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1. TENEMENT DETAILS

Exploration Licence 76/87 is situated on Tasmania's northeast coast between the towns of St. Helens and Scamander (Figure 1).

The licence was granted to P.F. Mining Shelf (No. 16) Pty Ltd in May 1987, and originally covered 250 km² of which about 40% was offshore. The area was subsequently reduced to 145 km² and ownership transferred to Seabed Resources.

EL 76/87 encloses the 4 km² retention licence RL 8714 held by BHP Co. Ltd.

Details of tenure, access, geology and prospectivity were discussed in a review by Cromer (1988).

2. EXPLORATION PHILOSOPHY

The licence holder's main target is stockwork or disseminated, medium grade — medium volume, gold or silver deposits in granodioritic host rocks in and adjacent to known sites of mineralisation near the southern extremity of the Scamander Tier Dyke.

3. SUMMARY OF PREVIOUS EXPLORATION

The only previous work done by the tenement holder on EL 76/87 was a prospectivity review and limited grab sampling survey by Cromer (1988). The work concentrated on several old Ag-Pb-(Au) prospects which had not received much attention from previous explorers. These included the Scamander [approx. 047093], Scamander Bell — Beulah [041105] and Yarmouth [057144] prospects, within or adjacent to the Scamander Tier Devonian granodiorite dyke. Each had been the site of small-scale mine workings in quartz-silver-lead-(gold) lodes hosted in granodiorite or Siluro-Devonian turbiditic Mathinna Beds. All were abandoned last century.

Further west, the copper workings of the Orieco line of lode [approx. 012138], apparently confined to a narrow shear zone in the Mathinna Beds, have a strike length of several kilometres. The prospects have received considerable attention from explorers — the last in the 1970's — but little work has been done on their gold potential.

4. SUMMARY OF YEAR 2 EXPLORATION

Year 2 exploration included

- (a) a stream sediment survey of the southern part of the Scamander Tier Dyke, and
- (b) prospect-level investigations on the Scamander, Beulah — Scamander Bell, Yarmouth and Orieco prospects. The work included literature reviews, topographic and geological

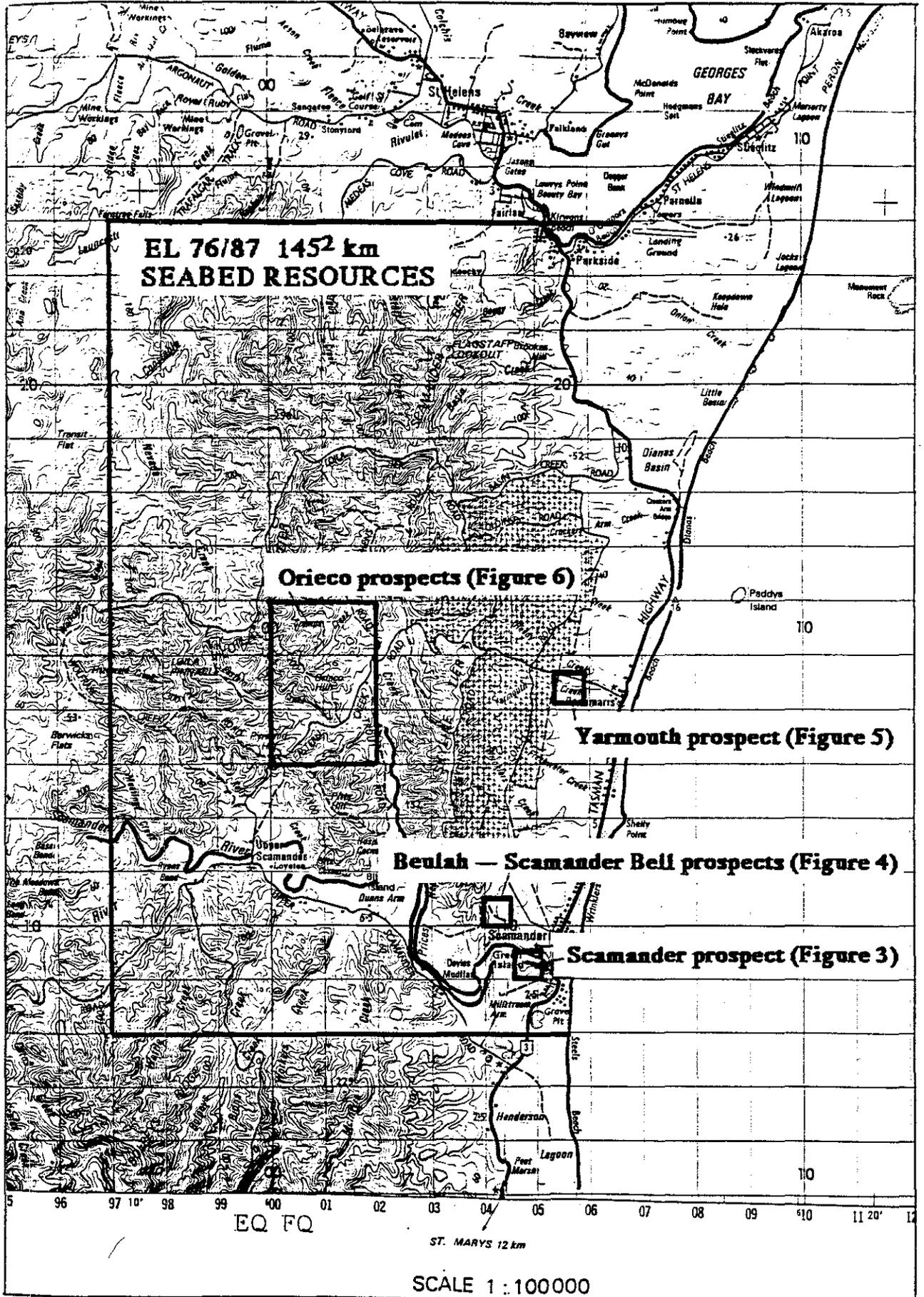


Figure 1. EL 76/87 (1:100 000), showing location of prospects.

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mapping and sampling. (A suitable topographic and geological map was previously available for the Orieco prospects, but some additions were made to the data arising from the present work.)

Results of Year² exploration are presented below. Assay results from all areas are tabled in the following text, and included in Appendix 1 as original laboratory reports. Grid coordinates refer to the 100 000 m square FQ.

5. STREAM SEDIMENT SURVEY

Twenty three stream sediment samples were collected from creeks draining the Scamander Tier. Locations are shown in Figure 2 and assay results summarised in Table 1.

Two kilogram samples were obtained, as close as possible to bedrock, and submitted untreated for assay as bulk samples. At sixteen locations, a duplicate sample was panned down to a heavy concentrate, and retained for in-house examination. Of these sixteen, nine concentrates showed trace amounts of sulphides — probably arsenopyrite. One concentrate (SS11) contained four grains (<100 micron) of possibly silver.

The stream sediment results were not considered encouraging enough to warrant follow-up work.

6. SCAMANDER PROSPECT

6.1 Location and access

The Scamander prospect is situated near sea level on the southern bank of the Scamander River estuary, about 0.5km west of the Scamander township (Figures 1 and 3). Access is good via foot and vehicle tracks.

The old workings are confined to a small area of about 0.5 ha in a steep-sided gully draining northeast to the river. Vegetation is mainly open eucalypt forest.

6.2 Scope of investigations

Prospect work included

- review of literature
- topographic surface and subsurface mapping at 1:1000 with compass, inclinometer and measuring wheel
- geological mapping at the same scale
- rock-chip sampling of surface exposures and the main adit
- 20 assays for Au, Ag, As, Cu, Pb and Zn

6.3 Previous mining history

Mining apparently started at the 'Scamander Silver Mine' about 1886, when a lease was obtained over private land. Soon after, Inspector of Mines Thureau (1886) visited the workings, where surface cuttings had been made over a distance of about 200m on the trace of several silver-bearing quartz veins, and a 24m tunnel driven from creek level in, and

Table 1. Stream sediment survey assay results

	Sample Number	AMG coord.	Panned Concentrate? (* = sulphide)	Au (ppb)	Ag	As	Cu (ppm)	Pb	Zn	
DATA BASE NO ↓	1801	881	[045147]	yes*	<8	<0.5	8	10	20	35
	2	882	[043145]	yes	<8	<0.5	7	20	25	40
	3	883	[044138]	no	<8	<0.5	3	10	20	25
	4	884	[045135]	yes*	<8	<0.5	8	15	20	50
	5	885	[044125]	yes*	10	<0.5	5	20	15	40
	6	886	[046152]	yes*	11	<0.5	5	15	15	30
	7	887	[046154]	yes	20	<0.5	11	15	10	15
	8	888	[029157]	yes	<8	<0.5	14	45	20	70
	9	889	[027156]	yes	9	<0.5	7	25	15	50
1810	8810	[024137]	yes*	9	<0.5	6	30	25	95	
	1	8811	[025127]	yes* + Ag?	11	<0.5	5	25	20	140
	2	8812	[027116]	no	<8	<0.5	3	20	10	30
	3	8813	[026117]	no	10	<0.5	6	250	10	50
	4	8814	[024121]	yes*	11	<0.5	16	30	20	90
	5	8815	[025125]	no	11	<0.5	10	20	30	95
	6	8816	[060144]	yes*	<8	<0.5	7	20	15	50
	7	8817	[045118]	no	24	<0.5	9	25	20	50
	8	8818	[046117]	yes	11	<0.5	3	20	15	25
	9	8819	[040097]	no	26	<0.5	17	20	20	80
1820	8820	[042098]	yes	15	<0.5	9	25	20	55	
	1	8821	[045098]	no	11	<0.5	14	40	35	100
	2	8822	[030108]	yes*	14	<0.5	6	30	15	140
1823	8823	[033103]	yes	11	<0.5	2	15	10	20	

Notes - Each 2 kg sample was dried, and sieved to two fractions: -80# and +80#. The full -80# fraction was then pulverised to -140#, and 50 g (for gold fire-assay) and 30 g splits assayed.
- Locations of all samples shown in Figure 2.

transverse to, the granodiorite dyke which hosted them. Several other mineralised veins were intersected in the drive.

The veins, from 0.15 to 1.2m thick, consisted mainly of quartz, with pyrite, arsenopyrite, galena and sphalerite associated with native silver. The silver occurred disseminated through the sulphides, and as patches and botryoidal clusters in quartz veins. Thureau (ibid.) also reported free gold.

Assays available at the time ranged from 600-6000 g/t Ag and up to 14 g/t Au, presumably from hand-picked samples.

The mine was abandoned by 1893 when Geological Surveyor Montgomery visited the workings. The main shaft (reportedly 40m deep) and a nearby underlay shaft (30m) were both flooded. The adit, which remains accessible today, had been extended to 40m through weathered granodiorite, with a 10m dogleg which ended in 1m of metamorphosed Mathinna Beds at the western contact. The adjacent main shaft does not connect with the adit. A flooded winze about 10m from the entrance connected with the underlay shaft some 14m to the northeast.

Montgomery observed many small quartz veins in the adit, with the 'footwall' of the main lode striking 070 (Mag. ?) and dipping 45 degrees NW.

Assays reported at the time included up to 3600 g/t Ag from quartz veins, and up to 700 g/t Ag from massive sulphides. Montgomery's own sampling of both types of ore returned much lower figures: 100 g/t Ag (and trace Au) from vein quartz, and 120 g/t Ag (and trace Au) from the sulphide ore. These assays complement those from a 50t trial ore shipment returning 100 g/t Ag prior to Montgomery's visit.

The mine was reported on by Harcourt-Smith (1897), who merely repeated aspects of earlier work, and Twelvetrees (1911). Twelvetrees added some of his own assays of arsenopyritic quartz (50 g/t Ag, trace gold).

Production at the mine is unknown, but is unlikely to have exceeded a few hundred tonnes of ore.

No detailed exploration has been carried out at the site since the mine was abandoned.

6.4 Prospect Geology

The most significant feature of the site is a 50-60m wide, sub-vertical dyke of Devonian granodiorite trending about 330° M, intruding Siluro-Devonian turbidites and apparently containing all the mine workings and mineralisation.

6.4.1 *Siluro-Devonian Mathinna Beds*

The Beds are well-exposed at sea level along the Scamander River estuary, especially just east of the mine site (Figure 3). They comprise major interbedded units of predominantly arenite and lutite, in a series of gently north-plunging, inclined similar folds. The units young upwards. Bedding strikes from 330-360°M and dips 55-90° east and west. The arenites consist mainly of indurated sandstone and quartzite.

West of the granodiorite dyke, the Beds are structurally simpler, and consist of uniformly east-dipping units striking about 330°M parallel to the igneous body. Only the more resistant arenites are well-exposed (Figure 3).

Small-scale dilatational fissures filled with milky quartz, which are ubiquitous in the Mathinna Beds throughout north-eastern Tasmania, are common in the arenites at the mine. They trend generally east-west, are un-mineralised, and are apparently unrelated to and predate the mineralised quartz veins in the granodiorite. The fissures are generally less than 2cm wide and 0.5m long, but are sometimes thicker and irregular. They are often in *en-echelon* sets, and occasionally show dextral shear deformation.

6.4.2 *Devonian Granodiorite*

The granodiorite dyke, and a larger granodiorite body on the northern side of the Scamander estuary also hosting Ag-Pb-(Au) mineralisation at the Scamander Bell and Beulah prospects, may be joined in the subsurface to the Scamander Tier Dyke, an elongate, tapering intrusion extending south for 15km from the St. Helens Granodiorite body.

At the mine, the granodiorite is a sub-vertical intrusion with roughly parallel sides, concordant with the structural trend of the Mathinna Beds. It is best exposed in the adit and in

creek sections. In the former, it is a brown, moderately-strongly weathered, even-grained to locally porphyritic rock, showing some clay-filled shears. Fracturing is variable, but prominent joints tend to dip 20-30° west subparallel to mineralised quartz veins. In places, incomplete spheroidal weathering has left relict corestones. An enclosed block of metamorphosed Mathinna Beds slate about 2-3m wide was intersected by the adit.

