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DISC 221

PART PROJECT A-84-111



AMOCO MINERALS AUSTRALIA COMPANY

PROGRESS REPORT

JANUARY TO JUNE 1984

EXPLORATION LICENCE 32/82

WELDBOROUGH

TASMANIA

P.A. JONES

JULY 1984

REPORT 399

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#### SUMMARY AND CONCLUSIONS

Exploration Licence 32/82 was granted to Amoco for a period of 12 months from July 15, 1983. The tenement embraces potential large tonnage low grade (0.2-0.4% tin) sheeted tin greisens within the Blue Tier Batholith of northeast Tasmania.

Intensive surface prospecting and limited exploration has been conducted from 1874 to the present outlining numerous rich alluvial deposits and small tonnage vein greisens. Recent work at the nearby Anchor deposit has established potential for a large greisen hosted tin orebody. The Anchor deposit is understood to be a near surface blind greisen sheet formed by the intrusion of a tin rich leucocratic granite into a pre-existent granite.

Regional stream sediment sampling surveys by Amoco have outlined highly anomalous tin geochemistry in the Schroaders Creek/Garnet

Creek and Weld Hill/Tallegang Creek areas. Values in the panned concentrates for the latter areas average from 406-5000 ppm tin (with maximum values of 1.8% and 2.47% tin) from panned concentrates and from 50-1250 ppm from stream sediments. Minor copper, zinc values were returned coincident with the tin values. Greisenous veins in four locations along Schroaders Creek proved moderately to highly anomalous with values ranging from 435-0.24% tin.

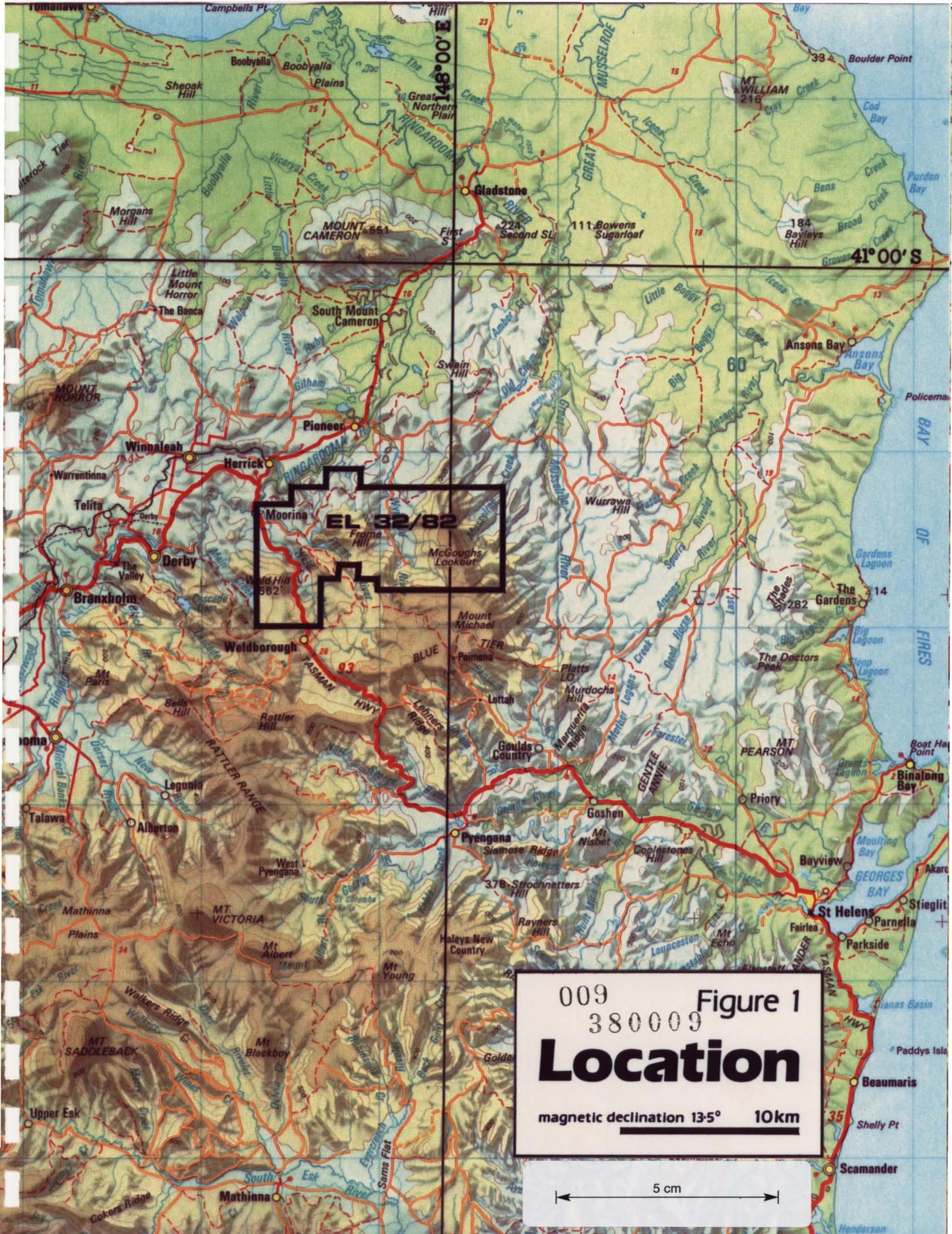
A suite of barren and mineralized rocks were checked for magnetic susceptibilities to ascertain the productiveness of conducting an airborne magnetometer survey. Values were very low and undistinguishable from each other.

