

97-4074

**GOLDSTREAM MINING NL**

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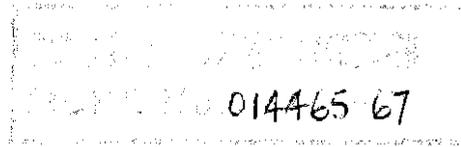


**TITAN RESOURCES NL**

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6872

276001

**CORINNA PROJECT**



**EXPLORATION LICENCE NO. 43/94  
CORINNA, WESTERN TASMANIA**

**ANNUAL REPORT TO 4/1/97**

Volume 1 of 3

EL43/94

See folio 12

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ANNUAL REPORT - CORINNA  
EL 43/94 - GOLDSTREAM MINING/TITAN  
RESOURCES - N J TURNER - VOL 1 OF 3

Prepared by: N.J. Turner Geological Services Pty Ltd  
65 Lochner Street, West Hobart Tasmania 7000

22<sup>nd</sup> October, 1997

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## CONTENTS

276003

<b>1.0 Summary</b>	<b>1</b>
<b>2.0 Introduction</b>	<b>1</b>
<b>3.0 Tenement information</b>	<b>2</b>
<b>4.0 Exploration concepts</b>	<b>2</b>
<b>5.0 Previous work in EL 43/94</b>	<b>2</b>
5.1 GEOLOGY	2
5.2 HISTORICAL GOLD WORKINGS	3
5.2.1 Stream workings	3
5.2.2 Workings in Tertiary to Recent Gravels	4
5.2.3 Hardrock workings	5
5.3 IRON ORE EXPLORATION	5
5.4 RECENT MINERAL EXPLORATION	6
5.4.1 Overview	6
5.4.2 Work in the Bowry Formation	6
5.4.3 Work outside the Bowry Formation	7
<b>6.0 Work carried out by Goldstream and Titan</b>	<b>8</b>
6.1 STREAM SEDIMENT SAMPLING	8
6.2 AEROMAGNETIC SURVEY	8
<b>7.0 Results</b>	<b>9</b>
7.1 PANNED CONCENTRATE SAMPLES	9
7.1.1 Gold grains recovered	9
7.1.2 Travel damage to gold grains	9
7.1.3 Intergrowths and inclusions in gold	10
7.1.4 Gold fineness	10
7.1.5 Counts of gold grains	10
7.2 MINUS 80 MESH SAMPLES	11
<b>8.0 Conclusions</b>	<b>13</b>
<b>9.0 Recommendations</b>	<b>14</b>
<b>10.0 Environmental matters</b>	<b>14</b>
<b>11.0 References</b>	<b>14</b>

## LIST OF FIGURES

- Figure 1 Exploration licences comprising the Corinna Project area of the Goldstream – Titan Joint Venture.
- Figure 2 Tenement and geology plan.
- Figures 3,4,5 Graphical presentations of minus 80 mesh stream sediment sample analyses.
3. Gold in panned concentrate, Gold in minus 80 mesh.
  4. Silver and arsenic in minus 80 mesh.
  5. Copper, lead and zinc in minus 80 mesh.

## LIST OF APPENDICES

- Appendix 1 Stream sediment sample numbers and AMG coordinates of sample sites.
- Appendix 2 Minus 80 mesh analyses.
- Appendix 3 (separate volume): Nolan, H.D. 1996. Microscopic examination of gold particles in panned concentrate samples. Report to the Goldstream – Titan Joint Venture.
- Appendix 4 (separate volume): Kitto, P.A. 1996. A petrographic and geochemical investigation of gold: Arthur Mobile Belt, western Tasmania. Report to Goldstream Mining NL.

## LIST OF PLANS

- Plan 1 Previous mineral exploration grids and surveyed lines; previous stream sediment sampling; old alluvial workings.
- Plan 2 Access; drainage; stream sediment sample numbers and locations.
- Plan 3 Drainage; counts of gold grains in panned concentrates; with gold, arsenic and silver in minus 80 mesh.
- Plan 4 Drainage; copper, lead and zinc in minus 80 mesh; notable crystalline minerals in panned concentrates.
- Plan 5 Corinna (Tas) detailed helimag survey, contour map of total magnetic intensity.

## 1.0 Summary

- The Goldstream – Titan Joint Venture's primary interest in EL 43/94 is exploration for gold.
- Gold in apparently good quantities was won from streams in EL 43/94 in the late 1800's. In the same period attempts were made to hydraulically mine high level, remnant Tertiary gravels and a number of hardrock occurrences of gold were located
- Modern mineral exploration has identified copper-zinc-trace gold in iron-rich rocks at the Alpine anomaly, also a siliceous banded ironstone near the Owen-Meredith River which carries copper and gold.
- Studies reported here indicate that the widespread alluvial gold in EL 43/94 is mostly of local derivation. Previously it was thought likely that much of the gold was transported into the area by Tertiary streams.
- Reconnaissance minus 80 mesh and panned concentrate stream sediment sampling has identified four areas for detailed investigation.
- Detailed helimag has been acquired as an aid to mapping and to structural interpretation.

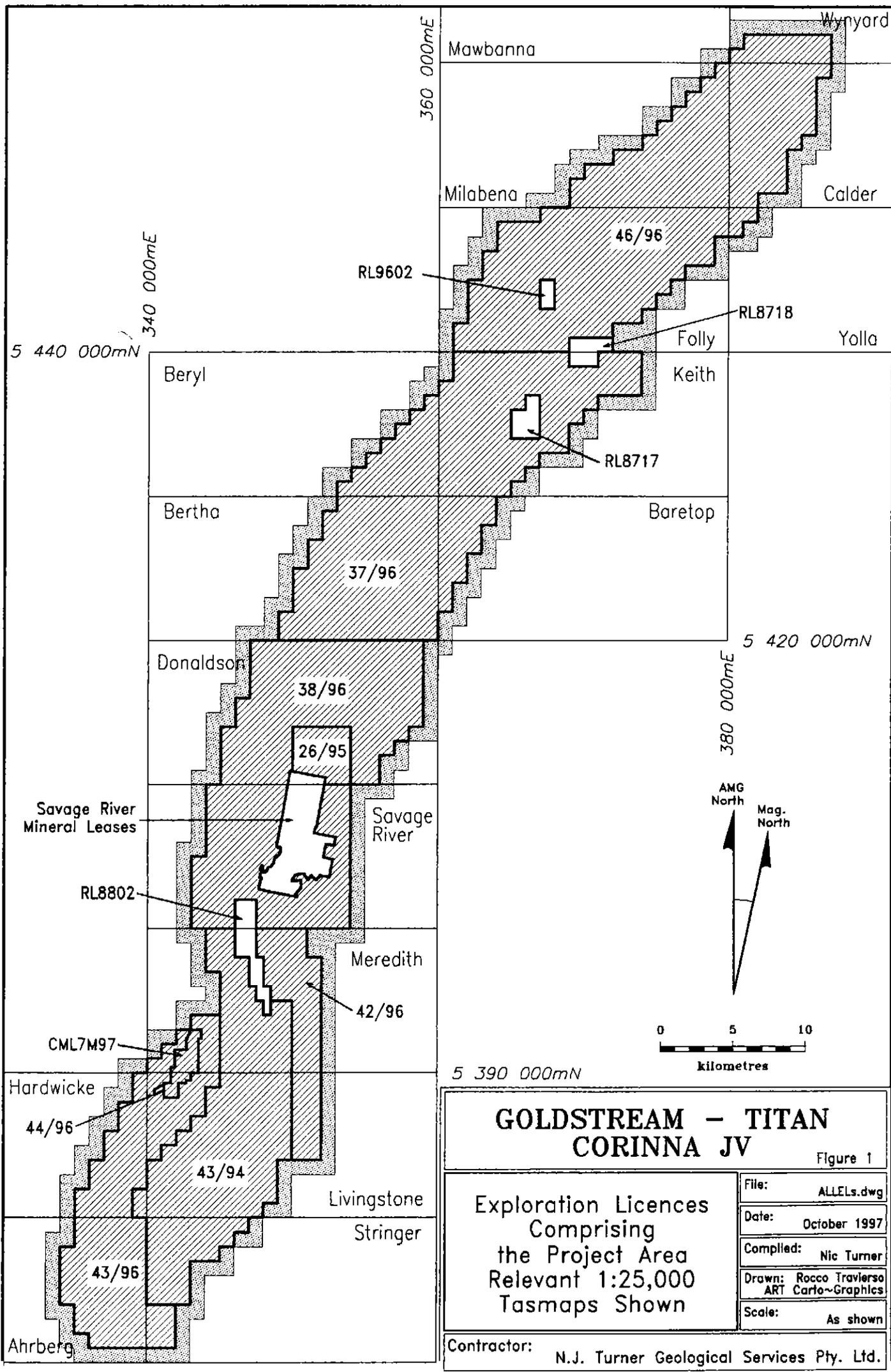
## 2.0 Introduction

This report outlines the nature and results of work by the Goldstream – Titan Joint Venture in Mineral Exploration Licence No 43/94 during the 1995-1996 summer field season. The work represents Stage 1 of the Joint Venture's Corinna Project which encompasses seven exploration licences covering virtually all of the Arthur Metamorphic Complex in north western Tasmania. Work for the 1996-1997 summer field season was in progress on the due date of the Annual Report (4/1/97) and will be described in the next Annual Report.

The exploration licences comprising the area of the Corinna Project (Figure 1) are EL 43/94 Corinna, EL26/95 Specimen Creek, EL 37/96 Rapid River, EL 38/96 Savage River, EL 42/96 Rocky River, EL 43/96 Pieman River and EL 46/96 Flowerdale River. In addition, an arrangement has been made with H. D. Nolan to carry out work on Consolidated Mineral Lease 7M97 which is bordered by the Joint Venture's EL 43/96.

A small exploration licence (No 44/96) held by R. Holland falls within EL 43/96. Holland's licence is for alluvial deposits and is limited to a depth of 15m. The Joint Venture has the right to explore within the licence area for deposits at depths greater than 15m. A lease shown as an excision from EL 43/94 at AMG 349000E, 5392000N in Figure 2 has been relinquished and the ground has become part of EL 43/94.

EL 43/94 was the first tenement acquired by the Goldstream – Titan Joint Venture in the Corinna district. It was taken up following a conceptual targeting exercise that focussed on Homestake style, Proterozoic, iron formation hosted, lode gold in the north west of Tasmania (Morritt, 1995). Fieldwork commenced in the tenement on 8/1/96.



### 3.0 Tenement information

Exploration Licence No 43/94 extends NNE from a locality 6km SW of the Reece Dam on the Pieman River to a locality 7km SW of Savage River township (Plans 1-4). The licence covers an area of 127skm and falls within the Tasmap 1:25000 sheets of Stringers, Hardwicke, Livingstone and Meredith (Figure 1).

Land categories in the licence area include State Forest classified as Multiple Use Forest Land, Crown Land and Crown Land classified as Deferred Forest Land. There is a 2.5skm area of land near Reece Dam which is vested in the Hydro Electric Commission. The land is excluded from EL 43/94 though access for mineral exploration is a negotiable matter with the HEC. The Pieman River State Reserve (Plans 1-4) is excluded from EL 43/94. However, mining is permissible at depths of greater than 50m below the surface.

EL 43/94 was granted on 3/2/1995. It will remain current to 3/2/2005, providing that the licensee's performance is deemed satisfactory by the Tasmanian Minister for Mines.

### 4.0 Exploration concepts

The following ideas underpinned the Joint Venture's initial interest in EL 43/94.

1. EL 43/94 covers a greenstone belt that contains lithologies which are consistent with the possible presence of Proterozoic, iron formation hosted, lode gold. However, given that all lithologies in a greenstone belt are capable of hosting gold, the aim should be to achieve a general coverage of the rocks in EL 43/94.
2. The widespread alluvial gold in the Corinna district is mostly of local derivation. Some alluvial gold was sourced directly from bedrock. Other alluvial gold was sourced locally, but was transported for short distances in the earliest of the Tertiary streams. These streams deposited the relatively gold-enriched basal gravels at Lucy Spur, Nancy Spur and elsewhere.

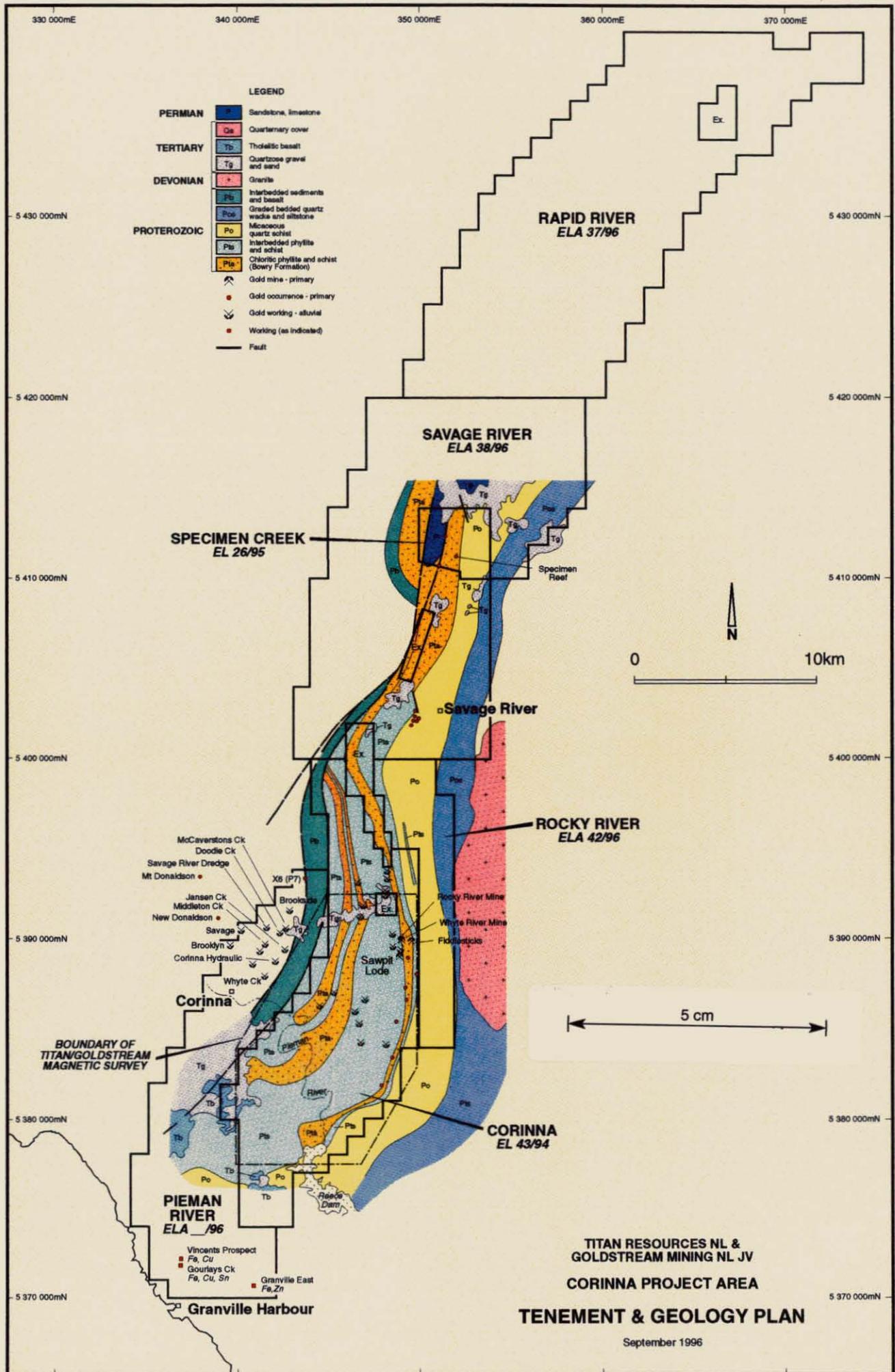
### 5.0 Previous work in EL 43/94

#### 5.1 GEOLOGY

The rocks in EL 43/94 and EL 42/96 (Figure 2) are a cross section of the Arthur Metamorphic Complex which is a linear greenstone belt that exceeds 100km in length and ranges up to about 10km in width (Turner et al, 1991; Calver, et al 1995). EL 43/94 and EL 42/96 are located in the widest part of the belt, where it changes trend from ENE to NNE.

In EL 43/94 the rocks comprise the Timbs Group (Pta, Pts in Figure 2) and the Oonah Formation (Po in Figure 2). The boundary between the Timbs Group and the Oonah Formation is structurally complex but appears to be transitional.

Schist and phyllite (Pts) in the Timbs Group are mostly muscovitic or chloritic though some intervals are quartzose. Respectively, these various compositional types were probably derived from muddy siltstone, (?) mafic



volcaniclastic siltstone and quartzose wacke. The chloritic schist and phyllite units (Pta) comprise mostly chlorite schist and chlorite phyllite with interbands of relatively massive amphibolite after tholeiitic basalt and dolerite. Disseminated magnetite is uncommon in the western Pta unit (Nancy Formation) but is abundant in the middle unit (Lucy Formation) and the eastern unit (Bowry Formation). The Bowry Formation contains widespread lenses of interlayered chlorite schist, amphibolite and massive to banded ironstone consisting of magnetite + pyrite  $\pm$  silicate. A granitoid in the Bowry Formation returned an ion probe zircon age of 777 Ma which is late Proterozoic.

