic and pegmatitic textures and although some domains contain anomalous chemistry (e.g. Ta, Nb, Y) there is no tonnage potential at the presently exposed level.

(b) Chip sampling results of the Bob Nob intrusive proved disappointing with the highest result obtained being 175 ppm Bc, 145 ppm Nb and 55 ppm Ta. (See Appendix 1; Plate 1)

(c) Cation Exchange Capacity (CEC) determinations for vermiculite bearing samples were obtained from the C.S.I.R.O. Division of Soils, Adelaide (Appendix 2). Results ranged from 47 to 110 meq, indicating the interstratification of vermiculite and phlogopite.

(d) The vermiculite present in the Exploration Licence area may be too fine-grained to be of significant economic importance. Trenching and sampling will be carried out in selected areas during the next quarter with samples forwarded to Amdel Adelaide for testing.

FIGURE 1: LOCATION OF THE EXPLORATION LICENCE AREA



SCALE 1:250,000

KILOMETRES 5 0 5 10 15 20 25 KILOMETRES

APPLICANT: LYNCH MINING LIMITED

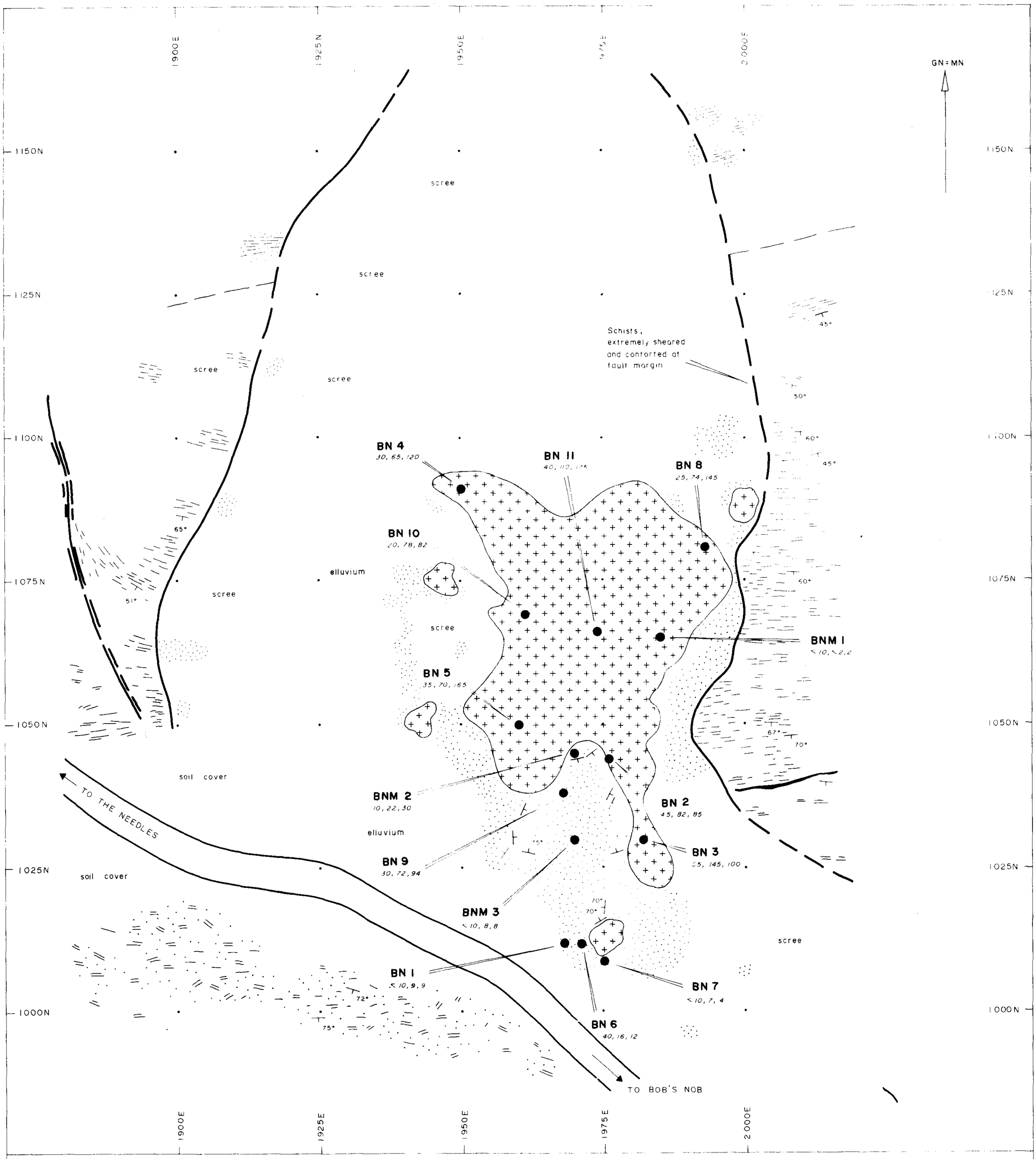
DME 401/89 AREA: 47 square kilometres (approx.)

1:250000 PLANS: COPLEY

LOCALITY: NORTH WELL CREEK AREA - Approx. 75 km east of Leigh Creek

DATE GRANTED: 7·3·90 DATE EXPIRED: EL No: 1645

PLATE 1



LEGEND

PALAEOZOIC

- Albitic, alkaline granite stock; *tourmaline-rich* and contains mangano-columbite, topaz and phenacite (~370 M.Y.)
- Metasomatised 'Wall Rock'; generally phlogopite, vermiculite, rectorite and talc-rich

LATE PROT.

- Brecciated and contorted Wywyana Formation (Late Proterozoic)

EARLY PROTEROZOIC

- Schistose meta-volcanics containing numerous 'quartz-eyes'
- Layered quartz-magnetite rock
- Quartz-feldspar schist and gneiss: probable deformed granite or volcanic

- Fault (known)
- Fault (inferred)
- S_o (in Wywyana Fm)
- S_3 (in Early Proterozoic schists)
- *10, 22, 30* — Ta, Nb, Be
- **BN** — Chip sample of granite
- **BNM** — Chip sample of metasomatised 'wall rock'

8300-2

PLATE 1

Geology of the Bobs Nob Alkaline Granite Intrusive, NORTH WELL CREEK AREA

0 10 20 30 40 50 METRES

SCALE 1:500

Drafted by GEODRAFTING, Adelaide S.A

PLATE 2

PLATE 2

8300-3

30°15'

INTERPRETIVE GEOLOGY OF THE GI ANTS HEAD LOCALITY , UMBERATANA AREA NORTHERN FLINDERS RANGES

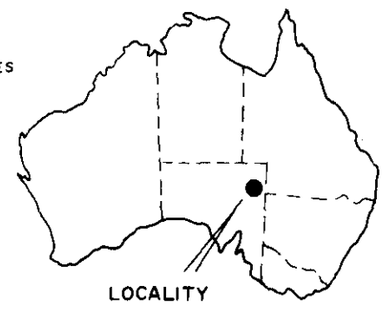
(modified after Lottermoser, 1985)

TN MN

7°

0 100 200 300 400 500 METRES

SCALE 1:10 000



65° 60° 75° 70° 80° 80° 70° 70° 72° 75° 60° 70° 80° 61° 40° 40° 76° 35° 40° 35° 45° 40° 75° 40°

Mallee Well

Windmill

Tank

Qa

139°10'

LEGEND

Alkaline, tourmaline-rich granites and pegmatites (417 ± 4)

Vermiculite ± talc - rich breccia, magnesio - riebeckite rich in part; rafts of limestone, tourmalinised calc-pelites, etc. Magnetite - pyrite - rich central 'core' dips shallowly to the north

Nuccaleena Fm., dolomitic shales, dolomite purple shales

Amberoona Fm., Scapolitic siltstones and dolomites, laminated to massive grey green shales and siltstones, amphibole - bearing limestones

Tapley Hill Fm., laminated dolomitic shales, black, scapolite - rich calc shales, scapolitic limestone blue grey shales, riebeckitic limestones, blue-grey shales

Yudnamutana Sub-group; unnamed member, tillites, shales, quartzites, conglomerates

Burra Group - undifferentiated; amphibole - rich carbonates, dolomites, dolomitic siltstones, shales etc.

ADELAIDEAN

MARINOAN

STURTIAN

TORRENSIAN

Trend of S_0, bedding

Dip / strike of S_0, bedding

Fault

Inferred fault

APPENDIX 1

CLASSIC LABORATORIES

Osman Place, Thebarton, South Australia 5031
Telephone: (08) 416 5300 Facsimile: (08) 234 0321

Mr John Lynch
Lynch Mining Limited
GPO Box 444
BRISBANE
QLD 4001

FINAL ANALYSIS REPORT

Your Order No: D 7104 Our Job Number : 2AD1051

Samples received : 09-APR-1992 Results reported : 27-APR-1992
No. of samples : 19
Report comprises a cover sheet and pages 1 to 1

This report relates specifically to the samples tested in so far as that the samples as supplied are truly representative of the sample source.

Note:
If you have any enquiries please contact Miss Anne Reed quoting the above job number.

Approved Signatory:

John Waters
Laboratory Manager - Adelaide

CC Mr G Teale SA

Report Codes:
N.A. - Not Analysed.
L.N.R. - Listed But Not Received.
I.S. - Insufficent Sample.

Distribution Codes:
CC - Carbon Copy
EM - Electronic Media
MM - Magnetic Media

CLASSIC LABORATORIES

ANALYTICAL REPORT

Job: 2AD1051
O/N: D 7104

Sample	Ta	Nb	Be
BN 1968E-1012N	<10	9	9
BN 1976E-1044N	45	82	85
BN 1982E-1030N	55	145	100
BN 1950E-1091N	30	65	120
BN 1960E-1050N	35	70	165
BN 1971E-1012N	40	16	12
BNM 1985E-1065N	<10	<2	2
BN 1975E-1009N	<10	7	4
BN 1993E-1081N	25	74	145
BN 1968E-1038N	30	72	94
BN 1961E-1069N	20	78	82
BN 1974E-1066N	40	110	175
BNM 1970E-1045N	10	22	30
BNM 1970E-1030N	<10	8	8
GHR-1	<10	11	5
GHC-1	10	34	46
THC-2	<10	12	4
GHC-2	<10	20	6
THC-1	<10	10	5
Units	ppm	ppm	ppm
DL	10	2	2
Scheme	XRF1	XRF1	AA3

APPENDIX 2

FX040592.DOC

FACSIMILE MESSAGE

CSIRO
AUSTRALIA

Division of Soils
Waite Road, URRBRAE,
Private Bag No. 2,
GLEN OSMOND, 5064,
SOUTH AUSTRALIA

Telephone (08) 274 9311
TLX 82406
FAX (08) 338 1636

To : Graham Teale **Fax Number** : 344 1636

From : Mr Mark Raven **Date** : 4 May, 1992

Dear Graham,

The CEC determinations for samples THV-2, 4, 6 and 8 have finally been calculated. Sorry for the delay.

THV-2	61 meq
THV-4	110 meq
THV-6	54 meq
THV-8	47 meq

The lower exchange capacities for samples 2 and 8 are due mainly to the interstratification of vermiculite and phlogopite. Sample 6 also has a low CEC due to low vermiculite concentration.

If you need any further information just let me know.

Regards,

M. Raven

Mark Raven,
Experimental Scientist

2. EXPENDITURE - 8/3/92 TO 7/6/92

Contract Geology	$3,200.00
Contract Labour	524.86
Metallurgy	940.00
Administration & Overheads	2,395.00
TOTAL	$7,059.86

QUARTERLY REPORT ON EXPLORATION ACTIVITIES

EXPLORATION LICENCE NO. 1645

NORTH WELL CREEK PROJECT, SOUTH AUSTRALIA

FOR PERIOD 8.6.92 TO 7.9.92

Author: G.S. Teale

Date: October, 1992

Distribution: Department of Mines and Energy, Adelaide
Lynch Mining Limited, Brisbane

EXPLORATION LICENCE 1645

NORTH WELL CREEK

TABLE OF CONTENTS

1. Discussion of Exploration Activities

Fig. 1. Location of the Exploration Licence area

Plate 1. Geological map of the tourmaline Hill east area showing trenching sites.

Plate 2. Photographs showing a typical trenching site; prior to trenching and during trenching.

Plate 3. Photographs showing -

(a) rehabilitated site from plate 2 and
(b) typical area in which trenching was carried out.

Appendix 1. Amdel Report G7414/93; Test work on bulk vermiculite-bearing material obtained during trenching programme.

Appendix 2. Carbon dioxide analyses on bulk vermiculite.

2. Expenditure

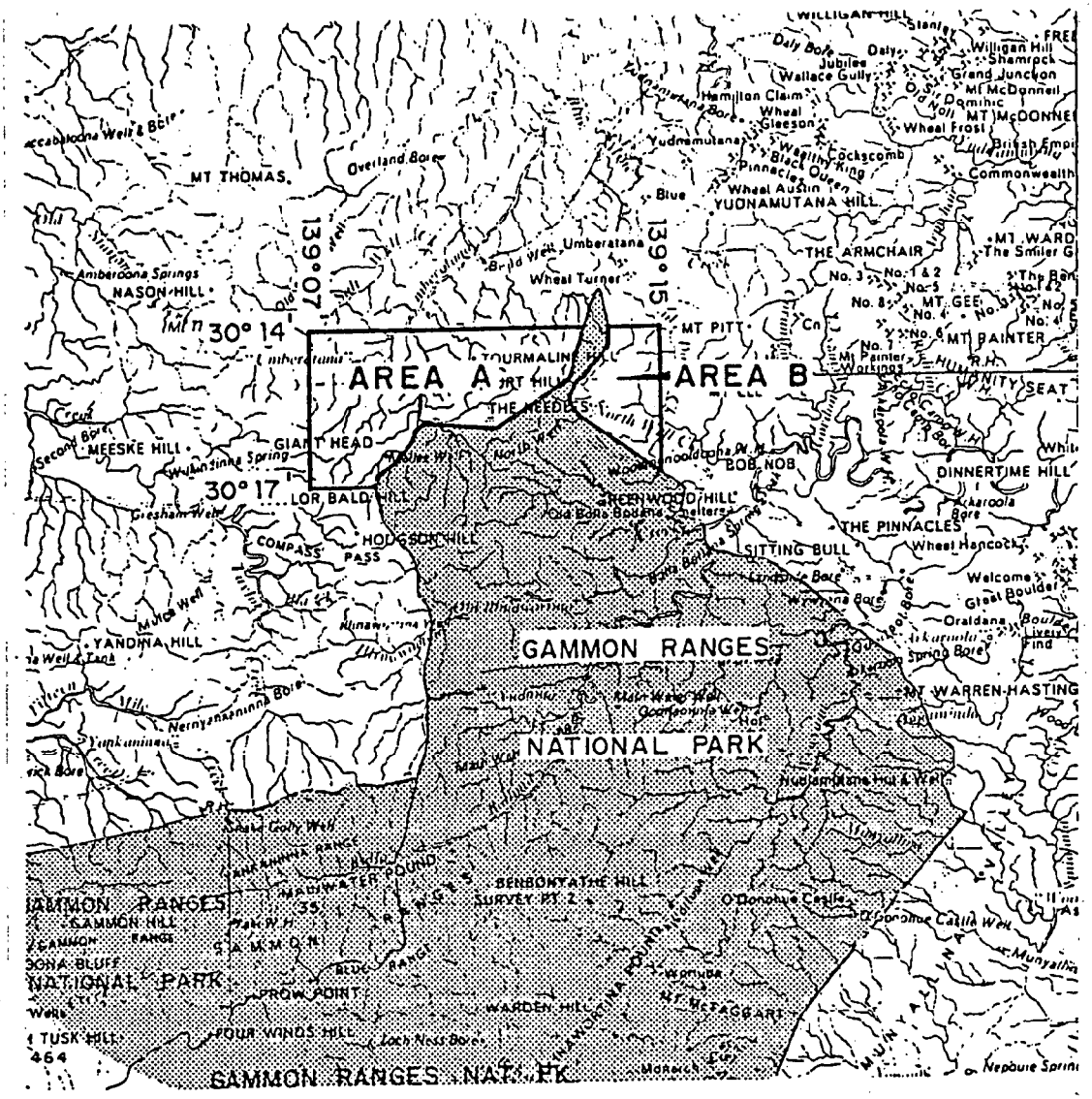
1. DISCUSSION OF EXPLORATION ACTIVITIES

During the quarterly period under review a trenching programme was undertaken at the Tourmaline Hill East area (plate 1). This involved gridding an area of approximately 350m x 350m and trenching on a 50m x 50m spacing. A JCB-3C backhoe/front end loader was used and trench dimensions were approximately 5m in length, 5m in depth and 0.75m in width. Thirty-four bulk samples (~10 kg) were taken. The area was geologically mapped (plate 1) and clasts and matrix from the diatrome breccia taken for petrological investigation. Trenching sites were rehabilitated and work undertaken caused minimal disruption to the natural environment.

