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Diamond drilling in the Lisle Valley

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Abstract

An attempt was made, by diamond drilling, to intersect the contact between the Lisle granodiorite and the hornfelsed Mathinna Beds near Lisle. The two diamond-drill holes failed to intersect the hornfels, or discover significant mineralisation, but they did provide good intersections of fresh granodiorite and other igneous rocks in the Lisle pluton, with some minor alteration and very weak gold mineralisation in the granitoid.

INTRODUCTION

The Lisle–Denison goldfield lies in the southwestern part of the Mathinna Beds in northeastern Tasmania. The locality and geology of the area are shown in Figure 1.

The Lisle goldfield was discovered in 1878, and produced about 8–9 t (3000 oz) of gold by 1902, mostly from Cainozoic placers in the Lisle valley (Twelvetrees, 1909). The valley is an ovoid basin with a drainage area of only about 20 km^2. The source of the gold is uncertain, despite several small occurrences of primary gold in the area. The gold appears to be closely related to the underlying granodiorite, and may be related to the hornfels-granodiorite contact (Bottrill, 1994).

Two diamond-drill holes were sited on the eastern flank of the Lisle valley (at 527 890 mE, 5 434 704 mN) above some of the main alluvial workings, in an attempt to test the granitoid/hornfels contact.

REGIONAL GEOLOGY

The oldest rocks exposed in the area are the Mathinna Beds, quartzwacke to pelitic turbidite sequences of (?)Ordovician to Early Devonian age, generally correlated with the Melbourne Trough in the Lachlan Fold Belt (Powell and Baillie, 1992). The Mathinna Beds are intruded and locally contact metamorphosed by small granitic to dioritic intrusive bodies, perhaps related to the Scottsdale Batholith, of probable Upper Devonian to Lower Carboniferous age.

The sandstone, quartzite, siltstone and pelite (phyllite and slate) strike 340–360 and are locally hornfelsed close to granitoid bodies. The folding and syntectonic metamorphism (greenschist facies) in the Mathinna Beds are considered to predate the intrusion of the granitoids. The metamorphic aureoles are commonly sharply defined, varying from 800 m to about 5 km in width, depending upon the dip of the contact (McClenaghan *et al*., 1982). Within these aureoles the pelite is commonly spotty and/or hornfelsed, and may contain biotite, andalusite and/or cordierite. A very hard Fe-cordierite (sekaninaite)-rich hornfels (with quartz, feldspars and biotite) makes up much of the rim around the Lisle Valley, and many of the other high ridges in the area.

Geophysical interpretation (Roach, 1994) suggests that a range of granitoid types are present at Lisle, but these are mostly deeply weathered and poorly exposed. Hornblende-biotite-magnetite–bearing granodiorites are present, but more alkali-feldspar rich phases also occur. Small quartz and greisen veins and granitic dykes occur in the metamorphic aureole.

Tertiary sediments and basalt, and Quaternary ironstone and quartz gravel beds, are preserved as remnants of old plateau surfaces in many areas. The river valleys are partly filled with Cainozoic alluvium, which is possibly partly Tertiary in age.

MINERALISATION

The Lisle area is locally highly mineralised, with at least 66 significant known gold deposits within or in close proximity to the area (Bottrill, 1994). About half of these deposits are in lodes, but more than 99% of the gold produced was from the alluvial and residual deposits. The various styles are discussed below.

Gold deposits are widespread in northeastern Tasmania, mostly as gold-quartz veins in the Mathinna Beds. The greatest concentration of deposits occurs in a belt running through the