The Oonah Formation comprises muscovitic schist and muscovitic phyllite interbanded with quartzose schist. This assemblage was derived from an interbanded sequence of mudstone, siltstone and turbiditic quartzose wacke.

Deformation is intense in the Arthur Metamorphic Complex with isoclinally folded compositional banding usually dipping subvertically and the second cleavage commonly dominant and also subvertical. The rocks mostly display retrograde greenschist facies metamorphism but relict amphibolite facies minerals including almandine, hornblende and glaucophane-crossite are locally preserved, particularly in the Bowry Formation. K-Ar hornblende ages give a minimum age for prograde metamorphism of about 500 Ma which is Cambrian. The Cambrian Period was an important time of metallogenesis in Tasmania.

A substantial Devonian granite intrusion outcrops a few kilometres east of EL 43/94 (Figure 2). Tin mineralisation and base metal mineralisation are associated with the granite. A small body of Devonian quartz porphyry is known in EL 43/94, at Timbs Creek.

Tertiary gravel is widespread in EL 43/94, occurring as remnant deposits on ridge tops. Thin basalt flows are commonly associated with the gravel.

## 5.2 HISTORICAL GOLD WORKINGS

### 5.2.1 Stream workings

Payable alluvial gold was discovered in the Corinna district in February, 1879 (Julen, 1984). The first discovery was at Middletons Creek, some 4km west of EL 43/94 (Figure 2). No accurate overall production figures exist for the alluvial mining at Middletons Creek, or for early alluvial mining in streams elsewhere in the Corinna district (Bottrill, 1991). The Tasmanian bank returns of the time are an inadequate record of production because it is believed that much (?most) of the gold was taken directly to Victoria for sale (Twelvetrees, 1903).

By 1881 shallow Recent gravels in Nancy Creek, Lucy Creek and the Paradise River, which are all within EL 43/94 (Plan 1), were being worked and some very coarse gold was reported. Around the same time similar gravels in streams near Browns Plains were being worked as well as gravels in streams south from the Paradise River to the Owen-Meredith River.

In 1882 McGinty and party recovered a 243 ounce (7.5kg) nugget from a depth of 5 or 6 feet in gravels in the Rocky River at a point about 1km above its

junction with the Whyte River (Julen, 1981), near AMG 349250E, 5389475E. Nuggets of 140 ounces and 39 ounces were found in the Rocky River shortly afterwards. Nuggets of up to 3 ounces were occasionally found in the period to 1900, during which time a considerable amount of gold was apparently won from the Rocky River and some of its tributaries. The Rocky River has been worked on a small scale intermittently up to the present day, with suction dredging being used in recent times.

Several alluvial mining operations were carried out in the Whyte River near its junction with the Rocky River. These included working the bed of the river by bucket dredging (1901-1903) and by hydraulic mining (1932-1934). The latter method was applied in the loop of the river upstream of the junction after the riverbed was drained by diversion of the river through a tunnel under the spur at AMG 349000E, 5390000N. Neither mining operation returned gold in the quantity that was apparently derived from the Rocky River, and both were abandoned.

Upper terrace gravels with an elevation of some 18m above the bed of the Whyte River at AMG 348600E, 5389600N, downstream of the Rocky River junction, were worked hydraulically in Tarrys Mine (1936-1938) but the presence of large boulders frustrated the operation. The greater part of the gold that was recovered was derived from basal gravels rich in pebbles of magnetite and hematite (Blake, 1939).

### 5.2.2 Workings in Tertiary to Recent Gravels

In the period 1893 to 1897 several companies developed hydraulic workings in the extensive Tertiary to Recent gravels north and north east of the Corinna township (Figure 2). Hydraulic workings were also developed in Tertiary gravels capping ridges at Nancy Spur and Lucy Spur which are within EL 43/94 (Plan 1). None of these hydraulic workings was successful because the average recovered grades were too low (about 0.1 grams per cubic metre north and north east of Corinna).

At Nancy Spur and Lucy Spur the Tertiary gravels are some 15m thick. However, the greater part of the gold was found to be unevenly distributed through the basal layer of gravel whilst the much greater volume of overlying gravel contained almost no gold (Blake, 1939; Montgomery, 1894). A similar situation was encountered at Browns Plains where adits driven along the basal contact of the Tertiary gravels encountered rich patches of gold but little was found in the overlying gravels.

Gold in the basal gravel layer at Lucy Spur was reported to be waterworn to angular, of coarse grain size and to be associated with tourmaline, rutile and chromite. It sometimes occurred as angular composite grains with quartz which suggests local derivation. One small 'auriferous leader' was exposed during sluicing.

### 5.2.3 Hardrock workings

The sections of the Rocky River and its tributaries which have been a source of alluvial gold flow across the Bowry Formation and adjacent rocks. At Rocky River the Bowry Formation includes two intervals containing bands of magnetite with subordinate pyrite. The more westerly of these intervals at AMG 349075E, 5390000N was investigated by the underground workings of the Rocky River Mine (1895-c1900) but no significant production of gold was achieved.

The best gold assay in published reports by the operators of the Rocky River Mine was 1oz 5dwt 8grs per ton whilst the best copper assay was 5% (Twelvetrees, 1900). The University of Tasmania returned an assay of 1.5dwt Au and 15.5dwt Ag from a grab sample of magnetite taken by Twelvetrees (1900) from a stack outside the main adit of the mine. An assay by the then Government Analyst of another sample gave 0.1% Cu, trace Au and 9dwt 19grs Ag. Small amounts of mineralisation containing Ni, Ba, Co, Mo, Pb, As and asbestos were reported from the workings.

Scattered, small prospecting adits and shafts between the Rocky River and the Owen Meredith River (Figure 2, Plan 1) also encountered patchy gold and copper mineralisation.

Good alluvial gold in a creek some 700m SSE of the Lucy Spur Tertiary gravel workings was traced to a source on the western slopes of the creek valley by sluicing (Harcourt Smith, 1897). Several adits were driven into the hillside (Plan 1) to develop a quartz porphyry intrusive carrying gold and copper. No assays or production figures for these workings have been located in the available literature. Importantly, the workings demonstrate that there is bedrock gold mineralisation in EL 43/94 outside of the Bowry Formation and adjacent rocks.

## 5.3 IRON ORE EXPLORATION

The belt of rocks containing magnetite-pyrite lenses which is now called the Bowry Formation (Plan 1, Figure 2) has been known since the early days of prospecting and mining in the Corinna and Savage River districts (Twelvetrees, 1903). Initially the magnetite-rich lenses were prospected for gold and copper, but later their potential as sources of iron ore became of interest.

Most interest has focussed on the larger magnetite lenses beside the Savage River (Duncan and Weatherstone, 1990), north east of EL 43/94. These have been mined for iron ore since 1967 by Pickands Mather and are currently being redeveloped by Australian Bulk Minerals. A fair amount of assessment work has also been done on the magnetite lens in Retention Licence 8802 (Figure 1) by Savage Resources, mostly under the company's previous name of Industrial and Mining Investigations. In addition IMI - Savage Resources carried out considerable work in RL 8802 on magnesite deposits in the Bowry Formation (Frost, 1982) and on overlying, surficial ochre deposits.

Magnetite lenses occur in the Bowry Formation in EL 43/94 (Reid, 1924), but only those between the Whyte River and Rocky River have attracted interest as

possible sources of iron ore (Urquhart, 1966). Geological mapping and a ground magnetometer survey were carried out over these in the early 1960s and two holes were diamond drilled in the more easterly interval containing magnetite (Plan 1). A small, low grade resource was inferred (Shannon, 1988).

## 5.4 RECENT MINERAL EXPLORATION

### 5.4.1 Overview

Most parts of the Bowry Formation in EL 43/94 have attracted mineral exploration in recent times (Plan 1). However, the degree of detail has varied considerably and only one locality has been tested by diamond drilling. Outside of the area underlain by the Bowry Formation geological mapping, regional stream sediment sampling and rock chip sampling have been carried out but the overall coverage of EL 43/94 is patchy and of a reconnaissance standard. Little recent work has been done between the Whyte River and the Paradise River, west of the Bowry Formation, where there is widespread evidence of early alluvial mining and a known example of hard rock mining.

### 5.4.2 Work in the Bowry Formation

CRA – Peko (Weir, 1985) gridded the Alpine aeromagnetic anomaly which is in the Bowry Formation 4km southwest of Reece Dam (Plan 1), in an area where the Tasmanian Geological Survey had previously found massive copper-bearing pyrite outcropping in a road cut. Geological mapping, soil sampling, ground magnetics and Genie EM were used to define two drill targets.

DDH AP1 returned 12.75m averaging 0.24% Cu from an interval of metasedimentary schist and ?metaigneous schist containing semi-massive, magnetite-rich and pyrite-rich bands. A veined interval just uphole returned 8.2m averaging 0.19% Zn and 0.04% Cu. DDH AP2 intersected similar rocks and returned 27.4m averaging 0.53% Cu, again with a veined uphole interval. The latter returned 26m averaging 500ppm Zn. Outokumpu (Herrman, 1991) assayed selected samples of the copper rich interval in each hole for gold, returning a best value of 0.105gpt.

Outokumpu gridded a section of the Bowry Formation between Reece Dam and the Owen Meredith River (Herrmann, 1991). Geological mapping, rock chip sampling, soil sampling and a small amount of stream sediment sampling were carried out. A banded, siliceous ironstone in a narrow zone near the eastern contact of the Bowry Formation was found to contain chalcopyrite and gold. Best values of 0.5% Cu and 0.29gpt Au were returned from this ironstone whilst chip sampling across a 10m interval in Doctors Creek returned bulk values of 0.12% Cu and 0.045gpt Au. Massive magnetite-subordinate pyrite lenses near the western edge of the Bowry Formation returned up to 70% Fe but the copper and gold values obtained were low.

Eight profile traverses across the Bowry Formation were carried out by Fodina Minerals (Poltock, 1993) between the Owen Meredith River and the Rocky River, a distance of about 5km. These traverses involved geological mapping,

rock chip sampling, B/C soil sampling and ground magnetics. The best of 17 rock chip analyses returned 0.18% Cu and 0.13gpt Au from ironstone in Bounds Creek. Copper and zinc in B/C soils defined the ironstone units with ranges of up to 344ppm Cu and 654ppm Zn. Isolated gold and arsenic soil anomalies were found east and west of the Bowry Formation with ranges of up to 0.061gpt Au and 44ppm As. No follow-up work was undertaken.

IMI – Savage Resources investigated the western part of the Bowry Formation at Rocky River by geological mapping, rock chip sampling and soil sampling (Shannon, 1988) without return of significant assay values for gold. It appears that no rock chips were collected from the eastern part of the formation or from the adjacent rocks to the east, though details of the Fiddlesticks Prospect (AMG349680E, 5389890N) are not on open file. Soil samples taken along the track which crosses the Bowry Formation returned a maximum value of 650ppm Cu over rocks just east of the eastern magnetite-rich interval.

IMI – Savage Resources selectively sampled the core (Shannon, 1985) from the two holes that had been drilled in the eastern magnetite-rich interval at Rocky River during the earlier phase of iron ore exploration. Best values of 5gpt Au and 1.2gpt Au were returned from DDH RR1 and DDH RR2 respectively but these values were not repeated in check analyses which gave a best value of 0.042gpt Au.

#### 5.4.3 Work outside the Bowry Formation

Rocks west of the Bowry Formation were investigated from a large grid cut by EZ Co. (Mathison and Ferguson, 1987) which had a baseline extending some 10km north from Dennis Track to near the Whyte River. Cross lines at roughly 1km intervals extended up to 4km westward but only short distances eastward. Reconnaissance geological mapping was carried out and 270 rock chips were collected for a best value of 0.042gpt Au. The calculated background value of the rock chips was found to be slightly higher than Levinson's (1974) values.

A small number (30) of minus 80 mesh stream sediment samples collected by EZ Co. did not define any distinct base metal anomalies but interesting gold values were obtained in five of the 29 panned concentrate samples collected. No soil sampling was done but soil sampling by IMI – Savage Resources (Penny et al, 1984) on east-west lines north of the EZ Co. grid delineated a number of distinct, low order base metal and silver anomalies.

Regional stream sediment sampling has been carried out in various parts of EL 43/94 by Fodina Minerals, Aberfoyle and IMI – Savage Resources. The distribution of sample sites, methods used and results for gold are summarised in Plan 1. Overall, the stream sediment sampling results demonstrate that gold is widespread in EL 43/94.

Fodina's results in the southern part of the Lucy Formation are of interest because there appears to be a correlation with geology. Aberfoyle returned some very high gold results from streams just east of RL 8802, in ground now held by the Goldstream – Titan Joint Venture as EL 42/96. IMI – Savage Resources delineated a substantial arsenic anomaly in streams east of the

Bowry Formation at Rocky River, in an area which has also been included in EL 42/96. Soil sampling in part of this area returned higher arsenic values of 100-750ppm (Penny et al, 1984).

## 6.0 Work carried out by Goldstream and Titan

### 6.1 STREAM SEDIMENT SAMPLING

As the first stage in the exploration of EL 43/94 stream sediment samples were collected at 115 sites between Browns Plain and the Pieman River. This work provided reconnaissance coverage of the Timbs Group from its western boundary at the Lefroy Ridge Fault eastward to the Bowry Formation (Map2, Figure 2). The survey area included a substantial part of the previously poorly explored ground between the Whyte River and the Paradise River.

At each of the 115 stream sites a minus 80 mesh sample and a panned concentrate sample were collected (Appendix 1, Map 2). Each panned concentrate sample was derived from 9 litres of minus 4cm gravel collected from the top 30cm or so of the coarse active gravel in the stream bed. Care was taken to ensure that the same type of sample was collected at all sites. Crevices and other special trap sites were avoided.

The aim of the panned concentrate sampling was twofold: to obtain individual gold grains for laboratory study, and to establish the variation in the abundance of gold through the area surveyed. To preserve the gold grains for further study, the abundance was determined by counting the grains during microscope examination (Appendix 3 – separate volume) rather than by assay. Polished section and microprobe studies (Appendix 4 – separate volume) were carried out on a set of gold grains selected during the initial microscope work.

In addition to the stream sites, panned concentrate samples were collected from two sites in the Tertiary gravels at Browns Plains. Also, eight panned concentrates were collected from the Tertiary gravels in the old workings at Nancy Spur. A sample (G190A) was collected of the fines from a suction dredge in the Rocky River, close to where McGinty found his big nugget.

Minus 80 mesh stream sediment samples were selectively taken from the fine grained, muddy, waning-flood deposits which settle in the bed of the stream, often behind log jams. The field samples were submitted directly to the Analabs (Coose) laboratory where they were dried, sieved to minus 80 mesh and pulverised to nominal minus 75 micrometres. Gold was determined by 30gm fire assay with carbon rod finish (Appendix 2). Portions of the samples were subjected to aqua regia/perchloric acid digest and copper, lead, zinc and arsenic were determined by AAS finish. Silver was determined by ICPMS finish.

### 6.2 AEROMAGNETIC SURVEY

A detailed helimag survey of EL 43/94 was carried out by UTS Geophysics as an aid to geological and structural interpretation. The flight line separation was 50m, the mean terrain clearance 40m and the sample interval 3-4m.

Specifications of the survey, the equipment used, and processing methods are summarised in Map 5 which also presents contours of total magnetic intensity. The digital survey data have already been submitted to Mineral Resources Tasmania.

## 7.0 Results

### 7.1 PANNED CONCENTRATE SAMPLES

#### 7.1.1 Gold grains recovered

Of the 118 panned concentrate samples that were collected at the 115 stream sites, 66 contained gold grains (Appendix 3) with the majority less than 0.5mm in diameter. A total of 378 individual grains were recovered of which 128 came from three samples (G172, 174, 192A). These three samples were collected in the tailrace creek of the Lucy Spur hydraulic workings thus the gold may effectively be from Tertiary gravel.

No gold grains were recovered from the two sites in basal Tertiary gravel at Browns Plain but 10 grains were recovered from the eight samples (each 9 litres) panned from basal gravel at the Nancy Spur workings. The dredge fines from Rocky River contained 147 grains of gold.

#### 7.1.2 Travel damage to gold grains

The amount of travel damage displayed by the gold grains is summarised in Table 1. Irrespective of grouping, relatively few grains show major travel damage whilst a substantial proportion show nil or minor travel damage. This is taken as an indication that little of the gold has been transported for long distances though more grains that are known to be from Tertiary gravels should be studied. The gold from the Lucy Spur tailrace creek shows markedly less travel damage and is perhaps closest to source.

Table 1: Travel damage displayed by alluvial gold grains

Samples	Total Grains	Nil or Minor %	Moderate %	Major %
Lucy Spur G172, 174, 192A	128	52	44	4
Other stream Samples	250	24	67	9
Tertiary Nancy Spur	10	30	60	10
Dredge fines Rocky River	147	31	69	

### 7.1.3 Intergrowths and inclusions in gold

A number of coarser grains (G190B) collected from the Rocky River suction dredge are composite, consisting of gold intergrown with limonite, goethite, magnetite and light grey mica. Examples of the grains are illustrated in Photos 17-22, Appendix 3, along with a similar example from the Owen Meredith River. The mineralogy of the intergrowths is consistent with derivation from local iron-rich formations which occur just upstream in each area.