The remaining portion of the licence will be stream sampled and detailed broad spaced traverses will be bedrock sampled in the vicinity of Schroaders Creek and Tallegang Creek. Geologic mapping and rockchip sampling surveys will also be implemented in the Schroaders Creek - Cotton Creek area.

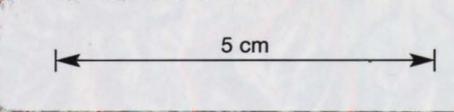
#### LOCATION AND ACCESS

Exploration Licence 32/82 is located immediately northeast of the town of Weldborough, northeast Tasmania. Access within the tenement is poor due to rugged terrain and thick vegetation, however the licence is serviced by a major sealed highway (Tasman Highway) connecting the area with St. Helens 40 kilometers to the southeast. Initial access in the region will be by foot and four wheel drive utilizing existing forest and mine tracks. Most of the old tracks will require opening up and repairing (Figure 1).

No difficulties would be anticipated with respect to power, water, labor and transport should a mine be developed.



009 Figure 1  
380009  
**Location**  
magnetic declination 13°5' 10km



DESCRIPTION OF THE PROPERTY AND OWNERSHIP

Exploration Licence 32/82 of approximately 86 square kilometers in area was granted to Amoco Minerals for the period of 12 months from July 15, 1983.

Seven pre-existing Mining Leases and two other leases (water and machinery) lie within the tenement. The leases vary in size from three to 47 hectares and embrace small rich alluvial tin patches (Enclosure 1). Details of the leases:-

4726/M	7 acres	Triako Mines	Machinery Lease
38M/74	10 hectares	G. Salter	Alluvial Tin
83M/77	20 "	C. Wood	" "
101M/77	47 "	M & V Johnson	" "
6W/78	3 "	Triako Mines	Pump House
44M/78	26 "	G. Whittaker	Alluvial Tin

110

380011

22M/79	19	"	C. Wood	"	"
25M/80	41	"	P. Martin Grose	"	"
38M/83	40	"	M. Reynolds	"	"

#### HISTORY AND EXPLORATION TO DATE

Tin was first discovered in the Blue Tier Batholith from alluvials in the vicinity of Ruby Valley near George Bay in 1874. Subsequent intensive prospecting found rich alluvial deposits near Weldborough and a number of sluicing ventures on veined greisens were undertaken. The more notable of these deposits are: Southern Cross, Lottah, Kent, Haleys, Marie, Planet, Rising Sun, Crystal Hill, Spinks, Cream Creek, Nichols (F-B), Australia and Anchor. Alluvial flats were also successfully worked in several creeks. The combined production from these mines is estimated to have been 5,000 tons of tin ore. In addition 2,680 tons of tin concentrates were recovered from the primary deposit of the Anchor Mine until closure by the original company in 1914. A further 1,500 tons are estimated to have been produced from other greisen deposits although invariably these mines were unsuccessful.

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The Mount Lyell and Railway company carried out extensive surface prospecting (17,160 meters of trenches) and diamond drilling (49 holes totalling 1950 meters) surveys during the period 1906 to 1907. Much of Mt. Lyells work was confined to vein greisens of narrow width and limited strike as evidenced by their best intercept: Moon Mine - Bore 18 from 6 - 9.75 meters assaying 0.51% tin.

Limited surveys have been conducted by the Mines Department over the years 1927 to 1943. Surveys included surface sampling (trenching perpendicular to greisen veins) and drilling (both churn drilling and diamond drilling) with generally disappointing results.

The Aberfoyle Tin Development Partnership conducted detailed surveys over the Anchor Mine area located approximately 18 kilometers south-southeast of EL 32/82 during the early to mid 1960's. Diamond drilling outlined a zone of tin mineralized greisenized boitite - muscovite granite totalling 1.2 million tons at 0.37% tin lying beneath a barren porphyritic biotite granite. Drilling failed to close off the mineralization. Subsequently Renison Limited obtained title to the ground through a joint venture with Hellyer Mining and Exploration in 1976 and increased the reserves of the Anchor Mine to +3 millions tons of 0.25% to 0.3% tin.

Geophoto Resources in 1974 conducted exploration surveys centered on the area from Cross Creek to Cream Creek workings. Geophoto concluded that the exposed greisen vein mineralization at Cream Creek was sub-economic.

In 1978 Aberfoyle pegged an exploration licence to the north of the Anchor Mine looking for repeat deposits of the Anchor type: tin mineralized greisen sheets occurring beneath a roof of older and barren granite. Limited areas were mapped on a reconnaissance basis (approximate 10 square kilometers) at a

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scale of 1:15 840. Detailed surveys at a scale of 1:600 were implemented on the Cream Creek workings culminating in a proposed six hole percussion drill program. The program was terminated prematurely at the completion of two holes due to the unsuitability of the drill rig. Both holes were stopped short of their planned depths due to heavy water inflows. Hole 1 failed to intersect the prospective horizon and hole 2 intersected a narrow greisenous zone containing low tin values before passing into fresh barren host granite.

