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VALLEY EXPLORATION PTY. LTD.

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Report on Exploration Licence 53/70.

Stanley River

Tasmania.

December 2, 1971.

J.T. Irving.

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SUMMARY:

The area near the Stanley River south of Mt. Livingstone has been subjected to a reconnaissance survey using aerial photography, stream sediment sampling and stream water sampling.

This preliminary prospecting, combined with geological data extracted from earlier reports, gave sufficient encouragement to justify more substantial prospecting in the next season.

It is proposed to make access tracks with a dozer and to costean a number of the ring structures shown on air photographs. In particular, we propose investigating in detail by means of geological mapping and stream sampling, the area near the headwaters of the Paradise Creek.

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 <i>APPENDIX E.L. 53/70 STANLEY RIVER AREA VALLEY EXPLORATION AUGUST 1971.</i>		

INTRODUCTION:

Application for Exploration Licence No. 53/70 was originally made in 1968 and, after a number of submissions for the area of 85 square miles, a portion amounting to 40 square miles was granted as from the 10th of December 1970.

1.1 Location

This Exploration Licence is on the West Central Coast of Tasmania, roughly midway between Renison Bell and Savage River.

1.2 Access

The area is best approached at this exploration stage from Zeehan which is serviced by bitumen roads from Launceston through Burnie, Rosebery, Queenstown to Hobart.

Road Mileages;	Zeehan to Launceston	181 miles
	to Burnie	95 miles
	to Rosebery	17 miles
	to Queenstown	22 miles
	to Hobart	180 miles

The Emu Bay Railway line passes within 100 yards of the South Eastern boundary of the area. Zeehan has a sealed airstrip suitable for light aircraft and is within 40 minutes flying time of Launceston.

There are two vehicular tracks running from Zeehan and Renison Bell to two cage crossings on the Pieman south of the E.L. area. North of the Pieman these tracks become walking tracks, eventually joining at the Stanley Reward workings. There is also a walking track from the Waratah-Savage River road. This traverses the Yellowband Plains and the headwaters of the Harman River, terminating at Mt. Lindsay. It is thought not to have been used for some years now.

1.3 Relief

The area of interest has a high relief and varies from 150 feet (49.4m) elevation at the Pieman River to 3,000 feet (990m) at Parsons Hood. In the south western part the relief is lower due to the presence of several old erosion levels from 1,200 feet

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downwards to the present level of 150 feet (49.4m) at the Pieman River.

#### 1.4 Vegetation

The northern and eastern parts of the area of interest are covered with dense rain forest. The rest of the area is covered by sedges, except for the valleys of the major streams.

The rain forest in the northern and eastern parts is virgin and consists dominantly of beech ('myrtle') and scattered eucalypt. Treeferns, waratah, leatherwood, dogwood, etc. form the undergrowth. Height of the rain forest is 60-80 feet (20-26m). Where the rain forest is relatively undisturbed by timber cutters, such as along the Wilson River, walking is not too difficult - say three to four miles per day. However, where the rain forest is disturbed either by cutting or fire the undergrowth is thicker. This is due to the growth of more eucalypts and dense ti-tree, which makes walking exceedingly slow, perhaps 1 mile per day.

Sedges and heaths cover most of the south west part of the area of interest with the exception of the stream valleys which are covered with eucalypt and ti-tree.

The sedgeland is limited dominantly to Precambrian quartzites. This is partly a result of fire frequency as well as underlying rock type. In some places large tree stumps are visible in the areas of sedgeland. Dense rain forest covers quartzite ridges in other places, such as near the Stanley Reward workings. After burning, erosion probably removes the thin top soil from the quartzite areas, thus limiting regrowth to heaths and sedges.

## 2. PREVIOUS EXPLORATION AND MINING:

The area has been prospected by tin miners from the 1880's at least. There have been two commercial developments in the area; Mt. Lindsay tin mine, and the Stanley Reward alluvial tin mine. Outside these areas prospecting is believed to have been limited to alluvial testing. In many areas the bush is too dense for effective ground prospecting. Furthermore, access has been restricted by the Pieman River to the South and West, and by the dense bush to the North and East.

The small amount of prospecting has centred on Mt. Lindsay in recent times and has been by very small parties on foot or using helicopters.

There was a regional investigation by R.T.Z. about 1955 with air photo interpretation and a couple of traverses. It is understood that there was a recommendation for further investigation of Stanley Reward alluvial and also Mt. Lindsay, however no action was taken. The Mt. Lindsay mining leases were acquired by Dr. Garretty and sold to Aberfoyle Ltd. who reopened the mine and examined this part of the area sporadically for 8 years. They attempted to drive a road from Mt. Cleveland to the area but eventually gave up. Part of the area is still held by this Company.

*11 Good Runy  
works in  
Bett's tract*

### 2.1 Geophysics

In 1955 the area was flown for aeromagnetism by B.M.R. on behalf of R.T.Z. However, there are major reservations by the geophysical section of B.M.R. in the accuracy of the work. There is no other known geophysics of the area.

The aeromagnetic map produced by Rio Tinto Zinc Exploration Pty. Ltd. delineated the known ultrabasic areas, but did not show up anything unusual.

### 3. GEOLOGICAL SETTING:

The area of the E.L. is on the western limb of a major syncline or rift valley. Precambrian basement, (quartzite and schist), forms a stable block or ridge over most of the south western half of the area. A sequence of N.W. trending Cambrian sediments is overlain to the North East by fragmented Ordovician limestone and conglomerates, in turn overlain by Silurian and Devonian (Eldon Group) sediments which include limey beds. A zone of serpentinitised ultrabasics separates the Cambrian and Ordovician, and is roughly conformable. It is presumably intrusive, although it could be an ophiolite lava type sequence. Devonian granite intrudes the succession in the North.

No major faulting is apparent, although the granite shows distinct jointing, again with prominent N.W. direction. The well developed syncline in the Eldon Group to the North East is apparent

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on air photos despite the thick vegetation. A number of ring structures ( $\frac{1}{4}$  mile in diameter or less) have been identified in a narrow zone trending slightly east of north along the Stanley River valley.

One patch of Pre Devonian crystalline dolomite basement of roughly circular expression and about thirty acres in extent was revealed in sluicing operations at the Stanley Reward. (See Geological Survey Bulletin No 15, 'The Stanley River Tin Field' L.L. Waterhouse 1915).