Mineral inclusions identified in polished sections of the gold grains are also consistent with derivation of the gold from the local metamorphic rocks. In particular, inclusions of talc-tremolite, rutile, spinel and CaMnFe carbonate. The latter (rhodochrosite) occurs as a vein mineral in parts of the metamorphics. Quartz and goethite after pyrite are the most common inclusions and are also consistent with local derivation, though less definitive of it.

Two platinum bearing grains in the Rocky River dredge fines are oddities that could have an exotic origin in, say, the ultramafic complexes east of EL 43/94. However, the other features of the gold in the dredge sample strongly support a predominantly local source.

### 7.1.4 Gold fineness

Microprobe analyses of 192 gold grains (Appendix 4) showed high average fineness (mean 941) and narrow fineness ranges (728-999) in the two dredge samples, in the Lucy Spur tailrace samples, in other stream samples and in the Tertiary samples.

This is consistent with all the gold having been derived from one style of mineralisation. Furthermore, the fineness characteristics are consistent with the style of mineralisation nominated in the Joint Venture's exploration model.

### 7.1.5 Counts of gold grains

High counts of up to 60 gold grains per 9 litres of gravel were obtained from samples taken in the Lucy Spur tailrace creek (Plan 3). Lower counts of up to 9 grains were returned from streams around the Nancy Spur workings. The parts of the Bowry Formation that were sampled returned very low counts of less than 3 grains per 9 litres of gravel which was surprising as many of the streams show evidence of having been worked.

Heavy minerals other than gold which were notably abundant in some panned concentrates and which showed low travel damage included magnetite, pyrite, epidote, chalcopyrite, rutile and some cassiterite grains. Sample sites where pyrite, chalcopyrite, rutile or cassiterite were notable are shown in Plan 4. Relatively undamaged, crystalline rutile is present in the Nancy Creek – Lucy Spur area where gold is also more abundant. The two minerals were probably associated at source, as is indicated by the polished section study.

## 7.2 MINUS 80 MESH SAMPLES

Anomalous values for the various metals analysed in the minus 80 mesh samples are defined graphically in Figures 3-5. Anomalous gold values of 3-20ppb are predominant in an area of some 15skm which includes the Lucy Spur workings (Plan 3). The eastern part of this area includes the Doctors Creek - Paradise creek (-?Bounds Creek) segment of the Bowry Formation where an exceptional value of 240ppb was returned from a site in Paradise Creek.

Anomalously high minus 80 mesh gold values were also returned from several other areas including Cataract Creek and Nolan Creek. These creeks flow across the eastern part of the Bowry Formation into the section of the Rocky River that has been a significant producer of gold. Anomalous copper, zinc and silver are also present in the creeks.

Arsenic values in the minus 80 mesh samples show a fair correlation with the regional geology (Plan 3). Values are mostly elevated to 6-14ppm (Figure 4) and occasionally anomalous (14-18ppm) in streams in and near the Bowry Formation, also in streams west of the Lucy Formation. Within the Lucy Formation and in the unnamed formation between the Lucy Formation and the Bowry Formation there are a few elevated and anomalous values of arsenic.

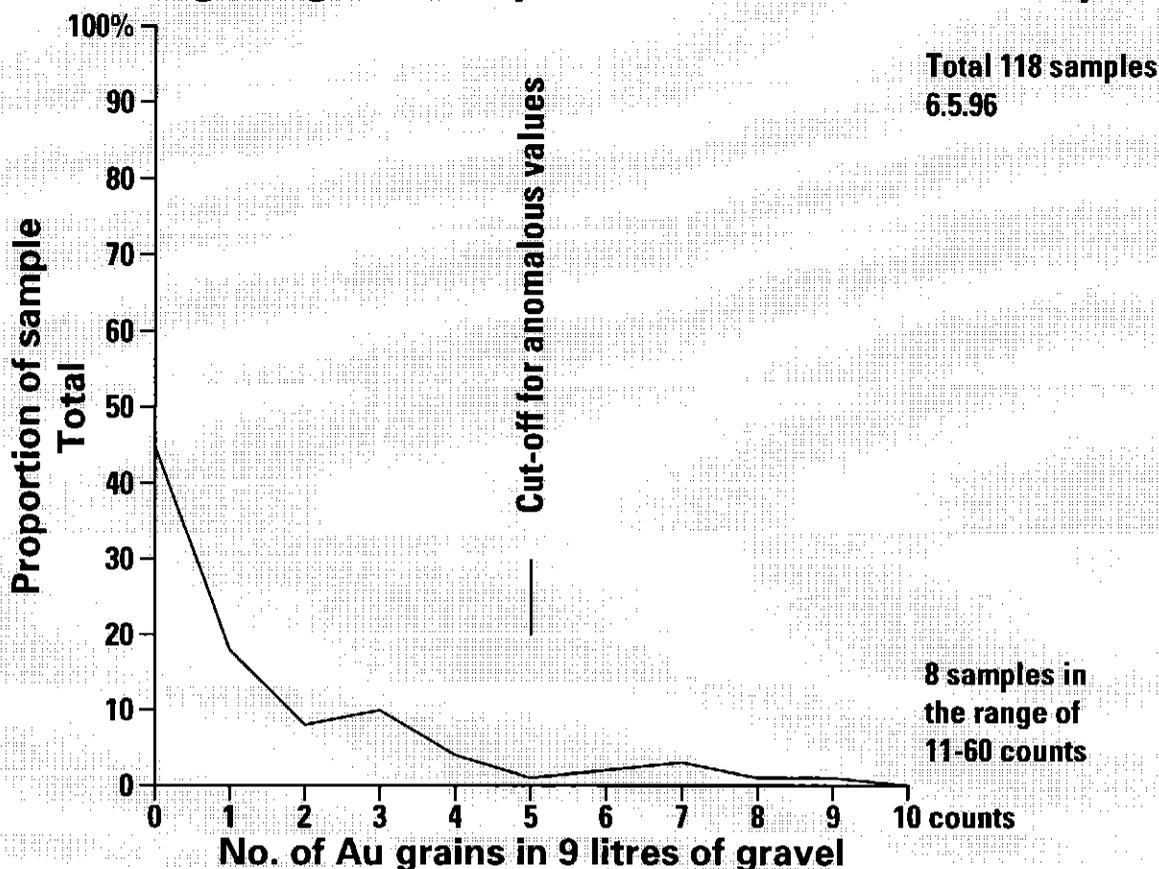
Anomalous zinc values of 70ppm or more are mostly associated with copper values that are either elevated to 20-50ppm or are anomalous at 50ppm or more (Figure 5, Plan 3). Streams in and near the Rocky River segment of the Bowry Formation returned both anomalous zinc and anomalous copper values whilst streams in and near the Bowry Formation west of Doctors Creek returned only anomalous zinc values. There are scattered anomalous values of zinc elsewhere and a few anomalous copper values.

A few anomalous silver values of 80ppb or more were returned from the minus 80 mesh samples (Figure 4, Plan 3). The highest lead values of 20-40ppm are elevated rather than anomalous (Figure 5, Plan 4).

Figures 3,4,5 Graphical presentations of minus 80 mesh stream sediment sample analyses.

3. Counts of gold grains in panned concentrate samples; gold (ppb) in minus 80 mesh samples.
4. Silver (ppb) and arsenic (ppm) in minus 80 mesh samples.
5. Copper (ppm), lead (ppm) and zinc (ppm) in minus 80 mesh samples.

**Counts of gold grains in panned concentrate samples.**



**Gold (ppb) in minus 80 mesh samples.**

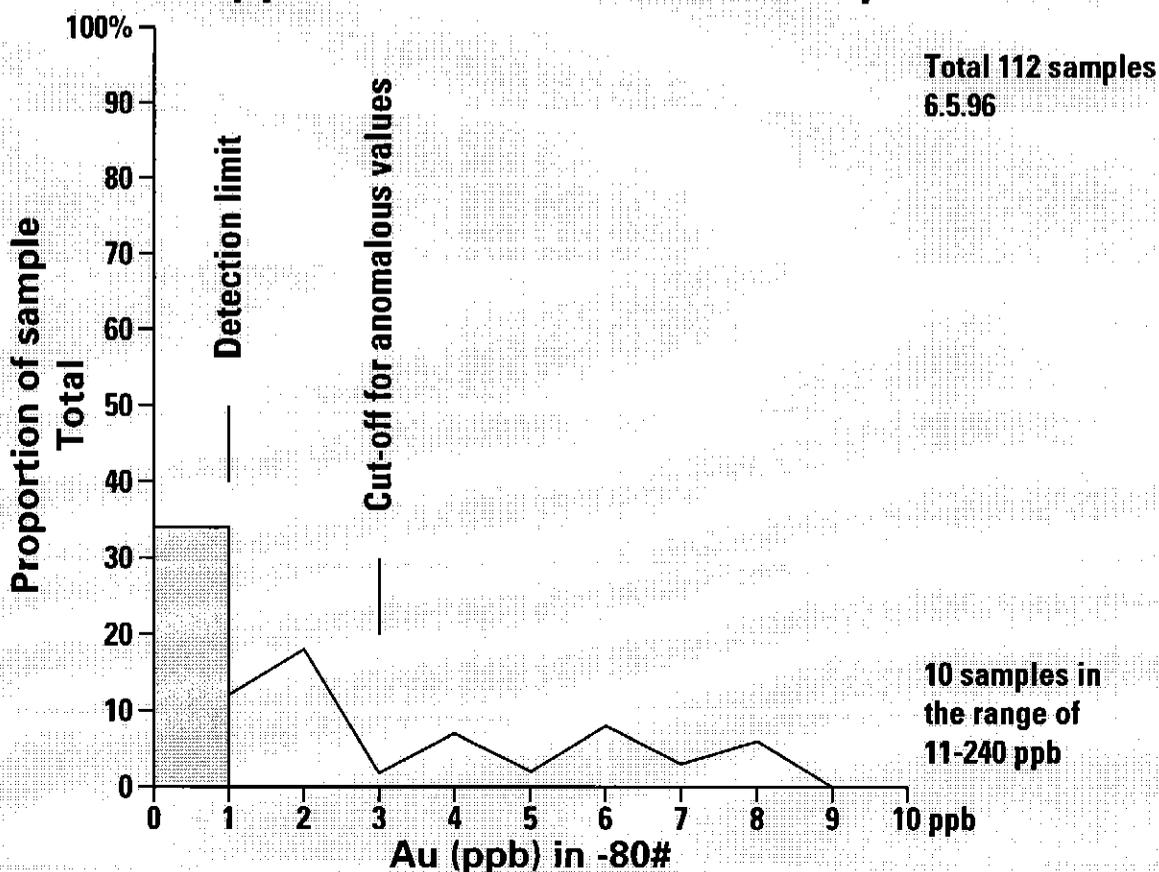
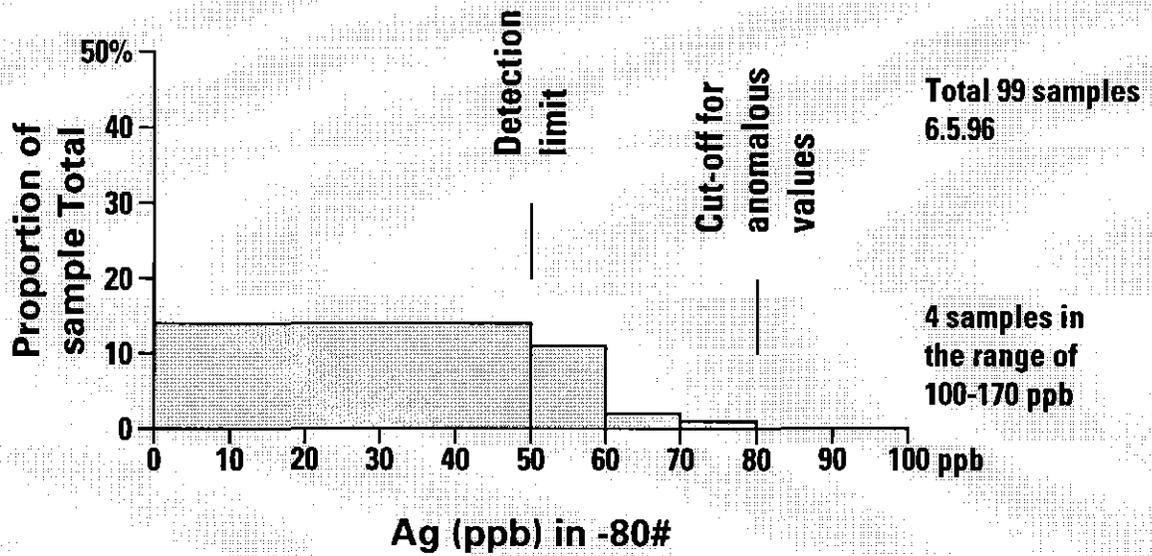


Figure 3.

**Silver (ppb) in minus 80 mesh samples.**



**Arsenic (ppm) in minus 80 mesh samples.**

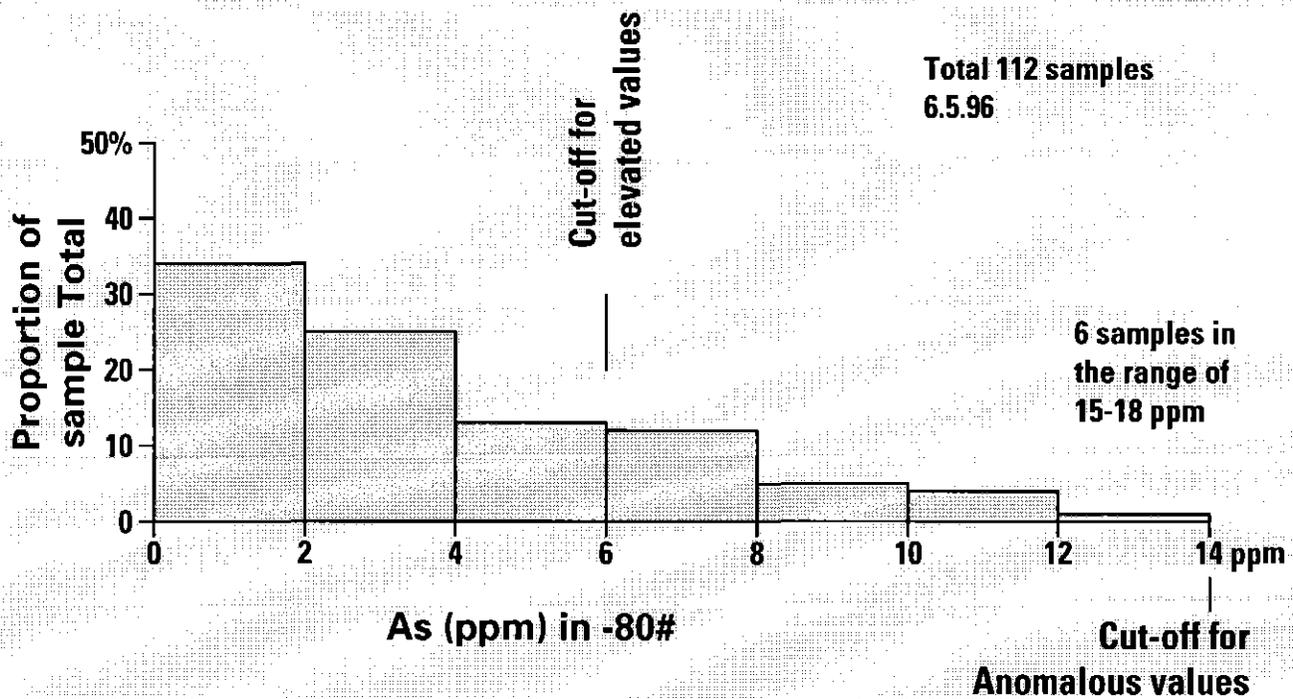
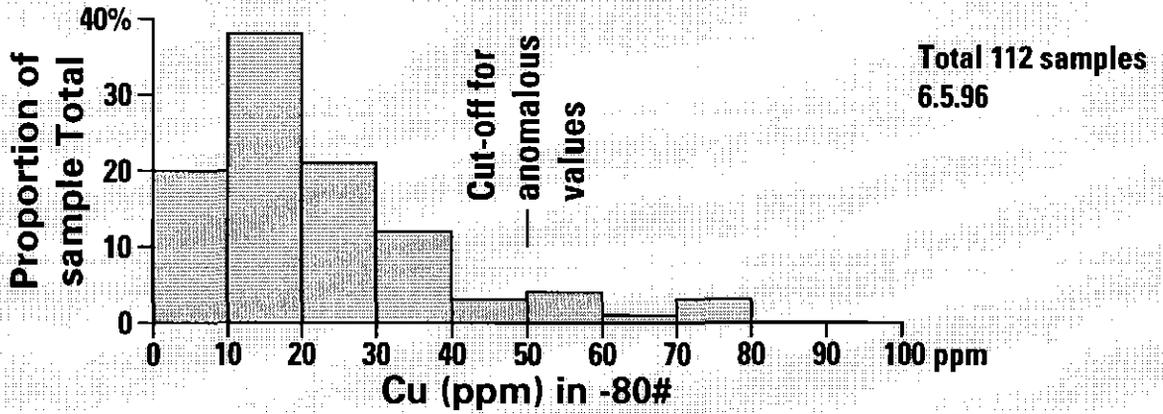
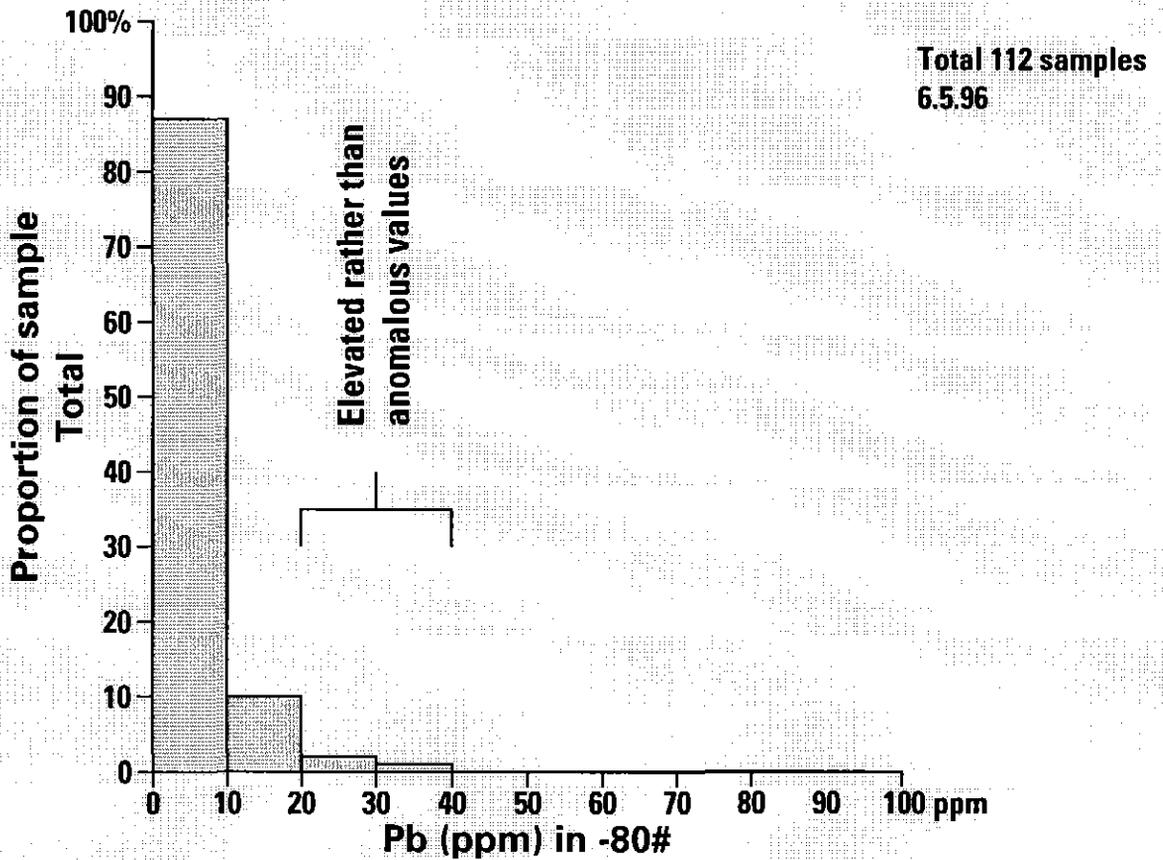