Six bulk samples were sent to Amdel for investigation of their vermiculite content (appendix 1). Results were not encouraging, due to the fine grain size of the vermiculites present. However, further work is required as the major element data for these samples (see Amdel report) indicates that vermiculite and "vermiculite-like" minerals can comprise up to 90% of some samples with albite and calcite being impurities.

Petrological studies indicate that the breccia contains local clast-types as well as high metamorphic grade (> 800°) clasts. This suggests that the breccias are not simple diapirs but are diatremes with possible carbonitic affinities.

FIGURE 1



SCALE 1:250,000

KILOMETRES 5 0 5 10 15 20 25 KILOMETRES

APPLICANT: LYNCH MINING LIMITED

DME 401 / 89 AREA: 47 square kilometres (approx.)

1:250000 PLANS: COPLEY

LOCALITY: NORTH WELL CREEK AREA - Approx. 75 km east of Leigh Creek

DATE GRANTED: 7·3·90 DATE EXPIRED: 6·3·91 EL No: 1645

4800 E 4900 E 5000 E 5100 E 5200 E 5300 E

2000 N 1900 N 1800 N 1700 N 1600 N

To Umberatana

To Arkaroola

Outcropping riebeckitic marbles, trending 042°.

TN MN

7°

Approximate contact between diatreme breccia and non-disrupted Tapleys Hill Formation.

Riebeckite marble clasts in breccia.

Extremely deformed actinolitic marble.

Numerous, poorly outcropping granite - pegmatite bodies.

Area of poorly outcropping breccia and breccia clast rubble.

Large 'raft' of marble in breccia.

THT - 1 THT - 2 THT - 3 THT - 4 THT - 5 THT - 6 THT - 7 THT - 8 THT - 9 THT - 10 THT - 11 THT - 12 THT - 13 THT - 14 THT - 15 THT - 16 THT - 17 THT - 18 THT - 19 THT - 20 THT - 21 THT - 22 THT - 23 THT - 24 THT - 25 THT - 26 THT - 27 THT - 29 THT - 30 THT - 31 THT - 32 THT - 33 THT - 34 THT - 35

THV - 1, 2, 3 THV - 4 THV - 5 THV - 6

42° 65° 70° 72° 75°

8300-4

LEGEND

- Creek
- THT - Backhoe Trench
- THV - XRD Sample Site
- RAB hole, C.R.A. Exploration
- Track
- Fault (observed)
- Fault (inferred)
- Dip and Strike of bedding (So)

Palaezoic

- Diatreme breccia, vermiculite, phlogopite, carbonate, talc, albite, rectorite - rich numerous clast types.
- Granites and pegmatites; Be, Rb, B, Ta, Nb, Cs - rich.

Late Proterozoic

- Tapleys Hill Formation; evaporitic sediments, marbles, dolomites.
- Tapleys Hill Formation; calc-pelites,scapolitic black shales.

Geology of the Tourmaline Hill East Area,

Umberatana, South Australia

Scale

0 50m

PLATE 2

2A. Typical trenching site, Tourmaline Hill East area

2B. Back-hoe in operation at the above site.

PLATE 3

3A. Rehabilitation of site shown in plate 2. The trench was infilled and compacted and manually raked and levelled.

3B. Typical view of area trenched for vermiculite. The area contains flat, rubble covered ground and undulating terrain with sparse eucalypt cover.

APPENDIX ONE

amdel
Amdel Limited
A.C.N. 008 127 802

Amdel Limited
Mineral Services Laboratory
PO Box 338
Torrensville SA. 5031
AUSTRALIA

Telephone: (08) 416 5200
Facsimile: (08) 352 8243
Telex: AA 82520

Reception: Brown Street
Thebarton SA 5031

31 July 1992

MSL G7414

Mr. J. Lynch
Lynch Mining Limited
GPO Box 444
BRISBANE Qld 4001

copy to
Mr. G. Teale
21 Daphne Street
PROSPECT SA 5082

REPORT G7414/93

YOUR REFERENCE:	Order No. D7109
IDENTIFICATION:	Samples THT-4, 6, 9, 15, 24 and 29
MATERIAL:	Vermiculite
LOCATION:	North Well Creek, S.A.
DATE RECEIVED:	20 July 1992
WORK REQUIRED:	Chemical analyses and X-ray diffraction
Investigation and Report by:	Dr J.R. Tuffley

Keith Henley

Dr Keith J Henley
Manager, Mineral Services Laboratory

---

* The results contained in this report relate only to the sample(s) submitted for testing. Amdel Ltd accepts no responsibility for the representivity of the samples submitted.

1. INTRODUCTION

Mr. G. Teale of Lynch Mining Limited visited Amdel on 22 June, 1992, for discussions on testing vermiculite samples from the North Flinders Ranges.

Six samples were received at Amdel for preliminary testwork on 20 June, 1992.

2. SAMPLES TESTED

The samples received were moist and were dried overnight at 110°C. The samples and dry weights were as follows:

Sample		Dry Wt, kg
THT-4	1847N-4992E	4.93
THT-6	1749N-5047E	4.28
THT-9	1800N-5056E	6.90
THT-15	1845N-5100E	11.35
THT-24	1908N-5148E	6.00
THT-29	1742N-5192E	5.77

A 1 kg sub-sample from each sample was crushed for X-ray diffraction and chemical analysis.

3. TEST RESULTS

3.1 X-ray Diffraction

The XRD results are listed in Table 1. These show that the "vermiculite" is present as a mixture of biotite, hydrobiotite and vermiculite. Samples 4, 6 and 9 contained dominant amounts of the mineral, but the other samples contained sub-dominant or accessory amounts only.

3.2 Chemical Analyses

The chemical analyses are listed in Table 2 together with a range of analyses for commercial vermiculites. These indicate the presence of calcium as a major impurity which highlights the need for physical upgrading of the samples.

3.3 Exfoliation Tests

Preliminary exfoliation tests were carried out on samples THT-4, THT-15 and THT-24. This was done by dropping small quantities of -2+1 mm material into an inconel tube in a vertical furnace. The tube was preheated to 1050°C and the material was left in the tube at temperature for 5 minutes. The products were examined under a binocular microscope.

In all samples the vermiculite minerals exhibited very good expansion on exfoliation. This was most evident in samples THT-4 and THT-24 because of the higher proportion of vermiculite minerals present. However, the small size of the vermiculite plus the high impurity levels created a large amount of fines which masked the result. It was not possible to obtain any quantitative yield figures.

4. DISCUSSION

Telephone enquiries were made to Vermiculite Exfoliators (Australasia) Pty Ltd in Victoria. They advised that commercial vermiculite should be in the 2 to 8 mm size range with the optimum being 3 to 4 mm. There is no market for material finer than 0.25 mm. The market for 0.25 to 2 mm fines requires material which contains at least 95% vermiculite minerals, less than 0.5% clay minerals and less than 100 ppm chlorides. All vermiculite must also be free of asbestos minerals.

Much of the vermiculite mineralisation in the North Wells Creek samples appears to be too fine for commercial exploitation. The remainder requires physical upgrading by trommeling to break up the agglomerates followed by flotation or drying and air tabling to produce a vermiculite concentrate.

TABLE 1: X-RAY DIFFRACTION RESULTS

Sample No	THT-4	THT-6	THT-9	THT-15	THT-24	THT-29
Mineral						
ML1*	D	D	D	A	SD	A
ML2*	Tr	Tr-A	Tr	A	CD	A
Mica	Tr	-	-	D	A	Tr
Talc	SD	A	A	SD	CD	Tr-A
Calcite	A	A	A	Tr-A	A	D
Dolomite	-	A	Tr	Tr	SD	A
Plagioclase (sodic)	A	SD	A	-	-	Tr-A
K-feldspar	A	-	Tr-A	Tr	-	Tr
Pyrophyllite	-	-	-	Tr	Tr	-
Quartz	Tr	Tr	Tr	Tr	Tr-A	-
Vermiculite	Tr	Tr	Tr	A	-	A

* ML1 - mixed layer clay of 12.1Å basal spacing
ML2 - mixed layer clay of 11.2Å basal spacing
Both ML1 and ML2 are possible biotite/hydrobiotite/vermiculite mixtures.

Semiquantitative Abbreviations

D = Dominant. Used for the component apparently most abundant, regardless of its probable percentage level.

CD = Co-dominant. Used for two (or more) predominating components, both or all of which are judged to be present in roughly equal amounts.

SD = Sub-dominant. The next most abundant component(s) providing its percentage level is judged above about 20.

A = Accessory. Components judged to be present between the levels of roughly 5 and 20%.

Tr = Trace. Components judged to be below about 5%.

TABLE 2: CHEMICAL ANALYSES (%)

Sample No	THT-4	THT-6	THT-9	THT-15	THT-24	THT-29	Commercial* Vermiculite
Component							
SiO_2	41.8	40.1	46.0	41.3	34.3	32.2	38 - 49
TiO_2	0.44	0.43	0.45	0.45	0.34	0.34	0 - 1.5
Al_2O_3	8.90	8.55	8.80	8.40	6.75	6.60	12 - 17.5
Fe_2O_3	2.56	2.90	3.30	9.75	3.78	3.36	5.4 - 9.3
MnO	0.04	0.02	0.03	0.09	0.11	0.05	0.1 - 0.3
MgO	17.5	18.9	15.3	19.5	20.9	14.2	20 - 23.5
CaO	9.20	8.10	8.30	4.06	11.5	18.3	0.7 - 1.5
Na_2O	2.80	3.38	2.18	0.98	1.30	1.19	0 - 0.8
K_2O	1.47	0.77	1.48	3.76	2.28	1.63	5.2 - 7.9
P_2O_5	<0.01	0.06	0.06	0.19	0.06	0.06	-
LOI	14.0	16.3	13.6	10.5	18.6	21.2	5.2 - 12.1
Total	98.7	99.5	99.5	99.0	99.9	99.1	
CEC#	57.8	n.d.	n.d.	37.9	30.7	n.d.	90 - 100

* From current pamphlet of "Red Top Vermiculite", Victoria.
\# Cation Exchange Capacity in milliequivalents per 100 grams.
n.d. Not determined

APPENDIX TWO

amdel

Job: 2AD2205
O/N: G7414/403

ANALYTICAL REPORT

	Sample	CO2
THT - 4	403/1	13.20
THT - 6	403/2	9.33
THT - 9	403/3	6.21
THT - 15	403/4	2.94
THT - 24	403/5	13.70
THT - 29	403/6	14.80
	Units	%
	DL	0.02
	Scheme	GRAV4A

GRAHAM TEALE

2. EXPENDITURE

PERIOD 8/6/92 TO 7/9/92

Contract Geology	$10,400.00
Contract Labour	172.00
Vehicle Expenses	192.00
Metallurgy	1,120.00
Drafting and Plan Printing	913.00
Postage, Stationery, Telephone etc.	531.00
Accommodation & Meals	33.00
Administration & Overheads	1,484.00
	$14,845.00

ANNUAL REPORT ON

EXPLORATION LICENCE NO. 1645

NORTH WELL CREEK PROJECT

SOUTH AUSTRALIA

PERIOD 7.3.92 TO 6.3.93

Author: G.S. Teale

Date: April, 1993

Distribution: Department of Mines and Energy - Adelaide
Lynch Mining Pty Ltd - Brisbane

FIGURE 1

SCALE 1:250,000

KILOMETRES 5 0 5 10 15 20 25 KILOMETRES

APPLICANT: LYNCH MINING LIMITED

DME 401/89 AREA: 47 square kilometres (approx.)

1:250000 PLANS: COPLEY

LOCALITY: NORTH WELL CREEK AREA - Approx. 75 km east of Leigh Creek

DATE GRANTED: 7·3·90 DATE EXPIRED: 6·3·91 EL No: 1645

EXPLORATION LICENCE 1645

NORTH WELL CREEK

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EXPENDITURE

DISCUSSION OF EXPLORATION ACTIVITIES

Activity during the period under review initially concentrated on the Be-Rb-Cs-Ta potential of the licence area. The emphasis however changed with the delineation of large areas of vermiculite-rich material, particularly in the Tourmaline Hill East area. A summary of activities and results obtained is outlined below:

a) Geochemical data (Be, Ta, Nb) for the Bob Nob intrusive area were received and plotted onto the geological map sheet (Plate 1). Results were disappointing with the highest values obtained being 175 ppm Be, 145 ppm Nb and 55 ppm Ta.

b) Mapping of the Giants Head alkaline intrusives was finalised and is presented in Plate 3. The granites exhibit a wide range of granitic and pegmatitic textures and although some domains contain anomalous chemistry (e.g. Ta, Nb, Y) there is no tonnage potential at the presently exposed level.

c) Outcropping zones of vermiculite-bearing material were sampled and submitted to the C.S.I.R.O., Division of Soils Adelaide for cation exchange capacity (CEC) determinations (Appendix 2). Results ranged from 47 to 110 meq, indicating the interstratification of vermiculite-hydrobiotite-phlogopite.

d) To test the vermiculite potential of the exploration licence an area to the east of Tourmaline Hill (Tourmaline Hill East; see Plate 2) was gridded (350m x 350m), trenched (50m x 50m) and sampled (10kg bulk samples collected at between 2.8m and 3.2m vertical depth). Trenches were approximately 5m in length, up to 5m in depth and 0.75m in width. A JCB-3C backhoe/front end loader was used. Thirty-four bulk samples were collected from the area. Trenching sites were rehabilitated (infilled, compacted and manually raked and levelled) and work undertaken caused minimal disruption to the natural environment.

DISCUSSION OF EXPLORATION ACTIVITIES (cont'd)

e) Six bulk samples, representing typical "breccia-types" were sent to Amdel Adelaide for investigation of their vermiculite content (Appendix One). The location of these sample sites is shown in Plate 2 and their description and geological association are discussed and exhibited in Appendix Five and Figures two to seven respectively. The results from Amdel were not encouraging, due to the fine grain size of vermiculites present. Further work is however required as the major element data for these samples (Appendix One) indicates that vermiculite and "vermiculite-like" minerals can comprise up to 90% of some samples with albite and calcite being the dominant impurities.

f) Petrological studies indicate that the breccia contains local clast-types as well as high metamorphic grade (>800°c) clasts. This indicates that the breccias are not simple diapirs but are diatremes with possible carbonatitic affinities. The development of "fenite-like" lithologies around the margins of the breccia bodies also involves a far more complex history than simple diapirism. The presence of magnesioriebeckite, richterite, albite, ± monazite-rich assemblages is of interest.

g) Work will continue on the vermiculite potential of the area.

EXPENDITURE

"NORTH WELL CREEK"

PERIOD 7/3/92 TO 6/3/93

Contract Geology	$15,600.00
Contract Labour	2,962.10
Vehicle Expenses	905.00
Metallurgy	2,110.00
Petrology	880.00
Drafting & Plan Printing	1,225.50
Field Consumables	303.81
Postage, Stationery Telephone etc.	924.37
Equipment Hire	1,170.00
Accommodation & Meals	811.40
Administration & Overheads	3,879.00
	$30,771.18

APPENDIX 1

CLASSIC LABORATORIES

Osman Place, Thebarton, South Australia 5031
Telephone: (08) 416 5300 Facsimile: (08) 234 0321

Mr John Lynch
Lynch Mining Limited
GPO Box 444
BRISBANE
QLD 4001

FINAL ANALYSIS REPORT

Your Order No: D 7104 Our Job Number : 2AD1051

Samples received : 09-APR-1992 Results reported : 27-APR-1992
No. of samples : 19
Report comprises a cover sheet and pages 1 to 1

This report relates specifically to the samples tested in so far as that the samples as supplied are truly representative of the sample source.

Note:
If you have any enquiries please contact Miss Anne Reed quoting the above job number.

Approved Signatory:

John Waters
Laboratory Manager - Adelaide

CC Mr G Teale SA

Report Codes:
N.A. - Not Analysed.
L.N.R. - Listed But Not Received.
I.S. - Insufficent Sample.

Distribution Codes:
CC - Carbon Copy
EM - Electronic Media
MM - Magnetic Media

CLASSIC LABORATORIES

ANALYTICAL REPORT

Job: 2AD1051
O/N: D 7104

Sample	Ta	Nb	Be
BN 1968E-1012N	<10	9	9
BN 1976E-1044N	45	82	85
BN 1982E-1030N	55	145	100
BN 1950E-1091N	30	65	120
BN 1960E-1050N	35	70	165
BN 1971E-1012N	40	16	12
BNM 1985E-1065N	<10	<2	2
BN 1975E-1009N	<10	7	4
BN 1993E-1081N	25	74	145
BN 1968E-1038N	30	72	94
BN 1961E-1069N	20	78	82
BN 1974E-1066N	40	110	175
BNM 1970E-1045N	10	22	30
BNM 1970E-1030N	<10	8	8
GHR-1	<10	11	5
GHC-1	10	34	46
THC-2	<10	12	4
GHC-2	<10	20	6
THC-1	<10	10	5
Units	ppm	ppm	ppm
DL	10	2	2
Scheme	XRF1	XRF1	AA3

APPENDIX 2

FX040592.DOC

FACSIMILE MESSAGE

CSIRO AUSTRALIA

Division of Soils
Waite Road, URRBRAE,
Private Bag No. 2,
GLEN OSMOND, 5064,
SOUTH AUSTRALIA

Telephone (08) 274 9311
TLX 82406
FAX (08) 338 1636

Page 1 of 1 page(s)

To : Graham Teale

Fax Number : 344 1636

From : Mr Mark Raven

Date : 4 May, 1992

Dear Graham,

The CEC determinations for samples THV-2, 4, 6 and 8 have finally been calculated. Sorry for the delay.