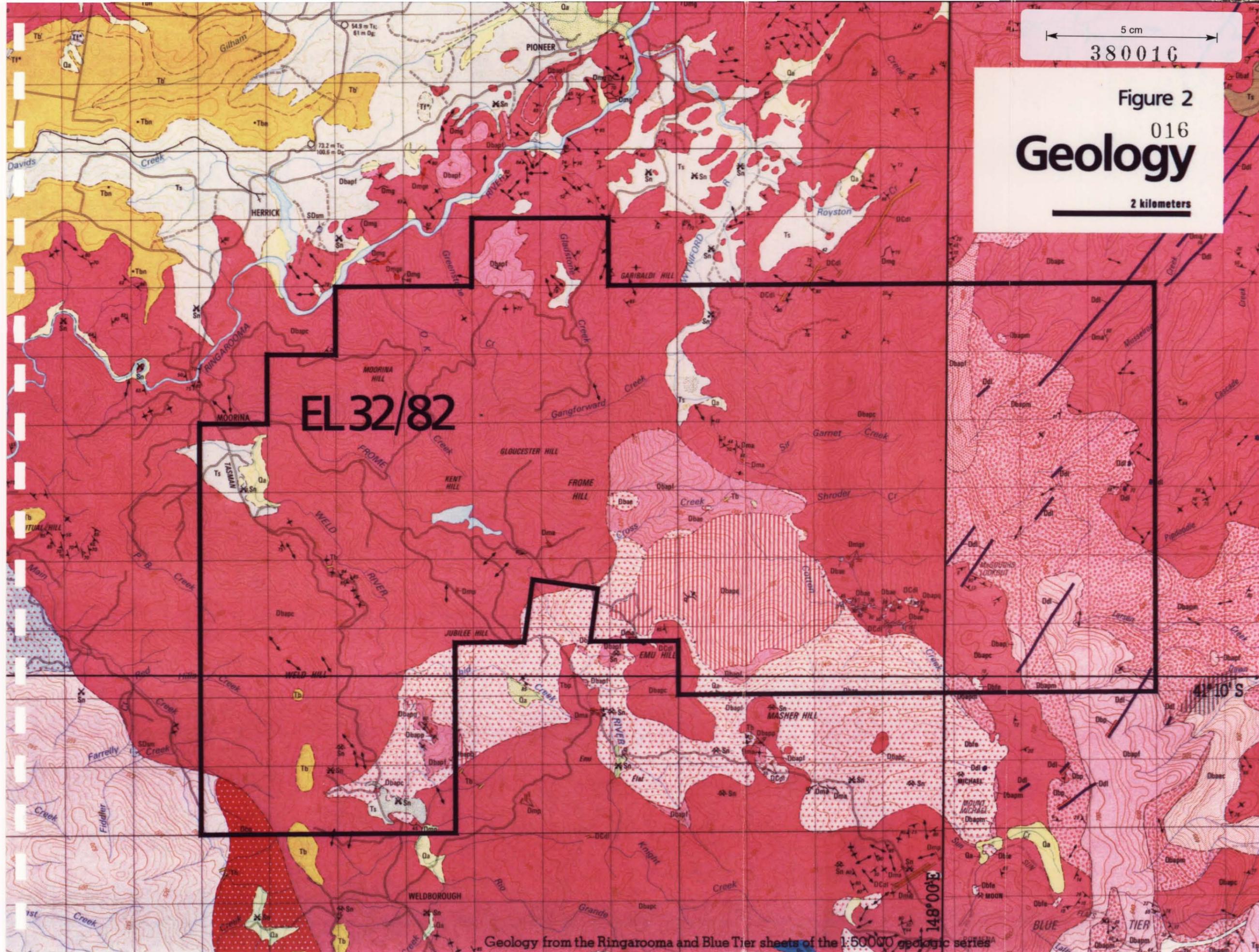
Large tracts of the Aberfoyle exploration licence remained unexplored and as no systematic exploration had been conducted by previous workers Amoco staked the ground as it became available late in 1982.

## REGIONAL GEOLOGY

Upper Devonian granitic rocks of northeast Tasmania crop out over an area of more than 2,500 square kilometers the largest mass being the Blue Tier Batholith.

The granitic rocks have been emplaced into the Mathinna Beds which are the only exposed Paleozoic sedimentary sequence in the area. They are unconformably overlain by Permian and minor Triassic sedimentary sequences. These have been intruded by Jurassic dolerite sills. An extensive cover of Tertiary sedimentary rocks and basaltic lavas exists particularly in the north and northeastern parts of the area.

The Blue Tier Batholith is a composite body varying from early mafic granodiorites to leucocratic granites (Grovers 1977). The plutons have sharp discordant contacts, narrow zones of contact