#### 4. WORK UNDERTAKEN AND RESULTS:

##### 4.1 Photogeology

As zoned ring structures were suspected in areas of Precambrian schists and quartzite and also possibly in Cambrian sediments, it was decided to locate these by aerial photography if possible. Numerous experts were consulted. There was no agreement on the best approach, and limited belief in us getting any useful results from the very closely forested areas. It was decided to examine the most likely parts of the area experimentally. Accordingly, we took our own improvised false colour infra red, black and white infra red, (two types of filter), and ektachrome photographs from four 35mm cameras fitted to a light aircraft. These were compared with the black and white enlargements from the Lands and Survey Department and also some false colour multiband infra red photos taken by Qasco on part of the area. The results from these experiments are:-

a) In the Precambrian schist and quartzite there were many ring or arcuate structures showing. These were in a band following the course of the Stanley River, and in many cases, bordering it.

b) No definite rings showed in the Cambrian or more recent rocks.

c) The black and white prints from the Lands and Survey Department showed most of the rings plainly. These could be confirmed by the other films.

d) In densely vegetated Precambrian country the multiband false colour infra red seemed to show much more variation and detail in vegetation changes. These latter might be caused by changes in rock type, local geochemical changes, or changes in micro climate such as soil thickness, access to sun and water etc.

e) Where there was 4 ft. or more of alluvium over a known dolomite outcrop, no ring showed on our films, although multiband did not cover this area.

f) Ektachrome was apparently unsuitable for this work because of exposure sensitivity.

g) Black and white infra red plainly penetrates light cloud and is less affected by shadows.

h) In any future work of this type we could get best results from a combination of ordinary black and white prints for general work and black and white enlargements of false colour infra red 'multiband' in areas of dense vegetation.

#### 4.2 Mineralogy of Sediment Samples

For preliminary regional investigations in this area access limitations forced us to use helicopter support and accordingly, we took a few large samples of main streams. Samples were panned down to 1½ to 2lb concentrates. This would probably give a concentration factor of heavy minerals of something between 12 and 20 to 1. The rivers concerned generally were large and had large watersheds.

Stream samples were examined petrologically and detailed results are shown in Table 3.

The coarse (+10 mesh ) fractions consist of the following (in decreasing order of abundance):-

Quartz

Fine-grained metasediments ('argillite')

Tourmaline

Limonite and Magnetite

Felspar

The heavy mineral fractions consist of the following (in approximately decreasing order of abundance):-

Tourmaline

?Ilmenite

Magnetite

Chromite

Amphibole  
Monazite  
'Limonite'  
Andalusite  
Zircon  
Biotite  
Rutile  
Garnet  
Cassiterite  
Carbonate  
Pyrite  
Sphalerite  
Chalcopyrite  
Spinel  
Corundum  
Gold

The presence of chromite was confirmed by X-ray diffraction. Two other samples with relatively high rare earth content were subjected to X-ray diffraction examination. No other mineral species could be positively identified.

The data above indicate that the source area consists predominantly of argillaceous metasedimentary rocks and quartzites which have been locally thermally metamorphosed and tourmalinized, probably by granitic intrusions. Ultrabasics must also be present. Monazite generally exceeds zircon in amount and this may indicate that much of the monazite has been derived from a source other than the granite.

Some of the mineralogical data has been plotted on the geological and sample location map (Figure 2). The mineralogical data agree very well with the previously known mapping data. Chromite is virtually confined to the eastern half of the area shown in Figure 1., and this agrees with the occurrence of a wide zone

of ultrabasic rocks here. The central area of Crimson Creek Argillites is intruded by probable high level granites in the central part of Figure 1. The strike of this zone is parallel to that of linear structures in the granite, and it is probable that much of the zone is underlain by granite at relatively shallow depth and this would be consistent with the widespread tourmaline.

However, it is noted that in one of the few sample points close to known extensive granitic contact, No. 13 on the Paradise River, no tourmaline is reported.

Sphalerite represented about 2% of Sample No. 9 with a small amount of chalcopyrite. Both sphalerite and chalcopyrite showed visually in Sample No. 13.

The presence of gold in Sample No. 12, (south central), is interesting and suggests granitic mineralisation upstream.

#### 4.3 Geochemistry of Sediment Samples

The heavy mineral fractions (non-magnetic) from most of the samples were analysed by emission spectrography at AMDEL for Th, Ce, La, Y, Be, Nb, Ta, Sr, and in some cases, U. At a later date these were analysed for Pb, Zn and Cu. A few magnetic fractions were also analysed, but negligible amounts of these elements were present. This is to be expected if the magnetic fractions consisted of magnetite. However, the magnetic fractions from samples 9 and 13 contain 3000 ppm Sn, probably due to the presence of cassiterite. This cassiterite could not be detected optically however.

The following conclusions can be made from the analytical data:-

1. The total amounts of rare earths (Ce, La, Y) show a positive correlation with Th (and U to some extent). Th and rare earths are more abundant in samples containing more monazite (e.g. in sample numbers 4 and 10).
2. The ratios of Th:Ce:La:Y in the samples are approximately the same (viz. 1:5:2 5:6).  
This suggests that the elements occur within the one mineral species - monazite.
3. Niobium shows a weak correlation with the rare earths and Th. Samples 4 and 5, in the vicinity of the Stanley Reward workings, contain the highest Nb and they also contain relatively high Sn.

4. Be tends to be highest in the samples containing the highest amounts of rare earths and Th. This is probably indirect because it would normally be correlating with uranium content.
5. Sr is both low and erratic.
6. Nb appears to be independent of Sn.

Some of the chemical and mineralogical features have been plotted on the geological and sample location map (Figure 1).

The most interesting samples are:-

Numbers 4 and 5	Stanley River
Numbers 14 and 15	Northridge Creek

Numbers 9 and 13. (Wilson and Paradise Rivers respectively), show anomalous zinc and copper.

The chemical data indicates that the amount of monazite is approximately;

4%	in Sample 4
1%	in Sample 5
3%	in Sample 10
2%	in Sample 14

The remaining samples contain 1% monazite or less. Monazite from samples 4 and 8 has been analysed A.M.D.E.L. for Th. Both samples (98% pure), contain 6.0% Th by weight.