Figure 4

**Copper (ppm) in minus 80 mesh.**



**Lead (ppm) in minus 80 mesh**



**Zinc (ppm) in minus 80 mesh.**

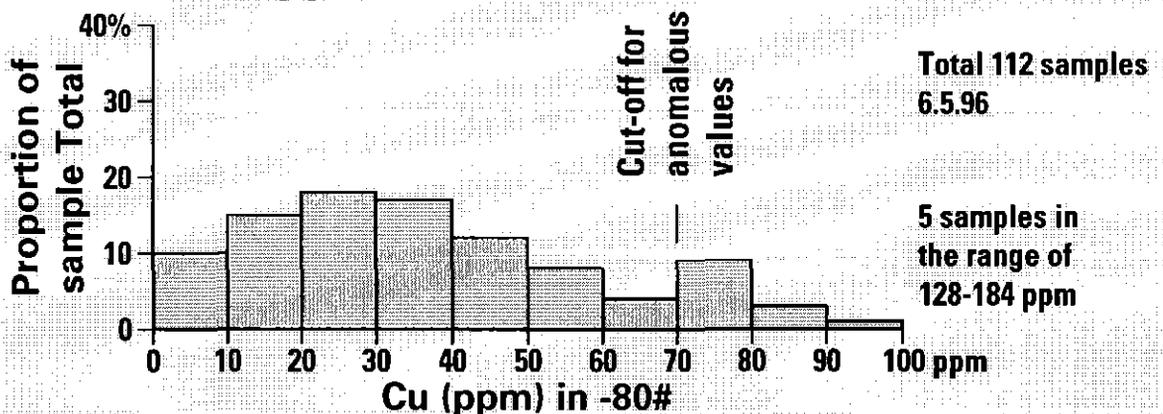


Figure 5.

### 7.3 AEROMAGNETIC DATA

The aeromagnetic data has enabled more accurate delineation of the regional boundaries of magnetic rock units such as the Lucy Formation and the Bowry Formation. Particularly in the area south west of the Pieman River where thin Tertiary cover is extensive.

Initial processing of the aeromagnetics has indicated that Hanning filtered data will be very useful in mapping at a prospect scale. Also, Hanning filtered data will be used to generate interpretive cross sections for drill hole planning.

### 8.0 Conclusions

Studies of the shapes of a substantial number of alluvial gold grains from well dispersed sites in EL 43/94 suggest that most gold in the district has not been transported very far. Intergrowths and inclusions of other minerals in the gold grains are generally consistent with local derivation from the Arthur Metamorphic Complex, particularly from the iron-rich intervals in the Complex and from quartz veins. Gold fineness characteristics are quite uniform and are consistent with an Archaean lode gold model.

Historically, hardrock gold has been found in small amounts associated with magnetite-rich intervals in the largely-mafic Bowry Formation. Modern mineral exploration by Outokumpu identified a banded siliceous ironstone in the eastern part of the Bowry Formation near Doctors Creek and the Owen Meredith River carrying up to 0.5% Cu and 0.29gpt Au in rock chips.

Stream sediment results reported here suggest that much of the segment of the Bowry Formation investigated by Outokumpu was unpromising (Plan 1 c.f. Plan 3). The segment north from Doctors Creek to Paradise Creek, and beyond, is of more interest. This segment was partly covered by Outokumpu but much of it only has coverage by the spaced profile traverses of Fodina.

At Rocky River it seems that the eastern part of the Bowry Formation has not received much attention. Stream sediment results from Cataract Creek and Nolan Creek (Plans 3, 4) suggest that the eastern part is anomalous in gold (-80#), copper, zinc and silver. North of the Whyte River there are scattered, gold-anomalous stream sediments reported by other companies but no follow-up work has been done.

CRA-Peko drilled significant copper and zinc mineralisation in the eastern part of the Bowry Formation south west of Reece Dam. Selective sampling of part of the core by Outokumpu demonstrated the presence of trace gold. The core should be tested more systematically for gold.

Outside of the Bowry Formation there are historical hardrock gold workings in a granitoid porphyry near Lucy Spur and a very small auriferous leader was exposed during sluicing at the Lucy Spur hydraulic workings. Since the gold in the Lucy Spur tailrace creek shows relatively little travel damage, it was probably derived from such local sources and underwent only a very small amount of transport in the earliest of the Tertiary streams.

Stream sediment sampling by Fodina suggests that there may be gold enrichment in the southern part of the Lucy Formation (Plan 1). This magnetite-bearing, largely-mafic formation is difficult to map with precision on the ground but is well defined by the Joint Venture's detailed aeromagnetics.

## 9.0 Recommendations

Follow-up programs of close spaced stream sediment sampling, geological mapping and rock chip sampling should be carried out in the following areas:

1. The southern part of the Lucy Formation where it can be accessed from the Heemskirk Road.
2. From the Owen-Meredith River northwards to around the old hardrock and hydraulic workings at Lucy Spur, thence to the upper reaches of Lucy Creek.
3. In the Doctors Creek – Paradise Creek – Bounds Creek segment of the Bowry Formation and adjacent rocks.
4. Along the eastern part of the Bowry Formation around Rocky River. This work should extend further east into EL 42/96 so as to include the head waters of Cataract Creek and Nolan Creek, also the arsenic anomaly reported by IMI – Savage Resources.
5. The area in the northern part of EL 42/96 where good gold values were reported by Aberfoyle. This work should extend northwards into EL 38/96 in order to include the old stream, eluvial and hardrock workings at Golden Ridge.

Hanning filtered aeromagnetic data should be generated for these various prospects.

## 10.0 Environmental matters

Minimal environmental impact was caused by the Joint Venture's work in EL 43/94. Approximately 20km of 1 metre wide walking tracks were cut to provide access for stream sampling. No cutting was undertaken in the Pieman River State Reserve.

No rehabilitation work is required.

## 11.0 References

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**Goldstream - Titan Corinna Joint Venture****EL 43/94: Annual Report to 4/1/97****APPENDIX 1****STREAM SEDIMENT AND TERTIARY GRAVEL SAMPLE NUMBERS WITH AMG  
CO-ORDINATES OF SAMPLE SITES****Sample Types**

1. Stream sediment panned concentrate samples were derived from 9 litres of minus 4cm, active gravel collected in the stream bed. Tertiary gravel samples also from 9 litres of minus 4cm.
2. Minus 80 mesh samples were derived from fine grained, muddy, waning-flood deposits usually collected in the stream channel. They were not sieved prior to laboratory processing.

**Note: Panned concentrate samples were not assayed. They were examined by microscope and the gold grains were counted.**

NOTE: Odd numbers are -80#, the following even number is a pan. con. taken at the same site.  
All samples were collected in EL43/94, Corinna.

Sample Number	AMG		Sample Number	AMG	
	Easting (m)	Northing (m)		Easting (m)	Northing (m)
G101	342800	5386850	G149	345075	5385825
G102	342800	5386850	G150	345075	5385825
G103	343825	5386225	G151	345350	5386175
G104	343825	5386225	G152	345350	5386175
G105	344350	5386025	G153	345400	5386200
G106	344350	5386025	G154	345400	5386200
G107	344175	5384625	G155	345325	5386200
G108	344175	5384625	G156	345325	5386200
G109	344200	5384600	G157	345475	5386700
G110	344200	5384600	G158	345475	5386700
G111	341725	5383850	G159	345475	5387125
G112	341725	5383850	G160	345475	5387125
G113	341775	5383800	G161	345100	5387000
G114	341775	5383800	G162	345100	5387000
G115	343300	5382325	G163	346000	5385400
G116	343300	5382325	G164	346000	5385400
G117	343050	5381650	G165	346025	5385375
G118	343050	5381650	G166	346025	5385375
G119	343550	5380875	G167	346275	5385435
G120	343550	5380875	G168	346275	5385435
G121	344175	5387900	G169	344525	5383750
G122	344175	5387900	G170	344525	5383750
G123	344250	5388025	G171	347025	5385750
G124	344250	5388025	G172	347025	5385750
G125	344550	5388500	G173	346925	5385850
G126	344550	5388500	G174	346925	5385850
G127	343225	5388675	G175	346950	5385900
G128	343225	5388675	G176	346950	5385900
G129	345300	5389025	G177	347125	5386775
G130	345300	5389025	G178	347125	5386775
G131	345325	5388950	G179	347125	5386700
G132	345325	5388950	G180	347125	5386700
G133	346150	5389500	G181	346935	5386650
G134	346150	5389500	G182	346935	5386650
G134A	346150	5389500	G183	346450	5386025
G135	346400	5389575	G184	346450	5386025
G136	346400	5389575	G184A	346425	5386050
G137	343950	5380900	G185	346350	5385800
G138	343950	5380900	G186	346350	5385800
G139	344650	5385600	G187	346300	5385800
G140	344650	5385600	G188	346300	5385800
G141	344700	5385700	G189	346725	5386075
G142	344700	5385700	G190	346725	5386075
G143	344725	5385775	G191	346750	5386025
G144	344725	5385775	G192	346750	5386025
G145	344600	5385575	G192A	346750	5386025
G146	344600	5385575	G193	344500	5383175
G147	345075	5385900	G194	344500	5383175
G148	345075	5385900	G194A	344500	5383175

Sample Number	AMG		Sample Number	AMG	
	Easting (m)	Northing (m)		Easting (m)	Northing (m)
G195	345425	5383525	G247	349550	5388890
G196	345425	5383525	G248	349550	5388890
G197	345000	5383275	G249	349425	5389325
G198	345000	5383275	G250	349425	5389325
G199	345600	5383225	G251	349125	5389350
G200	345600	5383225	G252	349125	5389350
G201	346075	5383375	G253	348875	5387315
G202	346075	5383375	G254	348875	5387315
G203	346400	5382970	G255	348850	5387300
G204	346400	5382970	G256	348850	5387300
G205	347250	5383830	G257	348850	5387850
G206	347250	5383830	G258	348850	5387850
G207	347200	5383810	G259	349225	5387810
G208	347200	5383810	G260	349225	5387810
G209	346975	5383775	G261	349200	5387800
G210	346975	5383775	G262	349200	5387800
G211	345675	5382700	G263	349025	5388500
G212	345675	5382700	G264	349025	5388500
G213	345725	5382675	G265	349060	5388450
G214	345725	5382675	G266	349060	5388450
G215	345400	5382125	G267	348925	5389725
G216	345400	5382125	G268	348925	5389725
G217	347850	5389650	G269	348550	5389275
G218	347850	5389650	G270	348550	5389275
G219	347100	5382025	G271	348600	5389300
G220	347100	5382025	G272	348600	5389300
G221	347030	5382130	G273	346075	5381125
G222	347030	5382130	G274	346075	5381125
G223	346300	5382200	G275	346075	5381000
G224	346300	5382200	G276	346075	5381000
G225	346300	5381980	G277	346950	5381100
G226	346300	5381980	G278	346950	5381100
G227	346050	5381525	G279	346450	5380800
G228	346050	5381525	G280	346450	5380800
G229	345475	5384725	G281	345250	5380300
G230	345475	5384725	G282	345250	5380300
G231	345450	5384700	G283	345300	5380400
G232	345450	5384700	G284	345300	5380400
G233	345300	5384700	G285	345800	5380375
G234	345300	5384700	G286	345800	5380375
G235	346910	5383225	G287	345825	5380450
G236	346910	5383225	G288	345825	5380450
G237	346575	5383225	G289	346375	5380275
G238	346575	5383225	G290	346375	5380275
G239	344300	5382700	G291	345650	5389350
G240	344300	5382700	G292	345650	5389350
G241	344800	5382550	G293	347575	5388130
G242	344800	5382550	G294	347575	5388130
G243	345050	5382225	G295	348500	5383925
G244	345050	5382225	G296	348500	5383925
G245	349425	5388650	G297	348575	5383950
G246	349425	5388650	G298	348575	5383950

Sample Number	AMG		Sample Number	AMG	
	Easting (m)	Northing (m)		Easting (m)	Northing (m)
G299	348075	5382050	G341	NOT COLLECTED	
G300	348075	5382050	G342	345600	5386575
G301	348100	5381975	G343	NOT COLLECTED	
G302	348100	5381975	G344	345600	5386575
G303	348165	5383000	G345	NOT COLLECTED	
G304	348165	5383000	G346	345600	5386575
G305	348175	5382915	G347	NOT COLLECTED	
G306	348175	5382915	G348	345600	5386575
G307	348075	5382930			
G308	348075	5382930			
G309	347750	5381250			
G310	347750	5381250			
G311	347530	5382385			
G312	347530	5382385			
G313	347610	5382200			
G314	347610	5382200			
G315	347850	5382200			
G316	347850	5382200			
G317	347800	5382200			
G318	347800	5382200			
G319	NOT COLLECTED				
G320	347900	5392250			
G321	347560	5383950			
G322	347560	5383950			
G323	347575	5383875			
G324	347575	5383875			
G325	347375	5383700			
G326	347375	5383700			
G327	NOT COLLECTED				
G328	347950	5393425			
G349	NOT COLLECTED				
G350	347000	5391400			
G351	NOT COLLECTED				
G352	347000	5391400			
Rocky River dredge samples					
G190A	349300	5389420			
G190B	349300	5389420			
Tertiary gravel samples					
G329	NOT COLLECTED				
G330	347300	5391675			
G331	NOT COLLECTED				
G332	348300	5391600			
G333	NOT COLLECTED				
G334	345600	5386575			
G335	NOT COLLECTED				
G336	345600	5386575			
G337	NOT COLLECTED				
G338	345600	5386575			
G339	NOT COLLECTED				
G340	345600	5386575			