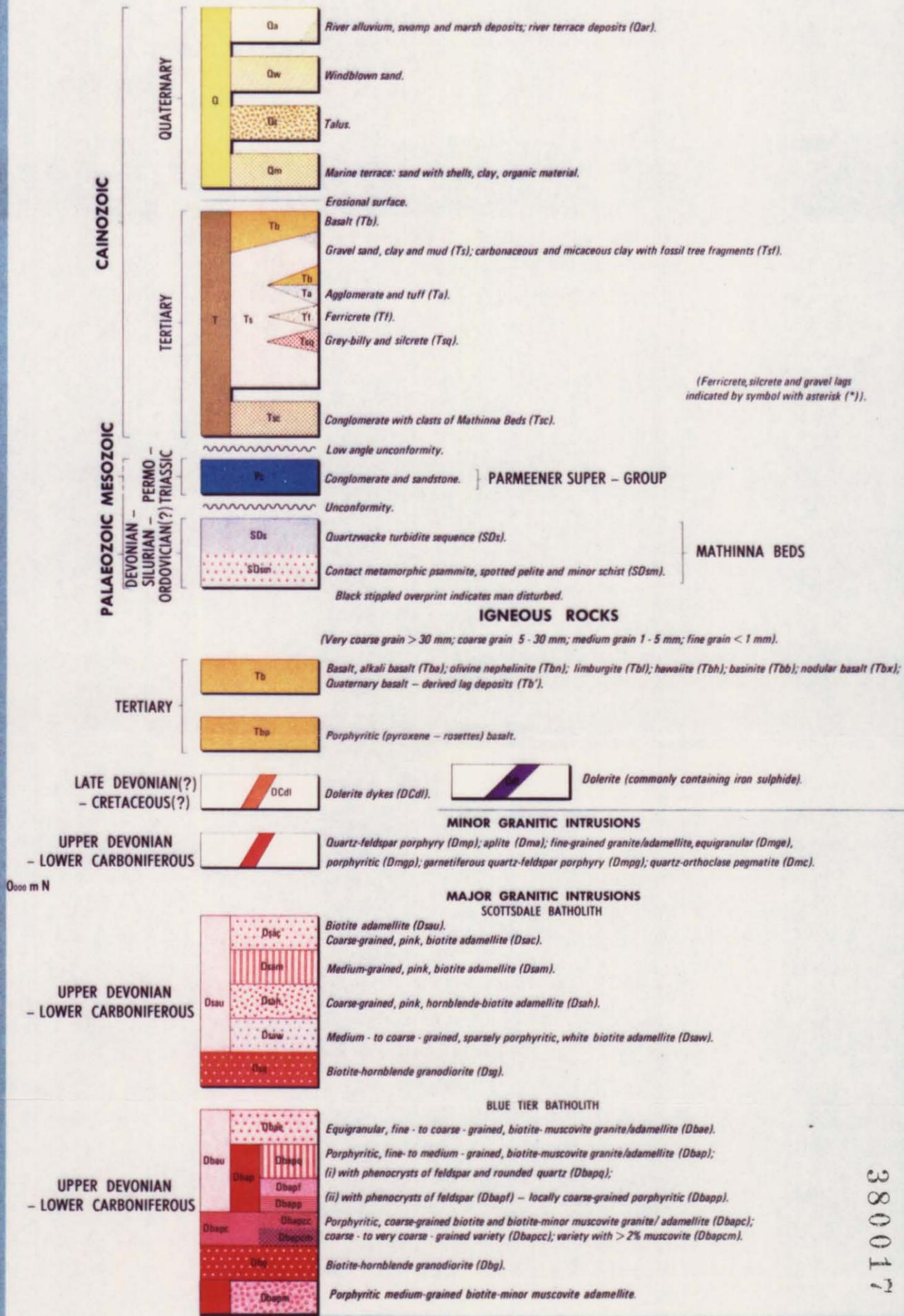


5 cm  
380016

Figure 2  
016  
**Geology**  
2 kilometers

**EL 32/82**

Geology from the Ringarooma and Blue Tier sheets of the 1:50000 geologic series



Geologic legend: Weldborough EL 32/82

018

metamorphism and appear to be high level magmatic intrusions that were generally passively emplaced with minor marginal deformation.

Small bodies of muscovite-biotite granite of sheet like character with associated feeder dikes are the youngest intrusion in the batholith. They are confined to the upper levels of the batholith and tin mineralization shows a marked association with them. Greisenized granites and greisens are generally confined to irregularities in the upper contact of the muscovite-biotite granite sheets where essentially unaltered granite is typified by higher lithium and tin at lower potassium rubidium and magnesium lithium ratios than granite from lower contacts.

#### LOCAL GEOLOGY

Regional mapping by Groves et al in 1977 shows the licence is underlain by upper Devonian porphyritic and coarse grained biotite granite/adamellite - Poimena Pluton (Figure 2). The pluton is the largest in the Batholith occupying about 45% of its surface area and considering its size is remarkably homogeneous. The normal granite/adamellite consists of large K-feldspar phenocrysts generally about five centimeters in length in a medium grained groundmass.

Late stage leucocratic tin granites - Lottah Sheets intrude the older granites in the vicinity of the Cream Creek workings and in an area encompassing both Schroaders and Cotton Creeks. The Lottah sheets are composed of equigranular fine grained muscovite-biotite granites, granite porphyries, leucogranites, aplites, pegmatites and greisens. The greisens typically consist

of aggregates of quartz and muscovite with minor albite. They are coarser grained ( up to four millimeters average grains size) than the greisenized granites and almost invariably contain abundant coarse grained fractured cassiterite crystals. Pale green biotite and carbonate are present in some greisens and topaz is more common than muscovite. Minor chalcopyrite, bornite, molybdenite and fluorite may be present.

There are a large number of small dike like bodies of acid and basic composition that intrude the major granitic rocks within the licence.

Extensive Tertiary and Quaternary deposits blanket much of the licence area many of which have been actively explored and worked by small concerns.

A major lineament is observed trending northwest from the Anchor Mine to the Weld River which Renison Limited have named the Crystal Hill Lineament. A number of major workings lie along or in close proximity to this basement structure.

## MINERALIZATION

Tin mineralization within the Blue Tier Area occurs as three distinct types:

- 1 Steeply dipping greisen veins or pipes in tin bearing granite
- 2 Flat lying greisen sheets in tin bearing granite
- 3 Quartz and quartz greisen veins in porphyritic adamellites

Of these mineralization styles the capped greisen sheets have the greatest tonnage/grade potential to be economically attractive. The flat lying greisen sheets (greisenized granite and greisen) occur sub parallel to the roof contact of fine grained muscovite - biotite tin granites (Lottah Sheets - Grove 1977) with the overlying porphyritic biotite granite/adamellite (Poimena Pluton Groves 1977). The contact of the two granites is sharp and is usually marked by a barren zone of pegmatite. Significant tin

mineralization (coarse grained cassiterite) roughly overlaps the limit of greisenization and is associated with minor molybdenite, chalcopyrite and fluorite. The major deposit of this type is at the Anchor Mine and other smaller bodies include the Crystal Hill, Liberator, North Liberator, Don, Australia, Summit, Mount Michael, New Moon and Ken Deposits.