In creek outcrops near [650225] (Figure 3), at [690310], and as float on hillslopes, the fresh granodiorite is a pale blue-grey, even- and medium-grained rock, locally porphyritic in plagioclase and quartz.

The granodiorite-sediment contact is exposed near the western end of the adit (see inset to Figure 3), and has been approximately located within a metre or two at [640330] and in the creek at [650220]. Elsewhere, its position is inferred from surface float to within about five metres. From its surface trace, and observations in the adit and at the main shaft, the contact is nearly vertical, and igneous rather than faulted.

Metamorphic effects appear minor. The Mathinna Beds show some recrystallisation, and development of closely spaced fracturing and slaty cleavage in lutite horizons. Minor silicification of previously indurated arenites has also occurred. The granodiorite shows only a slight decrease in grain size as the contact is approached.

The dyke is partly obscured by Tertiary(?) gravel south of the workings, and apparently continues NNW beneath the Scamander River. It may be a strike extension of the wider dyke on the north bank, but normal faulting along the river cannot be discounted.

6.5 Mineralisation

Mineralisation at the mine is apparently hosted only in the granodiorite dyke, and seems to be confined within it to a series of shallowly-west dipping quartz lodes near the western contact. At least six lodes are exposed in the adit, and mineralised quartz in the adjacent shaft is probably the strike extension of the most easterly of these (Figure 3). Strike of the lodes varies from 042-135° M, and in plan converge to a point some 20m south of the adit near the contact. This suggests a focus of mineralising fluids and perhaps very limited ore reserves. The lodes dip uniformly at about 45°.

The lodes vary from 0.1-0.8m thick, and consist of milky quartz veins, stringers and patches, often in *en-echelon* and separated by brown, weathered granitic material and clay. The granodiorite between lodes is brown, weathered, porphyritic, irregularly fractured, and apparently barren.

Ore specimens are best collected from the dumps at the entrance to the adit. Mineralisation is patchy and minor, always associated with quartz, and comprise arsenopyrite and subordinate pyrite, chalcopyrite, sphalerite and galena as disseminations, thin wispy stringers, and irregular massive but fine-grained patches. No free silver or gold were observed.

6.6 Sampling and assaying

Twenty samples were collected at the prospect. Fifteen of these were chip samples of quartz veins, or composite chip samples of the intervening granodiorite, from the full length of the adit. Five rock chip samples were collected from the mine dump or adjacent area, and included granodiorite and Mathinna Bed specimens.

All samples were submitted to Analabs (Burnie) for Au, Ag, As, Cu, Pb and Zn assay. Results are presented in Table 2. Sample locations are shown in Figure 3.

Assay results were disappointing, and indicated no further work was warranted at the prospect. Six adit samples returned more than 0.05 g/t Au (range 0.05-0.92 g/t; average 0.27 g/t), all from vein quartz or ore specimens. Twelve of the twenty showed Au at or below the detection limit of 8 ppb. Silver values up to 233 g/t (range 44-233 g/t; average 126 g/t) were returned from the same samples. All were associated with anomalous As (ranging from 1.1-3.7%) and Cu, Pb and Zn.

Background Cu, Pb and Zn values in the granodiorite are about 50-100 g/t, 50-200 g/t and 100-200 g/t respectively. Some higher values probably reflect mineralisation in very minor quartz veins rather than disseminated in the granodiorite itself.

Table 2. Scamander Prospect assay results

Sample Number	Description	Au (ppb)	Ag	As	Cu (ppm)	Pb	Zn
SP1	Adit, 0-6m; Dg	<8	1	120	315	70	140
SP2	Adit, at 6m; vein qtz + Dg	11	5	550	55	1250	60
SP3	Adit, 6-12m; Dg	<8	1	100	70	120	100
SP4	Adit, at 12m; qtz + sulphides	170	167	31000	1075	8200	250
SP5	Adit, 13-15m; Dg	<8	0.5	120	55	60	130
SP6	Adit, 15-17m; Dg	<8	5.5	280	70	245	125
SP7	Adit, 17-20m; Dg	<8	2.0	1400	115	870	90
SP8	Adit, 22m; qtz from vein footwall	82	152	11000	185	2050	100
SP9	Adit, 25-28m; Dg	<8	2.0	1400	80	580	155
SP10	Adit, 28m; vein qtz	51	233	14000	110	875	125
SP11	Adit, 28-30m; Dg	<8	1.5	330	65	110	135
SP12	Adit, 30-34m; Dg	<8	14	1450	50	350	175
SP13	Adit, 34-38m; Dg	9	1.5	1250	75	1450	135
SP14	Adit, 40m; slate contact rock	<8	2.5	37	30	245	95
SP15	Adit, 38m; vein qtz	99	44	22000	120	475	125
SP16	Main dump, mineralised qtz	924	98	26000	1250	8200	2775
SP17	30m shaft at surface; min. qtz	276	61	37000	225	2400	150
SP18	Entr. main shaft; leached mudst.	8	<0.5	110	20	45	60
SP19	Mudstone on Dg contact	<8	0.5	230	45	205	205
SP20	Dg on contact, adjacent to SP19	<8	0.5	46	35	220	80

Notes: AMG coordinates of all samples approx. [604700mE, 5409300mN]
Dg = Devonian granodiorite
Distances in adit for SP1-14 are from entrance
Gold by fire assay/ AAS

7. BEULAH, SOUTH BEULAH AND SCAMANDER BELL PROSPECTS

7.1. Access and location

These prospects are in lightly timbered bush about 1.5 km west of the township of Scamander, and are easily accessible via an all-weather gravel road. They cover an area of about 15 ha over a strike length of 600 m, marked by shallow workings in gently undulating country. Three groups of workings are apparent, and were identified from old reports as the Beulah, South Beulah and Scamander Bell prospects (Figure 4).

7.2. Scope of Investigations

Prospect work included

- review of literature
- topographic mapping at 1:1000 with compass, inclinometer and measuring wheel
- geological mapping at the same scale
- rock-chip and channel sampling of surface exposures and workings
- 30 assays for Au, Ag, As, Cu, Pb and Zn
- follow-up trenching, sampling and assaying of 65 channel samples at South Beulah

7.3. Previous mining history

These prospects were probably discovered about the same time as the nearby Scamander and Yarmouth deposits. Thureau (1886) does not mention them, but they were in operation when Montgomery (1893) prepared a report on the silver lodes in the district. At that time, the main shaft at the Beulah workings was down 14m in soft granodiorite, and on the surface two sub-parallel lodes 60 m apart had been opened up near the granodiorite — sediment contact. Each lode consisted of sets of thin, silver-bearing ferruginous quartz veins, dipping 45° east and trending about due north (mag.). Reported assays were up to 4000 g/t Ag.

Four years later, when Harcourt-Smith (1897) visited the prospects, the Beulah workings were being tributed. The main shaft had been sunk to the watertable at 34m, and a crosscut (which failed to reach the main No. 2 lode) extended 41m west. No. 2 lode was being stoped to 12m along a strike length of some 50m. Silver and gold were apparently associated with pyrite in ferruginous quartz veins up to 0.2m thick. In 1896-7, the Beulah Prospect yielded 51t ore averaging about 3000 g/t Ag. The nearby South Beulah and Scamander prospects were less productive.

Twelvetrees (1911) reported on the Scamander Mineral District but added no new information on the prospects. The workings were abandoned and collapsed at the time of his visit.

7.4 Prospect geology

The main feature of the area is an intrusive granodiorite dyke at least 500m wide which trends roughly 320°M. The dyke is probably the southward extension of the Scamander Tier Dyke, and may be continuous with the much narrower granodiorite body at the Scamander Mine 1.5 km to the southeast.

All the reported and observed mineralisation at the prospects is apparently confined to the granodiorite, which at the mine site is weathered to a stiff, orange-brown gravelly clay containing unweathered core stones of light grey, even-grained to porphyritic rock. Weathering locally extends to at least 34m depth, judging from old reports. A small outcrop of granodiorite occurs near pit 42.

The eastern contact of the granodiorite with the Siluro-Devonian Mathinna Beds is obscured beneath Tertiary and Recent cover, but the western contact is inferred from float, and observable in at least two localities (Figure 4). The contact was exposed in pit 55 near No. 1 lode, and at sea level in the Scamander River estuary at [043097]. At both sites it is subvertical, and metamorphic effects are minimal.

The Mathinna Beds are poorly exposed. Small outcrops of grey, indurated sandstone and

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quartzite occur on hillsides west and southwest of the workings (where bedding dips about 400 to 0950M), and along the Scamander River estuary (where bedding attitude is variable and strikes 3400M). Elsewhere, Mathinna float and soil obscure outcrops and the local structure of the Beds is unknown.

7.5 Mineralisation

Mineralisation is contained within quartz veins in the granodiorite. Like the lodes at the Scamander prospect, the Beulah veins are localised near the western contact of the body, but have easterly rather than westerly dips. At the Beulah prospect, they correspond with a change of direction of the contact, which itself may be structurally controlled.

The workings at No. 1 lode extend over a width of 20-30m and a strike length of 60m. At No. 2 lode, the workings are of similar width over a strike length of 230m. At South Beulah, they extend over about 100m.

Old reports suggest that the No. 1 and No. 2 lodes at Beulah consist of a series of *en-echelon* veins ranging from 0.05m to 0.2m thick, and rarely greater. The veins reportedly dip eastwards at about 45^o, and strike magnetic north. Judging by the line of workings at the South Beulah prospect, the trend of these veins is similar. All the 74 pits and costeans shown in Figure 4 have collapsed, and even in several of these opened up by backhoe very little *in-situ* veining or mineralisation remains.

However, new trenching at South Beulah as a follow-up to anomalous silver assays (see below) from pit 15 has exposed most of the veins at the prospect. Three trenches (A, B and C in Figure 4) each about 35-40m long and 2m deep were dug transverse to the mineralised trend over a strike length of 50m. It is clear that even over this short distance, the veins lack strike continuity and are generally unmineralised.

Trench A, near pit 22 and the adjacent 6m shaft (20), exposed thirteen quartz veins, all trending about 0100M and dipping east at 22-45^o. Trench B, 20m north along strike, exposed only five veins. One of these, near pit 15, was of irregular dip, and was the only vein to show weak and patchy mineralisation. Four veins were exposed in Trench C.

Each vein consists of a central quartz stringer or irregular set of *en-echelon* stringers, usually associated with granitic material, cream kaolinite or dark brown clay, and bordered by a chloritic granitic alteration zone. The central quartz veins vary from 0.05-0.15m thick, and give rise to an alteration zone of roughly equal thickness on either side.

Mineralisation is patchy, similar to that at the Scamander prospect, and best seen in several small quartz dumps near pits 20 and 30. Chalcopyrite, galena, sphalerite and pyrite occur as stringers, streaks, wisps and massive, fine-grained patches — mainly in ferruginous quartz. Silver and gold apparently occurred mainly in pyrite, and free silver chloride was relatively common. It is not clear whether mineralisation is wholly confined to quartz veins. Some elevated metal values from channel sampling in granodiorite (see Table 4) may be due to disseminated ore minerals, but it is more likely that the sampling has included very minor and un-noticed mineralised quartz.

7.6 Sampling and assaying

Thirty grab and channel samples from the area were submitted to Analabs (Burnie) for Au, Ag, As, Cu, Pb and Zn assay. Results are summarised in Table 3, and the laboratory report included in Appendix 1.

The main aim of the sampling was to assess whether the weathered granodiorite at the site carried disseminated mineralisation.

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All but two vein quartz samples (BSB 23, 27) returned anomalous Au, Ag and As assays, and most were also high in Pb. Gold in quartz ranged from <8-950 ppb, averaging 253 ppb. Five samples were 100 ppb or higher. Silver in quartz ranged from 6-512 ppm, averaging 215 ppm. Arsenic in quartz averaged 1525 ppm, with a range of 26- 7150 ppm. Lead averaged 1030 ppm, ranging from 265-3300 ppm.

In the seventeen granodiorite samples, gold averaged 15 ppb, but if the highest value (91 ppb in BSB24) is omitted the average is <10 ppb. Eight had gold values below the level of detection (8 ppb). Silver is similarly low, averaging <2 ppm. The only anomalous value of interest is 512 ppm in BSB24. Arsenic averaged 265 ppm, ranging from 8-1700 ppm, but if BSB24 is omitted, the average value is 175 ppm and the range 8-450 ppm. Copper, lead and zinc in the granodiorite averaged 16, 165 and 45 ppm (BSB24 omitted).

Table 3. Beulah — South Beulah Prospect assay results

Sample Number	Description	Au (ppb)	Ag	As	Cu (ppm)	Pb	Zn
BSB1	Grab; vein qtz, near pits 8,12	14	37	1050	25	925	55
BSB2	Grab; min. vein qtz, near pits 8,12	489	305	480	75	1700	415
BSB3	Grab; vein qtz, near pits 8,12	465	221	570	20	1375	25
BSB4	Grab; min. vein qtz, pit 12	520	207	330	25	1500	450
BSB5	Grab; EW Dg, pit 12	12	7	440	15	975	35
BSB6	5m channel; EW Dg, pit 51	<8	<0.5	8	10	30	45
BSB7	Grab; EW Dg, near pit 51	<8	<0.5	16	10	10	35
BSB8	Grab; vein qtz, pit 47	80	355	26	10	140	35
BSB9	5m channel; EW Dg, pit 47	10	1	87	15	130	40
BSB10	2m channel; EW Dg, pit 24	10	<0.5	450	10	55	45
BSB11	Grab; vein qtz, pit 24	46	20	2400	115	375	30
BSB12	2m channel; EW D, pit 26	10	<0.5	170	15	235	65
BSB13	4.5m channel; EW Dg, near pit 40	11	2	200	20	290	25
BSB14	Grab; vein qtz, near pit 41	332	411	360	90	950	30
BSB15	Grab; limonitic qtz, pit 29	950	361	7150	610	3300	110
BSB16	3m channel; EW Dg, pit 74	<8	<0.5	17	15	25	20
BSB17	2.5m channel; EW Dg, pit 65	<8	<0.5	250	20	140	40
BSB18	Grab; vein qtz, pit 65	94	438	4350	60	675	10
BSB19	2m channel; EW Dg, pit 69	<8	<0.5	34	15	20	15
BSB20	3m channel; EW Dg, pit 55	22	<0.5	170	10	110	15
BSB21	2m channel; siltstone, pit 55	13	1.5	22	10	<5	10
BSB22	4m channel; EW Dg, pit 11	12	1.5	380	15	215	75
BSB23	Grab; vein qtz, pit 11	<8	5.5	230	10	265	10
BSB24	3m channel; EW Dg, pit 15	91	512	1700	30	4025	35
BSB25	Grab; EW Dg, pit 20	<8	4	200	20	95	40
BSB26	2m channel; EW Dg, pit 20	<8	2	120	15	35	100
BSB27	Grab; vein qtz, pit 20	15	29	140	15	575	25
BSB28	Grab; vein qtz, near pits 15, 20	27	198	800	30	575	25
BSB29	4m channel; EW Dg, pit 59	<8	12	180	20	50	75
BSB30	2.5m channel; EW Dg, pit 12	10	3	110	10	230	80

Notes

1. EW = extremely weathered; Dg = Devonian granodiorite
2. Sample locations are shown in Figure 4.

Although these results were generally discouraging, BSB24 — a 3m channel sample across pit 15 (Figure 4) — was anomalously high enough in Au, Ag, As and Pb to suggest that some parts of the host rock might carry economic silver as disseminations or stockwork veins. Accordingly, sixty five continuous 2m channel samples were collected from three trenches dug 20m apart transverse to the South Beulah workings. Assay results are summarised in Table 4. A comparison of these results with trace metal values for average world and northeastern Tasmanian granodiorites is given in Table 5.