THV-2	61 meq
THV-4	110 meq
THV-6	54 meq
THV-8	47 meq

The lower exchange capacities for samples 2 and 8 are due mainly to the interstratification of vermiculite and phlogopite. Sample 6 also has a low CEC due to low vermiculite concentration.

If you need any further information just let me know.

Regards,

M. Raven

Mark Raven,
Experimental Scientist

APPENDIX THREE

amdel
Amdel Limited
A.C.N. 008 127 802

Amdel Limited
Mineral Services Laboratory
PO Box 338
Torrensville SA. 5031
AUSTRALIA

Telephone: (08) 416 5200
Facsimile: (08) 352 8243
Telex: AA 82520

Reception: Brown Street
Thebarton SA 5031

31 July 1992

MSL G7414

Mr. J. Lynch
Lynch Mining Limited
GPO Box 444
BRISBANE Qld 4001

copy to
Mr. G. Teale
21 Daphne Street
PROSPECT SA 5082

REPORT G7414/93

YOUR REFERENCE:	Order No. D7109
IDENTIFICATION:	Samples THT-4, 6, 9, 15, 24 and 29
MATERIAL:	Vermiculite
LOCATION:	North Well Creek, S.A.
DATE RECEIVED:	20 July 1992
WORK REQUIRED:	Chemical analyses and X-ray diffraction
Investigation and Report by:	Dr J.R. Tuffley

Keith Henley

Dr Keith J Henley
Manager, Mineral Services Laboratory

---

* The results contained in this report relate only to the sample(s) submitted for testing. Amdel Ltd accepts no responsibility for the representivity of the samples submitted.

1. INTRODUCTION

Mr. G. Teale of Lynch Mining Limited visited Amdel on 22 June, 1992, for discussions on testing vermiculite samples from the North Flinders Ranges.

Six samples were received at Amdel for preliminary testwork on 20 June, 1992.

2. SAMPLES TESTED

The samples received were moist and were dried overnight at 110°C. The samples and dry weights were as follows:

Sample		Dry Wt, kg
THT-4	1847N-4992E	4.93
THT-6	1749N-5047E	4.28
THT-9	1800N-5056E	6.90
THT-15	1845N-5100E	11.35
THT-24	1908N-5148E	6.00
THT-29	1742N-5192E	5.77

A 1 kg sub-sample from each sample was crushed for X-ray diffraction and chemical analysis.

3. TEST RESULTS

3.1 X-ray Diffraction

The XRD results are listed in Table 1. These show that the "vermiculite" is present as a mixture of biotite, hydrobiotite and vermiculite. Samples 4, 6 and 9 contained dominant amounts of the mineral, but the other samples contained sub-dominant or accessory amounts only.

3.2 Chemical Analyses

The chemical analyses are listed in Table 2 together with a range of analyses for commercial vermiculites. These indicate the presence of calcium as a major impurity which highlights the need for physical upgrading of the samples.

3.3 Exfoliation Tests

Preliminary exfoliation tests were carried out on samples THT-4, THT-15 and THT-24. This was done by dropping small quantities of -2+1 mm material into an inconel tube in a vertical furnace. The tube was preheated to 1050°C and the material was left in the tube at temperature for 5 minutes. The products were examined under a binocular microscope.

In all samples the vermiculite minerals exhibited very good expansion on exfoliation. This was most evident in samples THT-4 and THT-24 because of the higher proportion of vermiculite minerals present. However, the small size of the vermiculite plus the high impurity levels created a large amount of fines which masked the result. It was not possible to obtain any quantitative yield figures.

4. DISCUSSION

Telephone enquiries were made to Vermiculite Exfoliators (Australasia) Pty Ltd in Victoria. They advised that commercial vermiculite should be in the 2 to 8 mm size range with the optimum being 3 to 4 mm. There is no market for material finer than 0.25 mm. The market for 0.25 to 2 mm fines requires material which contains at least 95% vermiculite minerals, less than 0.5% clay minerals and less than 100 ppm chlorides. All vermiculite must also be free of asbestos minerals.

Much of the vermiculite mineralisation in the North Wells Creek samples appears to be too fine for commercial exploitation. The remainder requires physical upgrading by trommeling to break up the agglomerates followed by flotation or drying and air tabling to produce a vermiculite concentrate.

TABLE 1: X-RAY DIFFRACTION RESULTS

Sample No	THT-4	THT-6	THT-9	THT-15	THT-24	THT-29
Mineral						
ML1*	D	D	D	A	SD	A
ML2*	Tr	Tr-A	Tr	A	CD	A
Mica	Tr	-	-	D	A	Tr
Talc	SD	A	A	SD	CD	Tr-A
Calcite	A	A	A	Tr-A	A	D
Dolomite	-	A	Tr	Tr	SD	A
Plagioclase (sodic)	A	SD	A	-	-	Tr-A
K-feldspar	A	-	Tr-A	Tr	-	Tr
Pyrophyllite	-	-	-	Tr	Tr	-
Quartz	Tr	Tr	Tr	Tr	Tr-A	-
Vermiculite	Tr	Tr	Tr	A	-	A

* ML1 - mixed layer clay of 12.1Å basal spacing
ML2 - mixed layer clay of 11.2Å basal spacing
Both ML1 and ML2 are possible biotite/hydrobiotite/vermiculite mixtures.

Semiquantitative Abbreviations

D = Dominant. Used for the component apparently most abundant, regardless of its probable percentage level.

CD = Co-dominant. Used for two (or more) predominating components, both or all of which are judged to be present in roughly equal amounts.

SD = Sub-dominant. The next most abundant component(s) providing its percentage level is judged above about 20.

A = Accessory. Components judged to be present between the levels of roughly 5 and 20%.

Tr = Trace. Components judged to be below about 5%.

TABLE 2: CHEMICAL ANALYSES (%)

Sample No	THT-4	THT-6	THT-9	THT-15	THT-24	THT-29	Commercial* Vermiculite
Component							
SiO_2	41.8	40.1	46.0	41.3	34.3	32.2	38 - 49
TiO_2	0.44	0.43	0.45	0.45	0.34	0.34	0 - 1.5
[illegible]$_2O_3$	8.90	8.55	8.80	8.40	6.75	6.60	12 - 17.5
Fe_2O_3	2.56	2.90	3.30	9.75	3.78	3.36	5.4 - 9.3
MnO	0.04	0.02	0.03	0.09	0.11	0.05	0.1 - 0.3
MgO	17.5	18.9	15.3	19.5	20.9	14.2	20 - 23.5
CaO	9.20	8.10	8.30	4.06	11.5	18.3	0.7 - 1.5
Na_2O	2.80	3.38	2.18	0.98	1.30	1.19	0 - 0.8
K_2O	1.47	0.77	1.48	3.76	2.28	1.63	5.2 - 7.9
P_2O_5	<0.01	0.06	0.06	0.19	0.06	0.06	-
LOI	14.0	16.3	13.6	10.5	18.6	21.2	5.2 - 12.1
Total	98.7	99.5	99.5	99.0	99.9	99.1	
CEC#	57.8	n.d.	n.d.	37.9	30.7	n.d.	90 - 100

* From current pamphlet of "Red Top Vermiculite", Victoria.
\# Cation Exchange Capacity in milliequivalents per 100 grams.
n.d. Not determined

APPENDIX FOUR

amdel

Job: 2AD2205
O/N: G7414/403

ANALYTICAL REPORT

	Sample	CO2
THT-4	403/1	13.20
THT-6	403/2	9.33
THT-9	403/3	6.21
THT-15	403/4	2.94
THT-24	403/5	13.70
THT-29	403/6	14.80
	Units	%
	DL	0.02
	Scheme	GRAV4A

GRAHAM TEALE

APPENDIX FIVE

SUMMARY OF TRENCHES/COSTEANS IN
THE TOURMALINE HILL EAST AREA

5000E, 2000N: THT-1:

Approximately 2m of gravels cover an extremely weathered marble breccia. The marble can contain up to 50% Magnesioriebeckite. Vermiculite present as a minor matrix component to the marble clasts.

5000E, 1950N: THT-2:

1m of surface gravels. Extremely vermiculite-rich, calc-silicate breccia. Vermiculite-hydrobiotite up to 70% in some areas. Mg-riebeckite and calcite veins are numerous. Vermiculite grains up to 1mm. Trench walls exhibit abundant breccia lasts in a biotite-vermiculite-rich matrix; clasts down to 1cm in diameter, sometimes rounded. Smaller clasts and matrix tend to be monomineralic vermiculite-hydrobiotite. Trench bottomed on a large, siliceous, tourmaline-rich breccia clast.

500E, 1900N: THT-3:

1m of surface gravels. Extremely clay-rich, weathered breccia. Siliceous bands and carbonate-rich bands preserved. Micas totally altered to smectite. From 2m - 2.6m the breccia is vermiculite-hydrobiotite-rich with abundant rounded clasts, nodules and veins of Mg-riebeckite; actinolite is weathered to clays. Clasts of banded albite-vermiculite are common down to 4m depth. Vermiculite to 1.1mm in size.

5000E, 1850N: THT-4:

0.9m of gravel cover. Extremely micaceous, with no blue amphibole. Abundant talc. Vermiculite up to 2mm in size. A white clay rich zone sits below the gravels then into a bronze coloured mica breccia. Approximately 15% of talc clots in some domains. Mica Content >80%. Ore clast type contains ~1cm angular quartz fragments which are "sugary" in texture. No banded clasts observed.

5000E, 1800N: THT-5:

Extremely micaceous microbreccia. Sample taken between 2.7m-2.8m. Micaceous material >50% with talc bands (layered) intercalated with vermiculite bands. No blue amphiboles present. Relict breccia texture difficult to observe; maximum clast size is ~1cm with clasts generally rounded. Sample contains vermiculite-hydrobiotite, smectite, talc, quartz, calcite albite and (?) scheelite.

SUMMARY OF TRENCHES/COSTEANS IN THE TOURMALINE HILL EAST AREA (cont'd)

5050E, 1750N: THT-6:

Extremely weathered, vermiculite-rich lithology. Contains Fe-stained patches after oxidising pyrite. Clots of carbonate common.

5050E, 1700N: THT-7:

No gravel cover. Moderately thick (~0.5m) red-clay soil. Vermiculite-hydrobiotite-rich breccia; no marble clasts and no blue amphibole. Abundant talc in places; talc-calcite ± quartz bands and veins. Mica is <0.5 mm and green in colour; possibly clay-rich; sample taken from 3.0m - 3.1m.

5050E, 1650N: THT-8:

Approximately 0.2m of red clay, then into 2m of calcreted gravels. Thin calcrete layer at 0.7m below surface. Vermiculite-breccia contains clasts of biotite-actinolite marble. Vermiculite up to 2mm in size. Not as micaceous as previous costeans/trenches but still in excess of 30% vermiculite-hydrobiotite.

5050E, 1800N: THT-9:

Abundant talc-vermiculite material with bladed talc to 3cm in length. Sample taken at 3.0 - 3.2m depth. Coarse, sub-rounded biotite marble fragments present but no Mg-reibeckite observed. Sample predominantly vermiculite and talc with lesser clays, calcite and albite.

5050E, 1850N: THT-10:

Approximately 1.1m of gravel cover. Abundant clasts of Mg-reibeckite-bearing marble in vermiculite rock (± phlogopite ± K-feldspar) between 1.2m to 2.5m. Below 2.5m there is a vermiculite-talc-rich microbreccia which contains no marble clasts and no magnesioriebeckite. Sample taken at 2.8m to 3.1m. Some unusual lithologies (as clasts) between 1.2m - 2.5m, viz, K-feldspar-riebeckite, K-feldspar-carbonate-magnetite and riebeckite-bearing dolomite.

5050E, 1900N: THT-11:

This trench contains a mica rich lithology which is laced with nodules and clasts of magnesioriebeckite rock (>80% Mg-rich). Talc, chlorite, calcite, K-feldspar and limonite (after coarse pyrite) are also present.

SUMMARY OF TRENCHES/COSTEANS IN THE TOURMALINE HILL EAST AREA (cont'd)

5050E, 1950N: THT-12:

Sample taken was vermiculite and talc-rich, with vermic flakes up to 2mm in size (but generally finer grained). Calc-silicate clasts with Mg-riebeckite have been oxidised and weathered.

5100E, 1950N: THT-13:

2.8m of gravels; no sample obtained

5100E, 1900N: THT-14:

1.8m of gravels and then back-hoe encountered large purple siltstone "raft" in breccia (no sample taken).

5100E, 1850N: THT-15:

In stream bed. Approximately 0.6m of gravels. From 0.6m to 3.2m the breccia (microbreccia) contains >80% vermiculite and hydrobiotite with approximately 10% talc. No amphiboles and no carbonate or quartz; wide range in grain size of vermiculite, up to 3mm.

5100E, 1800N: THT-16:

1m of gravel cover. Sample taken at 3.3m and is "gritty" and green in colour. Vermiculite/hydrobiotite, ~20% - 40%. Very fine grained. Talc same grain size as vermiculite. Carbonate coarse-grained. Rock-type "layered", i.e. relict, S_o, preserved in altered material.

5100E, 1750N: THT-17:

Calc-silicate breccia with vermic matrix. Some rounded clasts and abundant carbonate-rich clasts. Carbonate-rich clasts can contain magnesioriebeckite (minor, ~1%). Breccia is "gritty" and calc-silicate clast-rich. Vermiculite tends to be fine-grained (and amphibole when present is coarse grained).

5100E, 1700N: THT-18:

Trench 2.1m in depth. No sample taken as the lithology here is a marble and calc-silicate breccia (with a biotite-actinolite matrix).

SUMMARY OF TRENCHES/COSTEANS IN THE TOURMALINE HILL EAST AREA (cont'd)

5100E, 1650N: THT-19:

Dominant rock-type appears to be a vermiculite-talc-calcite rock which is light apple green in colour. Some marble clasts are present and numbers increase with increasing depth. Tapleys Hill Formation siltstones are present as intensely (talc) altered clasts. Clasts exhibit abundant slickensides. Trench ended in a phlogopite marble breccia (vermiculite matrix).

5150E, 1700N: THT-20:

Trench encountered predominantly a breccia composed of Tapleys Hill Formation scapolitic siltstone clasts. These have been altered to talcose-clay material. The matrix to these clasts is vermiculite-talc.

5150E, 1750N: THT-21:

Abundant fragments of marble (thinly bedded in actinolite schist - therefore Tapleys Hill Formation?) and of siliceous tourmaline-biotite rock, phlogopite-bearing marble, biotite schist etc. These clasts sit in a greasy talc-vermiculite matrix. Precise vermiculite content difficult to discern because of clast abundance. Marble clasts up to 1m x 0.6m and entirely "encased" in vermiculite "breccia".

5150E, 1800N: THT-22:

1m of gravel cover. Trench revealed a vermiculite-rich (>90%) lithology which contains talc nodules up to 2cm in diameter. The vermiculite may contain significant talc. Still abundant clasts but they rarely exceed 2cm in diameter and have been altered to talc and phlogopite (now vermiculite); slickensides once again prominent, generally on clasts margins etc.

5150-E, 1850N: THT-23:

1.9m of gravel cover. Vermiculite and talc-rich lithology with blades of talc up to 1cm, also clots of black hydro-biotite. Breccia is green coloured. Large clasts of tourmaline-biotite-quartz rock (~2% of section exposed in trench). Generally the breccia is vermiculite-rich and relatively coarse-grained. Minor extremely altered calc-silicate nodules.

SUMMARY OF TRENCHES/COSTEANS IN THE TOURMALINE HILL EAST AREA (cont'd)

5150E, 1900N: THT-24:

1.8m of gravel cover. Trench revealed a vermiculite-hydrobiotite-rich breccia containing clasts up to 5cm. All clasts have been altered to vermiculite ± talc; sampled at 2.7m-3.2m.

5150E, 1950N: THT-25:

Gibber cover overlies a 0.3m loess-like soil cover which overlies a thick (2.7m) gravel cover. The breccia underlying the above was too weathered and oxidised to sample.

5200E, 1900N: THT-26:

Trench stopped in gravels at 1.8m due to large marble boulder.

5200E, 1850N: THT-27:

2m thick gravel cover, then into a vermiculite-talc rock similar to that in THT-22, 9 & 4. Weathered and oxidised with talc laths up to 4cm long. Minor calc-silicate and marble clasts.