Goldstream - Titan Corinna Joint Venture

EL 43/94: Annual Report to 4/1/97

APPENDIX 2

MINUS 80 MESH STREAM SEDIMENT SAMPLE NUMBERS AND ANALYTICAL DATA

**Laboratory Processing**

**Analabs**

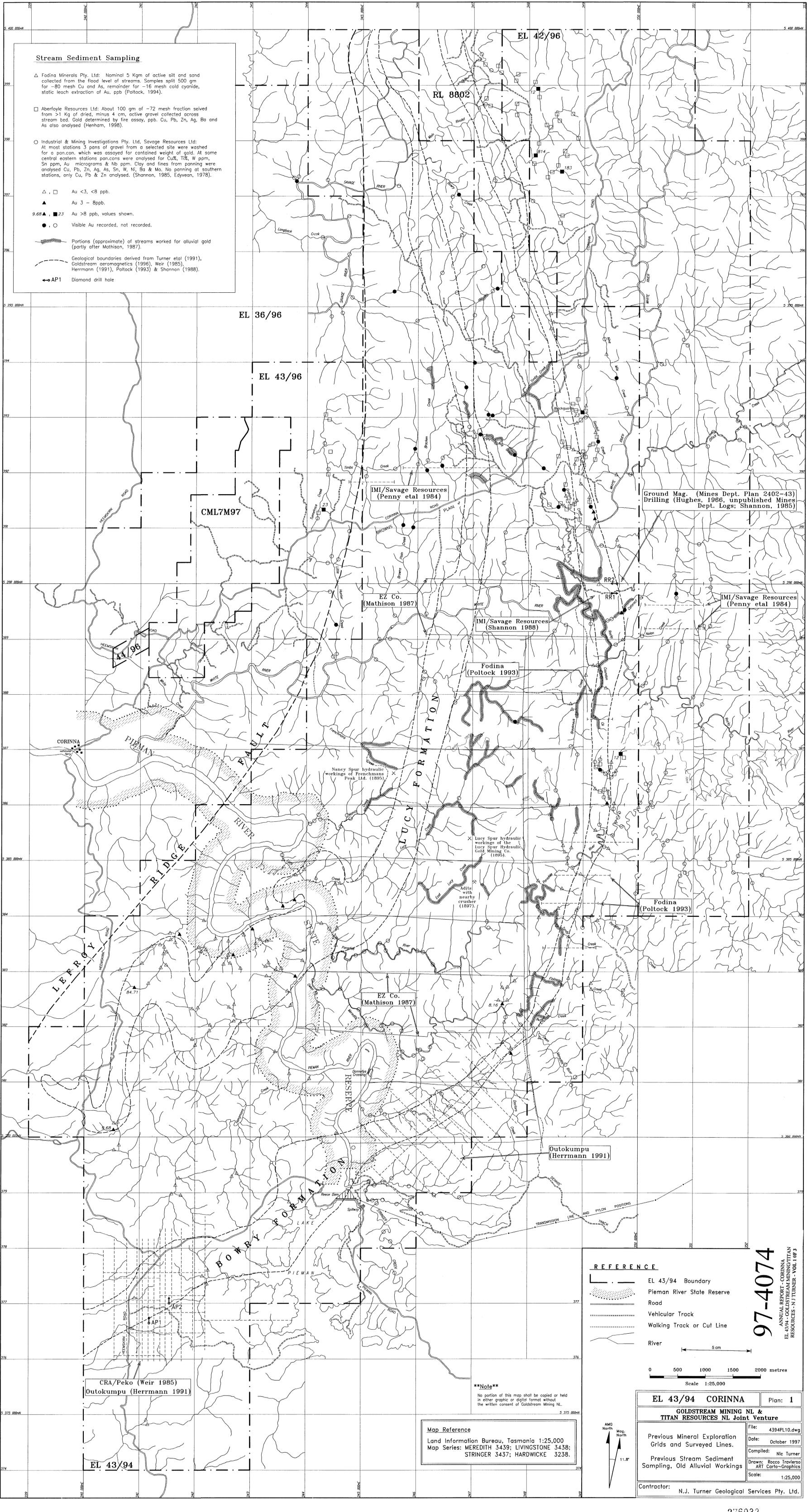
Minus 80 mesh samples dried, sieved and pulverised to nominal minus 75 micrometres. Gold determined by 30gm fire assay, carbon rod. Cu, Pb, Zn, As by aqua regia/perchloric acid digest, AAS finish (Ag by ICPMS finish).

Sample	Au	Au Dp1	Cu	Pb	Zn	As	Ag
G101	2		35	20	27	8.0	<0.05
G103			19	9	29	7.9	<0.05
G105	8		60	17	84	8.6	0.07
G107	1		41	11	91	3.4	<0.05
G109	1		11	4	4	0.9	<0.05
G111	1		15	19	32	2.0	<0.05
G113			13	5	28	1.3	<0.05
G115			40	8	71	2.3	0.05
G117	1		26	4	58	1.4	<0.05
G119	1		31	5	58	2.6	<0.05
G121	1		11	7	24	11.0	<0.05
G123	11		24	12	128	11.0	0.06
G125	<1		17	5	35	18.0	<0.05
G127	<1		52	9	80	3.7	<0.05
G129	<1		27	<3	38	13.0	0.06
G131	<1		27	10	183	14.0	0.06
G133	<1		38	6	49	2.8	0.06
G135	<1		24	3	54	0.5	0.06
G137	<1		11	3	21	0.6	<0.05
G139	<1		24	5	53	0.8	<0.05
G141	<1		22	6	43	1.7	<0.05
G143	<1		23	5	40	9.2	<0.05
G145	<1		15	3	37	4.6	<0.05
G147	<1		12	5	30	3.1	<0.05
G149	18	20	18	7	46	3.6	0.05
G151	<1		10	4	27	3.1	0.17
G153	<1		14	<3	28	2.4	<0.05
G155	<1		16	3	31	1.7	<0.05
G157	<1		19	32	64	17.0	0.06
G159	<1		10	3	19	1.6	<0.05
G161	<1		16	6	27	2.8	<0.05
G163	6		38	7	59	4.3	0.12
G165	2		8	7	59	4.3	0.12
G167	1	<1	10	5	12	1.9	<0.05
G169	1	1	35	13	75	0.07	3.3
G171	4		5	<3	4	0.9	<0.05
G173	<1	<1	3	<3	4	5.1	<0.05
G175	6		4	<3	6	2.4	<0.05
G177	2		3	<3	4	0.7	<0.05
G179	8	<1	5	<3	8	1.5	<0.05
G181	4		5	<3	7	0.6	<0.05
G183	2		16	5	33	2.6	<0.05
G185	6		8	<3	13	1.0	<0.05
G187	3		25	17	43	3.0	<0.05
G189	2		4	<3	6	0.7	<0.05
G191	4		6	4	10	1.2	<0.05
G193	2		11	4	18	8.0	<0.05
G195	5		38	7	69	3.8	0.08
G197	<1	<1	22	5	49	1.3	<0.05
G199	6		9	4	16	5.0	0.06
G201	8		19	<3	31	1.5	<0.05
G203	6		8	<3	17	2.8	<0.05
G205	4		20	4	32	1.6	<0.05
G207	2		13	5	32	3.0	<0.05
G209	11		23	<3	17	1.7	<0.05
G211	6		41	<3	37	1.1	<0.05
G213	2		15	<3	23	0.07	<0.05
G215	4		20	<3	32	0.9	<0.05
G217	8	2	20	5	44	5.7	<0.05

Sample	Au	Au Dp1	Cu	Pb	Zn	As	Ag
G219	2		21	<3	47	1.5	<0.05
G221	15	12	10	<3	18	1.1	<0.05
G223	<1		7	<3	13	1.0	<0.05
G225	2		18	6	35	3.5	<0.05
G227	<1		20	7	55	3.8	<0.05
G229	1		14	3	22	1.0	<0.05
G231	1		21	<3	23	1.2	<0.05
G233	4		23	9	40	1.4	<0.05
G235	1		8	<3	11	1.1	<0.05
G237	1		21	23	29	18.0	<0.05
G239	27		11	<3	25	2.5	<0.05
G241	2		36	5	66	2.0	0.05
G243	4	4	67	<3	73	2.1	<0.05
G245	2		59	6	66	4.6	0.05
G247	10		71	12	71	12.0	0.05
G249	8		73	22	179	9.6	0.10
G251	<1		38	16	51	15.0	<0.05
G253	2		78	9	84	8.5	<0.05
G255	<1		19	4	39	6.5	<0.05
G257	<1		7	<3	10	0.9	>0.05
G259	<1		32	12	88	2.9	<0.05
G261	<1		26	8	73	5.8	<0.05
G263	2		14	<3	13	6.2	<0.05
G265	<1		20	<3	20	3.4	<0.05
G267	2		16	4	27	5.5	<0.05
G269	<1		19	<3	21	1.8	<0.05
G271	<1		11	<3	14	2.2	<0.05
G273	<1		20	4	49	5.0	<0.05
G275	2		19	<3	45	5.5	<0.05
G277	2		28	3	58	4.9	<0.05
G279	<1		27	4	56	7.8	<0.05
G281	<1		39	5	76	7.5	<0.05
G283	<1		17	<3	44	4.4	<0.05
G285	2		31	<3	184	3.1	<0.05
G287	2		25	8	73	11.0	0.12
G289	<1		20	8	74	8.7	<0.05
G291	2		13	8	30	7.5	<0.05
G293	<1		5	<3	5	3.8	<0.05
G295	4		19	5	48	5.0	<0.05
G297	240		14	8	32	7.4	<0.05
G299	9		55	17	132	18.0	
G301	8		15	4	28	6.0	
G303	6		43	<3	49	6.2	
G305	8		26	5	35	8.4	
G307	7		32	<3	13	4.6	
G309	20		25	4	19	7.3	
G311	7		16	<3	34	1.9	
G313	17		28	5	45	7.0	
G315	7		21	4	40	6.2	
G317	6		20	3	18	7.1	
G319	NOT COLLECTED						
G321	8		15	<3	9	2.2	
G323	3		8	3	25	2.2	
G325	6		7	<3	11	1.5	
DETECTION	1	1	2	3	2	0.5	0.05
UNITS	ppb	ppb	ppm	ppm	ppm	ppm	ppm

**Stream Sediment Sampling**

- △ Fodina Minerals Pty. Ltd. Nominal 5 Kgm of active silt and sand collected from the flood level of streams. Samples split 500 gm for -80 mesh Cu and As, remainder for -16 mesh cold cyanide, static leach extraction of Au, ppb (Poltock, 1994).
- Aberfoyle Resources Ltd. About 100 gm of -72 mesh fraction sieved from >1 Kg of dried, minus 4 cm, active gravel collected across stream bed. Gold determined by fire assay, ppb. Cu, Pb, Zn, Ag, Ba and As also analysed (Henham, 1998).
- Industrial & Mining Investigations Pty. Ltd. Savage Resources Ltd. At most stations 3 pans of gravel from a selected site were washed for a pan.con. which was assayed for contained weight of gold. At some central eastern stations pan.con.s were analysed for Cu%, Ti%, W, ppm. Sn ppm, Au - micrograms & Nb ppm. Clay and fines from panning were analysed Cu, Pb, Zn, Ag, As, Sn, W, Ni, Ba & Mo. No panning at southern stations, only Cu, Pb & Zn analysed. (Shannon, 1985, Eadyean, 1978).
- △, □ Au <3, <8 ppb.
- ▲ Au 3 - 8ppb.
- , ○ Au >8 ppb, values shown.
- , ○ Visible Au recorded, not recorded.
- Portions (approximate) of streams worked for alluvial gold (partly after Mathison, 1987).
- - - Geological boundaries derived from Turner et al (1991), Goldstream aeromagnetics (1996), Weir (1985), Herrmann (1991), Poltock (1993) & Shannon (1988).
- ↔ AP1 Diamond drill hole



Ground Mag. (Mines Dept. Plan 2402-43)  
Drilling (Hughes, 1966, unpublished Mines  
Dept. Logs; Shannon, 1985)

IM/Savage Resources  
(Penny et al 1984)

IM/Savage Resources  
(Penny et al 1984)

EZ Co.  
(Mathison 1987)

IM/Savage Resources  
(Shannon 1988)

Fodina  
(Poltock 1993)

Fodina  
(Poltock 1993)

EZ Co.  
(Mathison 1987)

Outokumpu  
(Herrmann 1991)

CRA/Peko (Weir 1985)  
Outokumpu (Herrmann 1991)

**REFERENCE**

- EL 43/94 Boundary
- ▨ Pieman River State Reserve
- Road
- - - Vehicular Track
- - - Walking Track or Cut Line
- River

Scale 1:25,000

0 500 1000 1500 2000 metres

**\*\*Note\*\***  
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**Map Reference**  
Land Information Bureau, Tasmania 1:25,000  
Map Series: MEREDITH 3439; LIVINGSTONE 3438;  
STRINGER 3437; HARDWICKE 3238.

**EL 43/94 CORINNA** Plan: 1

**GOLDSTREAM MINING NL & TITAN RESOURCES NL Joint Venture**

Previous Mineral Exploration Grids and Surveyed Lines.

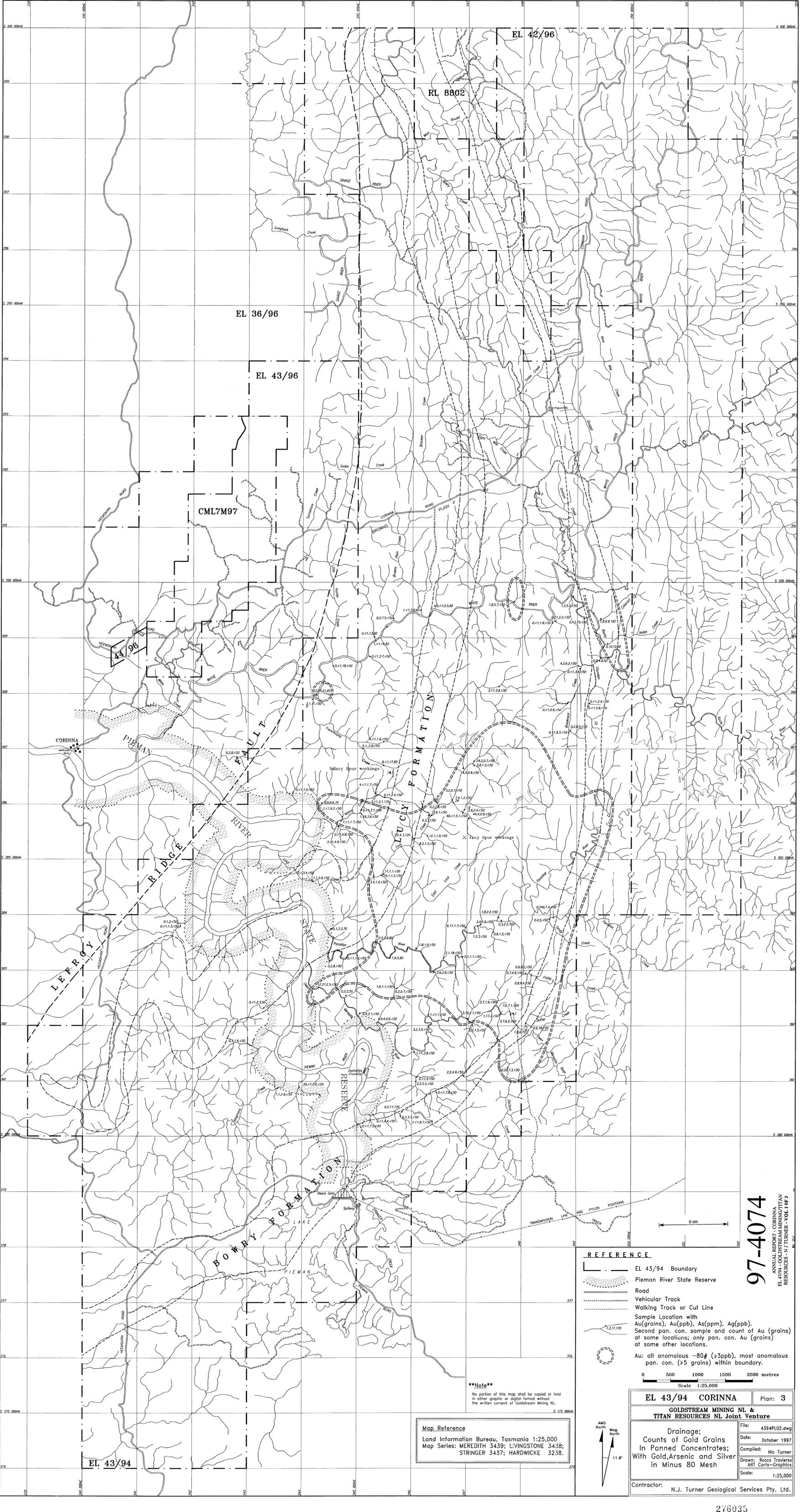
Previous Stream Sediment Sampling, Old Alluvial Workings

Contractor: N.J. Turner Geological Services Pty. Ltd.