The greisen sheet deposits appear to be local enrichments controlled by structural irregularities (Crystal Creek Lineament-Renison) in the roof of the tin granite sheets. Greisenization is attributed to the development through extensive fractionation of a water saturated melt in which tin, fluorine and other incompatible elements are concentrated.

WORK CONDUCTED BY AMOCO

Work conducted during the period January 1984 to June 1984 entailed further stream sediment/panned concentrate and minor rockchip geochemical surveys as well as minor magnetic susceptibility surveys.

Analytical Techniques

Regional stream sediment and panned concentrate samples were dried at 40°C prior to being despatched to Analabs, Tasmania for preparation and assay. An orientation survey was conducted to ascertain where the majority of tin resided and to evaluate the usefulness of -80 mesh sampling (Table 1). Samples were analyzed for copper, lead, zinc, silver, arsenic, tin barium and gold.

Analysis for basemetals, arsenic and gold was by AAS after hydrochloric acid digestion and tin and barium by XRF.

TABLE 1 - TIN VALUES (PPM)

Sample	Sample A	+20	+40	+60	+80	-80
102801	4	x	x	6	8	32
102802	9	5	20	13	16	25
102903	8	3	7	13	12	22
102804	10	x	4	10	39	1.5
102805	4	x	x	4	3	327
102806	5	x	x	3	x	x
102807	x	x	x	x	x	x
102808	8	8	6	7	x	7
102809	15	3	14	18	17	24
102810	9	x	x	x	3	131
102811	36	91	10	24	16	28
102812	61	10	227	519	222	65
102913	7	7	63	86	100	421
102814	53	13	46	55	88	426
102815	34	4	35	39	45	35
102816	34	19	46	96	125	91
102817	3010	31	217	177	347	462
102818	1560	13	13	61	186	134
102819	5480	30	277	1110	2820	1250
102820	1.80%	1060	1.86%	5390	2120	589
102821	93	14	27	38	174	338
102822	12	9	17	60	80	71
102923	75	5	31	84	95	51
102824	64	25	40	39	28	31
102825	2.47%	888	1343	272	127	49
102826	161	20	45	164	1170	2380
102827	87	6	13	13	I.S	170
102828	1070	10	151	98	91	71
102829	4.63%	40	33	33	100	572
102830	852	166	63	145	123	111
102831	476	196	268	290	320	360
102832	2630	39	73	128	528	382
102833	124	38	41	52	I.S	874
102834	130	796	70	115	220	517
102835	312	6	26	452	1070	471
102836	x	5	14	27	24	31
102837	x	x	x	x	4	7
102838	22	I.S	x	x	x	3

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Rockchip samples were dried prior to being crushed and pulverized and analyzed for an additional eight elements, manganese, nickel, cobalt, bismuth, molybdenum and cadmium by AAS and antimony and tungsten by XRF.

Check assays on every twentieth sample were carried out by Amdel in Adelaide.

#### Stream Sediment Geochemistry

A regional stream sediment program collecting 37 stream sediment and panned concentrate samples was completed over the northeast and southwest portions of the exploration licence (Enclosure 2).

An orientation survey was conducted on all the stream sediment samples assaying the +20, +40, +60, +80 and -80 mesh fractions. A number of individual samples throughout assayed strongly and the -80 mesh fraction proved to be the consistent indicator. The -80 mesh plus the panned concentrate values are the only results reported (Enclosure 2) and the complete results are included *Enclosure 2.* (Appendix 1).

It was also noted that anomalous tin values had associated anomalous copper-zinc geochemistry. This is corroborative evidence for minor chalcopyrite (plus sphalerite?) occurring within the sheeted and vein greisens as observed at Cream Creek and Schroaders Creek.

Eleven samples were taken from Mussebroe Creek in the northeast the results were of tenor (<35 ppm tin) with the exception of sample number 102805 assaying 327 ppm tin. This spurious sample was not reproduced in any other size fraction or the panned concentrate.

Nineteen samples were taken from the southwest portion of the licence (Weld Hill/Tallevant Creek) where consistently high tenor results were obtained. A number of percentile panned concentrate

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values were obtained along with strongly anomalous stream sediment values from streams draining into the Weld River between the Tasman Highway. Broad spaced soil traverse lines are planned to define this area further.

A further seven samples were taken from elsewhere within the EL 32/82 returning weak to moderate values within the -80 mesh fraction (60-426 ppm). Further sampling will help to define the anomalous drainage.

#### Rockchip Geochemistry

*Appendix 1* Four composite rockchip samples of quartz-muscovite greisenous material were taken from locations near to Schroaders Creek (Enclosure 2). Tin values ranged from 435 ppm to 0.24% with associated minor copper and zinc values. Wide spaced traverse lines are proposed to bedrock sample the area being drained by the highly anomalous Schroaders, Garnet and Cotton Creeks.

#### Geophysics

Fourteen samples of barren host rock and mineralized rock were collected and checked for magnetic susceptibilities (Table 2). Results show that no distinction can be readily observed between barren or mineralized material hence an airborne magnetometer survey would prove useless as an economic indicator.