5200E, 1800N: THT-28:

Nearby RAB hole (of C.R.A. Exploration) intersected actinolite-marble breccia with a vermiculite-talc matrix. The trench contained vermiculite-rich lithologies (green in colour) and breccias. Breccia clast size changed with depth. Base of trench exhibited abundant phlogopite marble clasts. Sample is "gritty" indicating significant calcite and albite.

5200E, 1750N: THT-29:

0.5m of gravel cover, then into vermiculite breccia. Sampled between 3.0m and 3.2m From 0.5 to 2.9m there is a micaceous, fine-grained breccia which contains biotite-rich clasts. Vermiculite-hydrobiotite is fine-grained (<0.5mm).

5200E, 1950N: THT-30:

1m of red soil (loess) overlies 1.4m of calcreted gravels. Trench went into a rotton phlogopite marble breccia with little matrix material, which changed to a more matrix-rich breccia at the base of the trench which contained clasts of phlogopite-marble, siliceous, tourmaline-biotite rock and vermiculite-rich "shales". No sample taken.

SUMMARY OF TRENCHES/COSTEANS IN THE TOURMALINE HILL EAST AREA (cont'd)

5250E, 1900N: THT-31:

0.7m of calcrete, then into gravels to 2.4m depth. Trench then encountered a talc-rich breccia which contains abundant calcite and talc-altered shale fragments. Calcite veins common. The breccia is a light green colour. Sample taken at 3.0m.

5200E, 1700N: THT-32:

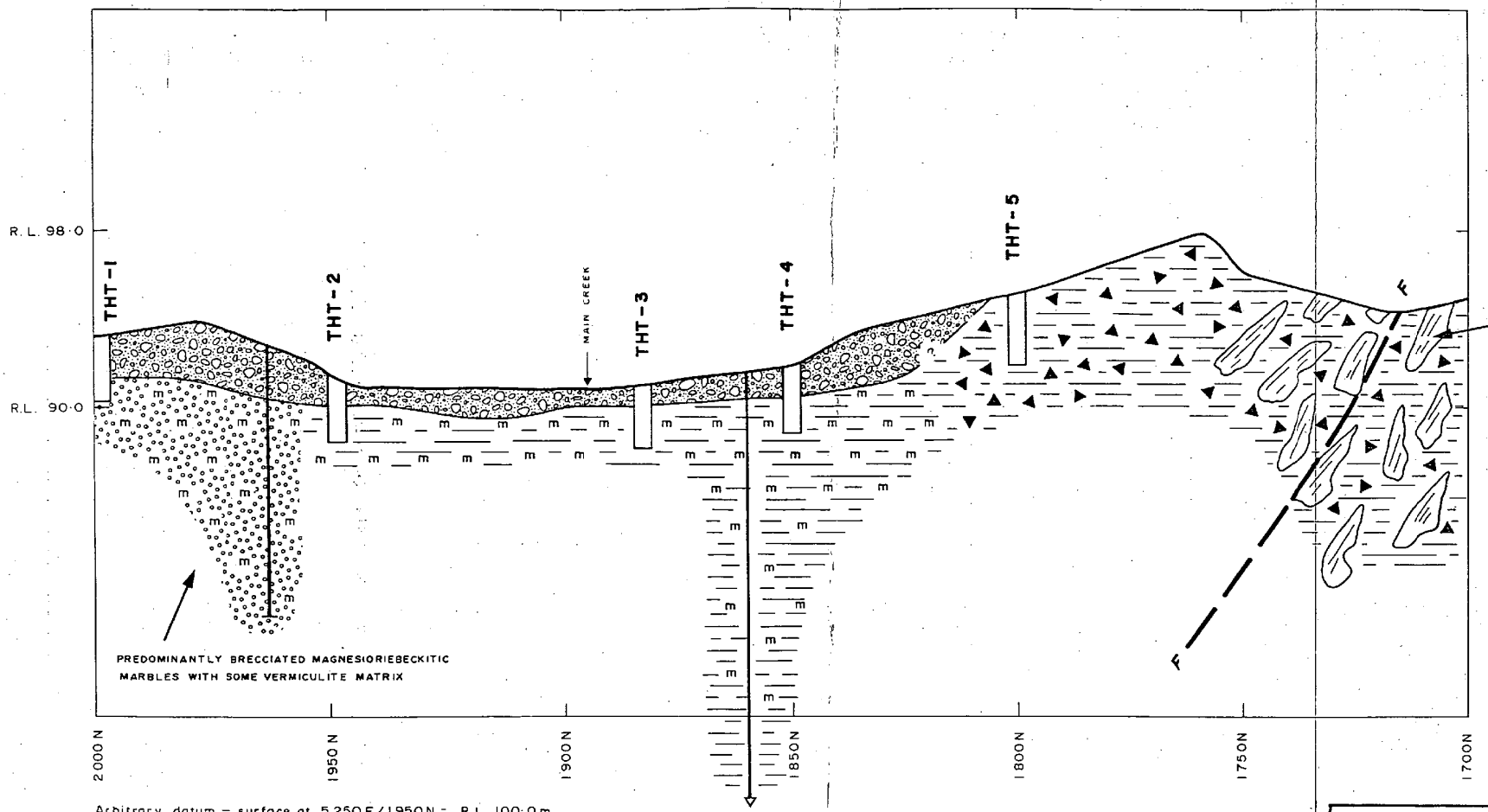
No gravels encountered, just a 0.4m thick talc-soil/wash. Sample taken at 3.2m and is micaceous (talc and vermiculite) with abundant "gritty" carbonate and limonite pseudomorphs after pyrite. No amphiboles present, but abundant calc-silicate clasts.

5250E, 1800N: THT-33:

Gravel cover to 2m depth and then into a "gritty" vermiculite plus talc altered calc-silicate. The gravel cover had a calcrete "cap". Some fragments of phlogopite marble but generally a vermiculite-talc-rich "gritty", altered actinolitic marble breccia. Some shale clasts and other exotic clasts.

5250E, 1850N: THT-34:

Beautiful vermiculite-rich breccia material. Unfortunately contains clasts of magnesioriebeckite rock (750 modal % Mg-rich). Also clasts of tourmaline-quartz-biotite rock, and rare marble clasts. Mg-riebeckite ~50% of sampled domain. In total however, the vermiculite content could exceed ~80% gravel cover to 1.7m.



Arbitrary datum – surface at 5250E/1950N = R.L. 100·0 m

Scale: Horizontal: 1 cm = 10 m

Vertical: 1 cm = 2 m

LEGEND

RECENT

Extremely fine, red 'soil'; loess

Talc-vermiculite-clay surface layer

PLEISTOCENE

Calcreted gravels or calcrete layer

Partially consolidated gravels; clasts originated from the east (Mt. Painter Inlier and adjacent metamorphosed Adelaidean sediments)

PALAEOZOIC

Extremely deformed, actinolite marble; present as large rafts and clasts in breccia (Tapleys Hill Formation)

Leucocratic, tourmaline ± biotite ± garnet granite/pegmatite

Brecciated and hydrothermally altered Tapleys Hill Formation scapolitic siltstones

Vermiculite ± talc-rich breccia; clasts retrogressed/weathered to vermiculite-rich and/or talc-rich lithologies

Vermiculite-hydrobiotite-rich breccia with clasts of magnesio-riebeckitic-rich marble

Calcite and albite-rich, talc-vermiculite breccia; abundant tourmaline-rich clasts and marble clasts

Talc-rich vermiculite breccia > 80% talc and vermiculite

LATE PROTEROZOIC

Tapleys Hill Formation; calc-pelites, scapolitic black shales; scapolitic marbles close to breccia margins.

T = Localised talc development;

m = Localised Magnesioriebeckite development

f Fault

THT-1 Costean/trench

R.A.B. hole (C.R.A.E., 1981)

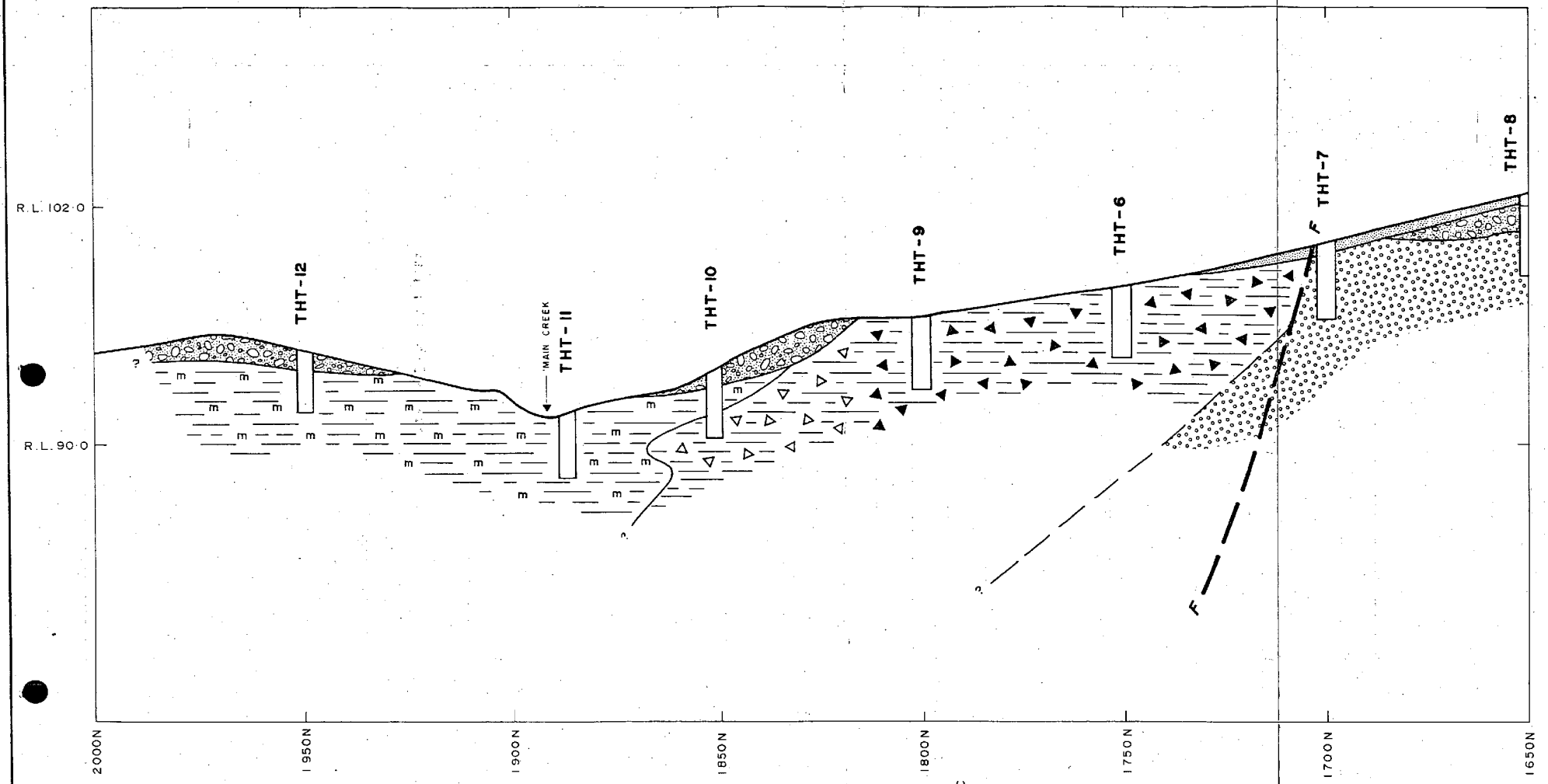
NORTH CREEK WELL

LINE 5000E

GEOLOGY AND TRENCH LOCATIONS

G. Teale Apr. 1993

FIG. 2



Arbitrary datum – surface at 5250E/1950N = R.L. 100·0m

Scale : Horizontal : 1 cm = 10m

Vertical: 1 cm = 2m

LEGEND

PLEISTOCENE RECENT

- Extremely fine, red 'soil', loess
- Talc-vermiculite-clay surface layer
- Calcreted gravels or calcrete layer
- Partially consolidated gravels; clasts originated from the east (Mt. Painter Inlier and adjacent metamorphosed Adelaidean sediments)

PALAEOZOIC

- Extremely deformed, actinolite marble; present as large rafts and clasts in breccia (Tapleys Hill Formation)
- Leucocratic, tourmaline ± biotite ± garnet granite/pegmatite
- Brecciated and hydrothermally altered Tapleys Hill Formation scapolitic siltstones
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- Talc-rich vermiculite breccia > 80% talc and vermiculite

LATE PROTEROZOIC

- Tapleys Hill Formation; calc-pelites, scapolitic black shales; scapolitic marbles close to breccia margins.

T = Localised talc development;

m = Localised Magnesioriebeckite development

F — Fault

THT-1 — Costean/trench

R.A.B. hole (C.R.A.E., 1981)

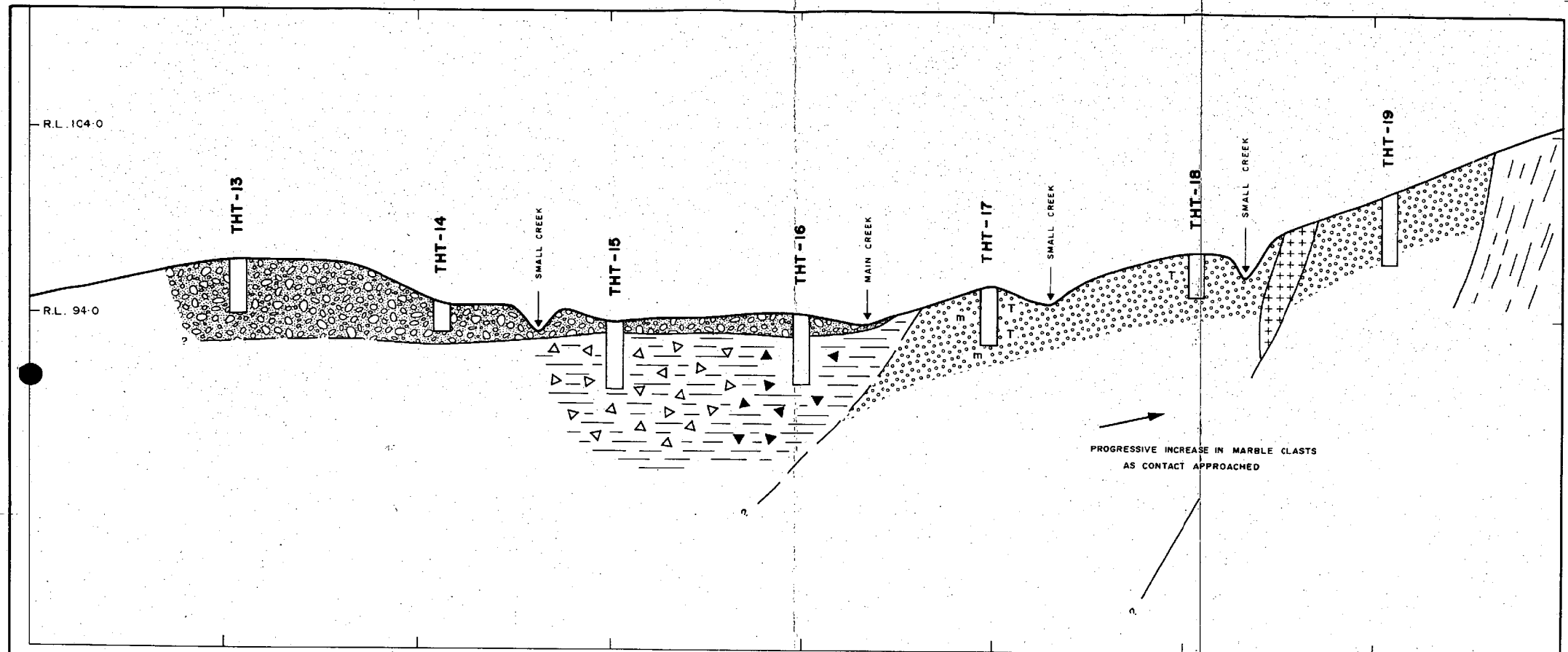
NORTH WELL CREEK

LINE 5050E

GEOLOGY AND TRENCH LOCATIONS

G. Teale Apr. 1993

FIG. 3



Arbitrary datum — surface at 5250E/1950N = R.L. 100·0m

Scale: Horizontal: 1cm = 10m
Vertical: 1cm = 2m

LEGEND

RECENT

Extremely fine, red 'soil'; loess

Talc-vermiculite-clay surface layer

PLEISTOCENE

Calcreted gravels or calcrete layer

Partially consolidated gravels; clasts originated from the east (Mt Painter Inlier and adjacent metamorphosed Adelaidean sediments)

PALAEOZOIC

Extremely deformed, actinolite marble; present as large rafts and clasts in breccia (Tapleys Hill Formation)

Leucocratic; tourmaline ± biotite ± garnet granite/pegmatite

Brecciated and hydrothermally altered Tapleys Hill Formation scapolitic siltstones

Vermiculite ± talc-rich breccia; clasts retrogressed/weathered to vermiculite-rich and/or talc-rich lithologies

Vermiculite-hydrobiotite-rich breccia with clasts of magnesio-riebeckitic-rich marble

Calcite and albite-rich, talc-vermiculite breccia; abundant tourmaline-rich clasts and marble clasts

Talc-rich vermiculite breccia > 80% talc and vermiculite

LATE PROTEROZOIC

Tapleys Hill Formation; calc-pelites, scapolitic black shales; scapolitic marbles close to breccia margins.