The trench samples of apparently un-veined, weathered granodiorite from South Beulah were uniformly disappointing, and confirmed that the host rock, although relatively enriched in lead and arsenic, is depleted in copper and probably normal in zinc, gold and silver. The remaining twenty nine trench samples included at least some visible vein quartz within the granodiorite. Values for all metals are higher than the granodiorite alone, but remain un-encouraging. The average values (with the range in brackets) are: Au 19 ppb (<8-117), Ag 6 ppm (0.5-29), As 175 ppm (10-650), Cu 12 ppm (5-45), Pb 201 ppm (50-1300) and Zn 57 ppm (25-115).

Table 4. Assay results from trenching at South Beulah

Sample Number	Metreage and description	Au (ppb)	Ag	As	Cu (ppm)	Pb	Zn
Trench A. Trends 286°M. Metreage from western end. 2m channels in EW Dg unless indicated.							
SBTA 1	0-2	<8	0.5	42	5	55	60
SBTA 2	2-4	<8	0.5	25	5	70	65
SBTA 3	4-6	<8	<0.5	26	5	95	60
SBTA 4	6-8	<8	<0.5	13	5	150	65
SBTA 5	8-10; + vein qtz	11	1	40	5	130	80
SBTA 6	10-12; + vein qtz	<8	2	56	5	125	75
SBTA 7	12-14; + vein qtz	<8	8	89	10	120	60
SBTA 7a	14.6-15.1; vein qtz only	67	6.5	550	15	950	25
SBTA 8	14-16; + vein qtz	9	30	250	15	290	45
SBTA 9	16-18	<8	0.5	150	10	115	40
SBTA 10	18-20; + vein qtz	<8	0.5	150	10	140	30
SBTA 11	20-22; + vein qtz	<8	<0.5	150	10	85	60
SBTA 12	22-24; +vein qtz	<8	<0.5	150	5	55	35
SBTA 13	24-26; + vein qtz	40	<0.5	150	10	65	45
SBTA 14	26-28; + vein qtz	10	<0.5	100	5	30	25
SBTA 15	28-30	<8	0.5	64	5	30	40
SBTA 16	30-32; + vein qtz	13	0.5	44	5	30	40
SBTA 17	32-34	10	0.5	17	5	35	55
SBTA 18	34-36	9	1	94	5	35	55
SBTA 19	36-38; + vein qtz	<8	1	86	5	45	55
SBTA 19a	37.7-38.0; vein qtz only	<8	1	200	5	55	26
SBTA 20	38-40	<8	1	67	5	30	50

Trench B. Trends 272⁰M. Metreage from western end. 2m channels in EW Dg unless indicated.

SBTB 1	0-2	<8	0.5	10	5	60	65
SBTB 2	2-4; + vein qtz	37	0.5	26	5	50	65
SBTB 3	4-6; +vein qtz	<8	1	59	5	70	70
SBTB 4	6-8	<8	0.5	5	5	55	75
SBTB 5	8-10	14	1	25	5	50	85
SBTB 6	10-12	10	1.5	12	5	60	65
SBTB 7	12-14	<8	1.5	13	5	55	65
SBTB 8	14-16	<8	3	14	5	70	60
SBTB 9	16-18	<8	17	70	5	100	65
SBTB 10	18-20; +vein qtz	<8	29	150	10	160	55
SBTB 11	20-22; + vein qtz	<8	7	42	10	95	85
SBTB 12	22-24	9	14	62	15	100	70
SBTB 13	24-26; + vein qtz	37	12	100	15	90	45
SBTB 14	26-28; +vein qtz	24	26	100	40	140	70
SBTB 15	28-30; + vein qtz	25	11	250	45	325	60
SBTB 16	30-32; + vein qtz	<8	9.5	650	20	1300	40
SBTB 17	32-34; + vein qtz	<8	4	350	15	450	25
SBTB 18	34-36; + vein qtz	<8	6	550	15	300	50
SBTB 19	36-38	<8	4.5	300	10	125	75

Trench C. Trends 272⁰M. Metreage from eastern end. 2m channels in EW Dg unless indicated.

Sample Number	Metreage and description	Au (ppb)	Ag	As	Cu (ppm)	Pb	Zn
SBTC 1	0-2	15	1.5	33	5	25	70
SBTC 2	2-4	<8	1.5	26	5	25	75
SBTC 3	4-6	<8	0.5	42	5	25	75
SBTC 4	6-8	<8	2	38	5	25	65
SBTC 5	8-10	12	1	33	5	35	70
SBTC 6	10-12	16	1.5	22	5	60	70
SBTC 7	12-14	<8	4	75	5	95	80
SBTC 8	14-16	33	3.5	92	5	85	95
SBTC 9	16-18	12	4.5	61	5	65	90
SBTC 10	18-20	12	4.5	92	5	70	110
SBTC 11	20-22	<8	5.5	86	5	70	110
SBTC 12	22-24	<8	23	500	10	415	130
SBTC 13	24-26	<8	5.5	500	15	200	140
SBTC 14	26-28	<8	6.5	250	10	110	100
SBTC 15	28-30; + vein qtz	<8	4.5	150	5	75	90
SBTC 16	30-32; + vein qtz	117	3	73	5	80	115
SBTC 17	32-34	57	2	22	5	85	100
SBTC 18	34-36	<8	2	19	5	105	125
SBTC 19	36-38	<8	2	13	5	110	120
SBTC 20	38-40; + vein qtz	78	1	14	5	85	90
SBTC 21	40-42; + vein qtz	<8	0.5	33	5	60	70
SBTC 22	42-44	<8	0.5	33	5	50	85
SBTC 23	44-46	<8	0.5	10	5	40	85
SBTC 24	46-48	<8	0.5	10	5	35	80

Note: Grid reference for all samples is approximately 604150mE, 5410200mN

Table 5. Comparison of trace metal values in world, northeast Tasmanian granodiorites and granodiorite at Beulah

	Au (ppb)	Ag	As	Cu (ppm)	Pb	Zn
Average world granodiorite	4	0.07	2	30	15	60
Ringarooma and Boobyalla granodiorites (6 samples)	N/A	<10	16	27	21	76
Scamander Tier granodiorite						
- 16 grab samples (Beulah and South Beulah)	<10	<2	175	16	165	45
- 36 trench samples (South Beulah)	<10	<3	72	6	78	79
- weighted average of 52 samples	<10	<3	104	9	105	69

8. YARMOUTH PROSPECT

8.1 Location and access

The Yarmouth prospect (Figure 5) extends over about 150m of Yarmouth Creek in an east-draining valley 1 km west of the township of Beaumaris, itself about 4 km north of Scamander. The site is bounded on the north by Eastern Creek Road, and on the west and south by vehicular tracks. Access is good except for the immediate creek area, where dense regrowth scrub obscures much of the old workings.

8.2 Scope of investigations

Prospect work included

- review of literature
- topographic surface and subsurface mapping at 1:1000 with compass, inclinometer and measuring wheel
- geological mapping at the same scale
- rock-chip sampling of surface exposures
- 26 assays for Au, Ag, As, Cu, Pb and Zn

8.3 Previous mining history

Thureau (1886) was the first to comment on the prospect, probably soon after its discovery. He reported that a 0.1m quartz vein had assayed about 60 g/t gold and 'a considerable percentage of silver...'

Mining at Yarmouth had apparently ended when Montgomery (1893) visited the district. He described arsenopyrite in a 0.15-0.25m wide quartz vein trending 330°M in 'slate country'. The lode was reported as up to 1m wide in a shaft sunk near creek level, carrying visible gold.

Harcourt-Smith's 1897 report describes three lodes trending northeast. The creek had been diverted around the central No. 1 lode, and a 12m shaft sunk with a 6m drive cut at 10m along the lode. The quartz vein occupied the full width of the drive. Water ingress prevented further work. Mineralised quartz and country rock from the nearby dump assayed up to 20

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g/t Au and 1200 g/t Ag.

Twelvetrees (1911) visited the prospect and assayed dump material of quartz and brecciated quartzite. The samples returned a trace of gold and no silver. Twelvetrees also included a previously unreported assay from Harcourt-Smith — 20 g/t Au, 20 g/t Ag and 3.5% Cu from one of the other lodes on the prospect.

The site has apparently not been investigated in detail since Twelvetrees' visit.

8.4 Prospect geology

The geology of the prospect is uncomplicated. Siluro-Devonian Mathinna Beds are the only rock type present, and in places are well-exposed along Yarmouth Creek. Elsewhere, a few small outcrops and abundant float occur on valley sides.

The Beds are relatively undeformed, dipping uniformly ENE at 50°-68°. Strike varies from 145°-160°M. The rocks consist of often finely interbedded, hard pink-brown sandstone, hard dark grey quartzite and brown shales. Some of the finer-grained varieties are hornfelsed.

A feature of the Beds at Yarmouth, not observed at other prospects in the district, is the presence of up to 2% sulphide in some of the fine-grained sandstones and quartzites. The sulphide, which occurs as disseminated fine grains, and as grains and aggregates on thin fracture surfaces, was tentatively identified as pyrite in hand specimen. The sulphide-bearing rocks extend over about 300m of creek section, as shown in Figure 5, and appear to be spatially related to the mineralised lodes and the more metamorphosed sediments.

Commissioned petrographic descriptions (Appendix 2) of polished thin sections of samples Y9 and Y19 show the rocks to be mildly-moderately hornfelsed sandstone and greywacke containing metamorphic zoisite, actinolite and chlorite. Metamorphic grade is locally up to lower-middle greenschist facies. The sulphide phase in Y9 was identified as mainly arsenopyrite with minor pyrrhotite, pyrite and chalcopyrite, in disseminated clusters of subhedral-anhedral grains after phyllic rock fragments. In Y19, the sulphide was mainly arsenopyrite, intimately associated with zoisite and chlorite.

Minor development of quartz-filled extension fractures is evident in some rocks, but is less common than at other prospects.

Immediately north of the prospect, the Mathinna Beds are obscured by a veneer of unconsolidated Tertiary sediments.

8.5 Mineralisation

None of the original quartz lodes was located, partly because of thick scrub, the uncertainty of their exact location, and possibly because most of the lode material was removed. The only evidence of mineralisation is confined to a small dump near the main shaft on No. 1 lode. The dump material comprises two main types:

- blocks up to 0.5m in diameter of strongly quartz-veined, mineralised and brecciated, locally iron-stained, dark grey siliceous hornfels, and

- blocks of vein quartz, up to 0.3m in diameter, locally strongly mineralised and often intimately mixed with hornfels.

In hand specimen, the ore minerals in both materials include abundant arsenopyrite with galena and subordinate chalcopyrite, in irregular crystalline masses and stringers. The dump is strongly stained with green arsenates.

In polished section (sample Y11, Appendix 2), dominant arsenopyrite occurs as two phases — one major and the other minor — and is the host for sphalerite (<1%), argentiferous(?) galena, chalcopyrite (trace?), and gold. The gold occurs as four 40-80 micron grains within arsenopyrite fractures, usually associated with base metal sulphides.

The genesis of the lodes is interpreted (Appendix 2) as initial quartz and arsenopyrite crystallisation in open-space veins, followed by a late-stage brecciation event which introduced base metals, gold, silver and minor second-stage arsenopyrite.

Clearly, brecciation is a clue to gold occurrence. However, apart from the lode material on the main dump, no signs of brecciation were observed in bedrock over the site. The sulphide (predominantly arsenopyrite in the polished thin sections of Y9 and Y19, but mainly pyrite further from the lodes) in the Mathinna Beds is interpreted as either authigenic material remobilised on contact metamorphism, or contemporaneous with first-stage quartz-arsenopyrite mineralisation in the lodes. The latter event may have sealed most pathways for ore fluids, so that the second-stage Au+Ag+Pb event was confined to more permeable, major fractures.

A granitic body is inferred beneath the site, probably at shallow depth judging from the degree of metamorphism.

8.6 Sampling and assaying

Because the petrographic work suggested two phases of mineralisation, and because arsenopyrite and other sulphides are associated with gold and silver lode mineralisation, it was considered worthwhile assaying the sulphide-bearing Mathinna bedrock to assess whether the sulphide phase might be related to ore formation.

Twenty six samples were submitted to Analabs (Burnie) for Au, Ag, As, Cu, Pb and Zn assay. Results are presented in Table 6, and original laboratory results are included in Appendix 1.

The six ore samples from the dump returned anomalous Au, As and Pb assays, but the gold (up to 217 ppb) and very low silver (up to 3.5 ppm) are not encouraging.