File: 4394PL10.dwg  
Date: October 1997  
Compiled: Nic Turner  
Drawn: Rocco Travieso  
ART Carlo-Graphics  
Scale: 1:25,000

**97-4074**  
 ANNUAL REPORT - CORINNA  
 EL 43/94 GOLDSTREAM MINING  
 RESOURCES - N.J. TURNER - VOL. 1 OF 3





EL 42/96

RL 8802

EL 36/96

EL 43/96

CML7M97

44/96

CORINNA

PIEMAN RIVER

BRIDGE

STATE RESERVE

LU CY FORMATION

BOMBY FORMATION

PIEMAN RIVER

EL 43/94

97-4074  
ANNUAL REPORT - CORINNA  
EL 43/94 - GOLDSTREAM MINING/TITAN  
RESOURCES - N.J. TURNER - VOL 1 OF 3

**REFERENCE**

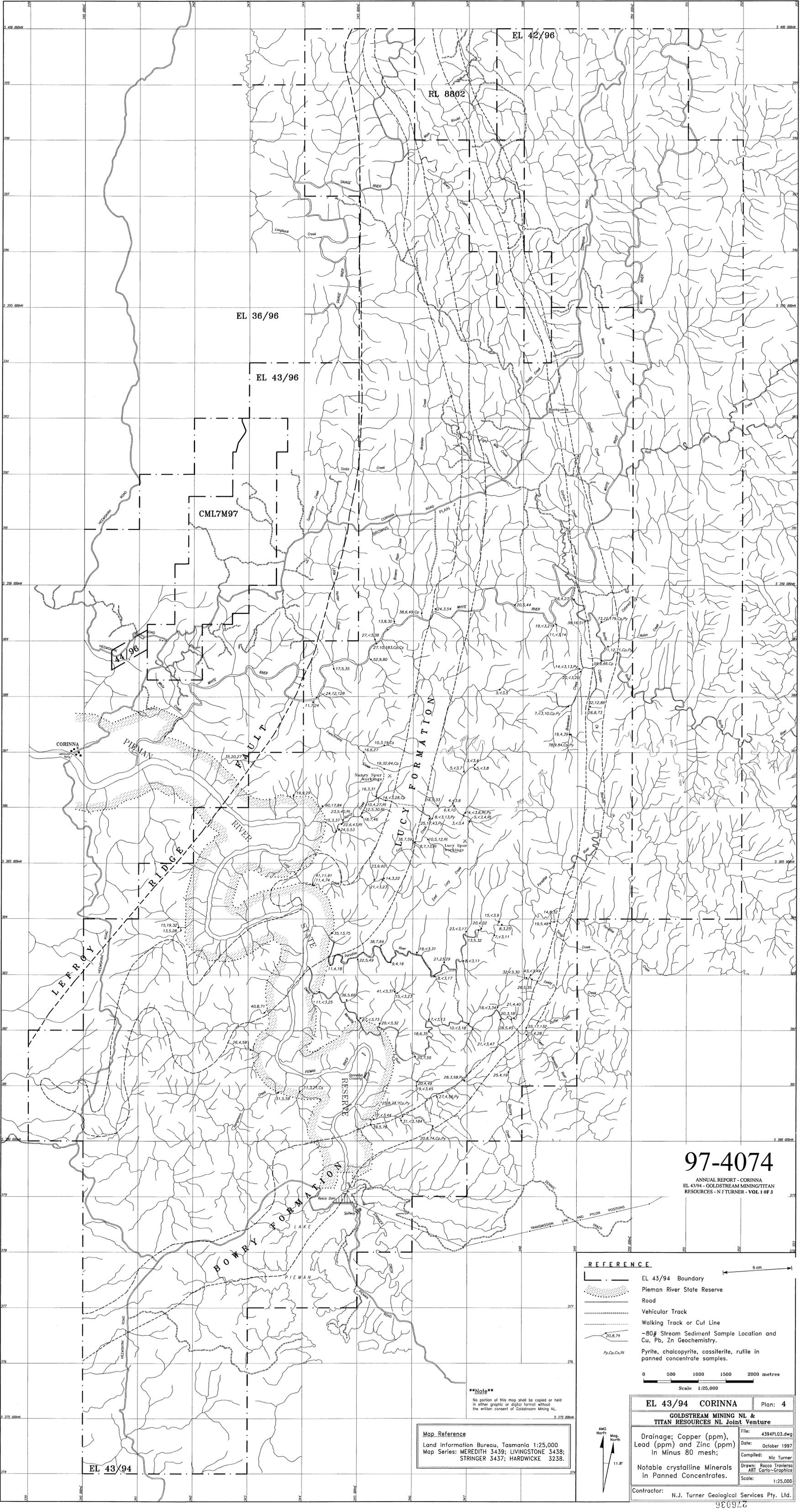
- EL 43/94 Boundary
- ▨ Pieman River State Reserve
- Road
- Vehicular Track
- Walking Track or Cut Line
- Sample Location with Au (grains), Au (ppb), As (ppm), Ag (ppb). Second pan. con. sample and count of Au (grains) at some locations; only pan. con. Au (grains) at some other locations.
- Au: all anomalous -80# (>3ppb), most anomalous pan. con. (>5 grains) within boundary.

0 500 1000 1500 2000 metres  
Scale 1:25,000

**\*\*Note\*\***  
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**Map Reference**  
Land Information Bureau, Tasmania 1:25,000  
Map Series: MEREDITH 3439; LIVINGSTONE 3438;  
STRINGER 3437; HARDWICKE 3238.

<b>EL 43/94 CORINNA</b>		Plan: <b>3</b>
<b>GOLDSTREAM MINING NL &amp; TITAN RESOURCES NL Joint Venture</b>		
Drainage; Counts of Gold Grains in Panned Concentrates; With Gold, Arsenic and Silver in Minus 80 Mesh		File: 4394P102.dwg Date: October 1997 Compiled: Nic Turner Drawn: Rocco Travierso ARI Carto-Graphics Scale: 1:25,000
Contractor: N.J. Turner Geological Services Pty. Ltd.		



**97-4074**  
 ANNUAL REPORT - CORINNA  
 EL 43/94 - GOLDSTREAM MINING/TITAN  
 RESOURCES - N.J. TURNER - VOL 1 OF 3

**REFERENCE**

- EL 43/94 Boundary
- Pieman River State Reserve
- Road
- Vehicular Track
- Walking Track or Cut Line
- 80# Stream Sediment Sample Location and Cu, Pb, Zn Geochemistry.
- Pyrite, chalcopyrite, cassiterite, rutile in panned concentrate samples.

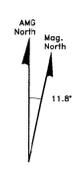
0 500 1000 1500 2000 metres  
 Scale 1:25,000

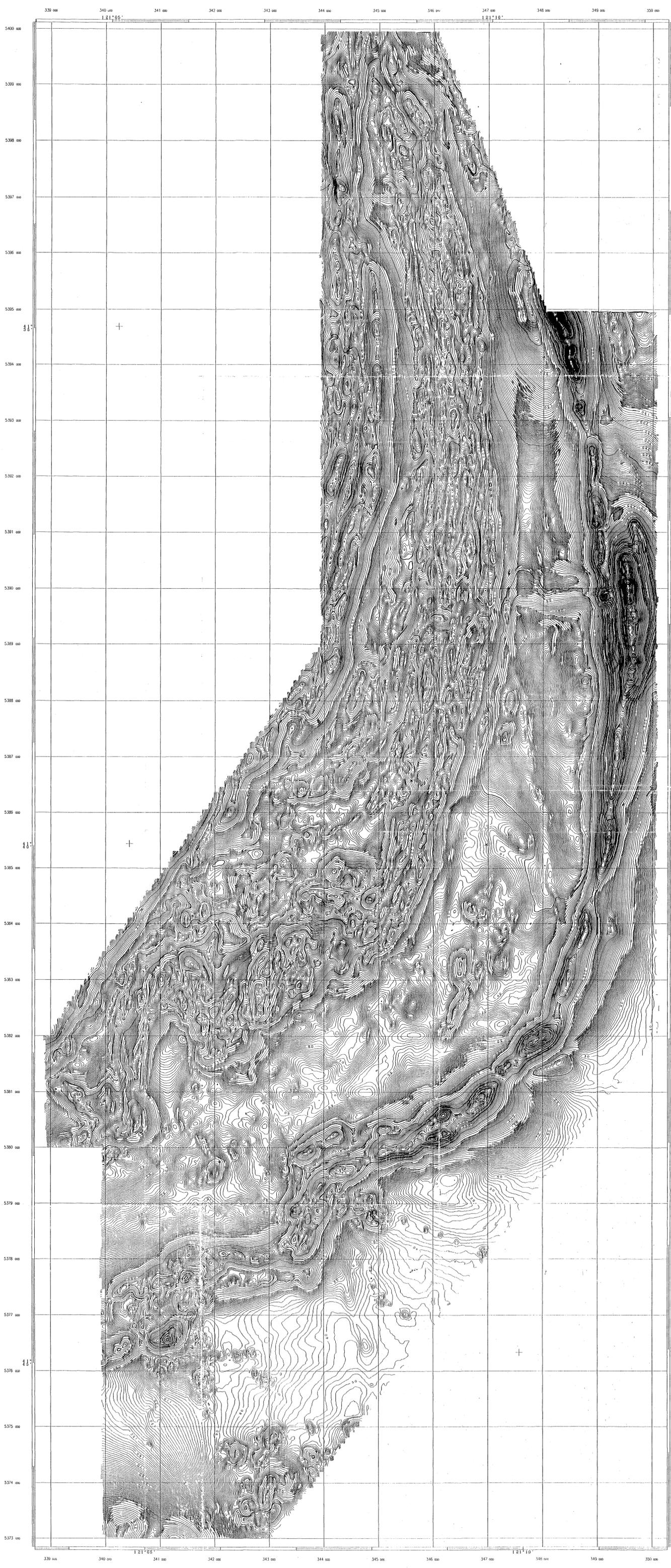
**\*\*Note\*\***  
 No portion of this map shall be copied or held in either graphic or digital format without the written consent of Goldstream Mining NL

**Map Reference**  
 Land Information Bureau, Tasmania 1:25,000  
 Map Series: MEREDITH 3439; LIVINGSTONE 3438;  
 STRINGER 3437; HARDWICKE 3238.

<b>EL 43/94 CORINNA</b>		Plan: 4
<b>GOLDSTREAM MINING NL &amp; TITAN RESOURCES NL Joint Venture</b>		
Drainage; Copper (ppm), Lead (ppm) and Zinc (ppm) In Minus 80 mesh;		
Notable crystalline Minerals in Panned Concentrates.		
Contractor: N.J. Turner Geological Services Pty. Ltd.		

File: 4394P03.dwg  
 Date: October 1997  
 Compiled: Nic Turner  
 Drawn: Rocco Traverso  
 ART Carto-Graphics  
 Scale: 1:25,000





**AIRBORNE SURVEY SPECIFICATIONS**

Flight Line Direction: 090 - 270 degrees  
 Flight Line Separation: 50 metres  
 Tie Line Direction: 000 - 180 degrees  
 Tie Line Separation: 500 metres  
 Mean Terrain Clearance: 40 metres  
 Sample Interval: 3-4 metres  
 Navigation: Differential GPS  
 Survey Flown: May 1996

**AIRBORNE SURVEY EQUIPMENT**

Acquisition: UTS Geophysics  
 Aircraft: AS350B Helicopter  
 Magnetometer: Scintrex Cesium Vapour CS-2  
 Resolution: 0.001 nT  
 Sensitivity: 0.001 nT  
 Recording Interval: 0.1 sec  
 Compensation: RMS AADC II Compensator

**PROCESSING DETAILS**

Diurnal variations have been removed from the data.  
 Tie line levelling processes have been applied.  
 Enhanced microlevelling processes have been applied.  
 The magnetic regional gradient has been removed by subtraction of the IGRF 1995 model computed at the date of the survey.

Grid cell size: 10mE x 10mN

1st contour interval: 2nT  
 2nd contour interval: 5nT  
 3rd contour interval: 10nT  
 4th contour interval: 50nT  
 5th contour interval: 100nT  
 6th contour interval: 250nT  
 7th contour interval: 500nT

UTS GEOPHYSICS

Scale 1:25000

UTS Geophysics

5cm

**97-4074**  
 ANNUAL REPORT - CORINNA  
 EL RECURSOS N/TURNER - VOL 1 OF 3

**Plan 5**

GOLDSTREAM MINING N.L.

CORINNA (TAS)  
 DETAILED HELI-MAG SURVEY  
 CONTOUR MAP OF  
 TOTAL MAGNETIC INTENSITY

DRAWN: UTS GEOPHYSICS      SCALE: 1:25000  
 DATE: 10 JUNE 1996      JOB: A101 - AREA 01

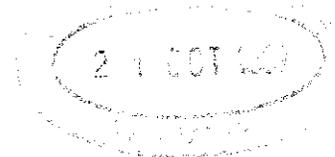
97-4074

Appendix 4 of Turner, N.J. 1997. Exploration Licence No 43/94, Corinna, Tasmania. Annual Report 4/1/97. Goldstream Mining NL and Titan Resources NL. Volume 3 of 3 of the annual report.

**Consultant's Report**

to

**Goldstream Mining N.L.**



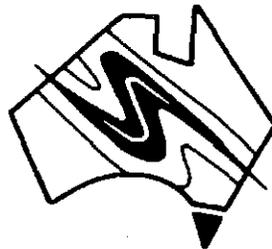
276038

**A PETROGRAPHIC AND GEOCHEMICAL  
INVESTIGATION OF GOLD:  
ARTHUR MOBILE BELT, WESTERN TASMANIA**

EXAM GOLD SAMPLES - CORINNA  
EL 43/94 - GOLDSTREAM MINING/TITAN  
RESOURCES - N J TURNER VOL 2 OF 3  
014465 67

(confidential)

September 1996



97-4074

EXAM GOLD SAMPLES - CORINNA  
EL 43/94 - GOLDSTREAM MINING/TITAN  
RESOURCES - N J TURNER VOL 2 OF 3

Dr Paul A. Kitto , Centre for Ore Deposit and Exploration Studies  
Geology Department, University of Tasmania, GPO Box 252-79, Hobart, Australia 7001  
ax: Aust. 0362 267662, Phone: Aust. 0362 262804, Email: P.A.Kitto@geol.utas.edu.au

276039

**Consultant's Report**  
to  
**Goldstream Mining N.L.**

**A PETROGRAPHIC AND GEOCHEMICAL  
INVESTIGATION OF GOLD:  
ARTHUR MOBILE BELT, WESTERN TASMANIA**

**(confidential)**

**September 1996**



Dr Paul A. Kitto , Centre for Ore Deposit and Exploration Studies  
Geology Department, University of Tasmania, GPO Box 252-79, Hobart, Australia 7001  
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## SUMMARY

Eleven epoxy probe mounts containing a total of 192 gold grains from the Whyte River - Pieman River area, Arthur Mobile Belt, western Tasmania were examined petrographical (size, sphericity, angularity, mineral inclusions, presence of vugs) and analysed for their gold fineness from core to rim ( $1000 \times \text{Au}/[\text{Au} + \text{A}]$ ) to document the characteristic nature of the gold and potential origins for mineralisation.

The eleven probe mounts contained gold specimens that had been previously classified on their physical properties (e.g., colour, travel damage, crystallinity, mineral intergrowths, and etched nature). No single physical characteristic was successful in pigeon holing the gold grains relative to gold fineness but it is interpreted that in most cases only minor travel damage has occurred and therefore the samples are proximal to source (1-2 km; Rose, 1987). The gold specimens typically contained high and consistent average fineness, and narrow fineness ranges (Mean = 941; Range = 728 to 999) comparable with hypogene depth classes of Fisher (1945), and similar to values for Archaean (including Witwatersrand), Slate Belt and Plutonic classes of Morrison (1991). An increase in gold fineness from core to rim typically corresponded with minor colour variations (darker) on the immediate rim of the grains, associated with increased Ag-poor rims. This increase in gold fineness from core to rim is more or less associated with increased sphericity and rounded and most probably resulted from supergene enrichment in an oxidising environment. However, it was equally noted that almost half of all gold grains decreased in gold fineness from core to rim and this was inferred as a primary depositional feature associated with falling temperatures during mineralisation.

Mineral inclusions associated with, and entrapped within, gold grains ranged from: quartz, goethite, rutile, carbonates, spinel, chalcopyrite, galena, talc/tremolite, feldspar? and platinum. Quartz inclusions were by far the most frequent followed by goethite after pyrite ( $\pm$  pyrrhotite). The associated decrease in gold fineness for grains containing galena, relative to grains containing chalcopyrite, support an interpretation for declining temperatures during mineralisation.

The source of gold mineralisation remains equivocal. The abundance of quartz inclusions, and the nature of associated mineral inclusions, may indicate that gold deposition occurred either in sulphide-rich quartz veins, during silica replacement of carbonate (Carlin-style; Bottrill, 1992), or in quartz-rich host rocks related to felsic intrusives. The presence of goethite after pyrite ( $\pm$  pyrrhotite) containing gold inclusions along primary growth zones indicates that gold deposition was coeval with sulphide deposition. A metamorphic origin for gold mineralisation is equally supported by mineral inclusions of talc/tremolite, rutile, spinel and K-feldspar (?). The detection of two platinum grains associated with gold might also indicate the presence of a minor basic to ultrabasic source for gold mineralisation.

## INTRODUCTION AND BACKGROUND

Native gold and silver in nature forms a continuous alloy between these two end members due to their almost identical atomic radii. Electrum is the term used to refer to alloys of a specific compositional range (i.e., between 20 & 80 wt.% gold; Boyle, 1979). Historically, however, the purity of gold has been expressed in terms of fineness ( $1000 \times \text{Au}/[\text{Au} + \text{A}]$ ). For the purpose of this report the Au-Ag alloy will be described in terms of the gold fineness characteristics; and the term electrum will not be used.