T = Localised talc development;

m = Localised Magnesioriebeckite development

F Fault

THT-1 Costean/trench

R.A.B. hole (C.R.A.E., 1981)

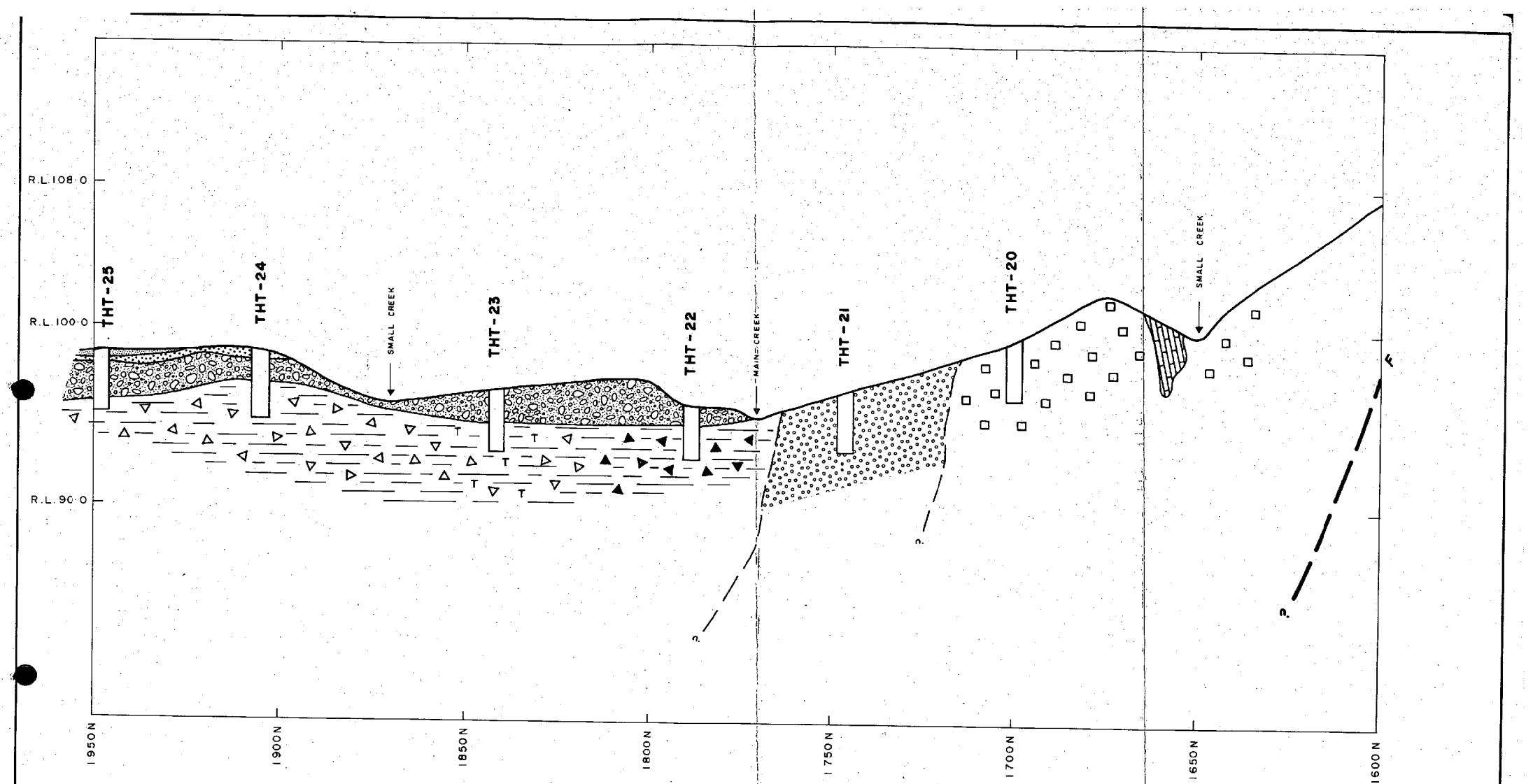
NORTH WELL CREEK

LINE 5100E

GEOLOGY AND TRENCH LOCATIONS

G. Teale Apr. 1993

FIG. 4



Arbitrary datum – surface at 5250E/1950N = R.L. 100·0m
Scale: Horizontal 1cm = 10m
Vertical 1cm = 2m

LEGEND

PLEISTOCENE RECENT

- Extremely fine, red 'soil'; loess
- Talc-vermiculite-clay surface layer
- Calcreted gravels or calcrete layer
- Partially consolidated gravels; clasts originated from the east (Mt. Painter inlier and adjacent metamorphosed Adelaidean sediments)

PALAEOZOIC

- Extremely deformed, actinolite marble; present as large rafts and clasts in breccia (Tapleys Hill Formation)
- Leucocratic, tourmaline ± biotite ± garnet granite/pegmatite
- Brecciated and hydrothermally altered Tapleys Hill Formation scapolitic siltstones
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- Vermiculite-hydrobiotite-rich breccia with clasts of magnesio-riebeckitic-rich marble
- Calcite and albite-rich, talc-vermiculite breccia; abundant tourmaline-rich clasts and marble clasts
- Talc-rich vermiculite breccia >80% talc and vermiculite

LATE PROTEROZOIC

- Tapleys Hill Formation; calc-pelites; scapolitic black shales; scapolitic marbles close to breccia margins.

T = Localised talc development;

m = Localised Magnesioriebeckite development

F — Fault

THT-1 — Costean/trench

R.A.B. hole (C.R.A.E., 1981)

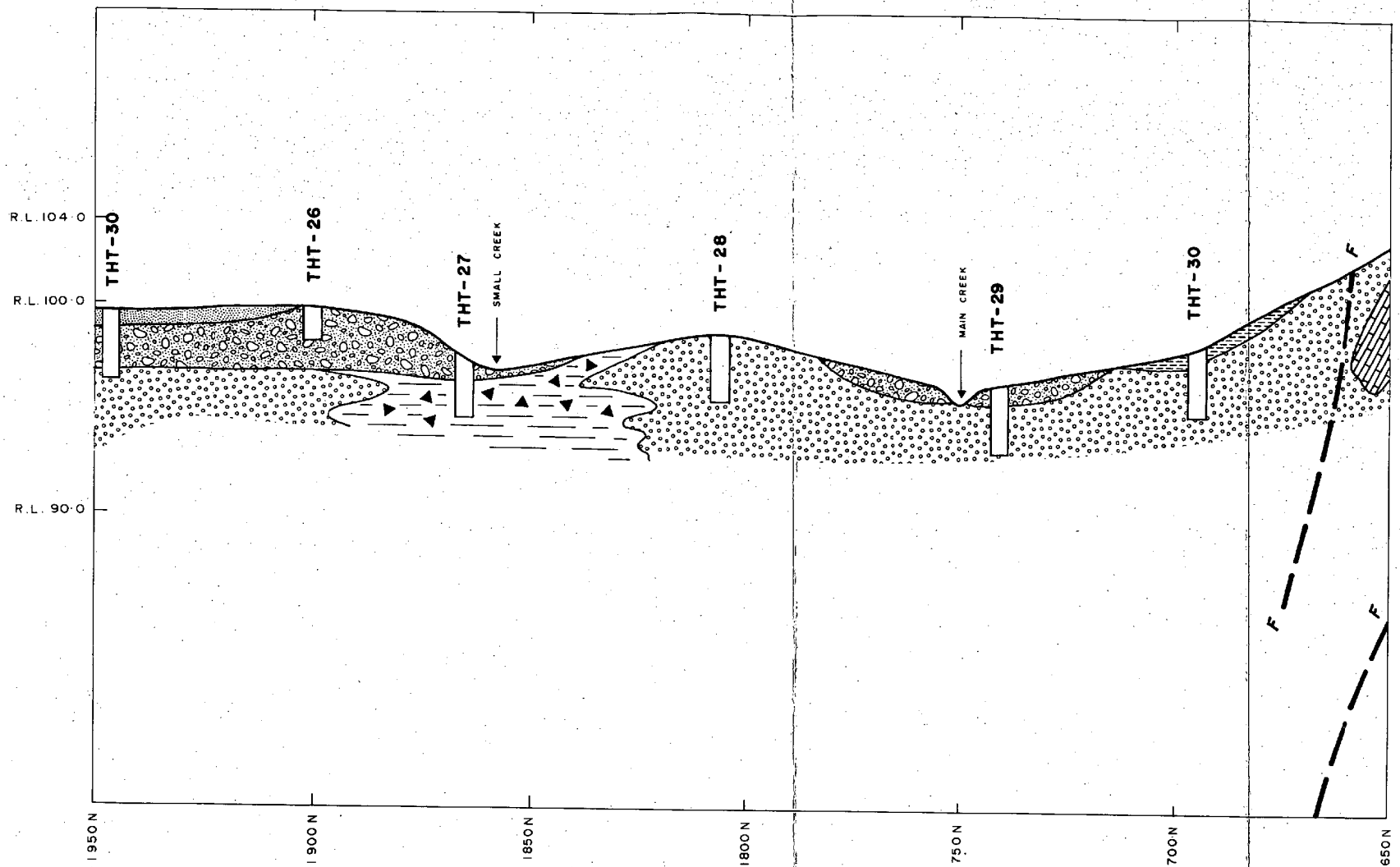
NORTH WELL CREEK

LINE 5150 E

GEOLOGY AND TRENCH LOCATIONS

G.Teale Apr. 1993

FIG. 5



Arbitrary datum – surface at 5250E/1950N = R.L. 100·0m.
Scale : Horizontal : 1 cm = 10m
Vertical : 1 cm = 2m

LEGEND

PLEISTOCENE RECENT
- Extremely fine, red 'soil'; loess
- Talc-vermiculite-clay surface layer
- Calcreted gravels or calcrete layer
- Partially consolidated gravels; clasts originated from the east (Mt. Painter Inlier and adjacent metamorphosed Adelaidean sediments)

PALAEOZOIC
- Extremely deformed, actinolite marble; present as large rafts and clasts in breccia (Tapleys Hill Formation)
- Leucocratic, tourmaline ± biotite ± garnet granite/pegmatite
- Brecciated and hydrothermally altered Tapleys Hill Formation scapolitic siltstones
- Vermiculite ± talc-rich breccia; clasts retrogressed/weathered to vermiculite-rich and/or talc-rich lithologies
- Vermiculite-hydrobiotite-rich breccia with clasts of magnesio-riebeckitic-rich marble
- Calcite and albite-rich, talc-vermiculite breccia; abundant tourmaline-rich clasts and marble clasts
- Talc-rich vermiculite breccia >80% talc and vermiculite

LATE PROTEROZOIC
- Tapleys Hill Formation; calc-pelites, scapolitic black shales; scapolitic marbles close to breccia margins.

T = Localised talc development;

m = Localised Magnesioriebeckite development

F — Fault

THT-1 — Costean/trench

R.A.B. hole (C.R.A.E., 1981)

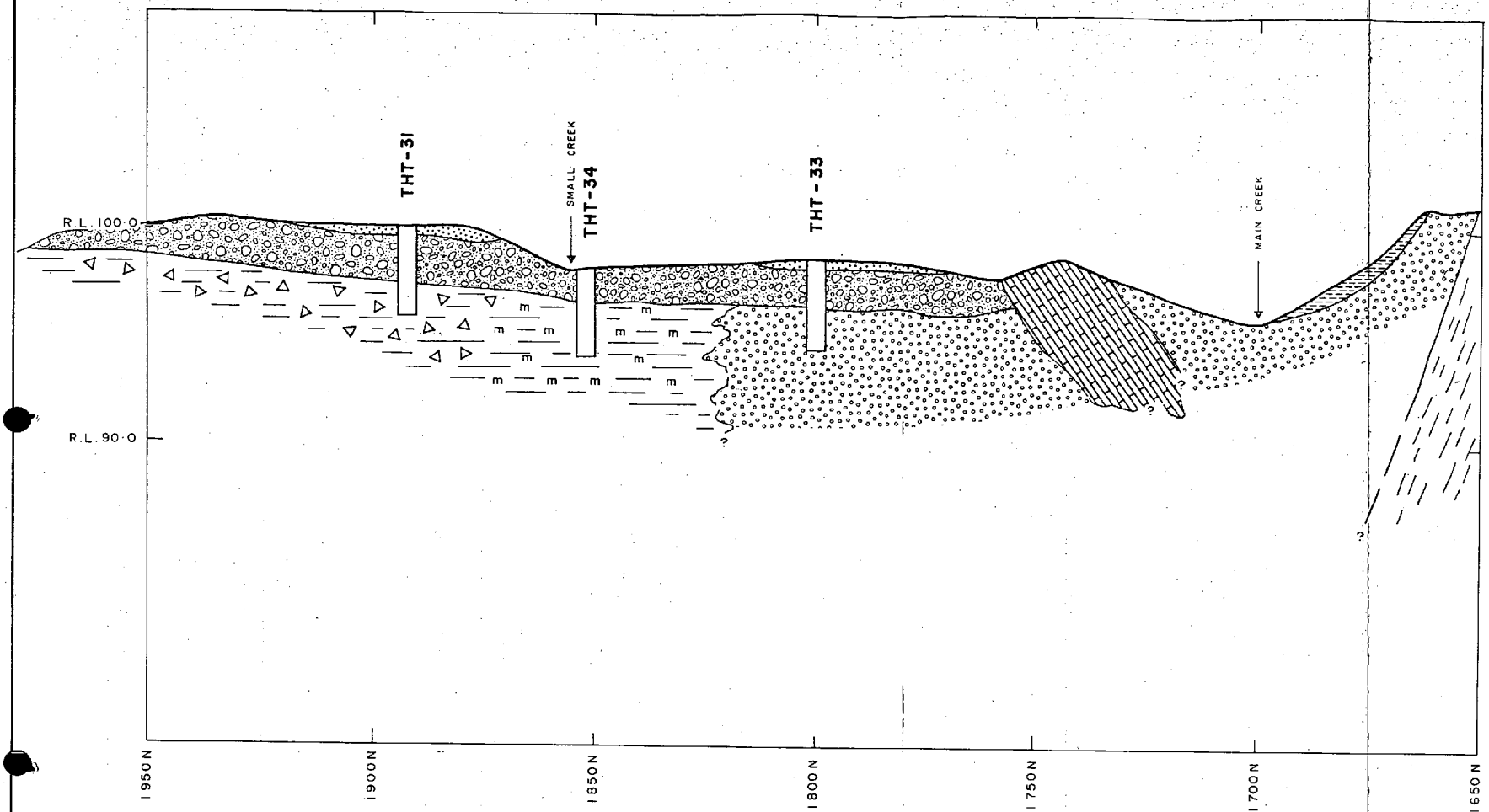
NORTH WELL CREEK

LINE 5200E

GEOLOGY AND TRENCH LOCATIONS

G. Teale Apr. 1993

FIG. 6



Arbitrary datum – surface at 5250E/1950N = R.L. 100·0m
Scale : Horizontal : 1cm = 10m
Vertical: 1cm = 2m

LEGEND

PLEISTOCENE RECENT

- Extremely fine, red 'soil'; loess
- Talc-vermiculite-clay surface layer
- Calcreted gravels or calcrete layer
- Partially consolidated gravels; clasts originated from the east (Mt. Painter Inlier and adjacent metamorphosed Adelaidean sediments)

PALAEOZOIC

- Extremely deformed, actinolite marble; present as large rafts and clasts in breccia (Tapleys Hill Formation)
- Leucocratic, tourmaline ± biotite ± garnet granite/pegmatite
- Brecciated and hydrothermally altered Tapleys Hill Formation scapolitic siltstones
- Vermiculite ± talc-rich breccia; clasts retrogressed/weathered to vermiculite-rich and/or talc-rich lithologies
- m_m Vermiculite-hydrobiotite-rich breccia with clasts of magnesio-riebeckitic-rich marble
- Calcite and albite-rich, talc-vermiculite breccia; abundant tourmaline-rich clasts and marble clasts
- Talc-rich vermiculite breccia > 80% talc and vermiculite

LATE PROTEROZOIC

- Tapleys Hill Formation; calc-pelites, scapolitic black shales; scapolitic marbles close to breccia margins.