TABLE 2 - MAGNETIC SUSCEPTIBILITY

ROCK NAME	MAGNETIC SUSCEPTIBILITY					
C Grn Biotite Granite	-	0.1	0.1	0.1	0.1	0.1
C Grn Biotite Granite	-	-	0.1	0.1	0.2	0.1
Porph. Lamprophyre	-	0.1	0.1	-	0.1	0.1
C Qtz, alt. Biotite Granite	0.1	0.1	0.1	0.1	0.1	0.1
M Grn Biot, Musc Granite	-	-	-	-	-	-
M Grn Musc, Biot Granite	-	-	-	-	-	-
C Grn Biotite Granite	-	-	0.1	0.1	-	0.1
M Grn Biotite Granite	-	0.1	0.1	0.1	0.1	-
C Grn Biotite Granite	-	-	-	-	-	-
Porph Biotite Granite	-	-	-	-	-	-
Greisen	-	0.1	0.1	0.2	0.1	0.1
Greisen	0.1	-	0.1	-	-	0.1
Greisen	-	-	-	-	-	-
Greisen	-	-	-	-	-	-

#### EXPLORATION POTENTIAL

The majority of the Weldborough licence is underlain by the Poimena Pluton however minor zones of leucocratic tin granites - Lottah Sheets crop out as windows beneath the barren overlying pluton. Further tin mineralized sheets may exist at shallow depth as discovered at the Anchor Mine, especially in the geochemically high anomalous area between Schroaders and Cotton Creeks, Weld Hill and Tallewang Creeks. There is good potential for locating large tonnage greisen hosted deposits amenable to open pitting and assaying from 0.2% to 0.4% tin.

## PROPOSED PROGRAM

The search for Anchor type greisen hosted tin deposits is made difficult as they are located immediately beneath a roof of older granite therefore they have little surface expression. The use of normal geochemical soil techniques may be unsuccessful if no leakage has taken place from the greisen systems. The low sulfide content of the mineralization has little surface geophysical expression and conventional geophysical surveys would appear to be of limited value.

On this basis the proposed program will include the completion of a stream sediment/panned concentrate survey over the remainder of the tenement as well as completing broad spaced soil geochemical lines in the Schoaders Creek/Cotton Creek and Weld Hill, Tallewang Creek areas. The traverse lines are to be geologically

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mapped and rockchip sampled in conjunction with the bedrock  
sampling survey.

SIGNED : *P.A. Jones* for .....

P.A. JONES

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AMOCO MINERALS AUSTRALIA COMPANY

EXPENDITURE FOR THE PERIOD JANUARY 1, 1984 TO JUNE 30, 1984

EXPLORATION LICENCE NO. 32/82

Salaries and Wages	1,581.65
Supplies	53.10
Supplies - maps	24.00
Cookery	-
Field Office Rent	21.57
Field Supplies	111.32
Freight	38.95
Aircraft Charter	-
Travel	181.10
Communications	-
Geophysics	-
Consultants/Contractors	4,813.59
Drilling	-
Assays	3,138.51
Legal Fees	-
Equipment Rental	44.04
Equipment Operation & Maintenance	322.00
Property Payments	430.00
Outside Services	<u>394.04</u>
	11,153.87
Overhead	<u>2,608.62</u>
	<u>\$13,762.49</u>

T.J. CONQUEST

Accountant 220

## APPENDIX 1

? STREAM SEDIMENT GEOCHEMISTRY - Assay results

? ROCK CHIP ONLY

↳ SAMPLES ONLY

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# ANALABS

A division of MacDonald Hamilton & Co. Pty. Ltd.  
52 Murray Road, Welshpool, W.A. 6106

Phone (09) 458 7999

Telex AA92560

ANALYTICAL REPORT No. 4.5 08 2417

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

ORDER No.

PROJECT

Amoco Minerals Australia Coy  
PO Box 949  
North Sydney  
N.S.W. 2060

11889 Welbborough

DATE RECEIVED 15.3.84 RESULTS REQUIRED

No. OF PAGES OF RESULTS

DATE REPORTED

No. OF COPIES

TOTAL No. OF SAMPLES

3 292

STATE OF SAMPLES	PRE-TREATMENT	ANALYSIS					
		REFER TO ANALYSIS SECTION	PREPARATION	METHOD			
U	103151-154			1	Cu Pb Zn Ag Mn Ni Co Bi Cd Mo As Au Sb Sn W Ba		101 303 402 401
C	102801-838(A)			1	Cu Pb Zn Ag As Au		101 303
S	102801-838(B)			2	Sn W		402 401

RESULTS

As Above

TO

RESULTS

TO

REMARKS

1. Weigh
2. Sieve to t20#, t40#, t60#, t80#.

Despatch No. 4804.