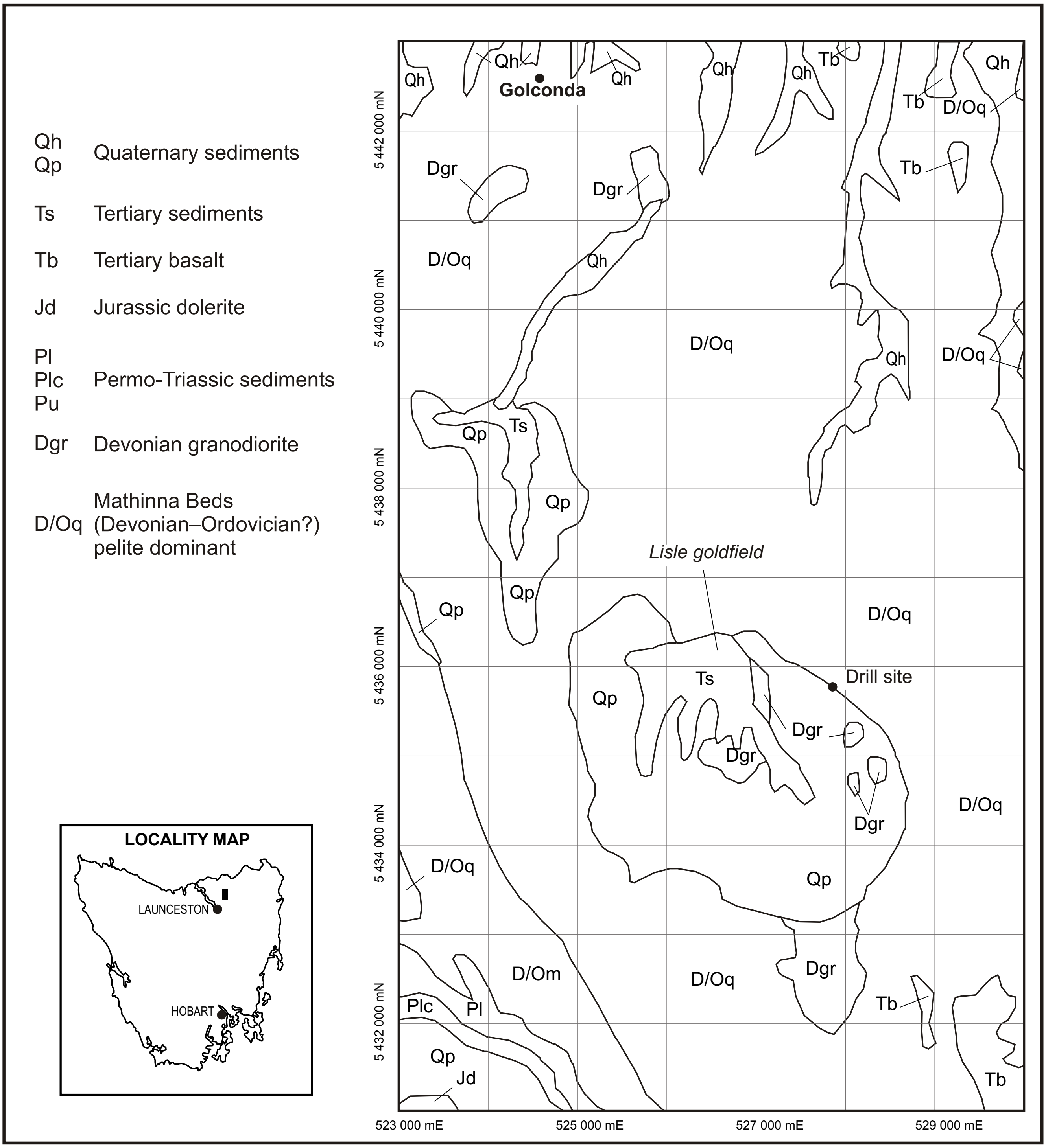


Figure 1

Location and geological map, Lisle area

Mathinna Beds from around Waterhouse, near the north coast, south for about 80 km almost to Fingal (Noldart and Threader, 1965; Bottrill *et al*., 1992; Bottrill, 1992; Taheri, 1992; Taheri and Bottrill, 1994). Other deposits, however, occur with spatial and possible genetic relationships to granitoid intrusions, and include deposits in the Upper Scamander (Hogans Road or Brilliant Creek) and Lisle–Denison areas (Bottrill *et al*., 1992; Bottrill, 1994; McNeil, 1995).

Workings at Lisle were in alluvium and eluvium in the basin-shaped depression, which was considered to represent an old Tertiary lake bed (Reid, 1926; Marshall, 1969) overlying a weathered granitic stock. There were numerous patchy gold-rich horizons in the possibly lacustrine sediments, and in carbonaceous horizons underlying talus, which produced relatively pure, free, angular (crystalline?) gold (Noldart *in* Marshall, 1969). The mineralogy of the gold suggests that some gold is detrital and some secondary (i.e. *in situ* reprecipitation of dissolved gold from groundwater; Reid, 1926; Bottrill, 1986, 1991; Roach, 1991).

Auriferous quartz was relatively rare at Lisle, both in alluvium and bedrock. Twelvetrees (1909) found evidence for gold originating in the contact metamorphosed sandstone of the Mathinna Beds surrounding the basin, near the contact with Devonian granitoid intrusive rocks. Inclusions of mica, rutile and magnetite in the gold grains also suggest that the gold was more likely to have been disseminated in the hornfels or granitoids than in quartz veins, while rare gold-limonite composites in placers suggest gold-bearing pyrite may have originally been present (Bottrill, 1986). Some gold was, however, found in small quartz veins in the granitic rock underlying the alluvial sediments (Thureau, 1882; Montgomery, 1894).

Gold veins in granitoids are poorly represented in Tasmania, and those described at Lisle by Montgomery (1894) consisted of a belt, 1–1.6 m wide with veinlets 6–40 mm wide, striking '076° (magnetic?), dipping 48° NW', in weathered 'granites' in the Titmus and Dodgson Sections. 'A little gold' was apparently recovered from both the veins and granite (Montgomery, 1894).

Thureau (1882) described other veins in 'syenite' as reaching widths of up to 600 mm, and being disjointed by the host rock. He noted 'the whole of the granitoid formation to be traversed by attenuated quartz veins charged with very fine gold'. Thureau (1882) also described weakly gold-bearing, ferromanganese-stained quartziferous formations at the granitoid/hornfels contacts, and the presence of relatively coarse gold with quartz detritus in the vicinity of these contacts. In general, however, quartz veins were rare in the Lisle valley. Disseminated gold in turbiditic greywacke has been described in very similar settings, with quartz-gold veins, in the Meguma area of Nova Scotia, but is very low in grade (Crocket *et al*., 1986).