T = Localised talc development;

m = Localised Magnesioriebeckite development

F Fault

THT-1 Costean/trench

R.A.B. hole (C.R.A.E., 1981)

NORTH WELL CREEK

LINE 5250E

GEOLOGY AND TRENCH LOCATIONS

G. Teale Apr. 1993

FIG. 7

1900E 1925N 1950E 1975E 2000E

GN = MN

1150N 1125N 1100N 1075N 1050N 1025N 1000N

scree

Schists; extremely sheared and contorted at fault margin

elluvium

soil cover

TO THE NEEDLES

TO BOB'S NOB

BN 4 30, 65, 120
BN 11 40, 110, 175
BN 8 25, 74, 145
BN 10 20, 78, 82
BNM 1 < 10, < 2, 2
BN 5 35, 70, 165
BNM 2 10, 22, 30
BN 2 45, 82, 85
BN 9 30, 72, 94
BN 3 55, 145, 100
BNM 3 < 10, 8, 8
BN 1 < 10, 9, 9
BN 7 < 10, 7, 4
BN 6 40, 16, 12

45° 50° 60° 65° 67° 70° 72° 75°

LEGEND

PALAEOZOIC

Albitic, alkaline granite stock; tourmaline-rich and contains mangano-columbite, topaz and phenacite (~370 M.Y.)

Metasomatised 'Wall Rock'; generally phlogopite, vermiculite, rectorite and talc-rich

LATE PROT.

Brecciated and contorted Wywyana Formation (Late Proterozoic)

EARLY PROTEROZOIC

Schistose meta-volcanics containing numerous 'quartz-eyes'

Layered quartz-magnetite rock

Quartz-feldspar schist and gneiss: probable deformed granite or volcanic

Fault (known)

Fault (inferred)

50° S_0 (in Wywyana Fm.)

60° S_3 (in Early Proterozoic schists)

10, 22, 30 Ta, Nb, Be

BN *Chip sample of granite*

BNM *Chip sample of metasomatised 'wall rock'*

8300-5

Geology of the Bobs Nob Alkaline Granite Intrusive, NORTH WELL CREEK AREA

0 10 20 30 40 50 METRES

SCALE 1:500

Drafted by GEODRAFTING, Adelaide S.A.

4800 E 4900 E 5000 E 5100 E 5200 E 5300 E

2000 N 1900 N 1800 N 1700 N 1600 N

Outcropping riebeckitic marbles, trending 042°.

To Umberatana

TN MN

7°

Approximate contact between diatreme breccia and non-disrupted Tapleys Hill Formation.

Riebeckite marble clasts in breccia.

To Arkaroola

THT - 1
THT - 2
THT - 3
THT - 4
THT - 5
THT - 6
THT - 7
THT - 8
THT - 9
THT - 10
THT - 11
THT - 12
THT - 13
THT - 14
THT - 15
THT - 16
THT - 17
THT - 18
THT - 19
THT - 20
THT - 21
THT - 22
THT - 23
THT - 24
THT - 25
THT - 26
THT - 27
THT - 29
THT - 30
THT - 31
THT - 32
THT - 33
THT - 34
THT - 35

THV - 1, 2, 3
THV - 4
THV - 5
THV - 6

Extremely deformed actinolitic marble.

Area of poorly outcropping breccia and breccia clast rubble.

Numerous, poorly outcropping granite - pegmatite bodies.

Large 'raft' of marble in breccia.

65° 67° 75° 70° 72° 68° 70° 65° 65°

8300-6

LEGEND

- Creek
- THT - Backhoe Trench
- THV - XRD Sample Site
- RAB hole, C.R.A. Exploration
- Track
- Fault (observed)
- Fault (inferred)
- Dip and Strike of bedding (So)

Palaezoic

- Diatreme breccia, vermiculite, phlogopite, carbonate, talc, albite, rectorite - rich numerous clast types.
- Granites and pegmatites; Be, Rb, B, Ta, Nb, Cs - rich.

Late Proterozoic

- Tapleys Hill Formation; evaporitic sediments, marbles, dolomites.
- Tapleys Hill Formation; calc-pelites,scapolitic black shales.

Geology of the Tourmaline Hill East Area,

Umberatana, South Australia

Scale

0 50m

8300-7

30°15'

INTERPRETIVE GEOLOGY OF THE GI ANTS HEAD LOCALITY, UMBERATANA AREA NORTHERN FLINDERS RANGES

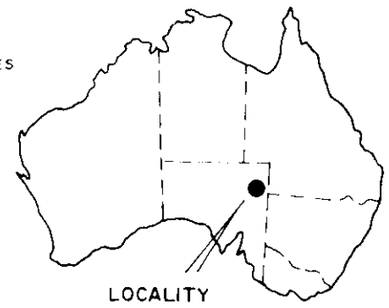
(modified after Lottermoser, 1985)

TN MN

7°

0 100 200 300 400 500 METRES

SCALE 1:10000



65° 60° 75° 70° 80° 80° 70° 70° 72° 75° 60° 70° 80° 61° 45° 40° 75° 40° 40° 76° 35° 40° 35°

Mallee Well

Windmill

Tank

139°10'

LEGEND

Alkaline, tourmaline-rich granites and pegmatites (417 ± 4)

Vermiculite ± talc-rich breccia; magnesio-riebeckite rich in part; rafts of limestone, tourmalinised calc-pelites, etc. Magnetite-pyrite-rich central 'core' dips shallowly to the north

ADELAIDEAN

MARINOAN

Nuccaleena Fm, dolomitic shales, dolomite purple shales

Amberoona Fm; Scapolitic siltstones and dolomites, laminated to massive grey-green shales and siltstones, amphibole-bearing limestones.

TORRENSIAN STURTIAN

Tapley Hill Fm; laminated dolomitic shales, black, scapolite-rich calc-shales, scapolitic limestone blue grey shales, riebeckitic limestones, blue-grey shales

Yudnamutana Sub-group; unnamed member, tillites, shales, quartzites, conglomerates

Burra Group – undifferentiated; amphibole-rich carbonates, dolomites, dolomitic siltstones, shales etc.

Trend of S_0, bedding

Dip/strike of S_0, bedding

Fault

Inferred fault

Final Report on

Exploration Licence No. 1645

North Well Creek Project

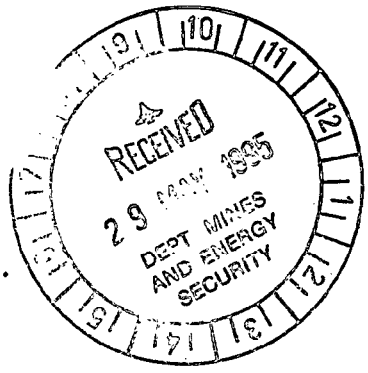
South Australia

Period 7.3.93 to 6.3.94

Author: G.S.Teale

Date: April, 1995

Distribution: Mines and Energy, South Australia.
Lynch Mining Pty Ltd., Brisbane.



Exploration Licence 1645

North Well Creek

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-Expenditure.

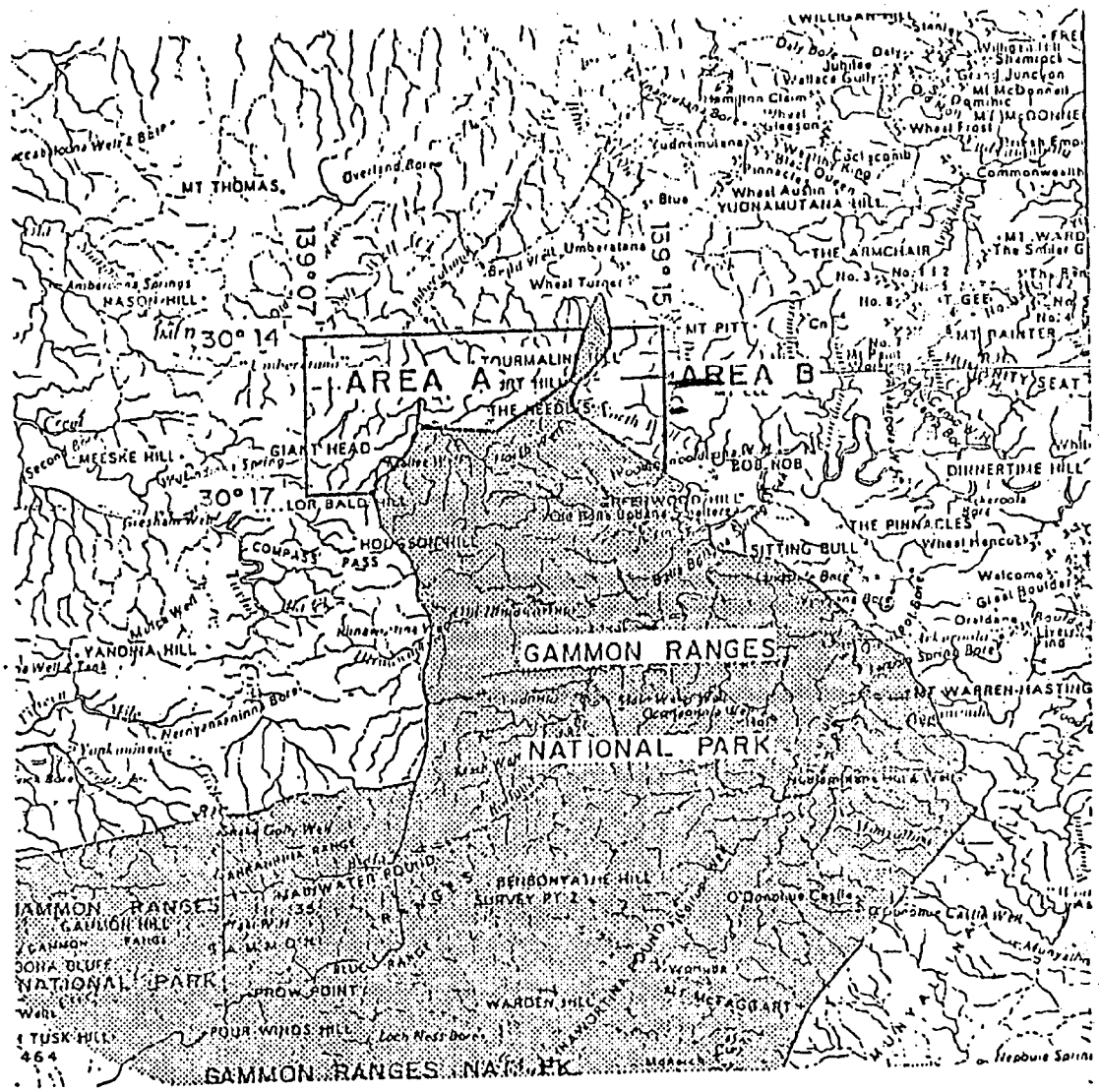
Figure 1. -Location of the North Well Creek exploration licence.

Appendix 1. -Electronmicroprobe analyses of manganocolumbite from the Bob's Nob Intrusive.

Appendix 2. -Rare Earth Element and selected trace element analyses for granites from the exploration licence area

Plates 1 - 3: -Rehabilitated areas after trenching.

FIGURE 1



APPLICANT: LYNCH MINING LIMITED

DME 401/89 AREA: 47 square kilometres (approx.)

1:250000 PLANS: COPLEY

LOCALITY: NORTH WELL CREEK AREA - Approx. 75 km east of Leigh Creek

DATE GRANTED: 7·3·90 DATE EXPIRED: 6·3·91 EL No: 1645

Discussion of Exploration Activities

E.L. 1645 North Well Creek

This report is an annual and final report for E.L. 1645 as the renewal for this exploration licence (12 month period ending 6.3.94) was inadvertently misplaced resulting in Lynch Mining having to re-apply for the exploration licence in March 1994. The exploration licence was again granted, in November, 1994, as E.L. 2032 commencing on 15th November.

During the period under review only limited fieldwork was undertaken.Areas that had been trenched/ costeaned in May/June 1992 were field checked to view rehabilitated areas. All areas were in excellent order with new vegetation growth (see plates 1-3) and little or no erosion.

All outcrops of granite in the E.L. area were sampled in July, 1993 and selected samples were submitted to Becquerel Laboratories for rare earth element analysis (see appendix two). The granites exhibit similar rare earth patterns to many rare metal granites and pegmatites found worldwide. High heavy rare earth element concentrations (and yttrium) are due to the presence of gadolinite.

There was some interest in the vermiculite occurrence located by Lynch Mining Ltd at Tourmaline Hill, however no joint venture partner was obtained. The presence of minor magnesioriebeckite ('blue asbestos') associated with the vermiculite on the northern margins of the diatreme should be noted. More testwork on the vermiculite - bearing material is required.

EXPENDITURE

EL 1645
NORTH WELL CREEK

7/3/93 to 6/3/94

ACCOUNT	TOTAL
ASSAYING	$440
CONTRACT GEOLOGY	$5,700
CONTRACT LABOUR	$713
VEHICLE EXPENSES	$216
PETROLOGY	$999
DRAFTING AND PLAN PRINTING	$431
POSTAGE, STATIONARY, PHONE, FAX etc.	$380
ACCOMODATION AND MEALS	$300
AIR FARES	$108
ADMINISTRATION AND OVERHEADS	$1,266
TOTAL	$10,552.35

APPENDIX ONE

Analysis of Manganocolumbite from The
Bob's Nob Intrusive, North Well Creek E.L.

TABLE 1: **Electron Microprobe Analyses of Manganocolumbite from the Bobs Nob Intrusive**

Nb_2O_5	59.57	61.11
Ta_2O_5	19.81	18.32
TiO_2	1.80	1.58
FeO_2	6.81	6.43
Mno	12.47	12.83
Total	100.46	100.27

Atomic Proportions

Nb	1.6198	1.6554
Ta	.3241	.2985
Ti	.0813	.0711
Fe	.3427	.3221
Mn	.6351	.6512
Total	3.0029	2.9982

APPENDIX TWO

Rare-Earth element analyses of selected granitic rocks, North Well Creek E.L.

N E U T R O N A C T I V A T I O N A N A L Y S I S

NEUTRON ACTIVATION ANALYSIS REPORT

Date: 19-08-93

ANALABS, ADELAIDE, 108540.35.10010
BECQUEREL JOB #311

NOTE:- A NEGATIVE SIGN INDICATES "LESS THAN".
- RESULTS ARE IN PARTS PER MILLION (ppm) UNLESS OTHERWISE INDICATED.
- ELEVATED D.L FOR Mo & Ba DUE TO U FISSION INTERFERNCE.
- IMPROVED D.L. FOR REE DUE TO LONG COUNT TIMES.

LYNCH SAMPLE No:		454	73/84	73/85	6019	6049	~~6110~~ 6110	6123	NW-75	NW-76	NW-77
ELEMENT	DL	# 43318	# 43319	# 43320	# 43321	# 43322	# 43323	# 43324	# 43325	# 43326	# 43327
LANTHANUM	.1	.74	3.73	7.79	1.62	222.00	1.96	1.34	221.00	32.90	59.20
CERIUM	1.0	1.58	7.98	16.50	3.83	454.00	5.20	3.30	445.00	73.40	124.00
NEODYMIUM	2.0	1.16	4.22	7.51	2.70	189.00	4.09	2.23	190.00	37.10	54.20
SAMARIUM	.05	.47	.88	1.60	.85	31.80	1.50	.56	29.90	9.56	12.40
EUROPIUM	.1	.05	.17	.23	.06	3.20	.10	.06	1.05	.52	.95
TERBIUM	.5	.13	.30	.37	.17	3.75	.17	.15	4.36	1.91	1.85
HOLMIUM	.5	.21	.40	.72	.23	5.65	.43	.31	6.84	3.15	2.75
YTTERBIUM	.1	.60	1.57	2.69	.51	15.70	2.30	1.24	17.70	7.76	7.30
LUTETIUM	.05	.10	.23	.43	.07	2.20	.40	.19	2.82	1.28	1.20

LYNCH SAMPLE No:		NW-78	NW-18	NW-19
ELEMENT	DL	# 43328	# 43329	# 43330
LANTHANUM	.1	41.60	72.50	28.00
CERIUM	1.0	93.30	381.00	142.00
NEODYMIUM	2.0	51.90	264.00	97.60
SAMARIUM	.05	13.41	92.50	38.50
EUROPIUM	.1	.45	10.20	2.47
TERBIUM	.5	3.01	17.50	6.65
HOLMIUM	.5	5.37	25.40	8.80
YTTERBIUM	.1	13.30	98.50	27.70
LUTETIUM	.05	2.10	14.00	3.53

BECQUEREL LABORATORIES
A.C.N. 003 271 832
LUCAS HEIGHTS RESEARCH LABORATORIES NEW ILLAWARRA RD, LUCAS HEIGHTS, NSW
Telephone: (02) 543 2644
Facsimile: (02) 543 2655
P.O. BOX 93
MENAI, NSW, 2234