STATE OF SAMPLES	ANALYSIS — PREPARATION	ANALYSIS — METHOD
whole core WC	perchloric acid A1	atomic absorption AAS
split core SC	hydrochloric acid A2	x-ray fluorescence XRF
cutting CU	nitric acid A3	spectrophotometry SPEC
rock Ro	aqua regia A4	colorimetry COL
oil SO	nitric-perchloric A5	chromatography CHR
pulp PU	HF mixture A6	titration TTN
water WA	HF under pressure A7	other chemicals means CHEM
issue TI	fusion A8	miscellaneous MISC
stream sediment SS		fluorescence FLUOR
heavy mineral HM		inductively coupled plasma ICP

01 1

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## ANALYTICAL DATA

SAMPLE PREFIX

REPORT NUMBER

REPORT DATE

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26.3.84

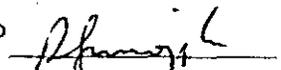
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1 OF 4

TUBE No.	SAMPLE No.		Cu	Pb	Zn	Ag	Mn	Ni	Co	Bi
1	103151	Rlc	5	5	100	X	590	15	10	X
2	103152	Rlc	5	20	160	X	710	15	10	X
3	103153	Rlc	185	5	90	0.5	315	15	10	X
4	103154	Rlc	65	10	165	X	370	15	10	30
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
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24										
25										

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



035

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## ANALYTICAL DATA

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1 OF 1

TUBE No.	SAMPLE No.	Sn	Ba	W	Sb	Ru				
1	103151	435	312	X	X	X				
2	103152	552	236	X	X	X				
3	103153	789	159	X	X	X				
4	103154	2400	311	X	X	X				
5										
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17										
18										
19										
20										
21										
22										
23	DETECTION	3	10	10	3	0.008				
24	DIGESTION									
25	METHOD	402	401	401	401	303				

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

*Refinick*

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## ANALYTICAL DATA

SAMPLE PREFIX

REPORT NUMBER

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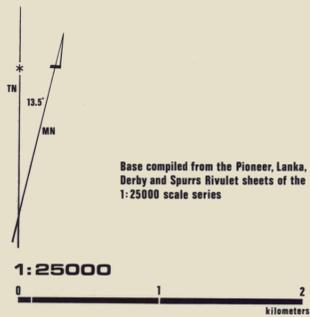
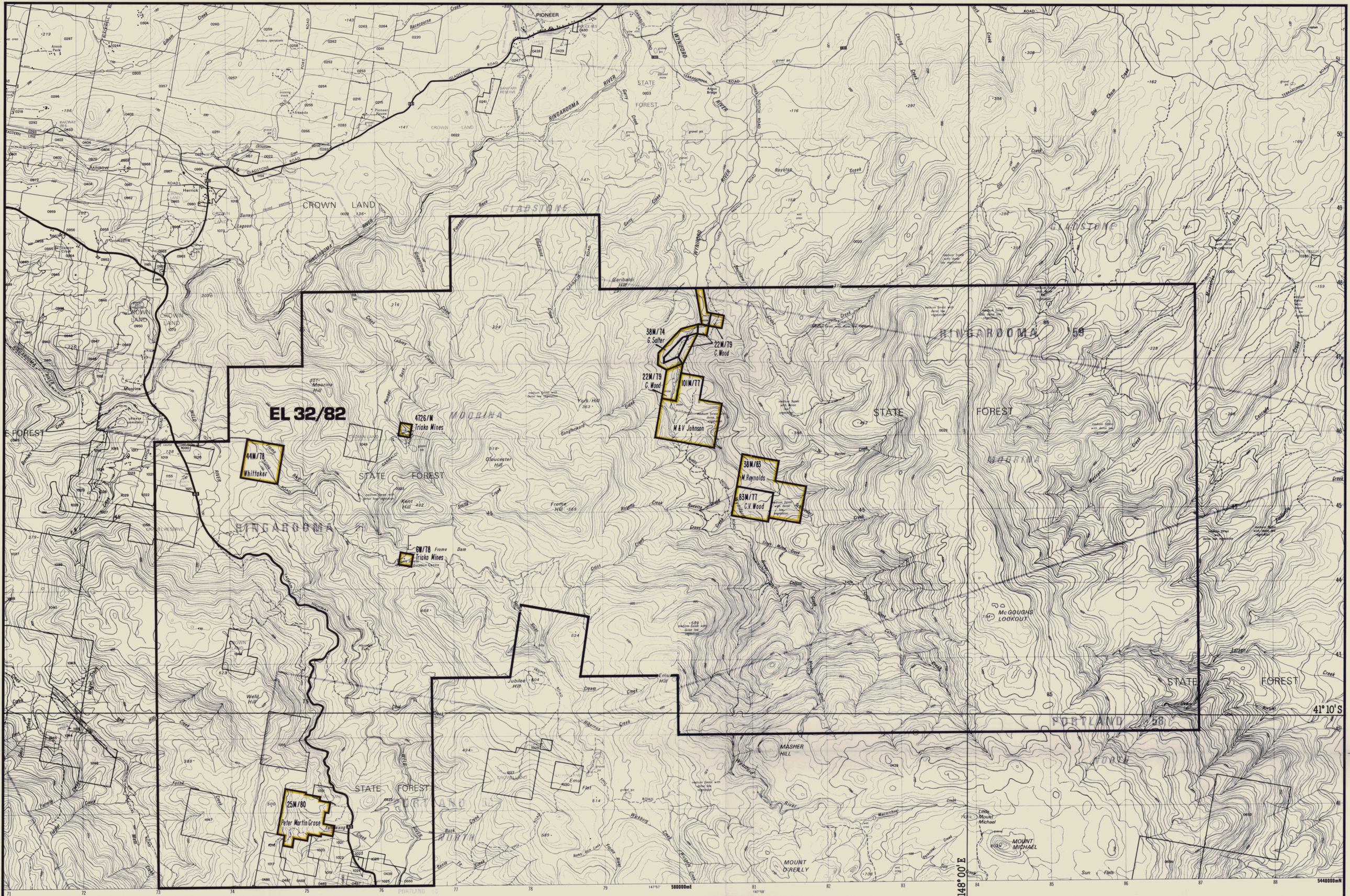
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3 OF 4