PREVIOUS MINERAL EXPLORATION AND DRILLING

Previous mineral exploration and Department of Mines studies have been summarised by Bottrill (1994).

The only recorded drilling was undertaken by BP Minerals/Seltrust (Storer, 1985), who drilled 29 percussion holes (to 60 m) in the area to test for gold mineralisation. Only three holes encountered the granitoid/hornfels contact and the gold results were generally poor (<0.06 g/t).

More recent exploration work has been undertaken in the area by Macmin NL (McNeil, 1995), but little of this has been in the Lisle Valley itself.

DRILLING RESULTS

The two holes drilled as part of this study failed to intersect the hornfels, or significant mineralisation, but did provide good intersections of fresh granodiorite and other igneous rocks in the Lisle pluton, with minor alteration and mineralisation.

Thirty-one samples were taken for geochemistry and petrology studies, mostly for signs of alteration and mineralisation (Table 1).

Mineralisation

The only indication of mineralisation encountered in the two drill holes was a small zone of brecciation with minor pyrite from 94.4 to 94.95 m in BH1. This zone contained 0.05 g/t Au, and is associated with quartz-sericite-carbonate alteration; base metals and arsenic are low (Table 2). A zone of similar appearance from 70.15–70.4 m in BH2 contains considerable carbonate, pyrite and chert, but is not anomalous in gold or other elements.

Geochemistry

The results of full, major and trace element analyses by XRF are shown in Tables 2 and 3. Some representative CIPW norms are listed in Appendix 3.

The pink to reddish granodiorite zones are similar in composition to the normal grey granodiorite, except for slightly elevated CO_2 and H_2O contents. The dykes are lower in Fe, Mg and Ti, and higher in Si and K. The xenoliths are the opposite. The rocks, in general, are all very low in Rb/Sr compared with other granitoids from northeastern Tasmania (fig. 3), reflecting their low degree of fractionation, as noted by Roach (1994).

The base metals (except Pb) are mostly slightly anomalous, but closely reflect the contents of Mg, Fe and the other transition metals, and the mafic content of the rocks. They may largely reside in solid solution in biotite, hornblende, magnetite and ilmenite, although some occur as rare sulphides (Cu).

There is no anomalous enrichment in any other element, with the exception of gold in the weakly mineralised zone described above.

Petrology

The petrography is summarised in Table 4. The petrographic analyses (Table 4 and Figure 2) indicate that the major rock types vary from granodiorite to tonalite. The xenoliths plot as quartz diorites and the dykes are adamellite and oligoclase-orthoclase aplite.

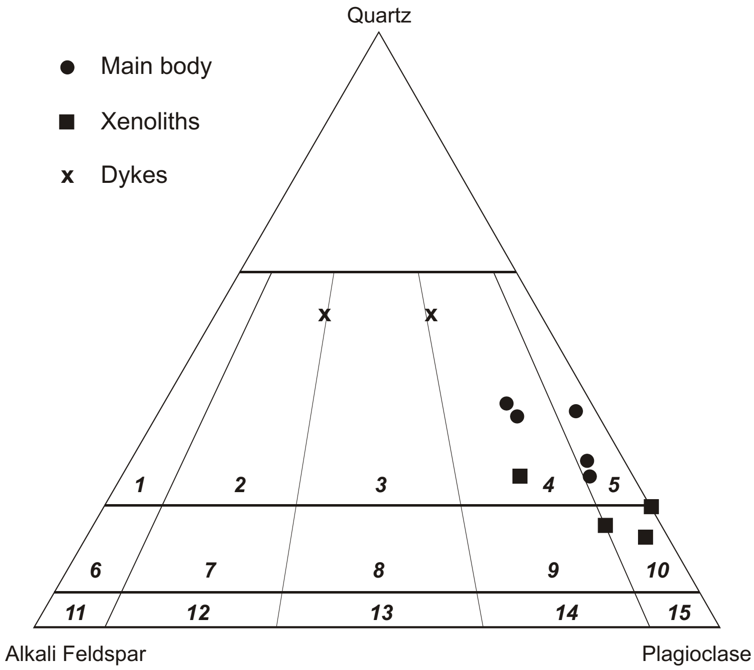
The freshest granodiorite/tonalite contains ~15–45% quartz, 45–65% plagioclase, 4–12% biotite, <10% orthoclase, 2–6% hornblende, <5% sericite and chlorite, <2% magnetite, and <1% ilmenite, leucoxene, epidote, fluorapatite, zircon, monazite, sphene, allanite, rutile, hematite, chalcopyrite and pyrite. The rocks are medium grained, essentially equigranular and non-foliated;