In addition, the assays for the sulphide-bearing bedrock samples are uniformly disappointing. Two samples were mildly elevated in gold, but all other values were around average background levels. The low arsenic in particular is surprising: the sulphides identified in Y9 and Y19 are apparently atypical, because if the sediments contained an estimated 1% arsenopyrite, assays should return arsenic values above 4000 ppm. Clearly, most of the bedrock sulphide is pyrite as tentatively identified in the field.

9. ORIECO PROSPECTS

9.1 Location and access

The Orieco line of prospects include the Orieco, North Orieco and South Orieco workings, extending over a strike length of 2 km in deeply dissected but lightly timbered country 6 km west of Beaumaris (Figure 6).

Access to the area is excellent via all-weather gravel roads, and a cleared firetrail along the Orieco Hill ridge allows vehicle access to most parts of the prospect.

Table 6. Yarmouth prospect assay results.

Sample Number	Description	Au (ppb)	Ag	As	Cu (ppm)	Pb	Zn
Y1	Sandstone, fine gr.	<8	<0.5	30	20	50	60
Y2	Sandstone + diss. sulphide	23	<0.5	100	70	35	90
Y3	Quartzite	40	<0.5	32	15	40	95
Y4	Quartzite + diss sulphide	<8	<0.5	31	20	30	60
Y5	Hornfels	<8	0.5	36	45	45	125
Y6	Quartzite + diss sulphides	<8	<0.5	27	30	10	70
Y7	Sandstone	<8	<0.5	17	25	105	70
Y8	Qtzite float + diss. sulphides	<8	<0.5	8	40	10	25
Y9	Hornfels + diss. sulphides	<8	<0.5	60	55	15	65
Y10	Dump float: qtz+aspy+ga.	217	3.5	11%	25	605	135
Y11	Dump float: qtz+ aspy	155	<0.5	10%	10	100	50
Y12	Dump float: qtz+asp+ brecc.horn	123	<0.5	9%	5	75	40
Y13	Dump float: brecc. horn + sulph.	<8	4	140	30	235	65
Y14	Dump float: brecc. horn +qtz,aspy	17	<0.5	2%	15	35	110
Y15	Dump float: qtz veined hornfels	9	5	3400	25	1500	45
Y16	Hornfels + diss sulphides	<8	<0.5	30	25	45	105
Y17	Tert(?) clay, ironstone	<8	1	60	165	55	115
Y18	Brecc. horn + vein qtz + diss. sulph.	<8	<0.5	46	30	50	75
Y19	Sandstone float + diss. sulphides	<8	<0.5	28	40	40	130
Y20	Sandstone + diss. sulphides	<8	<0.5	13	35	30	105
Y21	Sandstone + diss. sulphides	<8	<0.5	22	20	20	100
Y22	Sandstone float + diss. sulphides	<8	<0.5	10	15	30	40
Y23	Quartzite	<8	<0.5	6	60	20	45
Y24	Sandstone, brecciated, spotted	<8	<0.5	26	35	60	65
Y25	Quartzite + diss. sulphides	<8	<0.5	11	45	20	70
Y26	Quartzite + diss. sulphides	<8	<0.5	10	40	45	120

Note: All selected bedrock samples, without visible sulphides, unless indicated

9.2 Scope of investigations

The Orieco investigations were of a less detailed nature than those at other prospects described in this report. Work included

- review of literature
- geological reconnaissance
- rock-chip sampling of surface exposures and the main adit
- 19 assays for Au, Ag, As, Cu, Pb and Zn

9.3 Previous mining and exploration history

The Orieco line of copper prospects has received considerable attention from explorers and miners since its discovery late last century.

The first detailed mention of the Orieco workings was by Harcourt-Smith (1897), who visited the properties of the Eastern Proprietary Copper and Silver Mining Company. The company held extensive leases along the gossanous outcrops of the Orieco and other

prospects, collectively extending northwest for about 9 km from the Scamander River estuary.

The workings at Orieco essentially include the main adit, driven 265m northwest from Eastern Creek along the strike of the lode, various crosscuts and two nearby shafts. The lode consisted mainly of sub-vertical, soft, kaolinised slate 6-12m wide, carrying veins and patches of copper carbonates, oxides and sulphides in joints. About 120t of hand-picked ore yielded 28% Cu and 550 g/t Ag.

Waller (1901) described the workings and oxidised ores in detail. Two main ore zones had been detected — at about 45 m and 120 m from the adit entrance. From the latter, 300t ore averaging 28% Cu had been produced in 1897, and a further 200t averaging 17% Cu and 400g/t Ag in 1900. Total production of the mine is estimated at 85t of metallic copper.

Twelvetrees (1911) discussed the nature and significance of the leached orebody in terms of classical models. He observed that the ore above adit level was strongly oxidised, and that the lower levels of the winzes had intersected the upper part of the zone of sulphide enrichment. Primary ore could be expected at lower levels, but mining had been thwarted by groundwater. He regarded the two main ore sections as belonging to the one ore shoot.

The ore consisted of copper-bearing veins in quartz-pyrite gangue, in a zone of altered country rock (Mathinna Beds). The primary minerals were chalcopyrite, pyrite, pyrrhotite, sphalerite and arsenopyrite, and secondary minerals included azurite, chalcocite, chalcantite, cuprite, malachite and tenorite. Assays of oxidised and secondary ore returned up to 23% Cu, 400 g/t Ag and 2 g/t Au.

Henderson (1941) visited the prospects, and produced a prospectivity review of the Orieco and other nearby mines together with a large-scale map (on which Figure 6 is based). He remarked on the regionally uncomplicated nature of the folded Mathinna Beds host rocks, which at outcrop scale show isoclinal folding and extreme variations in dip and strike, and numerous small faults. Major fault trends were northwest (which included the ore channels of the Orieco prospects), north and west. The faulting at Orieco were all high angle, dipping 80° southwest. The line of gossanous outcrops consisted of limonitic, cherty material with chloritised slate and some quartz veining.

The adit at the Orieco workings had been driven beneath the gossanous outcrops in the lower part of the zone of weathering. Complete leaching had occurred to a depth of 60 m. The last 150 m of the adit had failed to locate ore shoots additional to the two main orebodies at 45 m and 120 m.

Two deep shafts near the entrance to the adit and sunk on the main fissure were apparently sited on a prominent cross fault striking 0100(M?).

Henderson (ibid) channel-sampled the main adit. An 18 m length averaged 2% Cu over a width of 1.3 m, and the main ore shoot for a length of 45 m averaged 5% Cu over a width of 2.2 m.

The abandoned South Orieco prospect consisted of a short adit and shallow shaft at creek level 400 m southeast of the main Orieco adit. It established the extension south of the ore channel, which in the creek consisted of 3 m of sulphide-bearing, chloritised rock. Henderson (ibid) also remarked on the strong and persistent gossan on the ridge between Orieco and South Orieco.

He concluded generally that the whole line of prospects was underexplored, and recommended 1000 m of exploratory diamond drilling to test the persistence of the ore bodies at depth. Two holes were later drilled (Groves, 1972, and Figure 6), but information about them is sketchy. The first was sited just west of a major gossanous zone about 200 m north of the end of the main adit near 600900mE, 5414100mN, and was inclined at 30° to the northeast. It apparently intersected the fault zone at about adit level, but was devoid of

significant mineralisation. The second was collared at about 601300mE, 5413700mN on the eastern side of the South Orieco prospect, and inclined at 30° southwest. It intersected a barren fault zone about 30 m below the Orieco adit level.

In the last twenty years, the prospects have received some attention from various mining companies, including Louisa Mining Company, Mt. Lyell, Rio Tinto, BHP and (in 1982-83) Shell in joint venture with BHP.

In the early 1970's, the Louisa Mining Company attempted to recover copper by bulk-leaching the old workings (M. Forster, pers. comm.). The main adit was blocked at about 25 m, and water pumped to the main air shaft about 120 m upslope. Leachate was tapped from the flooded adit and collected in concrete tanks where the copper was deposited onto iron plates and the depleted leachate returned to the mine. There are no records of production and the operation was apparently uneconomic.

BHP Co. Ltd held EL12/78 over several copper prospects in the area in the late 1970's and early 1980's. Part of the company's exploration included rock chip sampling of the line of gossans at Orieco. Assays were done for Sn, Cu, Pb, Zn, Ag, Au and As. The results are discussed in section 7.6. BHP later (1982) carried out a soil sampling programme in the South Orieco area.

9.4 Prospect geology

The geology of the area (Figure 6) has been adequately described in previous reports (eg. Henderson, 1941; Groves, 1972) and will not be repeated here.

The host rocks for the mineralisation are the Siluro-Devonian Mathinna Beds, consisting of often finely interbedded turbiditic sandstone, siltstone and mudstone. The Beds have a general northeast strike which is very variable in outcrop. Small-scale, occasionally isoclinal, folding is common. Major faulting is northwest (along the line of lode) and north-northeast, and there are numerous minor faults well-exposed in road cuttings.

The distribution of gossans in the area is attributed to mineralising fluids following major faults.

9.5 Mineralisation

Groves (1972) has discussed the mineralisation in detail. His work is summarised here.

The ore shoots appear to be fault-fill quartz-sulphide and sulphide veins contained in a zone 1.5-6 m wide between two sub-parallel, steeply southwest-dipping fault surfaces. The fault gouge is a soft, kaolinite-mica-quartz rock. Two main ore zones were intersected in the adit, which extends along the strike of the faults some 275 m. Mineralisation is in the form of veinlets, fracture infills and irregular masses within the fault gouge.

The Orieco mine appears to exhibit weathering effects typical of sulphide orebodies. A depleted gossanous surface zone overlies a barren leached zone which extends to near adit level. Above the watertable, supergene oxides and carbonates (limonite, haematite, cuprite, tenorite, azurite and malachite) occur in the adit. Supergene sulphides (chalcocite, covellite and pyrite), sulphates (chalcantite) and remnant hypogene sulphides (pyrite, arsenopyrite, sphalerite, chalcopyrite, bornite, pyrrhotite) were intersected at adit level and in winzes below the watertable. The adit appears to have been dug at about the top of the primary ore shoots.

9.6 Sampling and assaying

Nineteen rock chip samples of gossan, bedrock and ore were submitted to Analabs (Burnie) and assayed for Au, Ag, As, Cu, Pb and Zn. Sample locations are shown in Figure 6 and results summarised in Table 7. Laboratory results are presented in Appendix 1.

Table 8 compares assays of gossan samples collected from the Orieco prospects during the present survey, with similar samples from the same area previously obtained by BHP Co. Ltd.

Although the two surveys cannot be directly compared, they confirm the anomalously high Cu, Pb and Zn content of the gossans along the Orieco trend. The present survey returned significantly higher lead and silver than the BHP work. The gossans, however, show only background gold levels, and samples from the main adit returned only slightly elevated values.

These results are generally discouraging for further work on gold prospectivity. Moreover, the largely barren nature of the main adit and the failure of the two Department of Mines diamond drill holes at Orieco and South Orieco suggest the copper lodes are isolated occurrences within a narrow fault zone, and have been strongly leached to the watertable. Primary ore reserves are likely to be small and difficult to locate without intensive drilling.

Table 7. Orieco prospects assay results

Sample Number	Description	Au (ppb)	Ag	As	Cu (ppm)	Pb	Zn
OP1	gossanous bedrock; Orieco	10	8	2600	330	1450	145
OP2	limonitic gossan; Orieco	10	<0.5	1050	465	1150	55
OP3	cleaved mudstone; Orieco	24	26	14	85	225	55
OP4	brecciated, lim. qtz gossan; Orieco	<8	92	1650	415	1025	275
OP5	brecciated gossanous sandstone; Orieco	<8	1.5	67	80	140	50
OP6	gossan; Orieco	20	203	89	2500	1.4%	2250
OP7	gossan float; Orieco	<8	2.5	30	120	800	375
OP8	gossan float; North Orieco	<8	0.5	44	30	390	375
OP9	gossan float; North Orieco	<8	1	86	85	510	1450
OP10	gossan; North Orieco	10	0.5	39	565	285	105
OP11	gossan; South Orieco	8	1	160	295	1200	1250
OP12	gossan; South Orieco	10	1	120	40	225	135
OP13	gossan; South Orieco	<8	1	570	565	4750	180
OP14	gossan; South Orieco	<8	<0.5	63	440	665	670
OP15	Main adit: soft clay at 26 m	<8	5	150	70	545	130
OP16	Main adit: sheared clay, 20 m	45	57	1400	435	1075	250
OP17	Main adit: black ore, 4 m	43	<2	9.8%	8%	1500	275
OP18	Main dump: azurite+malachite	135	353	7%	11%	975	1100
OP19	gossanous shear, near main adit	<8	<2	1400	2650	7500	1550

Table 8. Orieco prospects assay results of gossan samples: comparison between present study and previous results

	Au (ppb)	Ag	As	Cu (ppm)	Pb	Zn
BHP						
Orieco-North Orieco (9 samples)	-	2	164	424	332	68
South Orieco (5 samples)	-	-	122	481	710	662
This report						
Orieco-North Orieco (10 samples)	11	34	567	468	1998	514
South Orieco (4 samples)	8	1	250	335	1750	525

10. CONCLUSIONS

1. The detailed prospect work at the Scamander, Beulah — Scamander Bell and Yarmouth prospects has established that

(a) silver-gold mineralisation is patchy and uneconomic, and confined to sets of sulphide-bearing quartz lodes within the host rock

(b) at Scamander and Beulah — Scamander Bell, the granodiorite host is unmineralised and thus gives no scope for even moderate tonnages of low-medium grade disseminated orebodies. Similarly, at Yarmouth the Mathinna Beds are apparently barren of economic minerals

(c) the stream sediment survey along the southern part of the Scamander Tier Dyke gave no encouragement for undiscovered mineralisation

(d) the Orieco line of prospects remain the most interesting of the four investigated. Copper-gold prospectivity seems low, but further more detailed prospect work is warranted before abandoning the area.

2. It is recommended that most of the tenement be relinquished now, and that a small area around the Orieco line of prospects be retained for Year 4 follow-up.