TUBE No.	SAMPLE No.	Mo	Pb							
1	103151	X	X							
2	103152	X	X							
3	103153	X	X							
4	103154	X	X							
5										
6										
7										
8										
9										
10										
11										
12										
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15										
16										
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22										
23										
24										
25										

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 R. King



**Note**  
Description of mining leases listed in Report 399

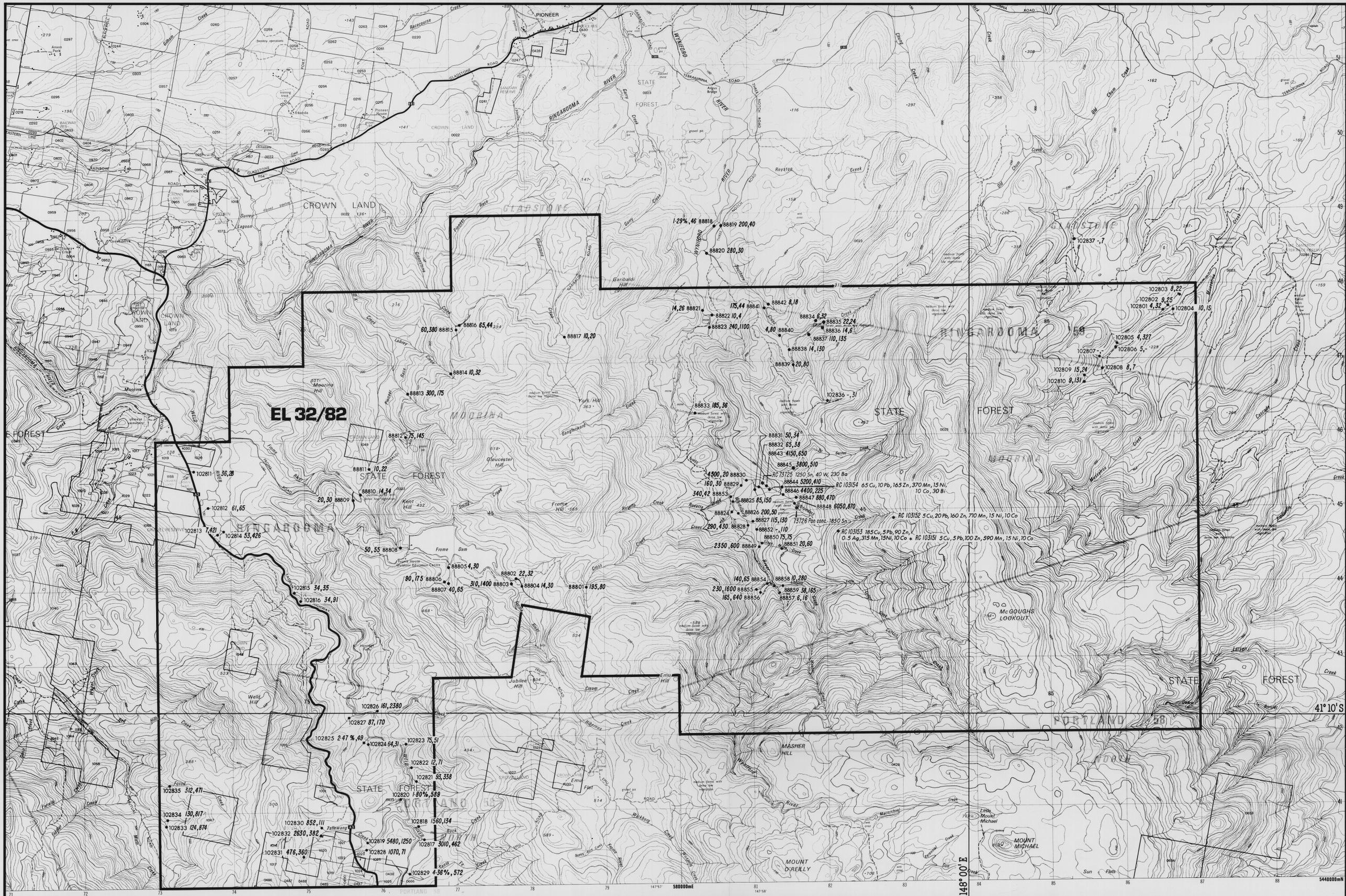


Amoco Minerals Australia Company

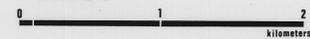
Project	WELDBOROUGH N° A-84.111		
Project Partner	EL 32/82 Weldborough		
<b>MINING LEASE STATUS</b>			
Map Ref. ANG	K-55-4	Latitude	41° 10' S Longitude 148° 00' E
Surveyed	Amoco	Date	1983 Scale 1:25000
Drawn	R. S-K, S. E	Date	1983 Drawing N° M84-2246

380037





1:25000

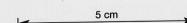


Base compiled from the Pioneer, Lanka, Derby and Spurs Rivulet sheets of the 1:25000 scale series

**Notes**

Sample location and number with tin assay in ppm

- stream sediment assay
- panned concentrate assay
- RC 103162 65 Cu, 10 Co, 30 Bi
- rock chip assay



380038

Amoco Minerals Australia Company

Project **WELDBOROUGH** N° A-84-111

Project Partner

**EL 32/82 Weldborough** 84-2178

**STREAM SEDIMENT GEOCHEMISTRY LOCATIONS & TIN**

Map Ref. ANG K-55-4 Latitude 41° 10' S Longitude 148° 00' E

Surveyed Amoco Date 1983 Scale 1:25000

Drawn R.S.-K., S.F. Date 1984 Drawing N°M84-2245

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