All the samples were scanned with a scintillometer spectrometer, however, the count rates measured were scarcely greater than background, probably because of the small amount of sample available for testing.

#### 4.4 Geochemistry of Water Samples

To help delineate likely mineralised dolomite areas all samples were analysed for calcium, magnesium and fluorine. The Ca and Mg results fall into two well defined groups with no overlap between the groups

1. The (Ca + Mg) values are either less than 3 or greater than 5 wt %.

2. The Ca:Mg ratios are either less than 1 or greater than 1.5.
3. Samples with (Ca + Mg) values greater than 5% have a Ca:Mg ratio greater than 1.5.
4. Samples with (Ca + Mg) less than 3% have a Ca:Mg ratio less than 1.0.

The significance of these relationships is not understood, but the data when expressed this way, so serve to distinguish empirically between the samples.

The high (Ca + Mg) values all occur in the Harman, Alfred and Upper Wilson Rivers, where the zone of ultrabasic and calcareous Middle Palaeozoic rocks occur. The lower (Ca + Mg) values and lower Ca:Mg ratios occur in the western half of Figure 1, and tend to indicate that large bodies of Ca rich rocks are lacking in this area. The water analyses do not reveal the existence of any relationship between the contents of Ca, Mg and F, and the amount of rare earths in the panned concentrates. The fluorine values are all less than 0.1% and no variation is apparent.

## 5. LITERATURE SURVEY:

An extensive literature survey was carried out for the whole region. Data is roughly divided into structural and mineralogical categories.

### 5.1 Structural Elements

It has been established that there were two major Precambrian blocks in the North West of Tasmania; the Rocky Cape Geanticline, and the Tyennan Block. The margins of these appear to be roughly parallel along a curved arc and about 20 miles apart.

The area between these two appears to be a major syncline or rift valley. Part at least is recognised as a rift valley dating from Cambrian times. Nearly all the significant mines in Tasmania appear to lie along these margins or within the syncline or rift valley.

Intruded through the western anticlinal axis or margin are three Devonian granites - all correctly called adamellites, carrying biotite and monazite, and in some cases, an abundance of fluorite.

It is thought that initial mineralization in dolomites occurred before the present granite emplacement. This could account for some of the complexities of replacement mineralization in some deposits.

The western anticlinal axis between the Heemskirk granite and the Meredith granite, is the subject of E.L. 53/70. In addition to the known circular dolomite outcrop in the Stanley Reward, our aerial photographs have shown 27 ring or arcuate structures - all in the Precambrian schists. They form a narrow band parallel to, and often bordering the Stanley River.

Regarding any potential fears of mining difficulties in this zone, it must be pointed out that there is a narrow ridge about 100 feet high separating the Stanley River and the headwaters of Salmon Creek. It would not be at all difficult to divert the Stanley just upstream of the area of interest.

## 5.2 Mineralogical Information

There is an ultrabasic belt paralleling the western anticlinal axis and showing in some places in the eastern zone. There are belts of diopsidic pyroxene, and in two areas descriptions of biotite pyroxenite. Biotite and phlogopite are commonly reported along with fluorite, apatite, and in a number of cases, peculiar forms of lignite or graphite. Barite is commonly reported in many areas.

Throughout this area, and adjoining the ultrabasic and ultramafic belt there are bodies of 'dolomite' (often magnesite), with magnetite segregations, both containing apatite.

Both igneous apatite and fluorite are known to be major accessories in most mines investigated. The fluorite, or much of it, may be associated with the Devonian granite, but in one mine containing a considerable amount of fluorite there is no known granite within 20 miles horizontally.

Pyrochlore has been reported from rivers draining from the north of our area of interest. We have not been able to substantiate this.

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Anomalous Nb was obtained from samples upstream of the known dolomite outcrop.

Undersaturated rocks are known in this region. Nepheline basalts are ubiquitous. Melilite basalts are known in several areas, and omphacite bearing eclogites and cancrinites are reported nearby.

Ultramafics are reported within the E.L. area as follows:-  
Olivine, diopside, phlogopite, tremolite.

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6. CONCLUSIONS:

6.1 Regional Geology

The literature survey tells us that within the general area of interest, structural and regional geological conditions were suitable for development of generalised alkaline ultramafics.

6.2 Potentially Economic Mineralisation Within this Area

In addition to the obvious base metal and cassiterite mineralization, there may be economic fluorite and rare earths associated with the ring structures observed in this area.

7. RECOMMENDATIONS:

7.1 Preliminary Prospecting

It is proposed to employ two experienced bushwalkers for a geochemical sampling program over accessible ring structures, and also to prepare for improved access by flagging a path for bulldozers out of the Pieman River gorge near the Stanley River entrance, also selecting a suitable area for dozers to construct a crossing of the Stanley. In addition, they could select a suitable site for a landing strip for light aircraft - probably along the western walking track.

It is proposed to have them in the field for six weeks out of an eight week trip. Two suitable geology students have been selected and would start in early December. They could be supplied weekly from Zeehan and samples returned to Melbourne for examination.

Estimated cost with travelling expenses, supervision and assay expenses together with report:- \$5,000.

7.2 Further Prospecting this Season

During the month of February, and sometimes also in March, it is possible to ford the Pieman at a number of locations. It is proposed that we arrange for two bulldozers of about D6 size with winches to be employed for four weeks to cross the Pieman and one run up each side of the Stanley River for the purpose of costeaming any nominated structures and also giving access tracks. They could construct at least one crossing of the Stanley.

This should be under the direction of one geologist with an assistant and two field assistants, They would undertake preliminary field mapping, geochemical sampling and rock sampling.

This work with petrographic analysis, map making, geochemical analysis and report writing should cost about:- \$35,000.

It may be that the preliminary field work will delimit the area to be tested in more detail, and that the cost will be reduced slightly.

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TABLE 1.