11. PROPOSED FUTURE EXPLORATION

It is proposed in Year 4 to conduct follow-up surface mapping and sampling of gossanous shear zones along the Orieco line of prospects.

12. REFERENCES

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APPENDIX 1.

**Analabs' laboratory results for samples from the
Scamander, Beulah — Scamander Bell, Yarmouth
and Orieco Prospects.**

ANALABS

STREAM SED. SURVEY

Phone (09) 458 7999

A Division of MacDonald Hamilton & Co. Pty. Ltd.

52 Murray Road, Welshpool, W.A. 6106

Telex AA92550

ANALYTICAL REPORT No. 999.46.08.06432

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

Mr. W.C. Cromer
W.C. Cromer Pty Ltd
190 Macquarie St
Hobart
Tasmania 7000

24157
DATE RECEIVED: 18/08/89
RESULTS REQUIRED: ASAP

No. OF PAGE OF RESULTS: 2	DATE REPORTED: 28/08/89	No. OF COPIES: 1	TOTAL No. OF SAMPLES: 23
---------------------------	-------------------------	------------------	--------------------------

DATE OF SAMPLE	REFER BELOW	SAMPLE NUMBER	PRE-TREATMENT						ANALYSIS					
			DRY	CRUSH	SPLIT	FIL. TENS	SEVE	OTHER SEE REMARKS	NONE	REFER TO ANALYSED SECTION	PREPARATION	METHOD		
	5501/23		SS				008,007,016,013					Cu, Pb, Zn, Ag/101, As/114		
	5501/23		SS									Au, AuChk/309		

RESULTS TO

✓ Mr. W.C. Cromer
W.C. Cromer Pty Ltd
190 Macquarie St
Hobart
Tasmania 7000

RESULTS TO

Mr. G. SMITH
KINGSTREIM RESOURCES NL
C/- ACA HOWE
3117 PEMBROKE STREET
BICTON WA 6157

REMARKS

ANALYSIS	PREPARATION	METHOD

AUTHORISED OFFICER

495028

ANALABS

A Division of Macdonald Hamilton & Co. Pty. Ltd.

STREAM SED. SURVEY
SS1-SS23

ANALYTICAL DATA

SAMPLE PREFIX

REPORT NUMBER

REPORT DATE

CLIENT ORDER No.

PAGE

999.46.08.06432

30/08/89

24137

1 OF 2

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	As	Au	AuChk		
1	SS01	10	20	35	<0.5	8	<0.008	<0.008		
2	SS02	20	25	40	<0.5	7	<0.008	-		
3	SS03	10	20	25	<0.5	3	<0.008	0.020		
4	SS04	15	20	50	<0.5	8	<0.008	-		
5	SS05	20	15	40	<0.5	5	0.010	-		
6	SS06	15	15	30	<0.5	5	0.011	-		
7	SS07	15	10	15	<0.5	11	0.020	-		
8	SS08	45	20	70	<0.5	14	<0.008	-		
9	SS09	25	15	50	<0.5	7	0.009	-		
10	SS10	30	25	95	<0.5	6	0.009	-		
11	SS11	25	20	140	<0.5	5	0.011	-		
12	SS12	20	10	30	<0.5	3	<0.008	-		
13	SS13	25	10	50	<0.5	6	0.010	-		
14	SS14 ✓	30	20	90	<0.5	16	0.011	-		
15	SS15 ✓	30	20	95	<0.5	10	0.011	-		
16	SS16	20	15	50	<0.5	7	0.011	<0.008		
17	SS17	25	20	50	<0.5	9	0.024	-		
18	SS18	20	15	25	<0.5	3	0.011	-		
19	SS19	20	20	80	<0.5	17	0.028	-		
20	SS20	25	20	55	<0.5	9	0.015	-		
21	SS21	40	35	100	<0.5	14	0.011	-		
22	SS22	30	15	140	<0.5	6	0.014	0.015		
23	SS23	15	10	20	<0.5	2	0.011	-		
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

495029

ANALABS

A Division of Macdonald Hamilton & Co. Pty Ltd.

STREAM SED. SURVEY
SSI-5523

ANALYTICAL DATA

SAMPLE PREFIX

REPORT NUMBER

REPORT DATE

CLIENT ORDER No.

PAGE

		999.46.08.06432				30/08/89		24157		2 OF 2	
TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	As	Au	AuChk			
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14	✓										
15											
16											
17											
18											
19											
20											
21											
22	DETECTION	5	5	5	0.5	1	0.008	0.008			
23	UNITS	PPM	PPM	PPM	PPM	PPM	PPM	PPM			
24	METHOD	101	101	101	101	114	309	309			
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

495030 ANALABS BEULAH - SCAMANDER BELL

Phone (09) 458 7999

A division of MacDonal Hamilton & Co. Pty. Ltd.
52 Murray Road, Welshpool, W.A. 6106
FAX: 094 31 8290

Telex AA92560

BSB1-30

ANALYTICAL REPORT No. 799.48.08.06305

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

Mr. B. Smith
Kingstream Resources NL
3/17 Pembroke Street
Gibson
W.A. 6157

ORDER No. 24135	PROJECT
DATE RECEIVED 20/07/89	RESULTS REQUIRED ASAP

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
2	07/08/89	1	30

STATE OF SAMPLES	REFER BELOW	SAMPLE NUMBERS	PRE-TREATMENT						ANALYSIS				
			DRY	CRUSH	SPLIT	PULVERISE	SIEVE	OTHER SEE REMARKS	NONE	REFER TO ANALYSIS SECTION	PREPARATION	METHOD	
		BSB01/30	RO	Prep: 016							Cu, Pb, Zn, Ag/101, As/114		
		BSB01/30	RO								Ag/109		
		BSB01/30	RO	Prep: 016							Pb, Ag/104		

RESULTS TO

Mr. W.C. Cromer
W.C. Cromer Pty Ltd
190 Macquarie St
Hobart
Tasmania 7000

RESULTS TO



REMARKS

STATE OF SAMPLES	ANALYSIS - PREPARATION	ANALYSIS - METHOD
whole core	perchloric acid A1	atomic absorption AAS
split core	hydrochloric acid A2	x-ray fluorescence XRF
cutting	nitric acid A3	spectrophotometry SPEC
rock	aqua regia A4	colorimetry COL
soil	nitric-perchloric A5	chromatography CHR
pulp	HF mixture A6	titration TIT
water	HF under pressure A7	other chemical means CHEM
tissue	fusion A8	miscellaneous MISC
stream sediment		fluorescence FLOR
heavy mineral		inductively coupled plasma ICP

AUTHORISED OFFICER

495031

ANALABS

A Division of Macdonald Hamilton & Co. Pty. Ltd.

BSB1-30

BSB1-30

ANALYTICAL DATA

SAMPLE PREFIX

REPORT NUMBER

REPORT DATE

CLIENT ORDER No.

PAGE

999.46.08.06365

07/08/89

24155

1 OF 2

TUBE No.	SAMPLE No.	Cu	Pb	Pb	Zn	Ag	Ag	As	AU	
1	BSB01	25	-	925	55	-	37	1050	0.014	gt2
2	BSB02	75	-	1700	415	-	305	480	0.489	gt2
3	BSB03	20	-	1375	25	-	221	570	0.465	gt2
4	BSB04	25	-	1500	450	-	207	330	0.520	gt2
5	BSB05	15	975	-	35	7.0	-	440	0.012	Dg
6	BSB06	10	30	-	45	<0.5	-	8	<0.008	Dg
7	BSB07	10	10	-	35	<0.5	-	16	<0.008	Dg
8	BSB08	10	140	-	35	-	355	26	0.080	gt2
9	BSB09	15	130	-	40	1.0	-	87	0.010	Dg
10	BSB10	10	55	-	45	<0.5	-	450	0.310	Dg
11	BSB11	115	-	375	30	-	20	2400	0.046	gt2
12	BSB12	15	235	-	65	<0.5	-	170	0.010	Dg
13	BSB13	20	290	-	25	2.0	-	200	0.011	Dg
14	BSB14	90	-	950	30	-	411	360	0.332	gt2
15	BSB15	610	-	3300	110	-	361	7150	0.950	gt2
16	BSB16	15	25	-	20	<0.5	-	17	<0.008	Dg
17	BSB17	20	140	-	40	<0.5	-	250	<0.008	Dg
18	BSB18	60	-	675	10	-	438	4350	0.094	gt2
19	BSB19	15	20	-	15	<0.5	-	34	<0.008	Dg
20	BSB20	10	110	-	15	<0.5	-	170	0.022	Dg
21	BSB21	10	<5	-	10	1.5	-	22	0.013	Sm
22	BSB22	15	215	-	75	1.5	-	380	0.012	Dg
23	BSB23	10	265	-	10	5.5	-	230	<0.008	gt2
24	BSB24	30	-	4025	35	-	512	1700	0.091	Dg
25	BSB25	20	95	-	40	4.0	-	200	<0.008	Dg

Results in ppm unless otherwise specified.
 P = element present, but concentration too low to measure.
 X = element concentration is below detection limit.
 - = element not determined.

AUTHORISED
OFFICER

ANALYTICAL DATA

SAMPLE PREFIX REPORT NUMBER REPORT DATE CLIENT ORDER No. PAGE

999.43.08.06365 07/08/89 24155 2 OF 2

TUBE No.	SAMPLE No.	Cu	Pb	Pb	Zn	Ag	Ag	As	Au	
1	BSB26	15	35	-	100	2.0	-	120	0.008	Dg
2	BSB27	15	-	575	25	-	29	140	0.015	gtz
3	BSB28	30	-	575	25	-	198	800	0.027	gtz
4	BSB29	20	-	50	75	-	12	180	0.008	Dg
5	BSB30	10	230	-	80	3.0	-	110	0.010	Dg
6										
7										
8										
9										-2
10										
11										
12										
13										
14										
15										-2
16										-2
17										
18										
19										-2
20										
21	Au checks were carried out on the following samples:-									
22	BSB01 = 0.014; BSB02 = 0.665; BSB18 = 0.102; BSB25 = 0 PPM									
23	DETECTION	5	5	25	5	0.5	2	1	0.008	
24	UNITS	101	101	PPM	101	101	PPM	114	PPM	-2
25	METHOD	101	101	104	101	101	104	114	309	

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 *[Signature]*

ANALABS

SOUTH BEULAH TRENCH SAMPLE

495033

Phone (09) 458 7999

A Division of Macdonald Hamilton & Co
37 Maitland Street, Wellington, N.Z.

ANALYSIS REPORT

999-46-08-06504

Mr. G. Smith
Kingstream Resources NL
3/17 Pembroke Street
Bicton
W.A. 6157

24158
DATE RECEIVED
02/16/89
ASAP

NO. OF SAMPLES	DATE REPORTED	NO. OF COMES	TOTAL NO. OF ANALYSES
6	13/10/89	1	65

SAMPLE NO.	DESCRIPTION	WEIGHT	PRE-TREATMENT						OTHER REMARKS	NONE	ANALYSIS		
			PREP	SELE	AS	AS	AS	AS			ANALYST	REMARKS	METHOD
	Various	50	Prep: 005,016							Cu, Pb, Zn, Ag/101			
	Various	50								As/114			
	Various	50								Au, AuChk/309			
	Various	50	Prep: 005,016							Ag/104			
	Various	50								As/101			

✓ Mr. W.C. Cromer
W.C. Cromer Pty Ltd
190 Macquarie St
Hobart
Tasmania 7000

Mr. G. Smith
Kingstream Resources NL
3/17 Pembroke Street
Bicton
W.A. 6157

REMARKS

ANALABS

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

SOUTH BEACH 4 25/01/89

SBTA 1-

ANALYTICAL DATA

79 495034
SBTB 1-24

SAMPLE PREFIX

REPORT NUMBER

REPORT DATE

CLIENT ORDER No

PAGE

			499.48.08.0855a	13/10/89			24153			1 OF 3	
TUBE No.	SAMPLE No.		Cu	Pb	Zn	Ag	Ag	As	As	Au	
1	SBTA 01	A	5	55	30	0.5	-	-	42	0.008	
2	SBTA 02	B	5	70	33	0.5	-	-	25	0.008	
3	SBTA 03	C	5	95	60	0.5	-	-	26	0.008	
4	SBTA 04	D	5	150	35	0.5	-	-	13	0.008	
5	SBTA 05	E	5	130	80	1.0	-	-	40	0.011	
6	SBTA 06	F	5	125	75	2.0	-	-	58	0.008	
7	SBTA 07	G	10	120	60	3.0	-	-	89	0.008	
8	SBTA 08	H	15	290	45	-	30	250	>100	0.009	
9	SBTA 09	I	10	115	40	0.5	-	150	>100	0.008	
10	SBTA 10	J	10	140	30	0.5	-	150	>100	0.008	
11	SBTA 11	K	10	85	60	0.5	-	150	>100	0.008	
12	SBTA 12	L	5	55	35	0.5	-	150	>100	0.008	
13	SBTA 13	M	10	65	45	0.5	-	150	>100	0.040	
14	SBTA 14	N	5	30	25	0.5	-	-	100	0.010	
15	SBTA 14.07	15.10	15	950	25	6.5	-	550	>100	0.067	
16	SBTA 15		5	30	40	0.5	-	-	64	0.008	
17	SBTA 16		5	30	40	0.5	-	-	44	0.013	
18	SBTA 17		5	35	55	0.5	-	-	17	0.010	
19	SBTA 18		5	35	55	1.0	-	-	94	0.009	
20	SBTA 19		5	45	55	1.0	-	-	36	0.008	
21	SBTA 20		5	30	50	1.0	-	-	67	0.008	
22	SBTA 37.7-38		5	55	26	1.0	-	200	>100	0.008	
23	SBTB 01		5	60	65	0.5	-	-	10	0.008	
24	SBTB 02		5	50	35	0.5	-	-	26	0.037	
25	SBTB 03		5	70	70	1.0	-	-	59	0.008	

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

AUTHORISED OFFICER



ANALABS

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

SOUTH BEVELLA FIBROUS SAMPLE

SBTA 1 -

495035

ANALYTICAL DATA

SBTB 1-19
SBTC 1-24
CLIENT ORDER No.