More recent investigations of gold mineralisation associated with the Arthur Mobile Belt in the Corinna district, western Tasmania, have been reported by Khin Zaw (1990), Khin Zaw et al. (1992), Bottrill (1991), Bottrill et al. (1992). Studies of alluvial gold grains together with silicification of associated Precambrian limestones have led to a suggestion of Carlin-style gold mineralisation in this region of western Tasmania (Bottrill et al., 1992).

In this investigation a detailed examination was made of panned gold concentrates from the Corinna district. Observation of grain size, sphericity, angularity, mineral inclusions and composition (Au, Ag, & Hg; fineness) were documented to identify the gold signature for the district and make comparisons with previous gold studies to determine the origin of gold mineralisation.

## METHOD

Eleven samples containing a total of 192 gold grains were provided by Mr Hugh Nolan and mounted in epoxy resin discs at the University of Tasmania by Mr Simon Stephens. The mounted alluvial gold grains were carefully polished with  $2.5\mu\text{m}$  aluminium paste allowing petrographic description, electron microprobe analysis and photographing.

Analyses were determined using a CAMECA-SX electron microprobe at the Central Science Laboratory, University of Tasmania under the supervision of Ms Alicia Verbeeten. The experimental conditions for gold analysis (Au, Ag & Hg) were set using the AgAuHg Label which uses an accelerating voltage of 20kv, and samples were standardised against the available silver standard.

## GOLD FINENESS SIGNATURES

Appendix I provides a detailed summary of the results obtained from petrographic descriptions of each gold grain (size visible on polished surface; sphericity; angularity; mineral inclusions; presence of vugs) in the epoxy resin mounts together with microprobe results (Ag, Au, and Hg) and calculations of gold fineness from core to rim within each grain are also summarised. Comments regarding the original grain classifications, field numbers, mean gold fineness, ranges in gold fineness for each epoxy probe mount, and the range in variations of gold fineness from rim to core are also included.

The following section systematically discusses the results presented in Appendix I.

### **G353 EPOXY PROBE MOUNT**

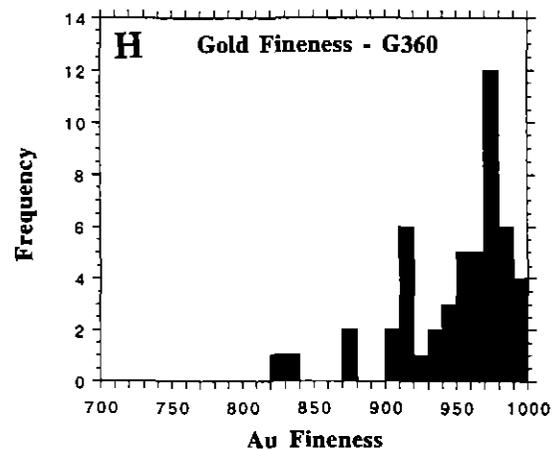
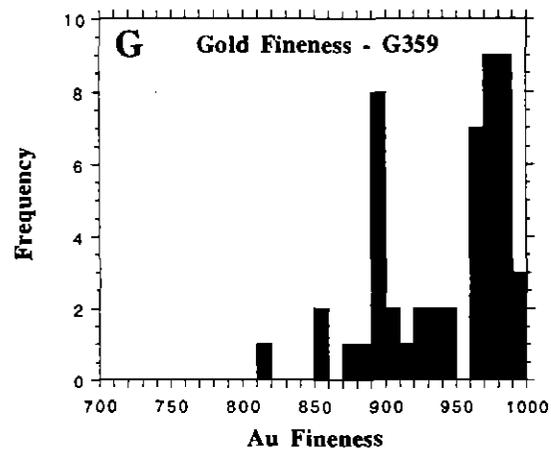
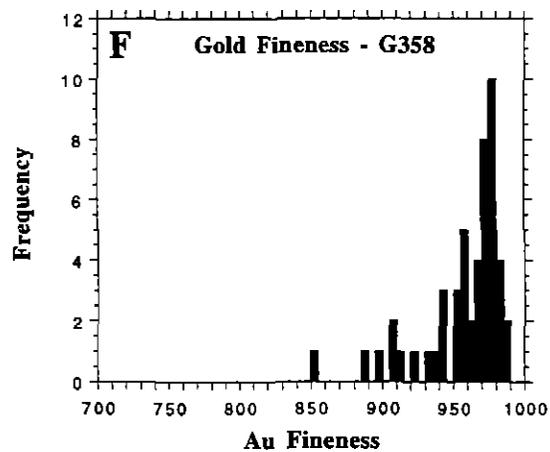
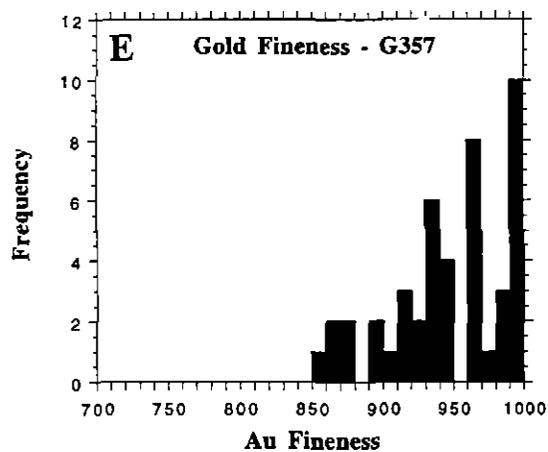
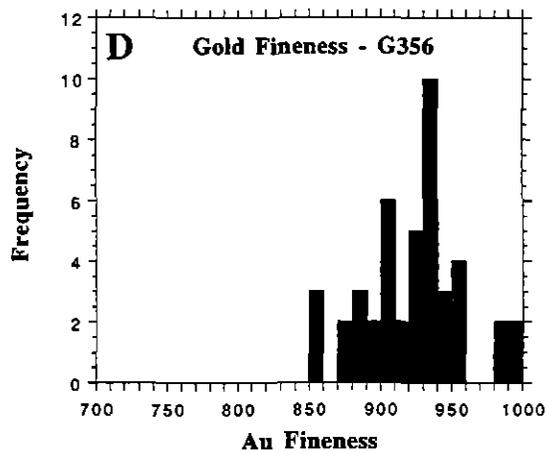
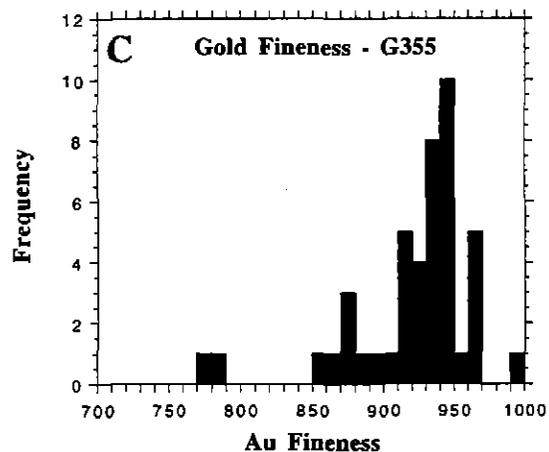
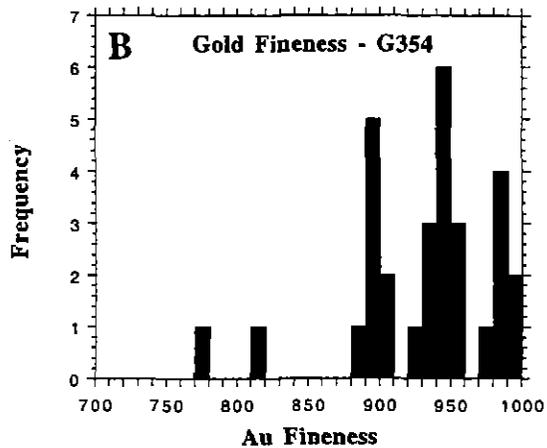
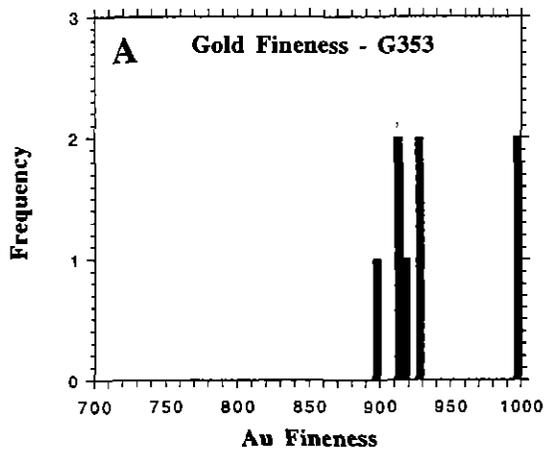
Probe mount G353 contains those **four grains** (Field no's: G154, G302, G206, G150) originally classified as **Pale in Colour** (Plate 1). The grains ranged in size (visibly exposed) from 450 to 100  $\mu\text{m}$ , were subangular, and ranged in sphericity from low to high. The four grains presented do not have vugs nor do they contain inclusions of other minerals. Silver contents of the gold grains are typically less than 10 wt.% and mercury contents are minimal (<0.4 wt.%). Gold fineness ranged from 898 to 999 (Fig. 1A) with a mean of 939. G353-G4 is anomalous in this data set in having extreme gold fineness (996-999). This same grain also has a higher sphericity relative to the remaining grains. Variations in gold fineness from core to rim are minimal with the exception of G353-G3 which actually decreases in fineness (-20).

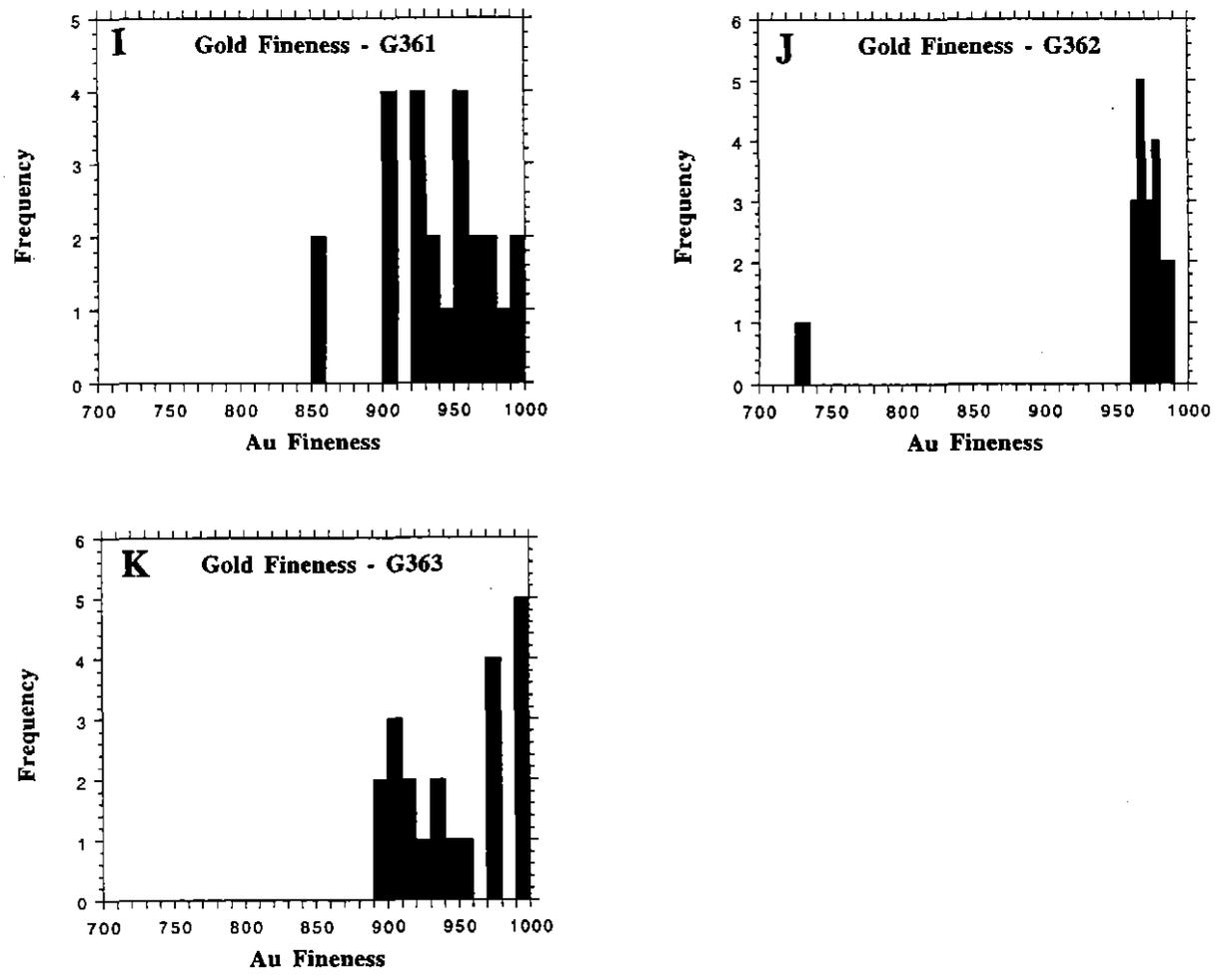
### **G354 EPOXY PROBE MOUNT**

Probe mount G354 contained **fifteen grains** (Field no's: G158, G148, G172, G174, G318, G294, G176, G328) originally classified as **Rich in Colour** (Plate 2). The grains ranged in size (visibly exposed) from 1500 to 200  $\mu\text{m}$ , exhibited low to medium sphericity with the exception of G354-G11, and were all sub- to well-rounded but for G354-G9 and G354-G13 (same Field no's - G318). The only gold grain to have a vuggy appearance was G354-G14 which coincidentally had the lowest gold fineness. Mineral inclusions within grains are many and varied (quartz, chalcopryrite, galena, Ti oxide, goethite after pyrite with minor hematite in fractures, K-spar?). In G354-G9 and G13 goethite pseudomorphs pyrite and gold occurs along primary growth zones. A lower gold fineness (~890) is associated with goethite. Silver contents of all gold grains are typically less than 12 wt.% (excluding G354-G14) and mercury contents minimal (<0.65 wt.%). Gold fineness ranged from 776 to 999 (Fig. 1B) with a mean of 931. The frequency histogram is positively skewed to higher gold fineness values (Fig. 1B). The highest gold fineness (999) occurs in G354-G10 associated with a possible feldspar inclusion. Gold fineness is higher in those grains containing chalcopryrite inclusions relative to grains with galena inclusions. Variations in gold fineness from core to rim are minimal with exception of G354-G5 (+49) and G354-G14 (-38).

### **G355 EPOXY PROBE MOUNT**

Probe mount G355 contained **twenty two grains** (Field no's: G172, G174) originally classified as **Medium Colour with Nil Travel Damage** (Plate 3). The grains ranged in size (visibly exposed) from 500 to 100  $\mu\text{m}$ , exhibited low to high sphericity, and were typically angular to subrounded. Vuggy appearances were typically present but mineral inclusions rarely observed (quartz, Ti-oxide, chalcopryrite). Silver contents of all gold grains are typically less than 15 wt.% (excluding G355-G15) and mercury contents minimal (<0.64 wt.%). Gold fineness ranged from 777 to 999 (Fig. 1C) with a mean of 922. The frequency histogram has a positively skewed distribution to higher gold fineness values (Fig. 1C). Variations in gold fineness from core to rim are minimal with exception of G355-G9 (+21) and G355-G18 (+38) which had increases in gold fineness from core to rim, and samples G355-G11 (-30) and G355-G13 (-22) which had decreases in gold fineness from core to rim. Variations in gold fineness are apparent in a number of grains, based on variations in colour change, but in G355-G15 and G355-G16 such changes





**Figure 1.** Histograms of gold fineness for the epoxy probe mount classifications (see Appendix 1 for detailed classifications).

appeared random. The only notable difference between panned concentrates G172 and G174 would be visible variability in colour (correlating with changes in gold fineness).

### **G356 EPOXY PROBE MOUNT**

Probe mount G356 contained **twenty two grains** (Field no's: G172, G174) originally classified as **Medium Colour with Minor Travel Damage** (Plate 4). The grains ranged in size (visibly exposed) from 550 to 50  $\mu\text{m}$ , exhibited low to high sphericity, and were typically subangular to well rounded. Highest sphericity and smallest grain size correlates well with highest gold fineness (G356-G7 & G356-G15). Vuggy appearances were typical but mineral inclusions rare (quartz, Fe+Mg carbonate?). Silver contents of all gold grains are typically less than 15 wt.% and mercury contents minimal (<0.9 wt.%). Gold fineness ranged from 852 to 997 (Fig. 1D) with a mean of 923. The frequency histogram has a normal bell shape distribution in gold fineness about the mean value (Fig. 1D). Variations in gold fineness from core to rim are highly changeable, ranging from +71 (G356-G5) to -37 (G356-G4) with an average increase of +3.2. It is interesting to note, however, that more than half of the grains decrease in gold fineness from core to rim. The only notable difference between panned concentrates G172 and G174 would be visible variability in colour as noted in epoxy mount G355 (correlating with changes in gold fineness).