Table 1

Samples from Lisle DDH1 and DDH2

Sample No.	*Depth (m)*	*Description*	*Treatment**
Lisle DDH1			
C102966	82.1–82.5	Reddish granodiorite	CA
C102967	82.3	Reddish granodiorite	PT
C102968	85.85–86.25	White granodiorite	CA
C102969	85.85	White granodiorite	PT
C102970	93.7–94.0	Grey granodiorite	CA
C102971	93.9	Grey granodiorite	PT
C102972	94.3–94.4	Brecciated quartz-pyrite zone	CA
C102973	94.35	Brecciated quartz-pyrite zone	PT
C102974	94.4–94.95	Reddish granodiorite	CA
C102975	94.45	Red/pink/black zone	PT
C102976	94.55	Reddish granodiorite	PT
C102977	95.9–96.1	Pink granodiorite	CA
C102978	96.1	Pink granodiorite	PT
C102979	99.2–99.4	Dark grey xenolith	CA
C102980	99.2	Dark grey xenolith (quartz diorite)	PT
C102981	99.6	Pink granodiorite	PT
Lisle DDH2			
C102963	110.15–110.35	Grey granodiorite with dioritic xenoliths	PT
C102982	65.1–65.26	Grey dioritic xenolith	CA
C102983	66.2–66.45	White granodiorite	CA
C102984	67.4–67.55	Pink granitic dyke	CA
C102985	70.22–70.3	Quartz vein	CA
C102986	88.3–88.6	Aplite dyke	CA
C102987	108.3–109.15	Grey granodiorite	CA
C102988	112.15–112.35	Grey dioritic xenolith	CA
C102989	65.26	Grey dioritic xenolith	PT
C102990	66.3	White granodiorite	PT
C102991	67.55	Pink granitic dyke	PT
C102992	70.25	Pink granodiorite with quartz-pyrite veining	PT
C102993	78.35	Dark grey xenolith (quartz diorite)	PT
C102994	88.3	Aplite dyke	PT
C102995	108.7	Grey granodiorite	PT
C102996	112.2	Dark grey xenolith (quartz diorite)	PT

* CA: chemical analysis PT: polished thin sections



1. alkali-feldspar granite
2. calc-alkali granite
3. adamellite
4. granodiorite
5. tonalite
6. alkali-feldspar quartz syenite
7. quartz syenite
8. quartz monzonite
9. quartz monzodiorite
10. quartz diorite
11. alkali-feldspar syenite
12. syenite
13. monzonite
14. monzodiorite
15. diorite/gabbro

Figure 2

Modal compositions of granitoids, adapted from the classifications of McClenaghan and Williams (1982) and Streckeisen (1973).

Table 2

Minor elements (XRF analyses, ppm), Lisle DDH1 & 2

(a)	903022	903023	903024	903025	903026	903027	903028	903029	903030	903031	903032	903033	903034	903035
(b)	C102966	C102968	C102970	C102972	C102974	C102977	C102979	C102982	C102983	C102984	C102985	C102986	C102987	C102988
(c)	GD	GD	GD	altd. zone	GD	GD	xenolith	xenolith	GD	granite	altd. zone	aplite	GD	xenolith
As	<20	<20	<20	<20	20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Au	<0.02	<0.02	<0.02	0.05	<0.02	0.02	0.02	<0.02	<0.02	na	<0.02	<0.02	<0.02	<0.02
Ba	640	700	650	470	530	650	550	550	740	450	270	580	660	620
Bi	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Ce	76	92	65	63	75	74	98	99	76	80	78	58	80	105
Co	16	17	14	<8	11	15	25	19	13	9	10	<8	12	24
Cu	28	22	19	21	17	20	52	37	30	26	25	26	21	82
Ga	16	16	15	11	16	16	17	37	34	23	10	12	17	17
La	36	38	28	34	36	35	35	36	38	40	35	22	32	42
Mo	12	6	7	5	5	5	<5	<5	9	7	<5	<5	6	<5
Nb	4	4	4	4	2	3	6	8	4	8	3	5	3	6
Nd	25	25	23	22	26	26	33	37	25	<20	26	20	20	38
Ni	32	34	32	22	29	31	44	37	34	23	23	16	31	53
Pb	<10	<10	<10	29	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Rb	79	81	79	105	76	73	78	80	78	100	74	82	74	82
Sc	9	9	9	<9	10	9	20	17	<9	<9	<9	<9	10	20
Sn	<9	<9	<9	33	<9	<9	<9	<9	<9	<9	<9	<9	<9	<9
Sr	320	310	350	87	220	330	330	350	320	220	93	120	340	330
Th	<10	<10	<10	<10	<10	10	<10	<10	<10	<10	<10	16	<10	<10
U	<10	<10	<10	<10	<10	<10	<10	<10	<10	13	<10	12	<10	<10
V	59	59	55	41	49	50	120	91	59	31	30	13	56	125
W	20	<10	<10	12	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Y	15	15	12	12	12	14	28	28	14	13	19	11	13	31
Zn	62	60	59	28	54	57	83	84	57	37	42	18	56	88
Zr	125	130	125	90	120	120	105	125	140	92	63	66	125	80

(a) = Laboratory number; (b) = Registered number; (c) = lithology; GD = granodiorite/tonalite

Table 3

Major elements (XRF analyses) (wt.%)