SAMPLE PREFIX

REPORT NUMBER

REPORT DATE

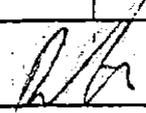
CLIENT ORDER No.

PAGE

SAMPLE PREFIX		REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE					
		999.46.08.06556	13/10/89	24158	2 OF 3					
TUBE No.	SAMPLE No.		Cu	Pb	Zn	Ag	Ag	As	As	Au
1	SBTB 04	/	5	55	75	0.5	-	-	5	0.008
2	SBTB 05		5	50	85	1.0	-	-	25	0.014
3	SBTB 06		5	60	65	1.5	-	-	12	0.010
4	SBTB 07		5	55	65	1.5	-	-	15	0.008
5	SBTB 08		5	70	60	3.0	-	-	14	0.008
6	SBTB 09		5	100	65	17.0	-	-	70	0.008
7	SBTB 10		10	160	55	-	29	150	2100	0.008
8	SBTB 11		10	95	85	7.0	-	-	42	0.008
9	SBTB 12		15	100	70	14.0	-	-	61	0.007
10	SBTB 13	/	15	90	45	12.0	-	-	100	0.037
11	SBTB 14	/	40	140	70	-	26	-	100	0.024
12	SBTB 15		45	325	60	11.0	-	250	2100	0.025
13	SBTB 16		20	1300	40	9.5	-	650	2100	0.008
14	SBTB 17		15	450	25	4.0	-	350	2100	0.008
15	SBTB 18		15	300	50	6.0	-	550	2100	0.008
16	SBTB 19		10	125	75	4.5	-	300	2100	0.008
17	SBTC 01		5	25	70	1.5	-	-	35	0.015
18	SBTC 02		5	25	75	1.5	-	-	26	0.008
19	SBTC 03		5	25	75	0.5	-	-	42	0.008
20	SBTC 04		5	25	65	2.0	-	-	38	0.008
21	SBTC 05		5	35	70	1.0	-	-	33	0.012
22	SBTC 06		5	60	70	1.5	-	-	22	0.018
23	SBTC 07		5	95	80	4.0	-	-	75	0.008
24	SBTC 08		5	85	95	3.5	-	-	92	0.033
25	SBTC 09		5	65	90	4.5	-	-	61	0.012

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



ANALABS

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

SOUTHERN CROSS
SBTA 1-
20
495036

ANALYTICAL DATA

SBTA 1-19
SBTA 1-19
CLIENT ORDER No

SAMPLE PREFIX

REPORT NUMBER

REPORT DATE

CLIENT ORDER No

PAGE

999.45.08.06856

13/10/89

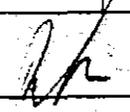
24158

3 OF 5

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ag	Ag	As	As	Au
1	SBTC 10	5	70	110	4.5	-	-	92	0.012
2	SBTC 11	5	70	110	5.5	-	-	88	0.008
3	SBTC 12	10	415	130	-	23	500	2100	0.008
4	SBTC 13	15	200	140	5.5	-	500	2100	0.008
5	SBTC 14	10	110	100	5.5	-	250	2100	0.008
6	SBTC 15	5	75	90	4.5	-	150	2100	0.008
7	SBTC 16	5	80	115	3.0	-	-	73	0.117
8	SBTC 17	5	85	100	2.0	-	-	22	0.057
9	SBTC 18	5	105	125	2.0	-	-	19	0.008
10	SBTC 19	5	110	120	2.0	-	-	15	0.008
11	SBTC 20	5	85	90	1.0	-	-	14	0.078
12	SBTC 21	5	60	70	0.5	-	-	53	0.008
13	SBTC 22	5	50	85	0.5	-	-	33	0.008
14	SBTC 23	5	40	85	0.5	-	-	10	0.008
15	SBTC 24	5	35	80	0.5	-	-	10	0.008
16									
17									
18									
19									
20									
21									
22									
23	DETECTION	5	5	5	0.5	2	100	1	0.008
24	UNITS	PPM	PPM						
25	METHOD	101	101	101	101	104	101	104	309

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

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

SBTA 1-

495037

ANALYTICAL DATA

SBTB 1-19
SBTB 1-24

SAMPLE PREFIX

REPORT NUMBER

REPORT DATE

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PAGE

999.46.08.06556

13/10/89

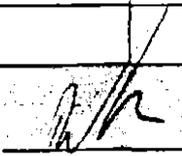
24158

4 OF 6

TUBE No.	SAMPLE No.	AuChk								
1	SBTA 01	-								
2	SBTA 02	-								
3	SBTA 03	-								
4	SBTA 04	-								
5	SBTA 05	-								
6	SBTA 06	-								
7	SBTA 07	-								
8	SBTA 08	-								
9	SBTA 09	-								
10	SBTA 10	-								
11	SBTA 11	00.008								
12	SBTA 12	0.064								
13	SBTA 13	-								
14	SBTA 14	-								
15	SBTA 14.6-15.1	-								
16	SBTA 15	00.008								
17	SBTA 16	-								
18	SBTA 17	-								
19	SBTA 18	-								
20	SBTA 19	-								
21	SBTA 20	-								
22	SBTA 37.7-38	-								
23	SBTB 01	-								
24	SBTB 02	-								
25	SBTB 03	-								

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

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ANALYTICAL DATA

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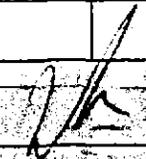
PAGE

5010 1-19
53-21-31

TUBE No.	SAMPLE No.	AuChk							
			999.46.08.0855a	13/10/89	24158	5 OF 6			
1	SBTB 04	-							
2	SBTB 05	-							
3	SBTB 06	-							
4	SBTB 07	-							
5	SBTB 08	-							
6	SBTB 09	<0.008							
7	SBTB 10	<0.008							
8	SBTB 11	-							
9	SBTB 12	-							
10	SBTB 13	-							
11	SBTB 14	-							
12	SBTB 15	-							
13	SBTB 16	-							
14	SBTB 17	-							
15	SBTB 18	-							
16	SBTB 19	-							
17	SBTC 01	-							
18	SBTC 02	-							
19	SBTC 03	-							
20	SBTC 04	-							
21	SBTC 05	-							
22	SBTC 06	<0.008							
23	SBTC 07	<0.008							
24	SBTC 08	-							
25	SBTC 09	-							

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

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ANALYTICAL DATA

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REPORT DATE

CLIENT ORDER No.

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13/10/99

24158

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TUBE No.	SAMPLE No.	AuChk							
1	SBTC 10	-							
2	SBTC 11	-							
3	SBTC 12	-							
4	SBTC 13	-							
5	SBTC 14	-							
6	SBTC 15	-							
7	SBTC 16	-							
8	SBTC 17	-							
9	SBTC 18	-							
10	SBTC 19	-							
11	SBTC 20	-							
12	SBTC 21	-							
13	SBTC 22	-							
14	SBTC 23	-							
15	SBTC 24	0.008							
16									
17									
18									
19									
20									
21									
22									
23	DETECTION	0.008							
24	UNITS	PPM							
25	METHOD	309							

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

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A Division of MacDonal Hamilton & Co. Pty Ltd

Phone (09) 458 7999

32 Murray Road, Welshpool, W.A. 6108

ORIECO OPL-0019

SCAMANDER OPL-0010

ANALYTICAL REPORT No.

999.46.08.06412

THIS REPORT MUST BE READ IN CONJUNCTION WITH THE ACCOMPANYING INSTRUCTIONS

Mr. W.C. Cromer
W.C. Cromer Pty Ltd
190 Macquarie St
Hobart
Tasmania 7000

24156
DATE REPORTED: 10/08/89
DELIVERED: ASAP

NO. OF COPIES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL NO. OF SAMPLES
6	28/08/89	1	65

SAMPLE NO.	SAMPLE NUMBER	PRE-TREATMENT						OTHER - SEE REMARKS	NONE	ANALYSIS SECTION	METHOD
		DRY	CRUSH	SPLIT	FULL PERSE	SEIVE					
OP 01/19, SP 01/20, Y 01/26		RD	Prep: 006,007,014,016						Cu, Pb, Zn, Ag / 101, As / 114		
OP 01/19, SP 01/20, Y 01/26		RD							Au, AuChk / 309		
OP 01/19, SP 01/20, Y 01/26		RD	Prep: 006,007,014,016						Cu, Pb, Zn, Ag / 101		

✓ Mr. W.C. Cromer
W.C. Cromer Pty Ltd
190 Macquarie St
Hobart
Tasmania 7000

MR. G. SMITH
KINGSTREAM RESOURCES NL
3/17 PEMBROKE STREET
BICTON WA 6157

REMARKS

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A Division of Macdonald Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

ORIECO OPI - OP19
SCAMANDER SPI - SP20
YARMOUTH YI - Y26

SAMPLE PREFIX

REPORT NUMBER

REPORT DATE

CLIENT ORDER No.

PAGE

		999.46.08.06412				28/08/89		24156		1 OF 3	
TUBE No.	SAMPLE No.	Cu	Cu	Pb	Pb	Zn	Zn	Ag	Ag	As	
1	OP 01	330	-	-	1450	145	-	-	8	2600	
2	OP 02	465	-	1150	-	55	-	0.5	-	1050	
3	OP 03	85	-	-	225	55	-	-	26	14	
4	OP 04	415	-	-	1025	-	275	-	92	1650	
5	OP 05	80	-	140	-	50	-	1.5	-	67	
6	OP 06	-	2500	-	13600	-	2550	-	203	89	
7	OP 07	120	-	800	-	375	-	2.5	-	30	
8	OP 08	30	-	390	-	375	-	0.5	-	44	
9	OP 09	85	-	510	-	1450	-	1.0	-	86	
10	OP 10	565	-	285	-	105	-	0.5	-	39	
11	OP 11	295	-	1200	-	1250	-	1.0	-	160	
12	OP 12	40	-	225	-	135	-	1.0	-	120	
13	OP 13	565	-	-	4750	180	-	1.0	-	570	
14	OP 14 ✓	440	-	565	-	670	-	0.5	-	63	
15	OP 15 ✓	70	-	545	-	130	-	5.0	-	150	
16	OP 16	435	-	-	1075	-	250	-	57	1400	
17	OP 17	-	80100	-	1500	-	275	-	82	92500	
18	OP 18	-	111600	-	975	-	1100	-	353	69500	
19	OP 19 ✓	2650	-	-	7500	-	1550	-	82	1400	
20	SP 01	315	-	70	-	140	-	1.0	-	120	
21	SP 02	55	-	-	1250	60	-	-	5	550	
22	SP 03	70	-	120	-	100	-	1.0	-	100	
23	SP 04	-	1075	-	8200	-	250	-	167	30500	
24	SP 05	55	-	60	-	130	-	0.5	-	120	
25	SP 06	70	-	245	-	125	-	5.5	-	280	

Results in ppm unless otherwise specified
 I = element present, but concentration too low to measure
 X = element concentration is below detection limit
 - = element not determined

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ANALYTICAL DATA

JR1300
 OPI - OPI9
 SCAMANDER SPI - SP20
 YARMOUTH Y1 - Y26

SAMPLE PREFIX

REPORT NUMBER

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TUBE No.	SAMPLE No.	Cu	Cu	Pb	Pb	Zn	Zn	Ag	Ag	As
1	SP 07	115	-	870	-	90	-	2.0	-	1400
2	SP 08	185	-	-	2050	-	100	-	152	11000
3	SP 09	80	-	580	-	155	-	2.0	-	1400
4	SP 10	110	-	-	875	-	125	-	233	13500
5	SP 11	65	-	110	-	135	-	1.5	-	330
6	SP 12	50	-	-	350	-	175	-	14	1450
7	SP 13	75	-	1450	-	135	-	1.5	-	1250
8	SP 14	30	-	245	-	95	-	2.5	-	37
9	SP 15	120	-	-	475	-	125	-	44	22000
10	SP 16	-	1250	-	8200	-	2775	-	98	25900
11	SP 17	-	225	-	2400	-	150	-	61	38500
12	SP 18	20	-	45	-	60	-	<0.5	-	110
13	SP 19	45	-	205	-	205	-	0.5	-	230
14	SP 20 ✓	35	-	220	-	80	-	<0.5	-	46
15	Y 01 ✓	20	-	50	-	60	-	<0.5	-	80
16	Y 02	70	-	35	-	90	-	<0.5	-	100
17	Y 03	15	-	40	-	95	-	<0.5	-	32
18	Y 04	20	-	30	-	60	-	<0.5	-	31
19	Y 05	45	-	45	-	125	-	0.5	-	36
20	Y 06	30	-	10	-	70	-	<0.5	-	27
21	Y 07	25	-	105	-	70	-	<0.5	-	17
22	Y 08	40	-	10	-	25	-	<0.5	-	8
23	Y 09	55	-	15	-	65	-	<0.5	-	60
24	Y 10	25	-	605	-	135	-	3.5	-	106500
25	Y 11	10	-	100	-	50	-	<0.5	-	100000

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.

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ANALYTICAL DATA

0P1 - 0P14
 SCAMANDER SPI - SP20
 YARMOUTH 3/1 -
 426

SAMPLE PREFIX

REPORT NUMBER

REPORT DATE

CLIENT ORDER No.