## RESULTS OF SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS OF HEAVY MINERAL FRACTIONS

Sample Number	Be (1)	Nb (20)	Ta (100)	Sn (1)	Ce (300)	Th (1000)	La (100)	Y (10)	Sr (50)	U %	Cu	Pb	Zn
1	1	20	X	1200	1000	X	600	2000	X	0.005	5	75	1350
2	1	X	X	400	600	X	200	1200	X	0.005	10	60	1450
2	1	X	X	3000	300	X	200	1000	X	0.005			
3	10	50	X	10000	600	X	300	600	50		85	65	280
4	10	300	X	8000	8000	1000	4000	10000	80	0.075	5	85	55
5	20	100	X	10000	2000	400	800	3000	X	0.01	30	50	45
7	1	20	X	800	1800	400	800	1500	X	0.01	5	80	1250
8	3	X	X	3000	2000	400	1000	2000	X	0.01	5	70	1100
9	1	20	X	10000	X	X	100	100	50		2900	140	14000
10	20	50	X	300	8000	2000	4000	5000	50		10	45	35
13	3	20	X	10000	X	X	100	150	50		2200	125	9000
14	20	50	X	1200	6000	800	3000	3000	X		15	10	150
15	20	X	X	400	1000	400	600	1000	X		10	3	500
15	15	30	X	1500	2000	800	1000	1800	X		5	40	65

MAGNETIC FRACTIONS:

1	1	X	X	150	X	X	X	10	X
2	1	X	X	60	X	X	X	10	X
8	1	X	X	60	X	X	X	15	X
9	X	X	X	3000	X	X	X	30	X
13	X	X	X	3000	X	X	X	10	X

NOTE: Samples analysed by Amdel. Results in ppm. X= below detection limit. Detection limits are given for each element in brackets.

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TABLE 1;

## ADDITIONAL RESULTS OF SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS OF HEAVY MINERAL FRACTIONS

Sample Number	Cu	Pb	Zn	Sn	Nb	Th	Ce	La	Y	Sr
6	5	200	X	10000	100	4000	>10000	>10000	3000	X
11	20	100	1400	10000	20	6000	>10000	6000	10000	X
12	2000	390	6200	8000	X	X	X	100	100	X
17	40	80	120	10000	100	8000	>10000	>10000	10000	X
18	15	520	80	10000	100	>10000	>10000	>10000	10000	X
19	10	190	65	10000	100	>10000	>10000	8000	8000	X

Results in ppm;

X- below detection limits quoted (See Table 1 proper)

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TABLE 2

ANALYTICAL RESULTS FOR WATER SAMPLES

Sample Number	Ca	Mg	F	Ca:Mg	Ca + Mg
S1	4.0	2.7	<0.1	1.48	6.7
S2	4.0	1.6	"	2.50	5.6
S3	3.7	1.9	"	1.95	5.6
S4	0.4	0.7	"	.57	1.1
S5	0.5	0.9	"	.55	1.4
S6	0.4	0.9	"	.44	1.3
S9	4.4	1.9	"	2.32	6.3
S11	0.4	1.2	"	.33	1.6
S12	1.5	1.6	"	.94	3.1
S13	0.4	0.7	"	.57	1.1
S14	0.7	1.3	"	.54	2.0
S15	0.8	1.3	"	.62	2.1
S16	0.7	1.3	"	.54	2.0
S17	0.7	0.9	"	.78	1.6
S18	0.7	1.3	"	.54	2.0
S19	0.5	0.6	"	.83	1.1

NOTE: Samples analysed by Sampey Exploration Services.

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TABLE 3

## MINERALOGICAL COMPOSITION OF PANNED CONCENTRATES

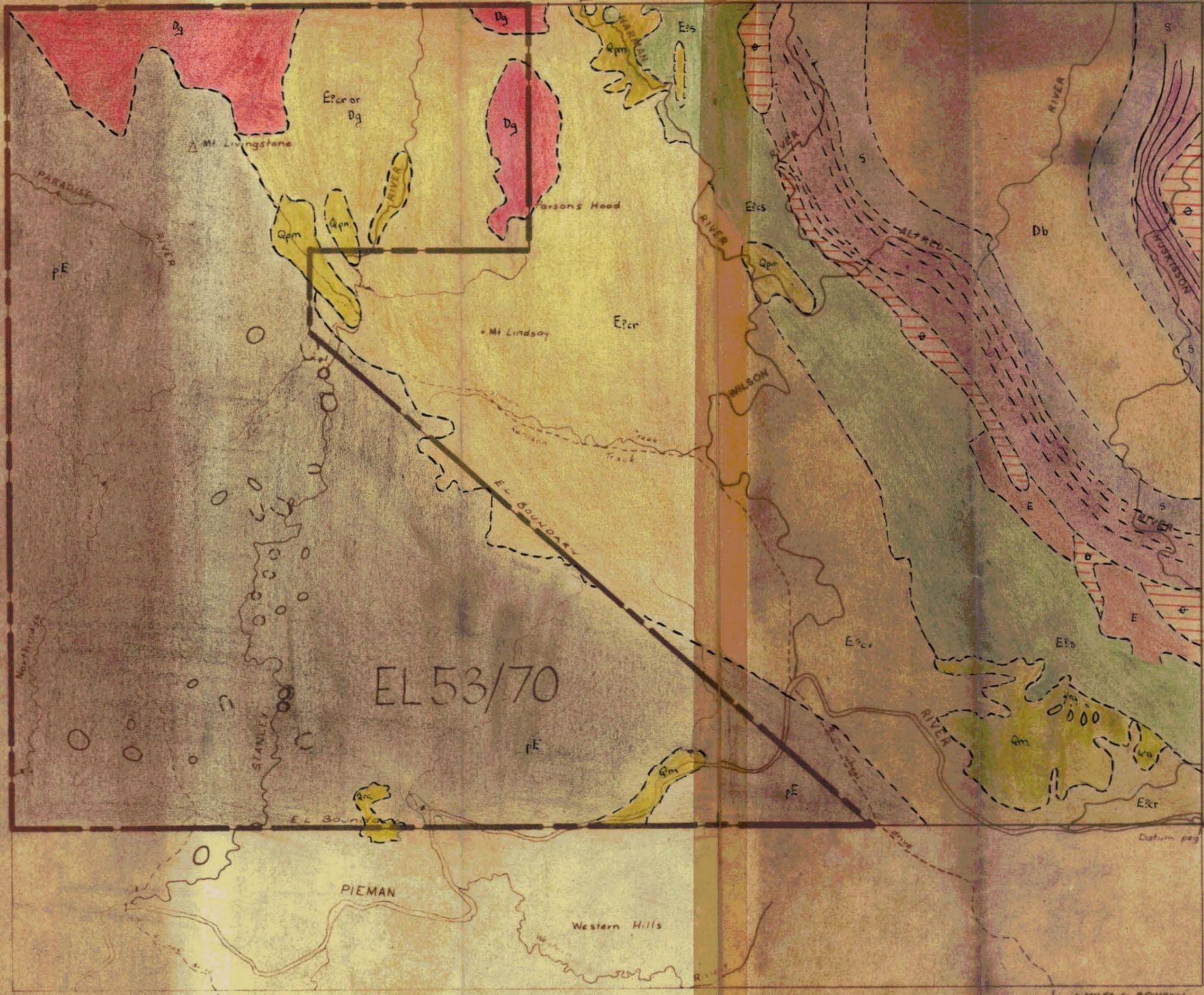
Sample 1	Oversize:	quartz metasediment magnetite  limonite	ilmenite chromite heavy silicate (tourmaline, hornblende) limonite monazite zircon gamet rutile cassiterite magnetite
Sample 2	Oversize:	quartz metasediment	ilmenite apromite limonite tourmaline amphibole monazite zircon garnet rutile
Sample 3	Oversize:	metasediment	ilmenite limonite tourmaline hornblende chromite monazite zircon cassiterite rutile
Sample 4	Oversize:	tourmaline quartz	ilmenite tourmaline monazite zircon cassiterite rutile
Sample 5	Oversize:	tourmaline quartz limonite	tourmaline limonite andalusite ilmenite monazite zircon cassiterite rutile pyrite