(a)	903022	903023	903024	903025	903026	903027	903028	903029	903030	903031	903032	903033	903034	903035
(b)	C102966	C102968	C102970	C102972	C102974	C102977	C102979	C102982	C102983	C102984	C102985	C102986	C102987	C102988
(c)	GD	GD	GD	altd. zone	GD	GD	xenolith	xenolith	GD	granite	altd. zone	aplite	GD	xenolith
SiO_2	65.34	66.66	65.47	66.23	64.16	66.05	55.63	58.34	65.66	70.44	66.55	74.12	64.58	55.83
TiO_2	0.56	0.57	0.56	0.38	0.51	0.50	0.79	0.87	0.56	0.30	0.27	0.14	0.56	0.87
Al_2O_3	15.51	15.15	15.67	10.86	15.75	15.43	16.30	17.13	15.68	14.36	8.65	12.89	15.48	16.53
Fe_2O_3	1.58	1.70	1.42	0.92	1.20	1.54	1.74	2.23	1.56	0.94	1.00	0.17	1.41	2.31
FeO	3.05	2.99	3.19	1.39	3.19	2.86	5.48	4.65	3.05	1.85	2.03	1.14	3.05	5.34
MnO	0.07	0.07	0.07	0.10	0.05	0.07	0.15	0.14	0.07	0.03	0.15	0.01	0.07	0.15
MgO	2.33	2.33	2.34	0.79	1.90	2.26	4.55	3.55	2.03	1.20	1.07	0.41	2.32	4.59
CaO	3.88	3.47	4.11	7.32	3.80	3.90	5.90	4.80	3.31	2.42	7.51	1.58	4.07	5.96
Na_2O	4.03	3.76	4.13	1.40	3.31	4.09	3.67	4.40	3.99	4.09	1.42	3.39	4.05	3.86
K_2O	2.30	2.36	1.97	2.41	2.17	2.14	1.95	2.00	2.30	3.14	1.90	4.75	2.07	2.06
P_2O_5	0.05	0.03	0.03	0.03	0.03	0.03	0.07	0.05	0.03	0.01	0.02	0.00	0.05	0.05
SO_3	0.15	0.10	0.10	0.69	0.18	0.09	0.28	0.21	0.18	0.18	1.75	0.10	0.10	0.38
CO_2	0.28	0.14	0.18	6.03	1.86	0.18	1.19	0.15	0.25	0.41	7.23	1.00	0.12	0.21
H_2O^+	1.35	1.00	1.04	1.50	2.21	1.03	2.00	1.32	1.06	0.65	2.04	0.62	0.95	1.98
LOI	1.30	0.81	0.87	7.38	3.72	0.89	2.58	0.97	0.99	0.87	9.06	1.50	0.75	1.62
Total	100.48	100.33	100.28	100.05	100.32	100.17	99.70	99.84	99.73	100.02	101.59	100.32	98.88	100.12

(a) = Laboratory number; (b) = Registered number; (c) = lithology; GD = granodiorite/tonalite

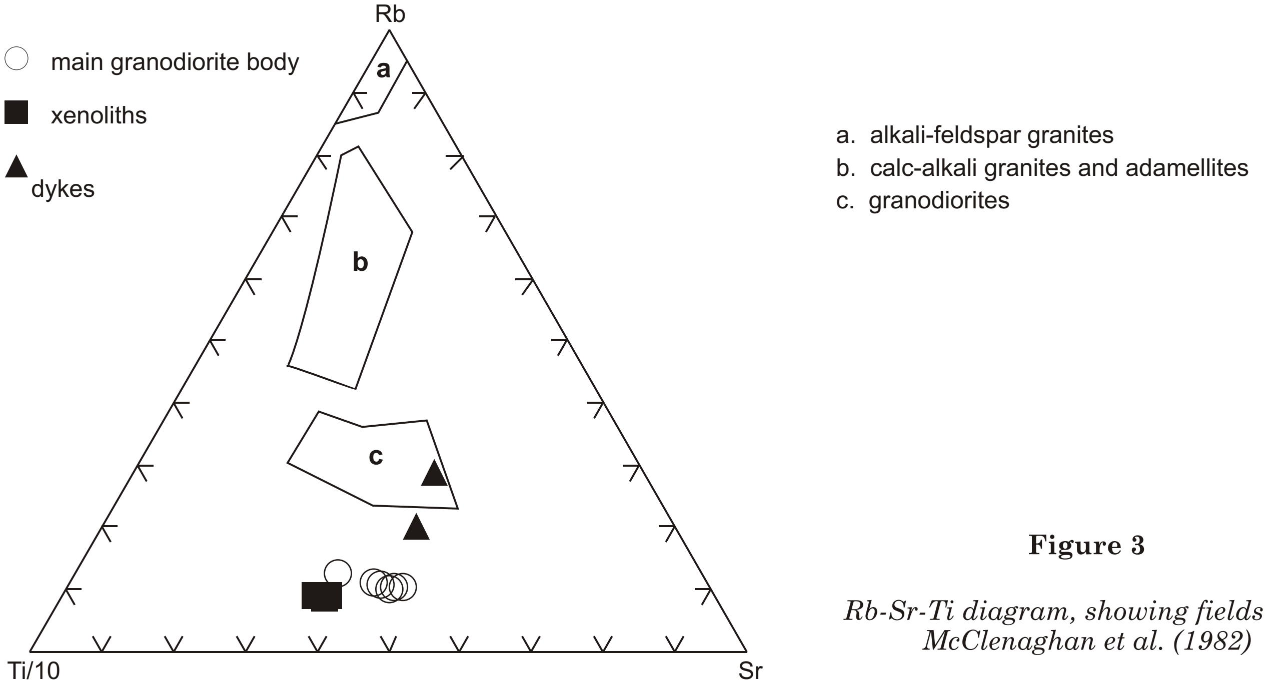


Figure 3

Rb-Sr-Ti diagram, showing fields from McClenaghan et al. (1982)