NEUTRON ACTIVATION ANALYSIS

BECQUEREL JOB # 311

LUNCH SAMPLE No: 454 73/84 73/85 6019 6049 454 6118 6123 NW-75 NW-76 NW-77

ELEMENT	DL	# 43318	# 43319	# 43320	# 43321	# 43322	# 43323	# 43324	# 43325	# 43326	# 43327
ANTIMONY	.20	1.05	.45	-.20	1.40	-.20	.66	2.11	-.20	.73	-.20
BARIUM	100.	-100.0	101.0	122.0	-100.0	-100.0	-100.0	-100.0	1180.0	254.0	1190.0
CAESIUM	1.0	-1.00	2.86	3.62	1.02	1.09	1.96	14.20	5.16	-1.00	3.85
COBALT	1.0	108.00	-1.00	.05	41.90	1.21	84.50	-1.00	2.79	3.94	2.16
GALLIUM	50.	-50.0	-50.0	-50.0	-50.0	-50.0	-50.0	-50.0	-50.0	-50.0	-50.0
GOLD, ppb	5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	25.0	-5.0
HAFNIUM	.5	1.20	.64	1.12	1.01	20.20	1.06	1.90	9.00	3.84	3.84
MOLYBDENUM	5.0	-5.0	-5.0	-10.0	-5.0	-5.0	5.2	-10.0	-100.0	-40.0	-40.0
POTASSIUM, %	.20	.29	3.00	3.04	-.20	.64	2.13	2.91	4.53	.13	4.38
RUBIDIUM	20.	-20.0	328.0	358.0	-20.0	42.8	353.0	504.0	456.0	28.0	331.0
SCANDIUM	.10	.26	1.14	2.61	.25	5.63	.55	1.02	9.95	14.10	11.10
SILVER	5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0
TANTALUM	1.0	40.20	2.03	3.01	38.50	4.59	25.20	31.40	5.03	1.73	1.55
TELLURIUM	20.	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
THORIUM	.5	-.50	5.75	10.90	.89	71.10	.95	2.81	190.00	31.30	25.60
TIN	500.	-500.0	-500.0	-500.0	-500.0	-500.0	-500.0	-500.0	-500.0	-500.0	-500.0
URANIUM	2.0	-2.00	2.99	8.98	-2.00	4.23	-2.00	10.80	73.10	21.80	27.00
ZINC	50.	-50.0	-50.0	-50.0	-50.0	-50.0	-50.0	50.9	117.0	124.0	77.8
ZIRCONIUM	500.	-500.0	-500.0	-500.0	-500.0	823.0	-500.0	-500.0	-500.0	-500.0	-500.0

BECQUEREL LABORATORIES
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MENAI, NSW, 2234

NEUTRON ACTIVATION ANALYSIS

BECQUEREL JOB # 311

ELEMENT	DL	# 43328 NW-18	# 43329 NW-18	# 43330 NW-19
ANTIMONY	.20	-.20	42.90	21.80
BARIUM	100.	302.0	-300.0	166.0
CAESIUM	1.0	4.16	2.47	1.16
COBALT	1.0	1.57	2.79	1.75
GALLIUM	50.	-50.0	-50.0	-50.0
GOLD, ppb	5.0	-5.0	-5.0	-5.0
HAFNIUM	.5	5.38	5.08	2.62
MOLYBDENUM	5.0	-10.0	-50.0	-20.0
POTASSIUM, %	.20	4.50	-.20	-.20
RUBIDIUM	20.	350.0	-20.0	-20.0
SCANDIUM	.10	8.72	8.66	5.80
SILVER	5.0	-5.0	-5.0	-5.0
TANTALUM	1.0	3.01	1050.00	359.00
TELLURIUM	20.	-20.0	-20.0	-20.0
THORIUM	.5	38.30	22.00	7.96
TIN	500.	-500.0	-500.0	-500.0
URANIUM	2.0	10.80	50.60	15.70
ZINC	50.	53.2	-50.0	-50.0
ZIRCONIUM	500.	-500.0	-500.0	-500.0

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Sample Locations

454 : South eastern side of the main Needles outcrop.

6019 : Main outcrop of the Pinnacles.

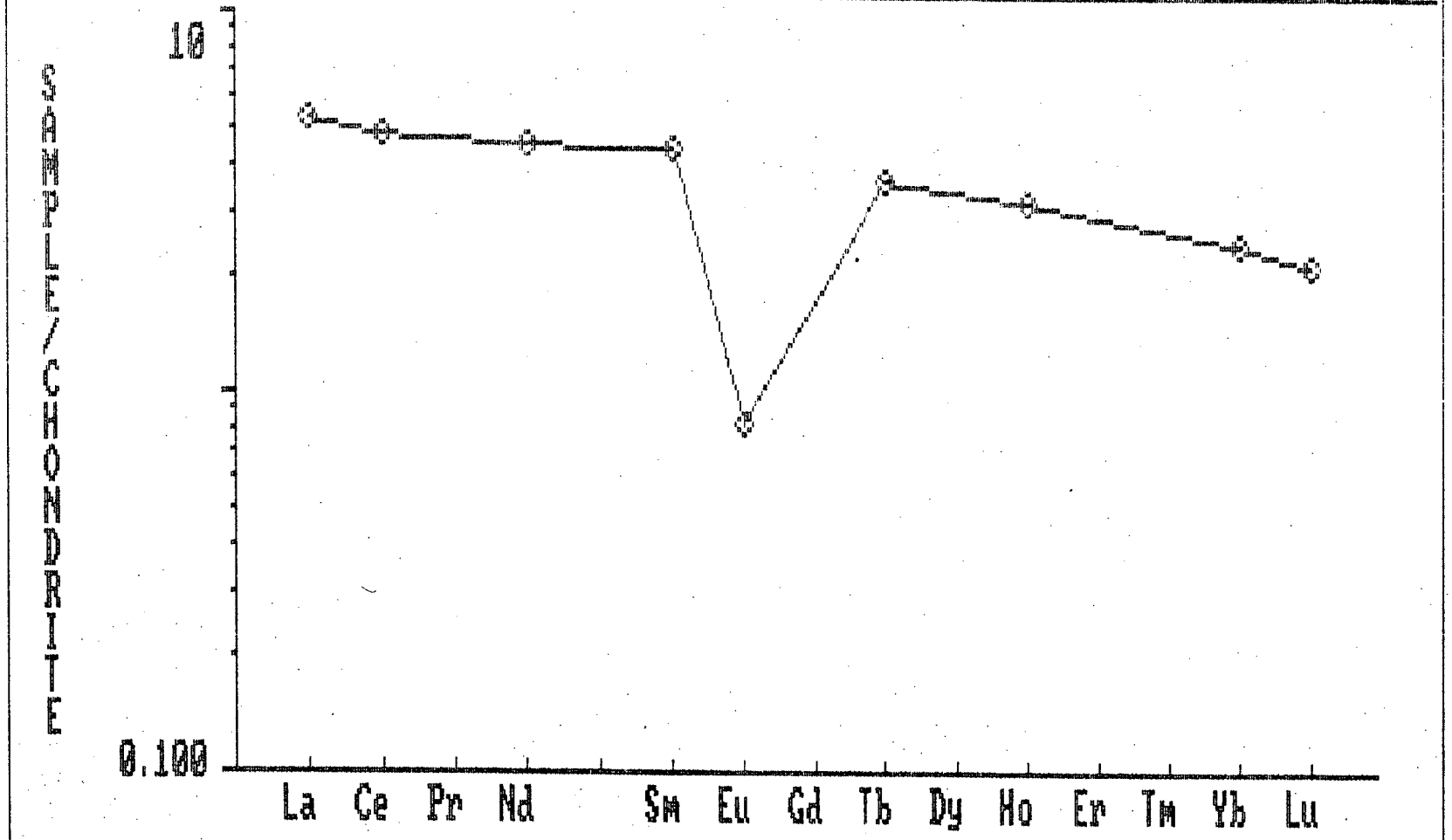
6110 : Main outcrop of the Pinnacles.

6123 : Eastern margin of the main granite outcrop of the Needles.

NW-18 : Giants Head Locality.

NW-19 : Giants Head Locality.

BECQUEREL NEUTRON ACTIVATION ANALYSIS: CHONDRITE NORMALIZED PLOT



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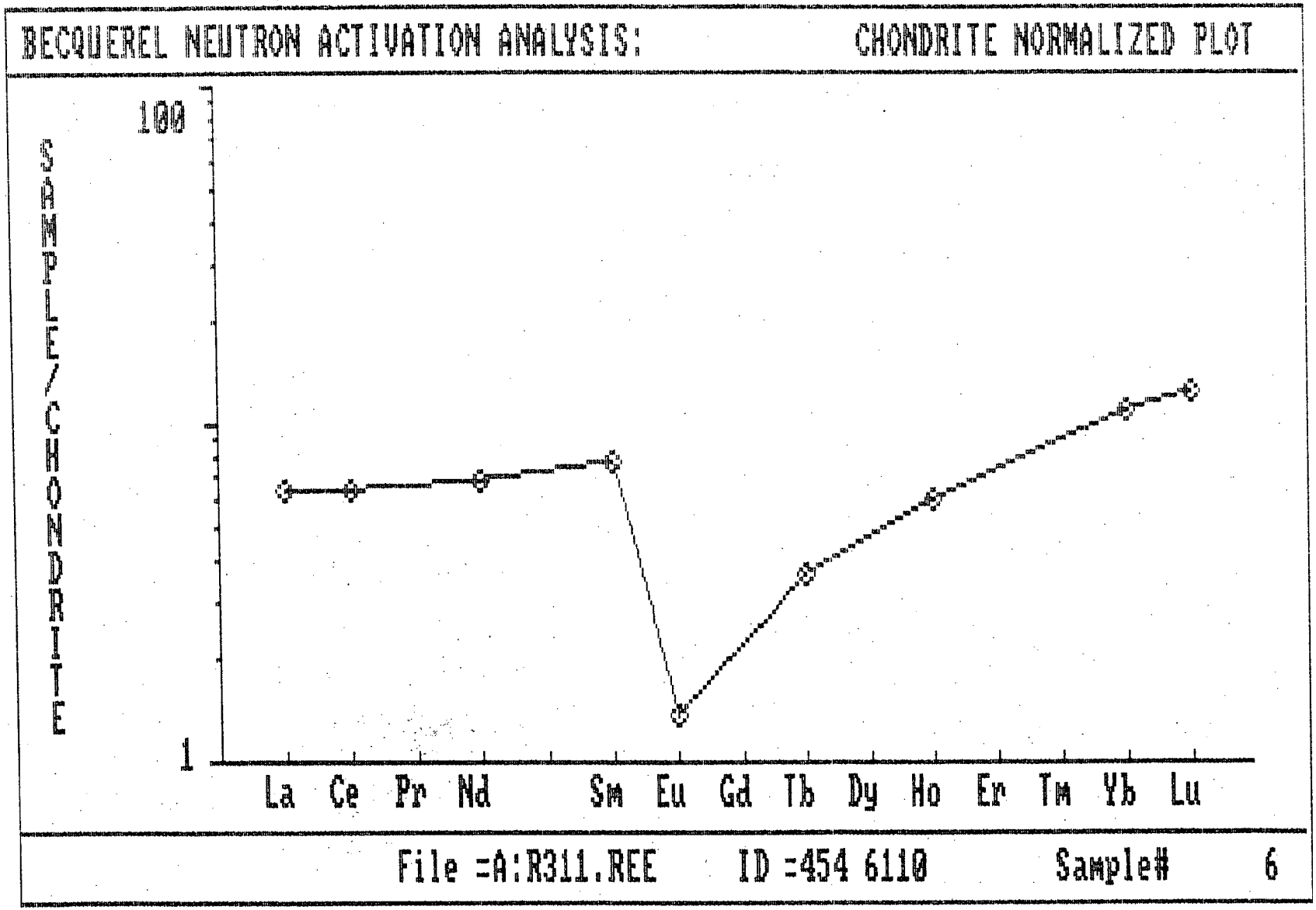
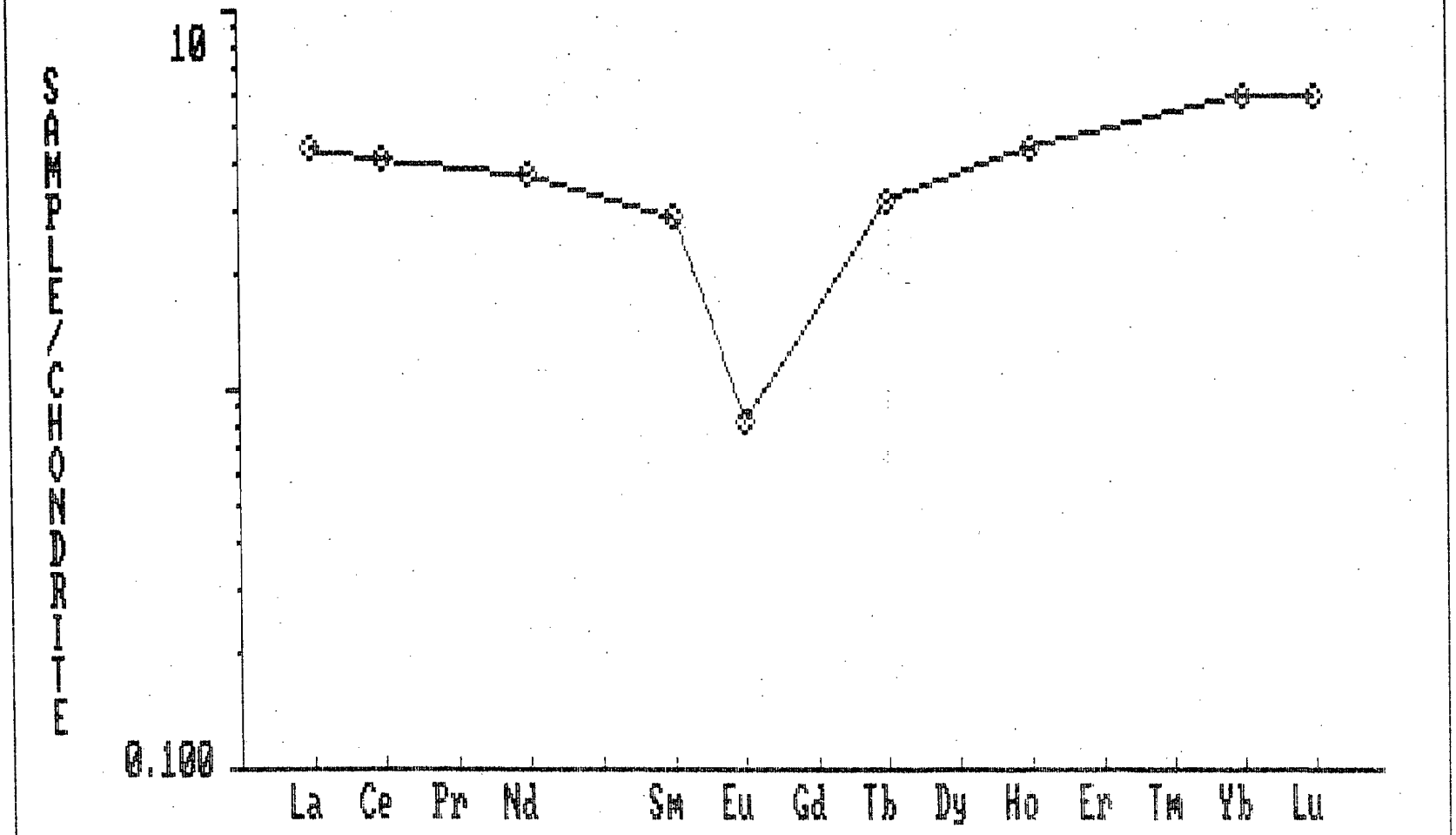
LYNCH