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Sample 6	Oversize:	felspar quartz metasediment	andalusite ilmenite tourmaline zircon chromite rutile monazite cassiterite corundum
Sample 7	Oversize:	quartz magnetite metasediment	ilmenite chromite hornblende tourmaline monazite zircon rutile garnet
Sample 8	Oversize:	quartz chromite magnetite limonite	chromite ilmenite tourmaline monazite zircon rutile
Sample 9	Oversize:	quartz felspar metasediment	ilmenite chromite sphalerite zircon cassiterite rutile Chalcopyrite monazite
Sample 10	Oversize:	tourmaline quartz	tourmaline andalusite monazite zircon garnet rutile corundum
Sample 11	Oversize:	quartz felspar metasediment	tourmaline ilmenite chromite andalusite cassiterite zircon monazite rutile spinel
Sample 12	Oversize:	felspar quartz metasediment	ilmenite chromite tourmaline zircon monazite cassiterite andalusite gold

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Sample 13	Oversize:	Metasediment quartz felspar	limonite ilmenite sphalerite altered silicates hornblende pyrite Chalcopyrite monazite zircon
Sample 14	Oversize:	quartz felspar metasediment	tourmaline ilmenite monazite zircon andalusite rutile cassiterite
Sample 15	Oversize:	tourmaline quartz	ilmenite amphibole monazite zircon chromite rutile cassiterite zircon
Sample 16	Oversize:	Shale/schist	tourmaline ilmenite monazite zircon rutile cassiterite
Sample 17	Oversize:	schist quartz	ilmenite chromite tourmaline hornblende zircon carbonate cassiterite
Sample 18	Oversize:	quartz black tourmaline shale minor diorite minor granite minor limonite minor feldspar	tourmaline ilmenite hornblende monazite
Sample 19	Oversize:	quartz black tourmaline minor feldspar minor green tourmaline	tourmaline ilmenite monazite zircon cassiterite garnet.



LOCATION DIAGRAM

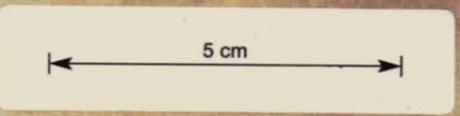
REFERENCE:-

GEOLOGY		
QUATERNARY	Qa	Alluvial Soils
	Qm, Qpm	Moraine
DEVONIAN	Dg	Quartzite + Shale
	Dg	Granite
SILURIAN	S	Quartzite, slate, siltstone
ORDOVICIAN	O	Ordovician limestone + conglomerate
CAMBRIAN	Eps	Igneous, ultrabasic rocks
	Epcr	Crimson Creek argillites
	Eg	Conglomerate
	E	Judith slates + tuffs
PRECAMBRIAN	pE	Quartzite + schists

REFERENCE

- Rings interpreted from Lands Dept 47 photos
- Rings interpreted from Waace 10 photographs
- <sub>36</sub> Rings apparent on 35mm photographs
- - - Tracks
- River or creek
- △ Trig station

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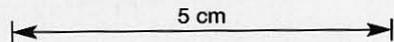


SCALE 1:63,360



**VALLEY EXPLORATION PTY LTD**  
**EL 53/70**  
**STANLEY RIVER AREA, TASMANIA**  
 Plan Showing  
**POSSIBLE RING STRUCTURES**  
 AND SAMPLE SITES  
 Prepared by  
**SAMPEY EXPLORATION SERVICES**