Table 4

Modal mineralogy, estimated from thin sections (vol. %)

Reg. No.	Lithology	Quartz	Plagioclase	Orthoclase	Hornblende	Biotite	Alteration	Other
C102963	granodiorite	20	55	5	6	12	Minor; chl, ser	py, ccp, mt, ap, ilm, zir, mon, sphene
C102967	granodiorite	25	60	5	3	4	Mod; chl, ser, ep, CO_3, hem, lim	py, mt, ap, ilm, sphene
C102969	granodiorite	30	50	5	5	10	Minor; chl, ser, ep	py, mt, ap, ilm
C102971	granodiorite	30	55	5	3	7	Minor; chl, ser	py, mt, ap, ilm, sphene, allanite
C102973	breccia	75, highly variable					Major; chl, ser, CO_3, lx	py, ilm
C102975	granodiorite	25-30	65	0	2-5	5	Major; chl, ser, CO_3, lx	py, mt, ap, ilm
C102976	granodiorite	30	55	5	5	5	Major; chl, ser, CO_3, lx	py, mt, ap, ilm, sphene
C102978	granodiorite	30	40	10	10	10	Mod; chl, ser, CO_3	py, ccp, mt
C102980	quartz diorite	15	60	0	5	15	Mod; chl, ser, CO_3, lx	py, ccp, mt, ap, ilm, hem
C102981	granodiorite	40–45	30–40	5–10	5	10	Major; chl, ser, CO_3, lx	py, ccp, mt, ilm
C102989	quartz diorite	10	45	5	20	20	Minor; chl, ser, lx	py, ccp, po, mt, ilm
C102990	granodiorite	30	50	2	6	10	Minor; chl, ser	py, ccp, mt, ilm
C102991	adamellite	50	15	30	0	3	Minor; chl, ser, lx	py, mt, ilm
C102992a	breccia	75					Major; chl, ser, CO_3, lx	py
C102992	granodiorite	35	45	5	5	10	Major; chl, ser, CO_3, lx, ru	py
C102993	quartz diorite	15	35	10	25	10	Mod; chl, ser, CO_3	py, ccp, mt, ilm
C102994	aplite	50	30	15	0	5	Mod; chl, ser, CO_3, lx	py, ccp, mt
C102995	granodiorite	30	45	10	5	8	Minor; chl, ser	py, ccp, mt, ilm
C102996	quartz diorite	10	55	2	20	10	Minor; chl, ser, CO_3	py, ccp, mt, ilm, sphene

Abbreviations: py = pyrite; ccp = chalcopyrite; po = pyrrhotite; mt = magnetite; ap = apatite; ilm = ilmenite; zir = zircon; mon = monazite
Alteration: chl = chlorite; ser = sericite/muscovite; ep = epidote; lx = leucoxene; CO_3 = carbonates

the alteration is described below. The plagioclase is zoned (~An_5–An_{40}) and variably sericitised. The hornblende is green-brown and variably altered. The biotite is fine to coarse grained, red-brown and variably chloritised. The orthoclase is relatively coarse grained and poikilitic.

The xenoliths contain 10–15% quartz, 35–60% plagioclase (~An_{20}–An_{50}), <10% orthoclase, 5–25% hornblende, 10–20% biotite, <10% chlorite, <5% sericite, <2% magnetite, 0.5–1% pyrite, and <1% ilmenite, leucoxene, chalcopyrite and pyrrhotite. There is little alteration except for carbonation of the orthoclase. Electron microprobe analyses of the hornblende and biotite are listed in Table 5.

The aplite is orthoclase-rich, but still quartz-plagioclase (~An_{15}) dominant; the plagioclase is relatively altered (to muscovite and carbonate).

The granitic dyke (an adamellite) contains more orthoclase than plagioclase (~An_{20}), and is also quartz rich and mafic poor. It contains both hornblende and biotite. Alteration is minor.