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28/08/89

24156

3 OF 6

TUBE No.	SAMPLE No.	Cu	Cu	Pb	Pb	Zn	Zn	Ag	Ag	As
1	Y 12	5	-	75	-	40	-	<0.5	-	38500
2	Y 13	30	-	233	-	65	-	4.0	-	140
3	Y 14	15	-	35	-	110	-	<0.5	-	18000
4	Y 15	25	-	1500	-	45	-	5.0	-	3400
5	Y 16	25	-	45	-	105	-	<0.5	-	50
6	Y 17	165	-	55	-	115	-	1.0	-	60
7	Y 18	30	-	50	-	75	-	<0.5	-	46
8	Y 19	40	-	40	-	130	-	<0.5	-	26
9	Y 20	35	-	30	-	105	-	<0.5	-	15
10	Y 21	20	-	20	-	100	-	<0.5	-	22
11	Y 22	15	-	30	-	40	-	<0.5	-	10
12	Y 23	60	-	20	-	45	-	<0.5	-	6
13	Y 24	35	-	60	-	65	-	<0.5	-	26
14	Y 25 ✓	45	-	20	-	70	-	<0.5	-	11
15	Y 26 ✓	40	-	45	-	120	-	<0.5	-	10
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	5	25	5	25	5	25	0.5	2	1
24	UNITS	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM
25	METHOD	101	104	101	104	101	104	101	104	114

Results in ppm unless otherwise specified.
 T = element present but concentration too low to measure
 * = element concentration is below detection limit
 - = element not determined

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495043

495044

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0.1 - 0.14
SCANDIUM SPI - SP20
YARMOUTH 7/11 -
426

ANALYTICAL DATA

SAMPLE PREFIX

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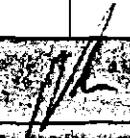
24156

4 OF 6

TUBE No.	SAMPLE No.	Au	AuChk						
1	DP 01	0.010	-						
2	DP 02	0.010	-						
3	DP 03	0.024	-						
4	DP 04	<0.008	-						
5	DP 05	<0.008	-						
6	DP 06	0.020	-						
7	DP 07	<0.008	-						
8	DP 08	0.008	<0.008						
9	DP 09	<0.008	<0.008						
10	DP 10	0.010	-						
11	DP 11	0.008	-						
12	DP 12	0.010	-						
13	DP 13	<0.008	<0.008						
14	DP 14 ✓	<0.008	-						
15	DP 15 ✓	<0.008	-						
16	DP 16	0.045	-						
17	DP 17	0.043	0.028						
18	DP 18	0.135	0.200						
19	DP 19	<0.008	-						
20	SP 01	<0.008	-						
21	SP 02	<0.008	0.011						
22	SP 03	<0.008	-						
23	SP 04	0.170	-						
24	SP 05	<0.008	-						
25	SP 06	<0.008	-						

Results in ppm unless otherwise specified
 E = element present, but concentration too low to measure
 X = element concentration is below detection limit
 - = element not determined

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ANALYTICAL DATA

011 - 2114
 SCANNED SPI - SP20
 YAMBOON VI -
 426

SAMPLE PREFIX

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TUBE No.	SAMPLE No.	Au	AuChk						
1	SP 07	<0.008	-						
2	SP 08	0.073	0.082						
3	SP 09	0.008	<0.008						
4	SP 10	0.051	-						
5	SP 11	<0.008	-						
6	SP 12	<0.008	-						
7	SP 13	0.009	-						
8	SP 14	<0.008	-						
9	SP 15	0.099	-						
10	SP 16	0.904	0.924						
11	SP 17	0.272	0.276						
12	SP 18	0.008	-						
13	SP 19	<0.008	-						
14	SP 20 ✓	<0.008	-						
15	Y 01 ✓	<0.008	-						
16	Y 02	0.023	-						
17	Y 03	0.040	-						
18	Y 04	<0.008	-						
19	Y 05	<0.008	-						
20	Y 06	<0.008	-						
21	Y 07	<0.008	-						
22	Y 08	<0.008	-						
23	Y 09	<0.008	-						
24	Y 10	0.217	-						
25	Y 11	0.155	-						

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

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ANALYTICAL DATA

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TUBE No.	SAMPLE No.	Au	AuChk						
1	Y 12	0.115	0.123						
2	Y 13	<0.008	-						
3	Y 14	0.017	-						
4	Y 15	0.009	-						
5	Y 16	<0.008	-						
6	Y 17	<0.008	-						
7	Y 18	<0.008	-						
8	Y 19	<0.008	-						
9	Y 20	<0.008	-						
10	Y 21	<0.008	-						
11	Y 22	<0.008	<0.008						
12	Y 23	<0.008	-						
13	Y 24	<0.008	-						
14	Y 25	<0.008	-						
15	Y 26	<0.008	-						
16									
17									
18									
19									
20									
21									
22									
23	DETECTION	0.008	0.008						
24	UNITS	PPM	PPM						
25	METHOD	309	309						

Results in ppm unless otherwise specified.
 T = element present, but concentration too low to measure.
 X = element concentration below detection limit.
 - = element not determined.

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APPENDIX 2.

495047

**Petrographic descriptions of samples from the
Yarmouth and Orieco Prospects.**

Sample numbers correspond with those in the text and on prospect maps.
Descriptions by G. Davidson, Dept. of Geology, University of Tasmania

Yarmouth Prospect.

Sample Y9. AMG 605650mE, 5414400mN. Mathinna Beds. Collected from outcrop in creek near main lode. Polished thin section.

Description Mildly hornfelsed, sub-mature, moderately sorted greywacke.

Hand specimen

Mildly hornfelsed dark grey sediment, containing fine flecks of arsenopyrite.

Thin section

Framework 50% of the rock, consisting dominantly of subround to subangular quartz, with minor lithic fragments and feldspar. Matrix of fine silt-sized quartz and smectites. Accessories: zircon (multiple cycle), detrital biotite and muscovite. Opaques: <1% arsenopyrite, pyrrhotite, pyrite and chalcopyrite. Minor ilmenite is not associated with the sulphides.

Brief textural description

Despite the hornfelsed field appearance, the rock seems basically unmetamorphosed in thin section. The average grain size is about 0.08 mm, ranging from 0.02-0.3 mm. Quartz grains are subround to subangular, with an alignment of long axes to bedding. The sulphides form small disseminated clusters of anhedral grains, mainly altering small phyllic rock fragments.

Sample Y11. AMG 605650mE, 5414400mN. Ore specimen from main dump. Polished block.

Description Gold-bearing quartz-arsenopyrite vein assemblage

Hand specimen

Semi-clear quartz vein containing 4 to 6 long arrays (presumably parallel to vein walls) and projecting crystals of euhedral arsenopyrite

Reflected light description

Mineralogy Approx. proportions: Quartz 70%, arsenopyrite 25%, chlorite? 3%, sphalerite <1%, argentite/argentiferous galena trace, gold 4 grains, chalcopyrite trace.

Textures Arsenopyrite is the dominant opaque, occurring in two main generations, one major, and one relatively minor forming perhaps 2% of all arsenopyrite. The abundant generation forms coarse strings consisting of compact coalesced masses of crystals varying from 0.5mm to 0.5 cm in diameter. These are optically and dimensionally similar (uniform anisotropic extinction) to disseminated finely-fractured arsenopyrite euhedra scattered within the quartz matrix.

A 1 cm wide zone of brecciated arsenopyrite is the main host for sphalerite, chalcopyrite, gold and argentite (? identified on the basis of its hardness, and lack of galena pitting). Within this zone, arsenopyrite forms angular chips averaging 0.02 mm long, together with less common larger relict euhedral grains. Anhedral corroded sphalerite, containing sparse blebs of chalcopyrite, crystallised in the same brecciation episode. Argentite post-dates the brecciation, cementing other fragments. Gold occurs as 40-80 micron grains within arsenopyrite fractures, generally in contact with base metal sulphides.

The subordinate arsenopyrite generation is most abundant in the brecciation zone, but also occurs as a thin skin on the euhedral surfaces of older disseminated grains (stoss growth: indicating one fluid flow direction during deposition), and in cracks within quartz. It is distinctively pinker, mottled and patchy compared with the older euhedral generation.

Genetic interpretation Arsenopyrite and quartz crystallised as open-space vein fill. A brecciation event, such as boiling late in the history of the vein, changed the fluid physiochemical conditions rapidly enough to deposit base-metals, gold, silver and anomalous arsenopyrite. The latter may also contain crystal lattice gold. Characterising areas of brecciation is likely to indicate the best gold grades in this system.

Sample Y19. AMG 605720mE, 5414400mN. Mathinna Beds float. Polished thin section.

Description Moderately hornfelsed feldspathic sandstone

Hand specimen

Fine-grained dark green hornfels with a bleached weathering rind, flecks of sulphide, and fine cross-cutting veins.

Thin section

Mineralogy: Framework: 70% of the rock, consisting mainly of vein-derived quartz grains, and finely sericitised K-feldspar and minor plagioclase. Matrix: smectites and fine silt flakes. Accessories: zircon. Opaques: about 1% fine disseminated weathered arsenopyrite. Metamorphic minerals: about 20% disseminated zoisite, actinolite and chlorite.

Brief textural description The framework-dominated sandstone is distinctly metamorphosed to lower-middle greenschist facies, on the evidence of zoisite, actinolite growth, and grain-boundary replacement of quartz. Arsenopyrite forms subhedral grains intimately intergrown with disseminated metamorphic zoisite and clear chlorite. The veins form 3 main cross-cutting sets consisting of monomineralic zoisite. There is no relationship between the grains and the distribution of sulphide.

Oriecopropect

Sample OP17. AMG 601200mE, 5413800mN. Main adit, 4m from entrance, northeast wall. Chip sample of sulphide ore.

Description Massive vein-style arsenopyrite, with subordinate oxidised copper minerals

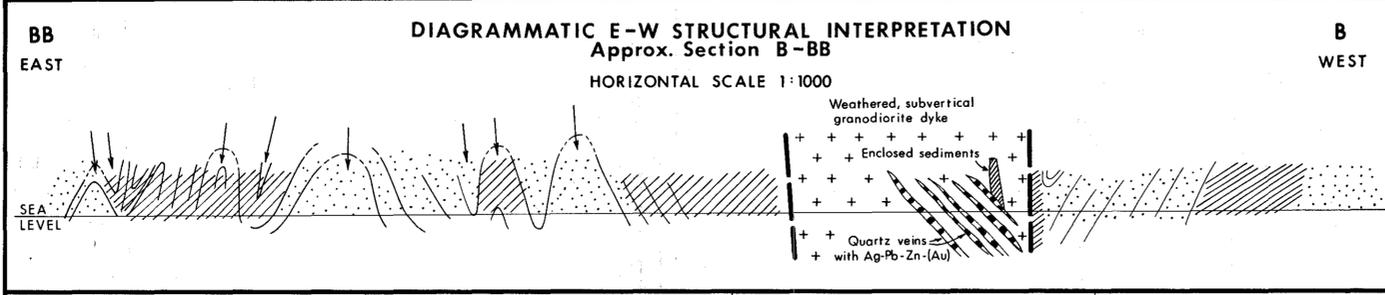
Hand specimen

Massive arsenopyrite containing malachite within fine fractures, reported as vein origin

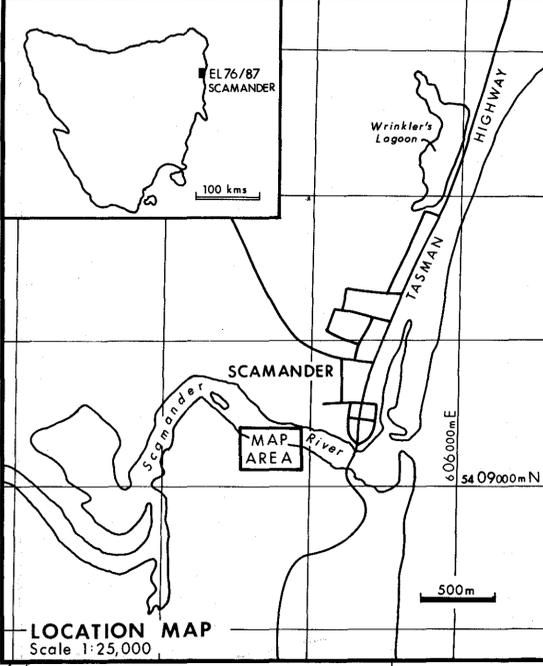
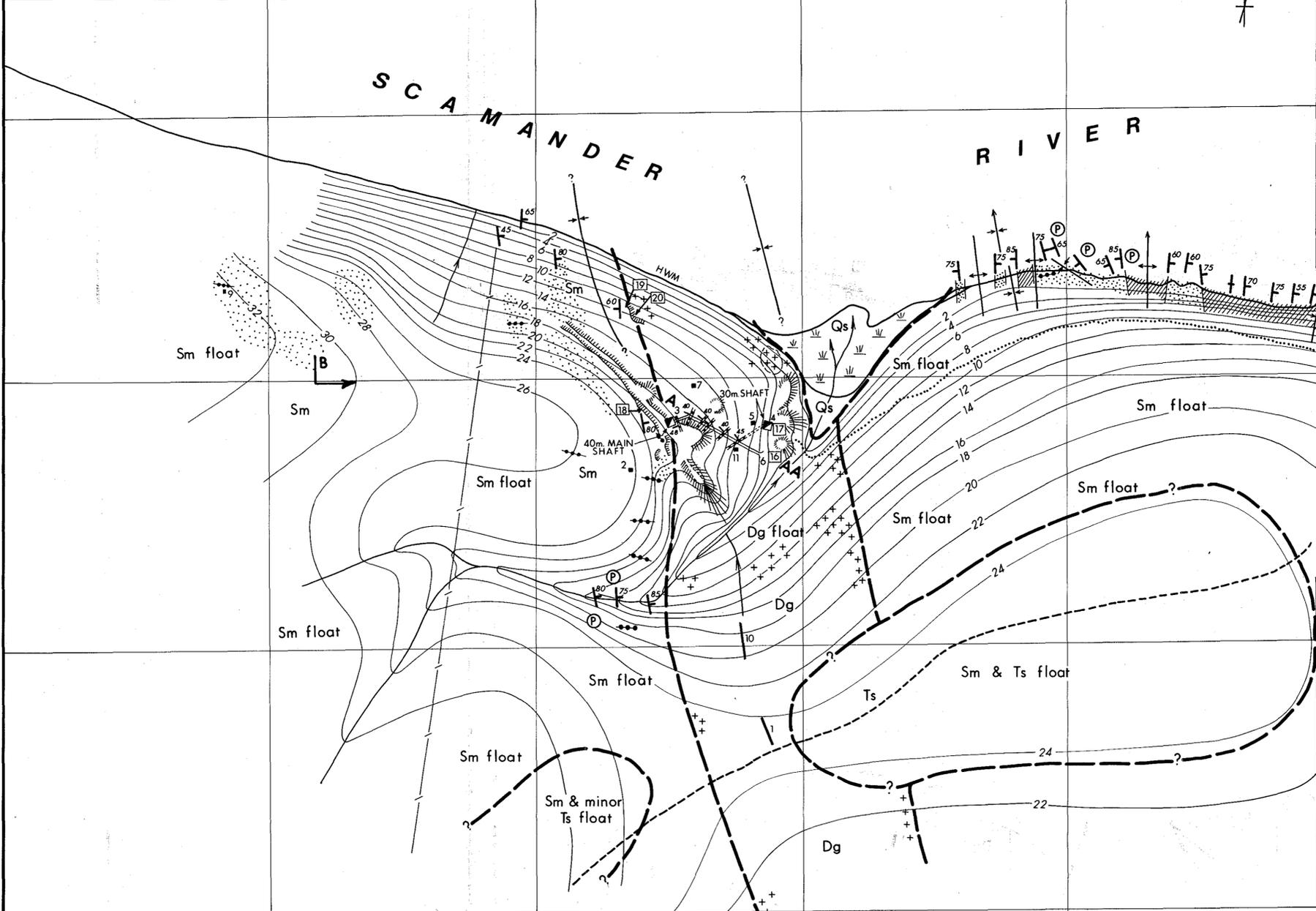
Reflected light description

Mineralogy, approximate proportions: Arsenopyrite 85-88%, chalcocite-digenite-covellite intergrowth 5-7%, malachite + clays 5%, silicates 2%, chalcopyrite and bornite trace.