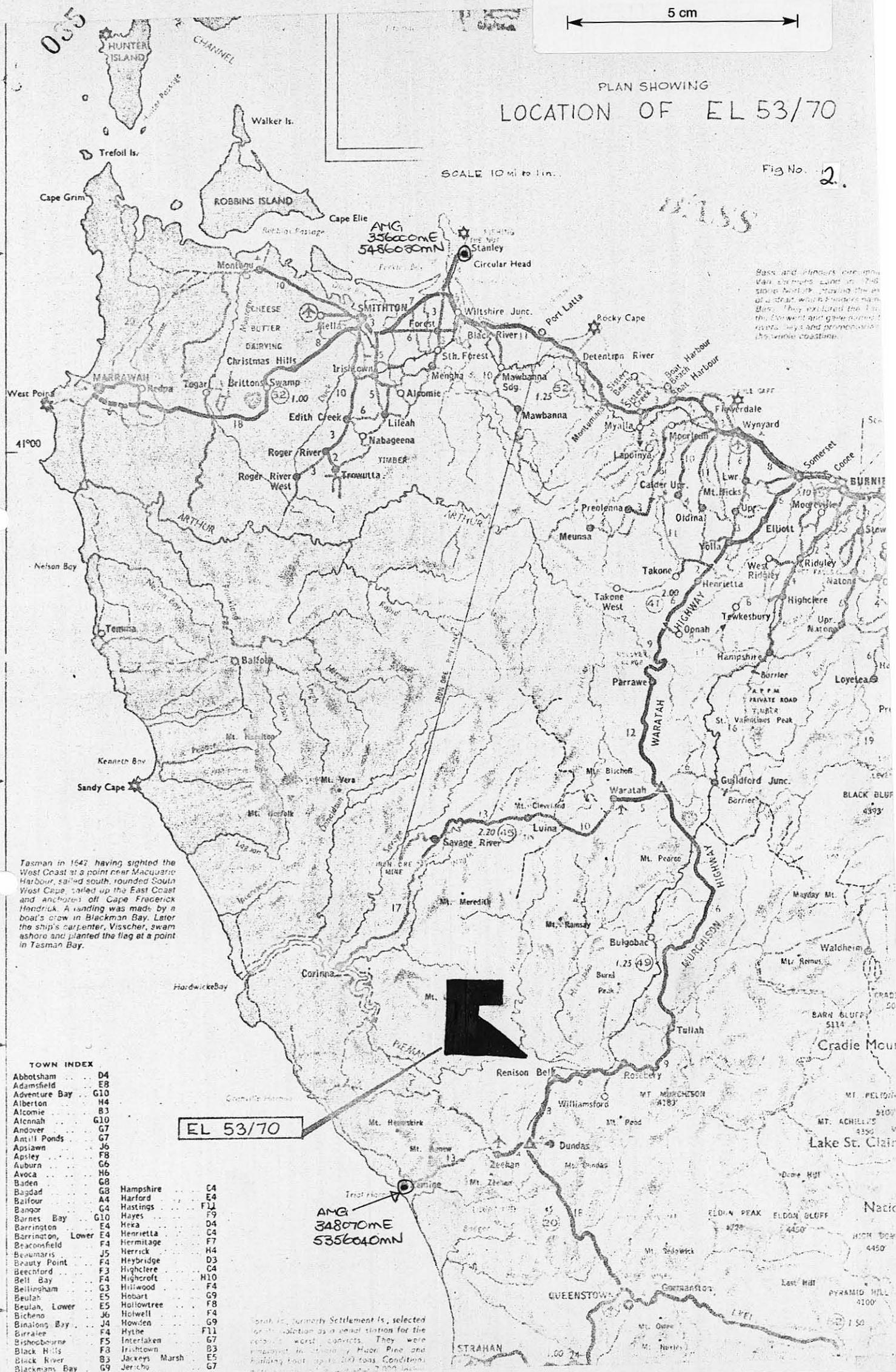
DRAWN M M	APPROVED	Fig. No
PLAN No 427STR-014	DATE JULY 1971	1



PLAN SHOWING LOCATION OF EL 53/70

SCALE 10 mi to 1 in.

Fig No. 2



Tasman in 1642, having sighted the West Coast at a point near Macquarie Harbour, sailed south, rounded South West Cape, sailed up the East Coast and anchored off Cape Frederick Hendrick. A landing was made by a boat's crew in Blackman Bay. Later the ship's carpenter, Visscher, swam ashore and planted the flag at a point in Tasman Bay.

TOWN INDEX

Abbotsham	D4
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Adventure Bay	G10
Alberton	H4
Alconie	B3
Alcannah	G10
Andover	G7
Antill Ponds	G6
Appiawn	F8
Auburn	G6
Avoca	H6
Baden	G8
Bagdad	G8
Balfour	A4
Bangor	G4
Barnes Bay	G10
Barrington	E4
Barrington, Lower	E4
Beaconsfield	F4
Beaumaris	J5
Beauly Point	F4
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Bellingham	G3
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Herrick	H4
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Highclere	C4
Highcroft	H10
Hillwood	F4
Hobart	G9
Hollowtree	F8
Holwell	F4
Howden	G9
Hythe	F11
Interlaken	G7
Irishtown	B3
Jakeys Marsh	E5
Jericho	G7

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AMG REFERENCE POINTS ADDED

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E.L. 53/70

APPENDIX

Stanley River Area  
Valley Exploration

SUMMARY

Panned concentrates were collected from stream sediments in the area of Exploration Licence 53/70. Heavy mineral fractions from the samples have been examined mineralogically and chemically.

The mineralogical data agree with the previously known geological data from the area. The main minerals of economic interest are monazite, cassiterite, gold, and possibly other rare earth minerals. The chemistry of the monazite indicates a non-carbonatite origin, but its origin remains unexplained.

The area definitely warrants further investigation. The source of the monazite and the nature of the ring structures in the area should be investigated, and the presence of other economic minerals should be examined. Further exploration would involve systematic sampling of the Stanley River, and examination of the ring structures, followed by mineralogical and chemical analysis of heavy mineral fractions.

A proposal and estimated cost for further exploration of the area is given.

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Sedges and heaths cover most of the south west part of the area of interest with the exception of the stream valleys which are covered with eucalypt and ti-tree.

The sedgeland is limited dominantly to Precambrian quartzites. This is partly a result of fire frequency as well as underlying rock type. In some places large tree stumps are visible in the areas of sedgeland. Dense rain forest covers quartzite ridges in other places, such as near the Stanley Reward workings. After burning, erosion probably removed the thin top soil from the quartzite areas, thus limiting regrowth to heaths and sedges.

## 2. GEOLOGICAL SETTING

### 2.1 Geology

Little detailed geological work has been undertaken in the area of interest due to poor access. Mapping was carried out by Rio Tinto geologists in the mid-fifties, and more recently by D.I. Groves, of the Tasmanian University.

The area of the E.L. application is on the western limb of a major syncline or rift valley. Precambrian basement (quartzite and schist) forms a stable block or ridge over most of the south western half of the area. A sequence of north west trending Cambrian sediments is overlain to the north east by fragmented Ordovician limestone and conglomerates, in turn overlain by Silurian and Devonian (Eldon Group) sediments which include limey beds. A zone of serpentinitised ultrabasics separates the Cambrian and Ordovician, and is roughly conformable. It is presumably intrusive, though it could be an ophiolite lava type sequence. Devonian granite intrudes the succession in the north of the area and is believed to be the source of the tin, arsenic, copper, silver lead zinc mineralisation in the Zeehan-Renison-Rosebery area to the south east. Consequently it may underlie the whole area at relatively shallow depth.

No major faulting is apparent, though the granite shows distinct jointing, again with a prominent N-W direction. The well developed syncline in the Eldon Group to the north east is apparent on air photos despite the thick vegetation. A number of ring structures ( $\frac{1}{2}$  mile diameter or less) have been identified in a narrow zone trending slightly east of north along the Stanley River valley (see our report dated 7th July, 1971). These have not yet been ground checked.