Table 5

Electron microprobe analyses, Cameca SX5, University of Tasmania

Sample No.	C102980	C102980
Description	biotite	hornblende
SiO_2	36.20	49.93
TiO_2	3.61	0.54
Al_2O_3	13.62	4.60
Cr_2O_3	na	0.01
FeO (tot)	20.70	15.56
MnO	0.32	0.68
MgO	11.10	13.14
CaO	0.05	11.47
Na_2O	0.28	0.90
K_2O	9.47	0.41
F	0.24	0.11
Total	95.59	97.35
-O = F	0.10	0.05
Total	95.49	97.30
No. oxygens	22	24
Si	5.59	7.39
Ti	0.42	0.06
Al	2.48	0.80
Cr		0.00
Fe	2.68	1.93
Mg	2.56	2.90
Ca	0.01	1.82
Mn	0.04	0.09
Na	0.08	0.26
K	1.87	0.08
Total cations	15.73	15.33

Alteration

Small zones of quartz-carbonate-sericite-pyrite alteration were observed in the breccia zones noted above. Minor alteration was also noted in other parts of the cores, mostly in the form of red and pink zones. Petrological analysis indicates that these altered zones contain more sericite (<15%), chlorite (<5%) and carbonate (<5%); the forms of alteration are:

plagioclase chlorite, muscovite, sericite and rarely carbonate;

biotite chlorite, muscovite, rutile and carbonate; and

hornblende chlorite, carbonate, rutile and rare epidote.

The alteration probably results from late-stage H_2O-CO_2-rich fluids released during the sub-solidus cooling of the granodiorite. The traces of disseminated sulphides probably also originate at this stage.

CONCLUSIONS

The two diamond-drill holes failed to intersect the hornfels, or discover significant mineralisation, but they did provide good intersections of fresh granodiorite and other igneous rocks in the Lisle pluton, with some minor alteration and very weak gold mineralisation in the granitoid.

The granitoids mostly fall within the granodiorite-tonalite fields, with minor dykes of albite-aplite and adamellite. There are numerous small xenoliths of quartz diorite composition. The granitoids are relatively rich in magnetite and sulphides.

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[7 March 1996]

APPENDIX 1

Logs of diamond-drill holes BH1 and BH2, Lisle

Hole Number:	**BH1**	*Project:*	Netgold
Drilled for:	Tasmania Department of Mines	*Drilled by:*	Tasmania Department of Mines
Logged by:	R. S. Bottrill	*Date:*	6/10/1989
Bearing:	~45° Mag.	*Dip:*	~55° SW
Core Size:	HQ: 0–42.3, NQ: 42.3–100.4 m		
Total Length:	100.4 m	*Recovery:*	~95%
Location (AMG):	527 890 mE, 5 434 704 mN	*Elevation:*	299 m

Depth (metres)	*Description*	*Samples*
0 – 67.95	Bouldery talus and red clay, grading downwards into highly weathered granitic material.	
67.95 – 70.15	Slightly weathered, pale grey, medium-grained, equigranular granodiorite, fresher between 68.6–69.5 m.	
70.15 – 82.1	Granodiorite, pale grey, medium grained, equigranular, with scattered small, medium grey, medium to fine-grained dioritic xenoliths. Slightly weathered between 74.9 and 75.3 m.	
82.1 – 83.4	Red metasomatised zones in granodiorite (especially 82.1–82.5 and 83.25–83.4 m).	82.3 m: C102966, 967
83.4 – 91.95	Slightly bleached and broken zones, especially 83.4–87.65 and 91.6–91.95 m.	85.9 m: C102968, 969
91.95 – 94.0	Grey granodiorite, becoming more mafic towards base.	93.9 m: C102970, 971
94.0 – 94.95	Red, altered, broken zone in granodiorite, with minor sulphide veining at 94.3 m.	94.35 m: C102972, 973 94.45 m: C102974, 975 94.55 m: C102976
94.95 – 95.45	Reddish grey granodiorite, becoming more mafic towards base.	
95.45 – 100.4	Grey granodiorite with dioritic xenoliths. Thin pink zone at 96 and 99.5 m. Relatively large xenolith at 99.2–99.4 m.	96.1 m: C102977, 978 99.2 m: C102979, 980
100.4	EOH	99.6 m: C102981

Logs of diamond-drill holes BH1 and BH2, Lisle

Hole Number:	**BH2**	*Project:*	Netgold
Drilled for:	Tasmania Department of Mines	*Drilled by:*	Tasmania Department of Mines
Logged by:	R. S. Bottrill	*Date:*	6/10/1989
Bearing:	~225° Mag.	*Dip:*	~55° NE
Core Size:	HQ: 0–46.5 m, BQ: 46.5–112.7 m		
Total Length:	112.7 m	*Recovery:*	~95%
Location (AMG):	527 890 mE, 5 434 704 mN	*Elevation:*	299 m