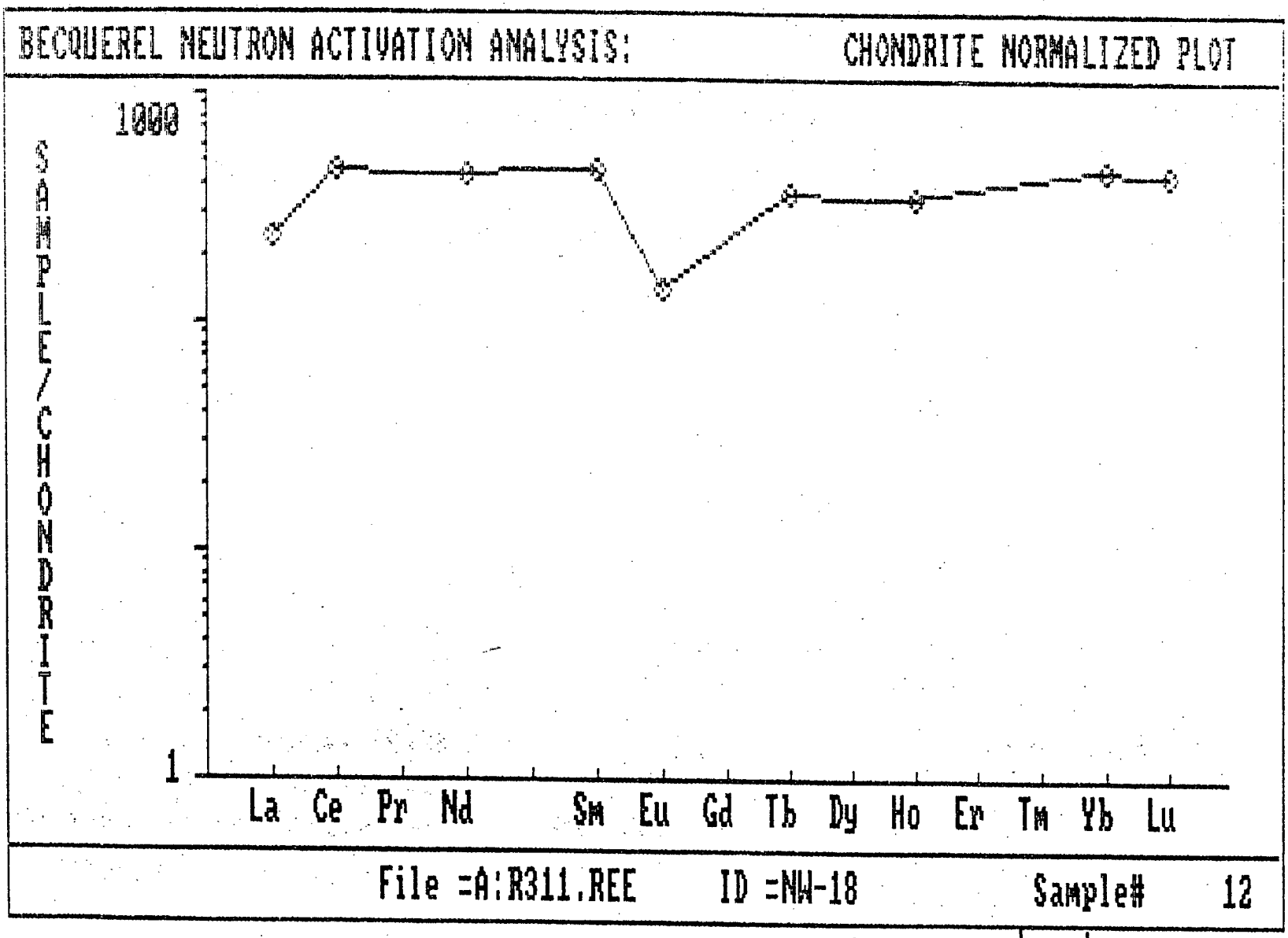
LyNdd
Sample No. 454 6110

BECQUEREL NEUTRON ACTIVATION ANALYSIS: CHONDRITE NORMALIZED PLOT



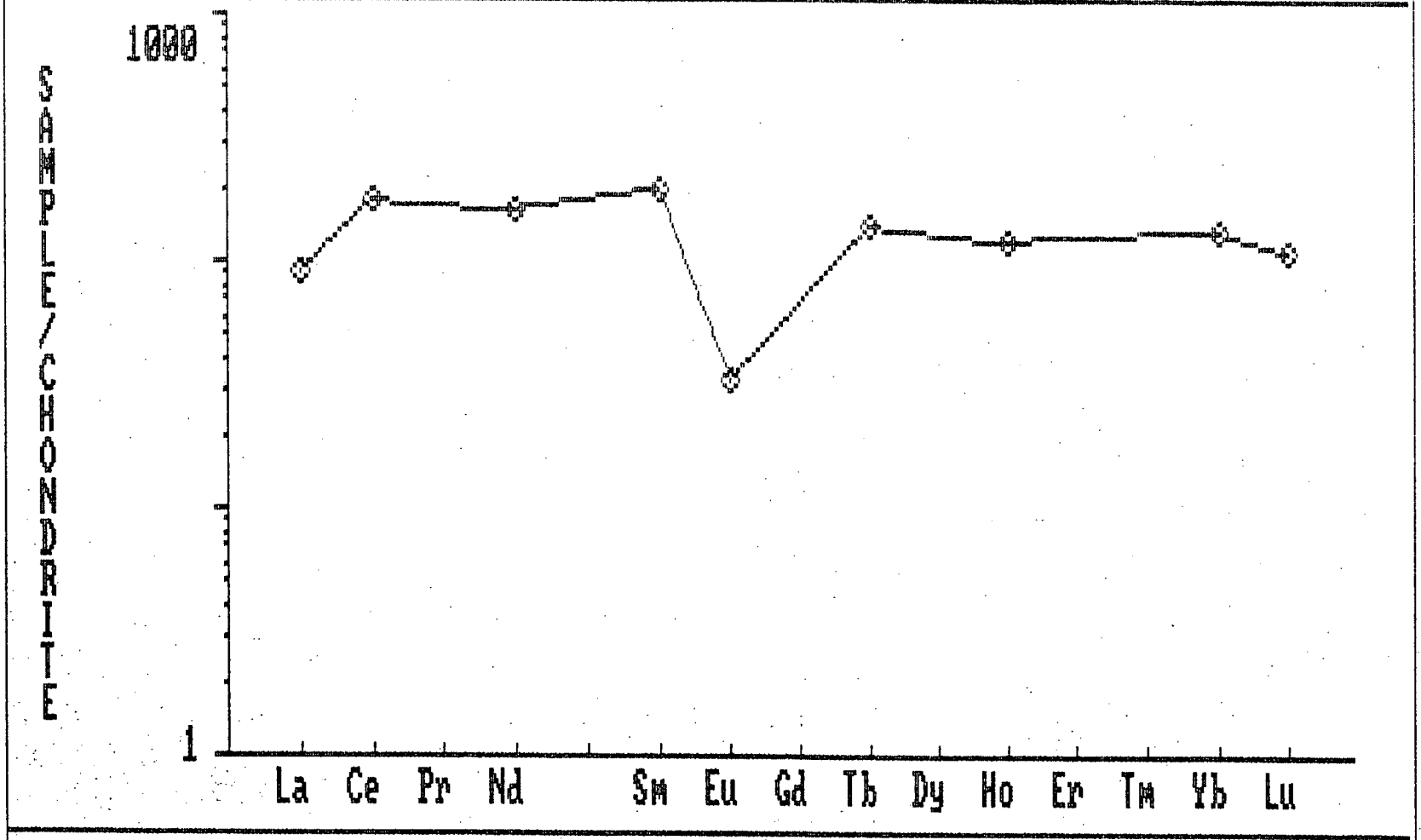
File =A:R311.REE ID =6123 Sample# 7

Lynch
Sample No 6123


BECQUEREL NEUTRON ACTIVATION ANALYSIS:
CHONDRITE NORMALIZED PLOT
1000
1
SAMPLE/CHONDRITE
La Ce Pr Nd Sm Eu Gd Tb Dy Ho Er Tm Yb Lu
File =A:R311.REE
ID =NW-18
Sample# 12

lynch

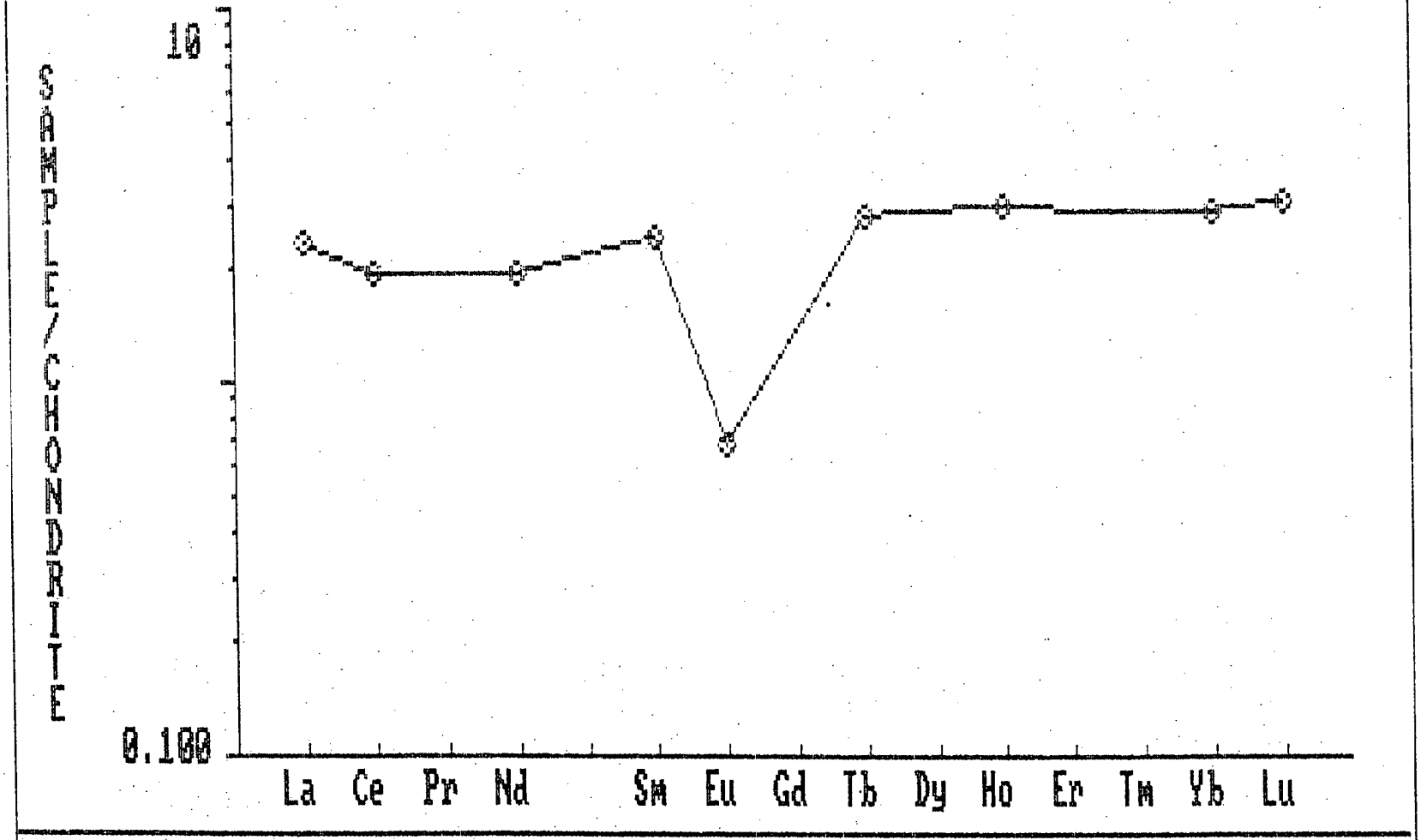
BECQUEREL NEUTRON ACTIVATION ANALYSIS: CHONDRITE NORMALIZED PLOT



File =A:R311.REE ID =NW-19 Sample# 13

Lynch
Sample # NW-19

BECQUEREL NEUTRON ACTIVATION ANALYSIS: CHONDRITE NORMALIZED PLOT



File =A:R311.REE ID =454 Sample# 1

LYNCH SAMPLE 454

PLATES 1 - 3

PLATE 1: Rehabilitated area near trench THT-2 (reported in previous annual report). No erosion or "gulleying" has occurred at all.

PLATE 1

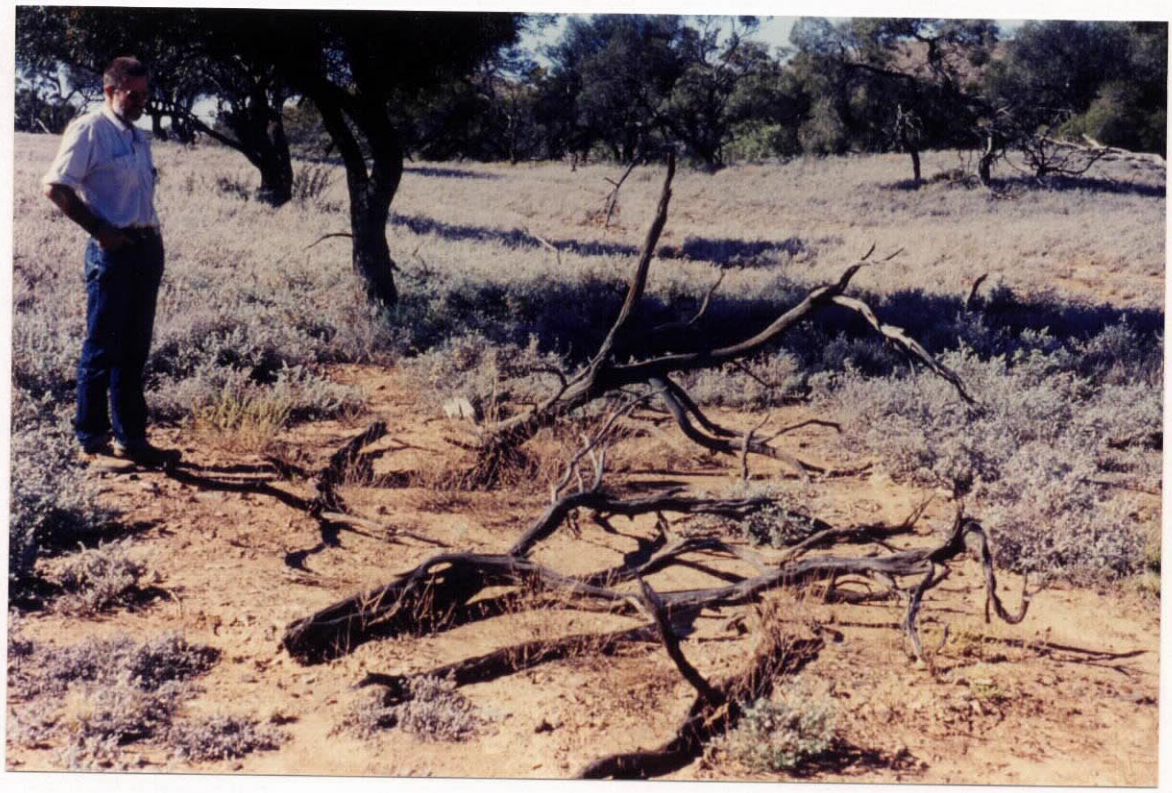


PLATE 2: Rehabilitation near trenches THT-3 (foreground) and THT-4 (RHS of photograph, background). Methods employed to minimise erosion have succeeded. Photograph taken approximately 14 months after excavation of trenches.

PLATE 2

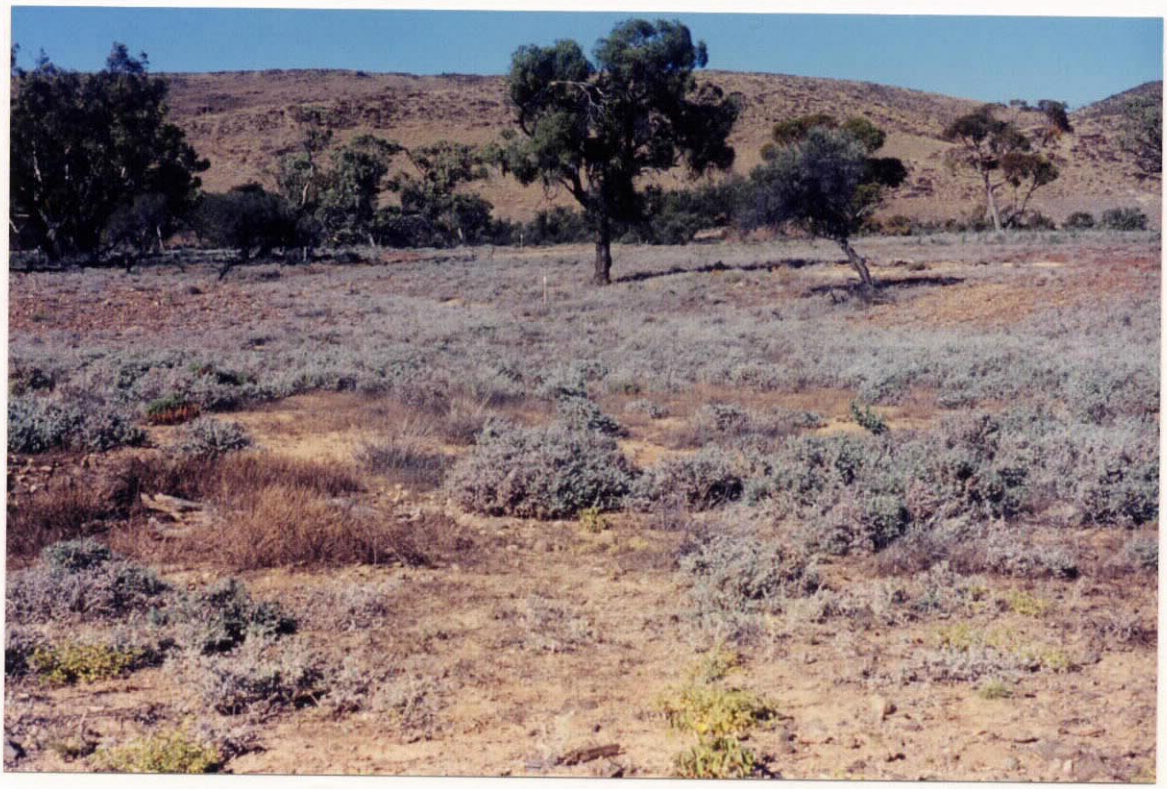


PLATE 3: Rehabilitated area near and over THT-18.

PLATE 3