One patch of crystalline dolomite basement was revealed by tin sluicing operations during working of the Stanley Reward area (Geo. Survey Bull. No. 15 Tas. Dept. Mines).

## 2.2 Mineralisation \*

There is no known mineralisation within E.L. 53/70. However alluvial tin was worked at Stanley Reward and lode tin is known at Mt. Lindsay, east of the area. The tin is almost certainly related to the Devonian granite compared with Renison and Mt. Cleveland.

Diamonds have been reported from the Pieman River.

Monazite and one or two occurrences of pyrochlore have been recorded in streams just north of the area of interest and in the Stanley River.

Traces of pyrite were observed in pebbles of slate in the Wilson River.

*These samples  
not necessarily on  
E.L. area. - per  
Common. *

## 3. WORK DONE AND RESULTS

### 3.1 Work Undertaken

A series of 19 panned heavy mineral concentrate and water samples were taken from various streams in the area.

Sediments for panning were selected from gravel beds in the active stream channels where heavy minerals were likely to be already partially concentrated by natural stream processes. The stream sediments tested varied from fine sand to cobble size and were screened through a  $\frac{1}{4}$ " (7.5 mm) aluminium sieve before panning. Samples collected averaged half to three-quarters of a pound (0.23 - 0.34 kg). The time taken to collect each sample varied, but averaged about two hours.

\* The source of this information cannot be remembered but will be forwarded when available.

Nothing of interest was found in the plus ¼" (7.5 mm) fraction. However, the sieve was useful in quickly obtaining material of suitable panning size.

Heavy mineral concentrates were obtained from the panned samples by bromoform separation. The heavy mineral fractions were examined microscopically and selected samples were analysed semiquantitatively by emission spectroscopy for Sn, Th, Ce, La, Y, Sr, Be, Nb, Ta by AMDEL. Water samples were analysed for Ca, Mg and F by Sampey Exploration Services. Monazite fractions were separated from samples 4 and 8 and submitted to AMDEL for determination of the thorium content.

### 3.2 Mineralogy of Sediment Samples

The coarse (+10 mesh) fractions consist of the following (in decreasing order of abundance):-

Quartz

Fine-grained metasediments ('argillite')

Tourmaline

Limonite and magnetite

Felspar

The heavy mineral fractions consist of the following (in approximately decreasing order of abundance):-

Tourmaline

?Ilmenite

Magnetite

Chromite

Amphibole

Monazite

'Limonite'

Andalusite

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Zircon  
Biotite  
Rutile  
Garnet  
Cassiterite  
Carbonate  
Pyrite  
Spinel  
Corundum  
Gold

The presence of chromite was confirmed by X-ray diffraction. Two other samples with a relatively high rare-earth content were subjected to X-ray diffraction examination. No other mineral species could be positively identified.

The data above indicate that the source area consists predominantly of argillaceous metasedimentary rocks and quartzites which have been locally thermally metamorphosed and tourmalinised, probably by granitic intrusions. Ultrabasics must also be present. Monazite generally exceeds zircon in amount, and this may indicate that much of the monazite has been derived from a source other than granite.

Some of the mineralogical data has been plotted on the geological and sample location map (Figure 2). The mineralogical data agree very well with the previously known mapping data. Chromite is virtually confined to the eastern half of the area shown in Figure 1, and this agrees with the occurrence of a wide zone of ultrabasic rocks here. The central area of Crimson Creek Argillites is intruded by probable high level granites in the central part of Figure 1. The strike of this zone is parallel to that of linear structures in the granite, and it is probable that much of the zone is underlain by granite at relatively shallow depth and this would be consistent with the widespread tourmaline.

The presence of gold in sample 12 (south central) is interesting and suggests granitic mineralisation upstream.

### 3.3 Geochemistry of Sediment Samples

The heavy mineral fractions (non-magnetic) from most of the samples were analysed by emission spectrography at AMDEL for Th, Ce, La, Y, Be, Nb, Ta, Sr and, in some cases, U. A few magnetic fractions were also analysed, but negligible amounts of these elements were present. This is to be expected if the magnetic fractions consisted of magnetite. However, the magnetic fractions from samples 9 and 13 contain 3000 ppm Sn, probably due to the presence of cassiterite. This cassiterite could not be detected optically however.

The following conclusions can be made from the analytical data:

1. The total amounts of rare earths (Ce, La, Y) show a positive correlation with Th (and U to some extent). Th and rare earths are more abundant in samples containing more monazite (e.g. sample numbers 4 and 10).
2. The ratios of Th:Ce:La:Y in the samples are approximately the same (viz. 1:5:2.5:6). This suggests that the elements occur within the one mineral species - monazite.
3. Niobium shows a weak correlation with the rare earths and Th. Samples 4 and 5, in the vicinity of the Stanley Reward workings, contain the highest Nb and they also contain relatively high Sn. Thus Nb may occur in cassiterite. However, other samples containing similar amounts of Sn contain low Nb, so that it is equally possible that Nb occurs in a different mineral (e.g. columbite).
4. Be tends to be highest in the samples containing the highest amounts of rare earths and Th.
5. Sr is erratic.
6. Sn tends to be more abundant in samples containing appreciable rare earths, but this relationship is not consistent.

TABLE 1

## RESULTS OF SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS OF HEAVY MINERAL FRACTIONS

Sample Number	Be (1)	Nb (20)	Ta (100)	Th (1000)	Sn (1)	Ce (300)	La (100)	Y (10)	Sr (50)	U	Total Rare Earths
1	1	20	X	X	1200	1000	600	2000	X	0.005	3600
2	1	X	X	X	400	600	200	1200	X	0.005	2000
2	1	X	X	X	3000	300	200	1000	X	<0.005	1500
3	10	50	X	X	10000	600	300	600	50		1500
4	10	300	X	1000	8000	8000	4000	10000	80	0.075	22000
5	20	100	X	400	>10000	2000	800	3000	X	0.01	5800
7	1	20	X	400	800	1800	800	1500	X	0.01	4100
8	3	X	X	400	3000	2000	1000	2000	X	0.01	5000
9	1	20	X	X	10000	X	100	100	50		200
10	20	50	X	2000	300	8000	4000	5000	50		17000
13	3	20	X	X	>10000	X	100	150	50		250
14	20	50	X	800	1200	6000	3000	3000	X		12000
15	20	X	X	400	400	1000	600	1000	X		2600
15	15	30	X	600	1500	2000	1000	1800	X		4800

MAGNETIC FRACTIONS:

1	1	X	X	X	150	X	X	10	X
2	1	X	X	X	60	X	X	10	X
8	1	X	X	X	60	X	X	15	X
9	X	X	X	X	3000	X	X	30	X
13	X	X	X	X	3000	X	X	10	X

**NOTE:** Samples analysed by AMDEL. Results in ppm. X = below detection limit. Detection limits are given for each element in brackets.