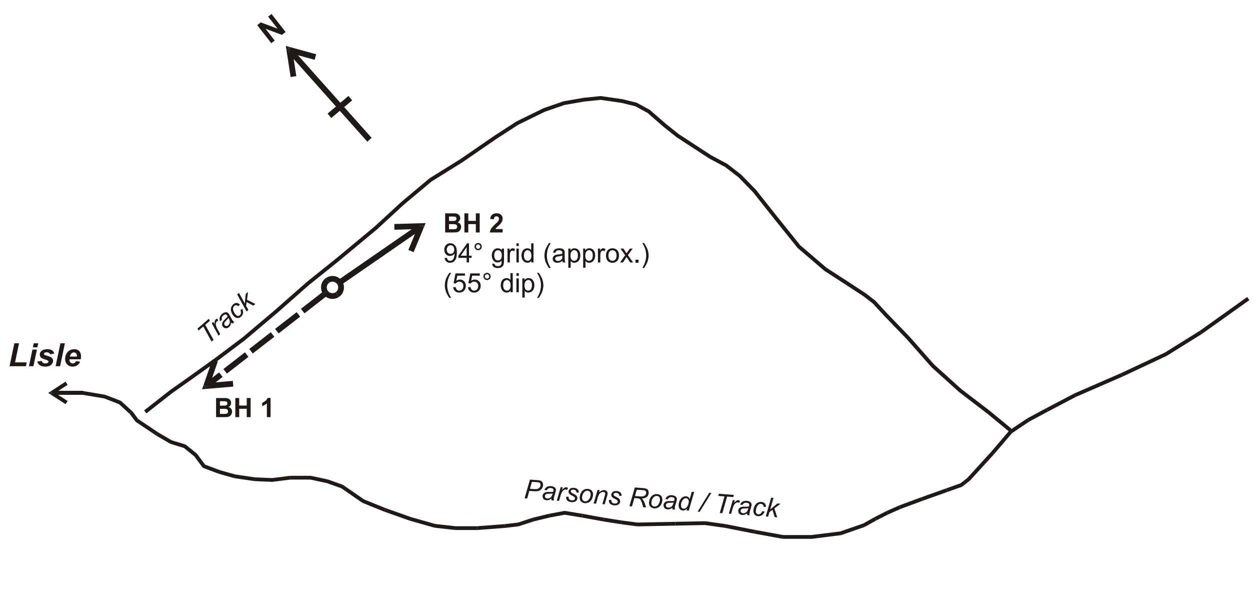
Depth (metres)	*Description*	*Samples*
0 – 63.3	Bouldery talus and red clay, grading downwards into highly weathered granitic material.	
63.3 – 65.9	Granodiorite, pale grey, medium grained, equigranular, with scattered small, medium grey, medium to fine-grained dioritic xenoliths, increasing downwards.	65.2 m: C102982, 989
65.9 – 70.15	Granodiorite, pale grey, medium grained, equigranular. Pink granitic dyke at 67.4 – 67.55 m.	66.3 m: C102983, 990 67.55 m: C102984, 991
70.15 – 70.4	Bleached and broken zone, some oxidation and a pyritic quartz vein. Fault?	70.25 m: C102985, 992
70.4 – 73.7	Grey granodiorite, with red zones at ~73.2 m.	
73.7 – 106.5	Grey granodiorite, with xenoliths. Variably broken, sheared, bleached and weathered zones, especially at: 80.7 – 82.7 83.1 – 85.7 88.3 – 88.6 91.5 – 92.7 100.9 – 103.7 104.6 – 106.4 Pink aplitic dyke: 88.3 – 88.6.	78.35 m: C102993 88.45 m: C102986 99.1 m: C102994
106.5 – 112.7	Reddish grey granodiorite, becoming more mafic and xenolith-rich towards the base.	108.7 m: C102995 109.15 m: C102987 110.25 m: C102963 112.2 m: C102988, 996
112.7	EOH	

APPENDIX 2

Survey data

Borehole Name/Number	Lisle BH No. 2
Date Commenced	4-9-1989
Date Finished	6-10-1989
Easting Co-ordinates	527 890 m
Northing Co-ordinates	5 434 704 m
Height	299.0 m

Height Datum — Contour along flat area on 1:25 000 scale map (Lisle)



SKETCH PLAN

APPENDIX 3

CIPW norms for selected rocks

Sample	C102966 main body: granodiorite/ tonalite	C102979 Diorite xenolith	C102986 aplite
SiO_2	65.3	55.6	74.1
TiO_2	0.6	0.8	0.1
Al_2O_3	15.5	16.3	12.9
FeO	3.1	5.5	1.1
Fe_2O_3	1.6	1.7	0.2
MgO	2.3	4.6	0.4
CaO	3.9	5.9	1.6
Na_2O	4.0	3.7	3.4
K_2O	2.3	2.0	4.8
P_2O_5	0.1	0.1	0.0
MnO	0.1	0.2	0.0
Total	98.7	96.2	98.6
Quartz	20.4	5.8	32.3
Corundum	-	-	-
Orthoclase	13.8	12.0	28.5
Albite	34.6	32.3	29.1
Anorthite	17.7	23.1	6.0
Nepheline	-	-	-
Leucite	-	-	-
Acmite	-	-	-
Na-Metasilicate	-	-	-
Diopside	1.2	5.6	1.6
Diopside (Wo)	0.6	2.9	0.8
Diopside (En)	0.4	1.6	0.3
Diopside (Fs)	0.2	1.1	0.5
Hypersthene	8.8	16.9	2.0
Hypersthene (En)	5.5	10.1	0.7
Hypersthene (Fs)	3.3	6.8	1.2
Olivine	-	-	-
Olivine (Fo)	-	-	-
Olivine (Fa)	-	-	-
Magnetite	2.3	2.6	0.3
Hematite	-	-	-
Ilmenite	1.1	1.6	0.3
Apatite	0.1	0.2	-
Colour Index	13.4	26.7	4.1
Diff. Index	68.8	50.0	89.9