Brief textural description Strongly fractured massive arsenopyrite is the dominant phase, with minor cracks 0.4mm apart, up to major blocks 1-2mm wide. The copper minerals are now an oxidised assemblage after chalcopyrite, with the result that semi-coliform overgrowths of covellite are common. Chalcopyrite was originally distributed in 3-4mm wide vein-like domains, although the sample is too small to know the relationship between these and the main vein walls. Alteration of arsenopyrite by chalcocite/digenite (after chalcopyrite) is common.



B WEST

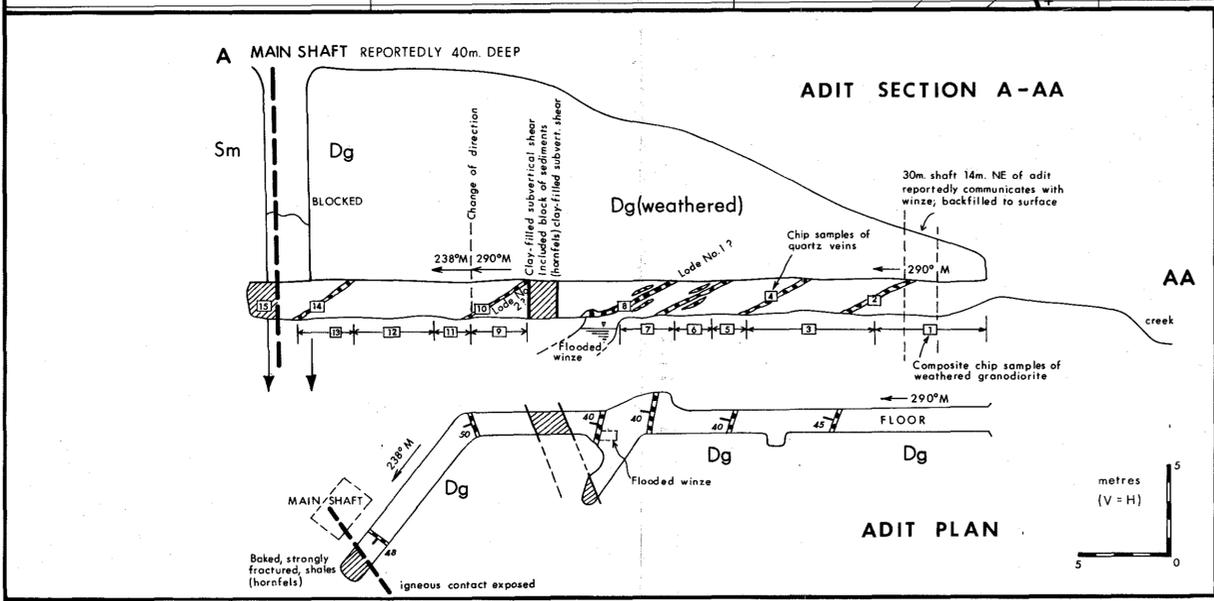


KEY

- Qs Quaternary - creek and marsh deposits
- Ts Tertiary lag gravel
- Dg Devonian granodiorite (Scamander Tier Granodiorite), mainly obscured by residual soil.
+ = outcrop, + = surface boulders
- Sm Siluro-Devonian indurated sandstone, shale and siltstone (Mathinna Beds).
 Predominant sandstone ▨ and shale/siltstone ▩ horizons indicated
- Geological boundary, inferred
- Dip, strike of beds; fold axis and plunge
- Trend of subvertical quartz veins in Sm, granodiorite
- 12 Sample location, grab and channel; samples 1-15 in adit
- Old working, trench, pit, dump
- Adit
- Strike and dip of mineralised quartz veins in adit
- Vehicular track, foot track
- Water-course
- P Photographic location point and direction
- Contour (interval 2m.) position and height approx.

Map compiled from compass, inclinometer and measuring wheel

SCALE 1:1000
 0 50 100 metres
 5 cm



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SEABED RESOURCES N.L.

EL. 76/87 - TASMANIA
 SCAMANDER PROSPECT

495350

REF. No.	
Compiled	W. C. C.
Drawn	T. K. D.
Date	Sept. 1989
Scale	1:1000

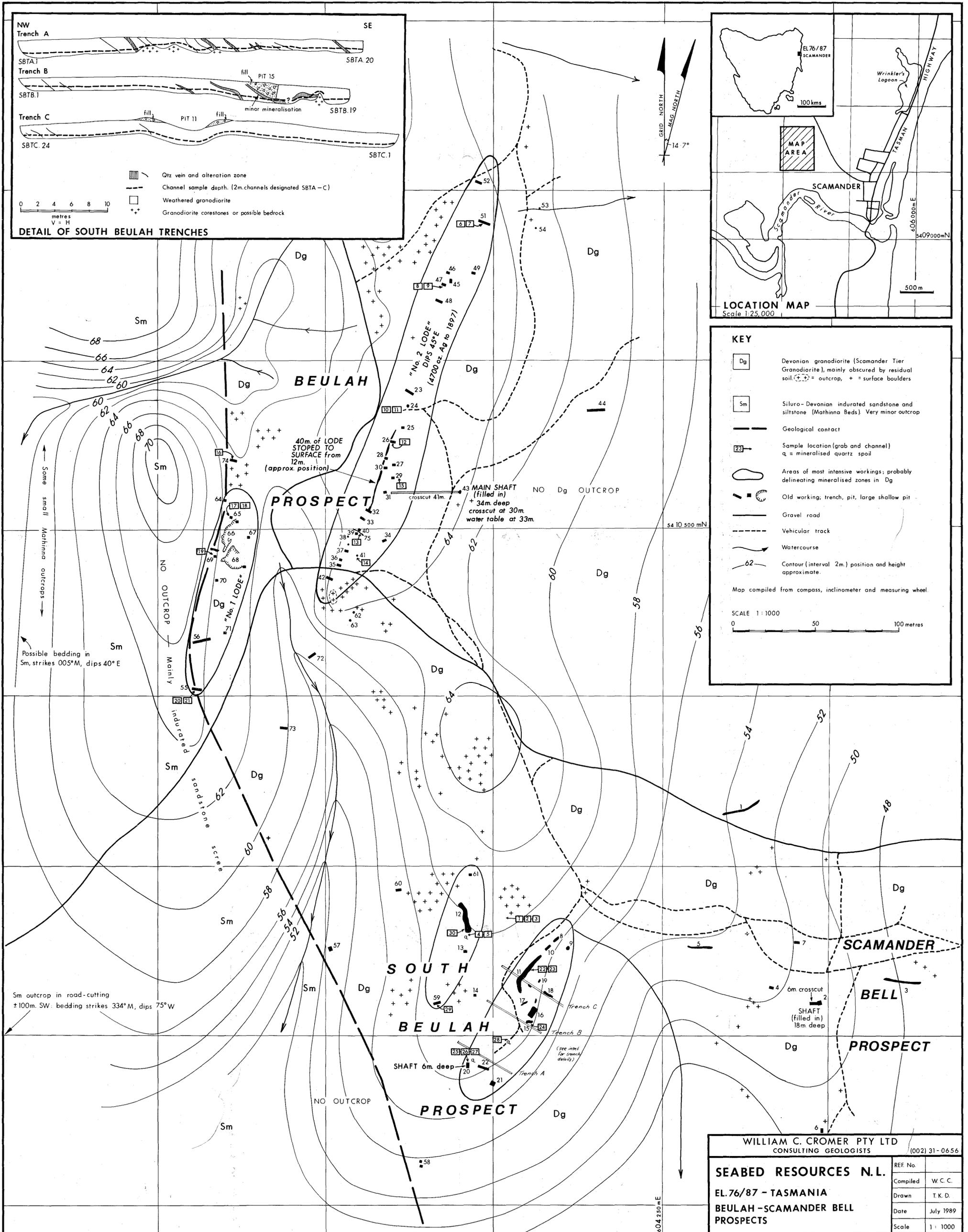
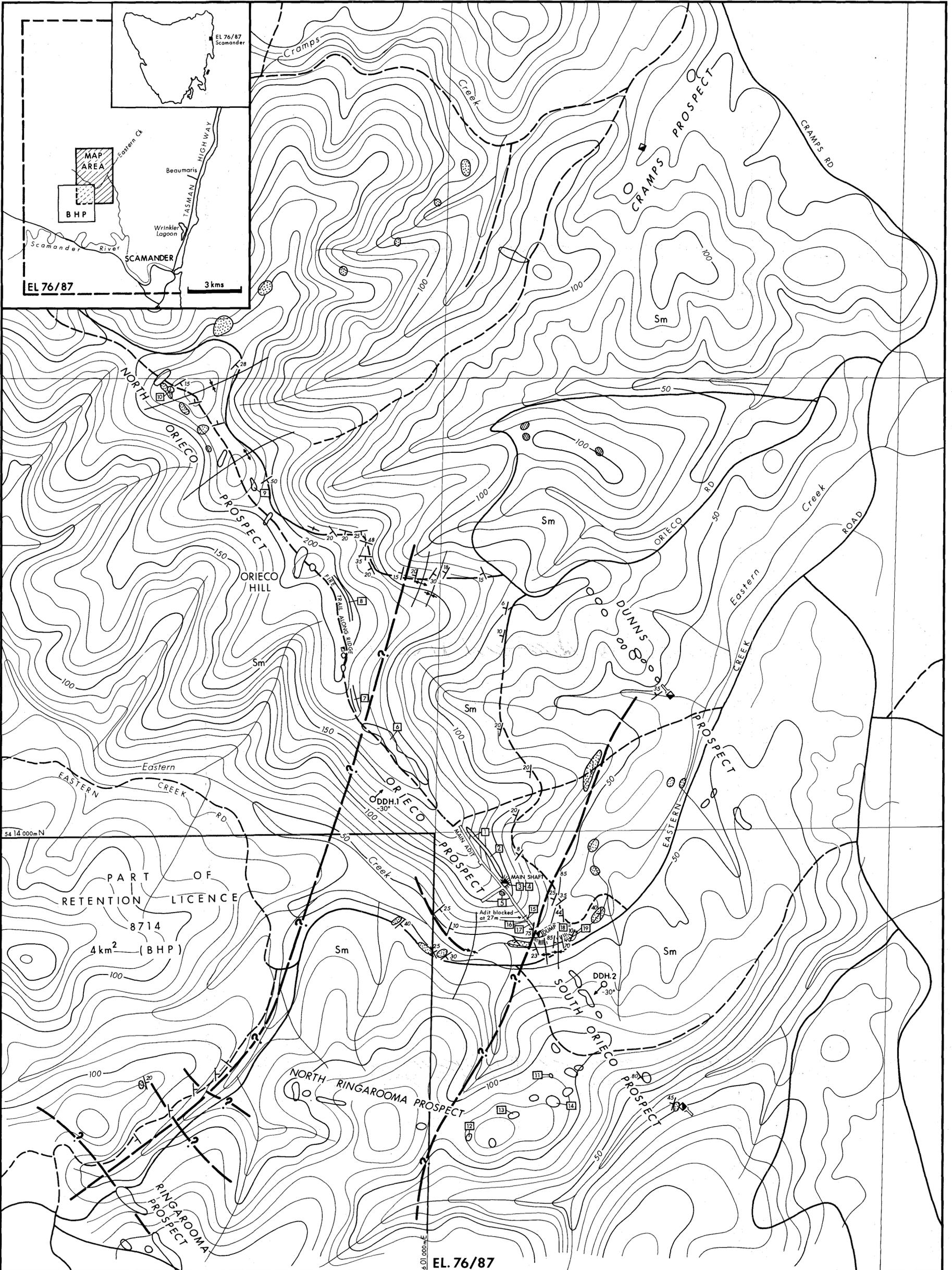


Figure 4
 90-3120.
 495051



KEY	
	Prominent sandstone outcrops, Siluro-Devonian Mathinna Beds (Sm)
	Prominent siltstone/mudstone outcrops, Siluro-Devonian Mathinna Beds (Sm)
	Gossanous outcrop and float
	Strike and dip of bedding
	Anticlinal; synclinal axial trend
	Fault; observed, approximate, inferred (dip of fault surface indicated)
	Sample location
	Adit
	Shaft
	Gravel road
	Contour (interval 20m)
	Dept Mines' diamond drill hole c.1941

GRID NORTH
MAG NORTH
15°

0 100 200 300 400 500
metres

5cm

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SEABED RESOURCES N.L.
EL. 76/87 - TASMANIA
NORTH ORIECO, ORIECO & SOUTH ORIECO PROSPECTS

REF. No.	
Compiled	W.C.C.
Drawn	T. K. D.
Date	Aug. 1989
Scale	1:4000

Map based on Henderson (1941) with modifications

90-31201

435053