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TABLE 2

ANALYTICAL RESULTS FOR WATER SAMPLES

	Ca	Mg	F	Ca:Mg	Ca + Mg
1	4.0	2.7	<0.1	1.48	6.7
2	4.0	1.6	"	2.50	5.6
3	3.7	1.9	"	1.95	5.6
4	0.4	0.7	"	.57	1.1
5	0.5	0.9	"	.55	1.4
6	0.4	0.9	"	.44	1.3
9	4.4	1.9	"	2.32	6.3
11	0.4	1.2	"	.33	1.6
12	1.5	1.6	"	.94	3.1
13	0.4	0.7	"	.57	1.1
14	0.7	1.3	"	.54	2.0
15	0.8	1.3	"	.62	2.1
16	0.7	1.3	"	.54	2.0
17	0.7	0.9	"	.78	1.6
18	0.7	1.3	"	.54	2.0
19	0.5	0.6	"	.83	1.1

E: Samples analysed by Sampey Exploration Services.

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TABLE 3

## MINERALOGICAL COMPOSITION OF PANNED CONCENTRATES

Sample 1	Oversize:	quartz metasediment magnetite  limonite	ilmenite chromite heavy silicate (tourmaline, hornblende) limonite monazite zircon gamet rutile cassiterite magnetite
Sample 2	Oversize:	quartz metasediment	ilmenite apromite limonite tourmaline amphibole monazite zircon garnet rutile
Sample 3	Oversize:	metasediment	ilmenite limonite tourmaline hornblende chromite monazite zircon cassiterite rutile
Sample 4	Oversize:	tourmaline quartz	ilmenite tourmaline monazite zircon cassiterite rutile
Sample 5	Oversize:	tourmaline quartz limonite	tourmaline limonite andalusite ilmenite monazite zircon cassiterite rutile pyrite

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Sample 6            Oversize: felspar            andalusite  
                          quartz            ilmenite  
                          metasediment        tourmaline  
                                                     zircon  
                                                     chromite  
                                                     rutile  
                                                     monazite  
                                                     cassiterite  
                                                     corundum

Sample 7            Oversize: quartz            ilmenite  
                          magnetite            chromite  
                          metasediment        hornblende  
                                                     tourmaline  
                                                     monazite  
                                                     zircon  
                                                     rutile  
                                                     garnet

Sample 8            Oversize: quartz            chromite  
                          chromite            ilmenite  
                          magnetite            tourmaline  
                          limonite            monazite  
                                                     zircon  
                                                     rutile

Sample 9            Oversize: quartz            ilmenite  
                          felspar            chromite  
                          metasediment        zircon  
                                                     cassiterite  
                                                     rutile  
                                                     monazite

Sample 10           Oversize: tourmaline        tourmaline  
                          quartz            andalusite  
                                                     monazite  
                                                     zircon  
                                                     garnet  
                                                     rutile  
                                                     corundum

Sample 11           Oversize: quartz            tourmaline  
                          felspar            ilmenite  
                          metasediment        chromite  
                                                     andalusite  
                                                     cassiterite  
                                                     zircon  
                                                     monazite  
                                                     rutile  
                                                     spenel

Sample 12           Oversize: felspar            ilmenite  
                          quartz            chromite  
                          metasediment        tourmaline  
                                                     zircon  
                                                     monazite  
                                                     cassiterite  
                                                     andalusite  
                                                     gold

Sample 13	Oversize: Metasediment quartz felspar	limonite ilmenite altered silicates hornblende pyrite monazite zircon
Sample 14	Oversize: quartz felspar metasediment	tourmaline ilmenite monazite zircon andalusite rutile cassiterite
Sample 15	Oversize: tourmaline quartz	ilmenite amphibole monazite zircon chromite rutile cassiterite zircon
Sample 16		tourmaline ilmenite monazite zircon rutile cassiterite
Sample 17		ilmenite chromite tourmaline hornblende zircon carbonate cassiterite
Sample 18		tourmaline ilmenite hornblende monazite
Sample 19		tourmaline ilmenite monazite zircon cassiterite garnet.

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JOB NO: 4294B

METHOD: Semi-Quantitative Spectrographic Analysis

DATE: 30th November 1971.

Sample No.	Cu	Pb	Zn	Sn	Nb	Th	Ce	La	Y	Sr
6	5	200	X	10,000	100	4,000	>10,000	>10,000	3,000	X
11				10,000	20	6,000	>10,000	6,000	10,000	X
12				8,000	X	X	X	100	100	X
14	15	10	150							
15	10	3	500							
17				10,000	100	8,000	>10,000	>10,000	10,000	X
18				10,000	100	>10,000	>10,000	>10,000	10,000	X
19				10,000	100	>10,000	>10,000	8,000	8,000	X
Limit of Detection	(0.5)	(1)	(100)	(1)	(20)	(100)	(300)	(100)	(10)	(10)

Results in ppm.; X = not detected at limits quoted.

Results are semi-quantitative. Elements apparently present in concentrations of economic interest should be redetermined by an appropriate accurate analytical technique.

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**LABTECH** PTY. LTD.



**ANALYSTS**

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Field Sheet No.:-

Line No.:-

Project/Charge/  
Despatch Note No.:-

C124/7-STR.

Date:-

9-NOV-71

Any queries please quote Lab. Sheet Number:-

42948/1

SAMPLE	CU	PB	ZN
11	20	100	1400
12	2000	390	6200
17	40	80	120
18	15	520	80
19	10	190	65
METHOD	1018	1018	1018

- WHEN ANNOTATING, KEEP IT CLEAR OF OTHER NCR