### **G357 EPOXY PROBE MOUNT**

Probe mount G357 contained **twenty two grains** (Field no's: G172, G174) originally classified as **Medium Colour with Medium Travel Damage** (Plate 5). The grains ranged in size (visibly exposed) from 1500 to 200  $\mu\text{m}$ , exhibited low to medium sphericity, and were typically subangular to subrounded. Vuggy appearances were most apparent as were mineral inclusions (quartz, goethite, spinel, Ti-oxide, galena, Ca-carbonate, chalcopryrite). Gold fineness was lower in galena bearing gold grains than in chalcopryrite bearing gold grains (similar to G354). Silver contents of all gold grains are typically less than 14.5 wt.% and mercury contents minimal (<0.6 wt.%). Gold fineness ranged from 857 to 999 (Fig. 1E) with a mean of 946. The frequency histogram shows a positively skewed distribution in gold fineness to higher values (Fig. 1E). Variations in gold fineness from core to rim are highly changeable, ranging from +92 (G357-G14) to -43 (G357-G7) with an average increase of +12.4. The average increase in gold fineness for the epoxy probe mount G357 was the second largest of the eleven probe mounts investigated but even out of the 22 grains in G357 six grains decreased in gold fineness from core to rim and three grains showed no variation. The only notable difference between panned concentrates G172 and G174 were in the nature of inclusion types found within the gold grains. G172 was dominated by quartz inclusions and G174 was dominated by base metal inclusions (galena & chalcopryrite). A similar trend is noted for epoxy probe mounts G355 and G356 but the general lack of inclusions in these probe mounts requires caution in drawing such a conclusion.

### **G358 EPOXY PROBE MOUNT**

Probe mount G358 contained **twenty five grains** (Field no's: G190A) originally classified as **Medium Colour with Minor Travel Damage** and

**80% crystallinity** (Plate 6). The grains ranged in size (visibly exposed) from 1000 to 400  $\mu\text{m}$ , exhibited very low to high sphericity, and were typically angular to subrounded. Vuggy appearances were most apparent and the extreme nature of this phenomenon resulted in a brain-rock appearance. Mineral inclusions were minor (Fe-Mn-Mg-rich carbonate, Platinum) but the nature of the inclusions may be important for interpreting the genetic origins for the gold. Silver contents of all gold grains are typically less than 10.5 wt.% and mercury contents minimal (<0.5 wt.%). Gold fineness ranged from 850 to 986 (Fig. 1F) with a mean of 957, the highest mean gold fineness value obtained for all epoxy probe mounts investigated. The frequency histogram exhibits a strong positively skewed distribution in gold fineness to higher values (Fig. 1F). Variations in gold fineness from core to rim are unusual in that only minor increases in gold fineness from core to rim occurred (+4 in G358-G25 to -101 in G358-G19) with an average decrease of -7.2.

### **G359 EPOXY PROBE MOUNT**

Probe mount G359 contained **twenty five grains** (Field no's: G190A) originally classified as **Medium Colour** with **Moderate Travel Damage** and **50% crystallinity** (Plate 7). The grains ranged in size (visibly exposed) from 1200 to 250  $\mu\text{m}$ , exhibited low to medium sphericity, and were typically subangular to rounded. Vuggy appearances were most apparent but not as extreme as visible in G358. Mineral inclusions were minor (quartz, goethite) and in G359-G5 goethite pseudomorphs pyrite with gold aligned along primary growth zones. Silver contents of most gold grains are typically less than 12.5 wt.% but reach a maximum in G359-G24 at 18.3 wt.%. Mercury contents are minimal (<0.6 wt.%). Gold fineness ranged from 819 to 999 (Fig. 1G) with a mean of 944. The frequency histogram exhibits a strong positively skewed distribution in gold fineness to higher values but a secondary high is present at 890 (Fig. 1G). Similar secondary highs were not present in corresponding pan concentrates G358 (Fig. 1F) but were noted in G360 (Fig. 1H). Variations in gold fineness from core to rim are highly variable, ranging from +81 (G359-G2) to -74 (G357-G24) with an average increase of +1.7.

### **G360 EPOXY PROBE MOUNT**

Probe mount G360 contained **twenty five grains** (Field no's: G190A) originally classified as **Medium-rich Colour** with **Moderate Travel Damage** and **nil crystallinity** (Plate 8). The grains ranged in size (visibly exposed) from 1500 to 350  $\mu\text{m}$ , exhibited low to high sphericity, and were typically subangular to well rounded. Vuggy appearances were apparent but not as extreme as seen in G358 and G359. Mineral inclusions were minor (quartz, Ti-oxide, goethite). Silver contents of most gold grains are typically less than 13 wt.% but reach a maximum in G360-G19 at 17.46 wt.%. Mercury contents were minimal (<0.5 wt.%). Gold fineness ranged from 829 to 998 (Fig. 1H) with a mean of 950. The frequency histogram exhibits a strong positively skewed distribution in gold fineness to higher values (Fig. 1H). Variations in gold fineness from core to rim are highly variable, ranging from +87 (G360-G2) to -5 (G360-G19) with an average increase of +13.3. This increase is the largest average increase of all the epoxy probe mounts studied but still nine grains had a decrease in gold fineness from core to rim, and one sample was unchanged. In most grains that showed an increase in gold fineness from core to rim a corresponding colour change was also visible.

### **G361 EPOXY PROBE MOUNT**

Probe mount G361 contained **twelve grains** (Field no's: G312, G314, G316, G318) originally classified as **Medium Colour with Minor-Major Travel Damage** (Plate 9). The grains ranged in size (visibly exposed) from 550 to 100  $\mu\text{m}$ , exhibited low to high sphericity, and were typically angular to subrounded. Vuggy appearances were apparent for most grain as were mineral inclusions (quartz, Ca-Mn-Fe-rich carbonate, Ca-carbonate, goethite, Si-Al-Fe-K-rich feldspar?). Silver contents of most gold grains are typically less than 10 wt.% but reach a maximum in G361-G7 at 15.01 wt.%. Mercury contents were minimal (<0.45 wt.%). Gold fineness ranged from 852 to 998 (Fig. 1i) with a mean of 938. The frequency histogram exhibits a normal bell shaped distribution (Fig. 1i). Variations in gold fineness from core to rim are variable, ranging from +38 (G361-G2) to -7 (G361-G6) with an average increase of +6.3.

### **G362 EPOXY PROBE MOUNT**

Probe mount G362 contained **ten grains** (Field no's: G190A, G190B) originally classified as **Gold Intergrown With Other Minerals** (Plate 10). The grains ranged in size (visibly exposed) from 3400 to 450  $\mu\text{m}$ , exhibited low to high sphericity, and were typically angular to subrounded. Gold was typically intergrown with goethite which exhibited a spongy laminated texture in a number of samples (G362-G3, G362-G4, G362-G10) suggestive of pyrrhotite replacement. In goethite dominated examples gold constituted less than 35% of the intergrowth. Other minerals intergrown with gold included talc/tremolite (G362-G1, G362-G7, G362-G8), and quartz. Silver contents of most gold grains are typically less than 3.8 wt.% but reached a maximum in G362-G1 at 27.39 wt.%. Mercury contents were minimal (<0.25 wt.%). Gold fineness ranged from 728 to 986 (Fig. 1J) with a mean of 948. The frequency histogram exhibits bimodal distribution with one sample having a gold fineness of 728 and the remainder of values near 970 (Fig. 1J). Variations in gold fineness from core to rim are minimal, ranging from +3 to -1 with an average increase of +0.33. Panned concentrate samples G190A and G190B appeared inseparable in terms of their observed and measured properties. The only exception was G362-G1 from panned concentrate G190B which had a gold fineness of 728, the lowest of any samples measured in this study.

### **G363 EPOXY PROBE MOUNT**

Probe mount G363 contained **ten grains** (Field no's: G334, G340, G346, G348) originally classified as **Etched Surfaces** (Plate 11). The grains ranged in size (visibly exposed) from 1400 to 400  $\mu\text{m}$ , exhibited low to medium sphericity, and were typically very angular to rounded. Gold was typically vuggy and inclusion free but quartz was present in two samples (G363-G5, G363-G6) and goethite in one other (G363-G10). Silver contents of most gold grains are typically less than 11 wt.% and mercury contents were minimal (<0.75 wt.%). Gold fineness ranged from 893 to 966 (Fig. 1K) with a mean of 948. The frequency histogram of gold fineness for G363 exhibits a positively skewed distribution (Fig. 1K). Variations in gold fineness from core to rim are variable, ranging from +46 to -7 with an average increase of +9.1. Largest variations in fineness from core to rim were noted in those two gold grains with quartz inclusions (G363-G5, G363-G6), however, Ag-poor rims regions (darker) were optically visible in many of the grains.

## GOLD FINENESS

Gold fineness values result from a complex function of temperature, redox state, activity of the ligands, pH, and total Au/Ag content of the system in question (Boyle, 1979; Morrison et al., 1991; Huston et al., 1992; Gammons and Williams-Jones, 1995). As a result the fineness of gold deposited in various geological environments under differing physico-chemical conditions will be different. In figure 2 Morrison et al. (1991) has summarised the six major classes of gold-silver forming environments together with their overall averages and ranges of fineness values, after Fisher (1945). They note that Archaean (including Witwatersrand), Slate Belt and Plutonic classes are characterised by high and consistent average fineness and narrow fineness ranges. There would appear to be no clear subdivision within these classes according to deposit style or inferred genesis. The Porphyry, Volcanogenic and Epithermal classes have variable average deposit fineness and a wide total range in fineness values. Within these three classes, higher fineness is typical of deposits in andesitic rather than rhyolitic volcanic settings; and deposits with Cu-Au rather than Cu-Mo or Pb-Zn element associations.

In major gold-silver forming environments the dominant transportation mechanism for gold and silver takes place in the form of  $\text{AgCl}_2^-$  for silver and  $\text{Au}(\text{HS})_2^-$  for gold. The solubility of gold and silver in hydrothermal fluids for all the classes of gold-silver deposits decreases with a fall in temperature, except for the fluids responsible for acid-sulphate type epithermal deposits (Morrison et al., 1991). In addition to cooling some gold-forming environments are characterised by the predominance of one or more processes of ore deposition. In Archaean greenstone-hosted deposits, dilute  $\text{CO}_2$  rich fluids precipitate gold by reaction with iron-rich wallrocks resulting in sulphidation of the associated wallrocks (Neall & Phillips, 1987). In Slate Belt environments ore-forming fluids are generated by metamorphic dewatering and consist of  $\text{CO}_2$  bearing chloride brines. Gold deposition results when the ore fluids are reduced by carbonaceous wallrock reactions, or by mixing with methane bearing fluids derived from the rocks. Similarly, cooling and an increase in fluid pH due to wall rock reactions, as seen in the Otago schist belt (Paterson, 1986), may play a role in gold deposition, as might sulphidation reactions associated with pyritic shales (Cox et al., 1983). In the plutonic environment mantle-lower crust interaction, metamorphic dewatering, and melting may be important (Bohlke & Kistler, 1986; Bohlke, 1989). Gold precipitation mechanisms include cooling, wall rock interaction (sulphidation) and reduction by fluid mixing.

Whereas cooling affects chloro and bisulphide complexes of gold and silver in the same manner by decreasing their solubility, changes in pH,  $f\text{O}_2$ , salinity and activity of reduced sulphur have different effects on the stability of chloro and bisulphide complexes (Morrison, 1991). For example, at a fixed temperature an increase in pH and a drop in oxidation levels causes a fall in the solubility of gold and silver chloro-complexes. However, for bisulphide complexes the effect of changes in pH, redox and reduced sulphur depends on the initial pH and oxidation state of the fluid.

In summary, of the six major classes of gold-silver forming environments the Archaean (including Witwatersrand), Slate Belt and Plutonic classes are

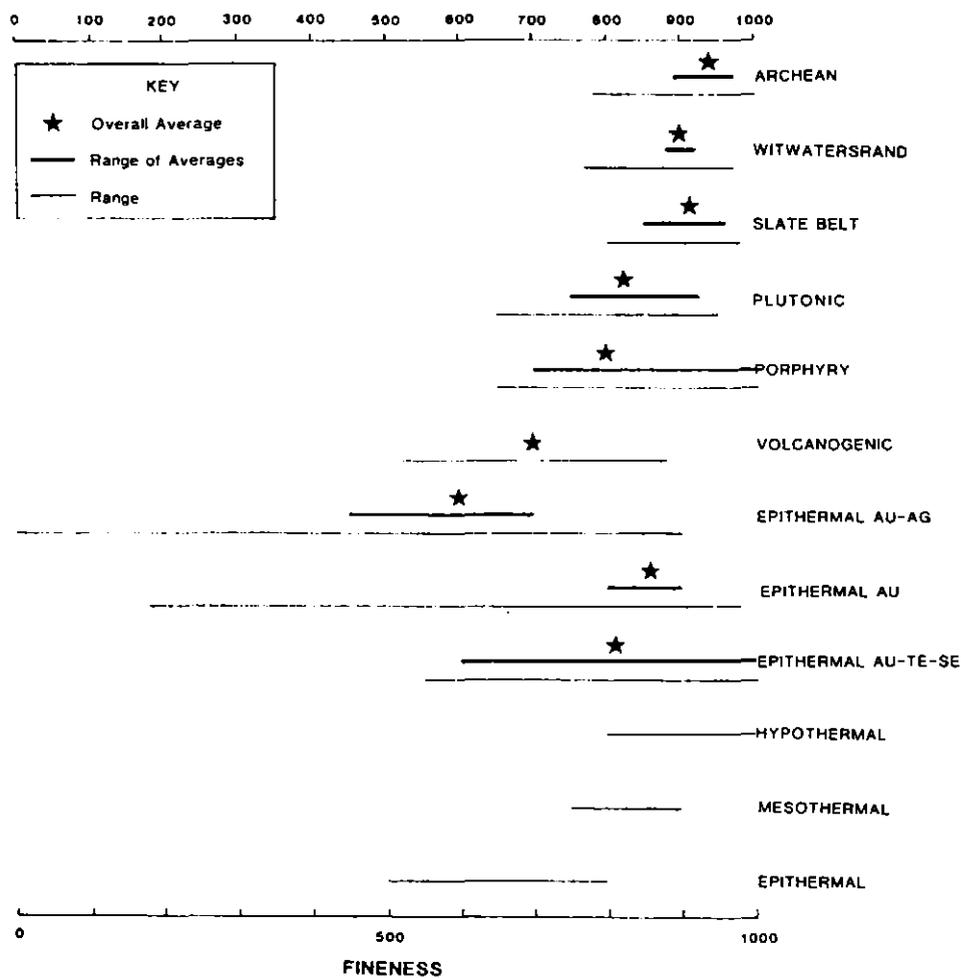


Figure 2. Overall average, range of averages and range of fineness for major deposit classes. Hypothermal, Mesothermal and Epithermal ranges from Fisher (1945) included for comparison. From Morrison et al. (1991).

characterised by high and consistent average fineness and narrow fineness range comparable to the hypogene depth classes used by Fisher (1945). Au/Ag ratios can not be explained by transport mechanisms alone and therefore Au/Ag ratios in the source rock and mechanisms of deposition must be considered.

Four possible explanations for consistency in gold fineness values are possible:

1. a common origin for all styles of mineralisation
2. a common source for gold and silver bearing fluids without modification
3. a mechanism for homogenising the fineness values through post-mineralisation deformation and metamorphism
4. a mechanism of supergene enrichment

### **INTERPRETATION OF GOLD FINENESS IN PANNED CONCENTRATES**

A summary of gold fineness variations is graphically presented in figure 3 which compares gold fineness for each of the epoxy probe mounts. A tabulation of the mean, range and variations from core to rim of fineness are also summarised in Table 1.

It is immediately apparent from the results that with few exceptions all gold samples from the Whyte River - Pieman River area have characteristically high and consistent average fineness, and narrow fineness ranges comparable to the hypogene depth classes used by Fisher (1945), and similar to the values for the Archaean (including Witwatersrand), Slate Belt and Plutonic classes of Morrison (1991). The data is also comparable to the findings reported by Zaw (1990), Zaw et al (1992) and Bottrill et al.(1992) from the Corinna region.

The original classification of gold samples into the various epoxy probe mount types based on their physical properties has not been a complete success. For example, minor variations in gold fineness have been noted from lowest average gold fineness in those samples with least travel damage (G355, mean = 922) to highest average gold fineness in those samples with maximum visible crystallinity (G358, mean = 957). Original classifications of samples by colour alone was not diagnostic in identifying highest gold fineness (c/f. G353, mean = 939; G354, mean = 931). In individual gold grains, however, colour variations have been noted and correspond with Ag-poor rims on grain boundaries. Classification of samples by the degree of travel damage was moderately more successful than other techniques but not completely (c/f. G355, mean = 922; G356, mean = 923; G361, mean = 938; G359, mean = 944; G360, mean = 950).

The nature of mineral inclusions associated with and entrapped within individual gold grains was many and varied. The most common inclusions being quartz. Goethite after pyrite or pyrrhotite has also been identified. In a number of samples goethite has pseudomorphed original pyrite grains and contains gold inclusions enclosed along pyrite growth zones. Where goethite has replaced pyrrhotite, laminated intergrowths after secondary marcasite are apparent. Minor inclusions of rutile, carbonate, spinel, chalcopyrite, galena, talc/tremolite, platinum, and feldspar? have also been identified.

## Gold Fineness - All Data

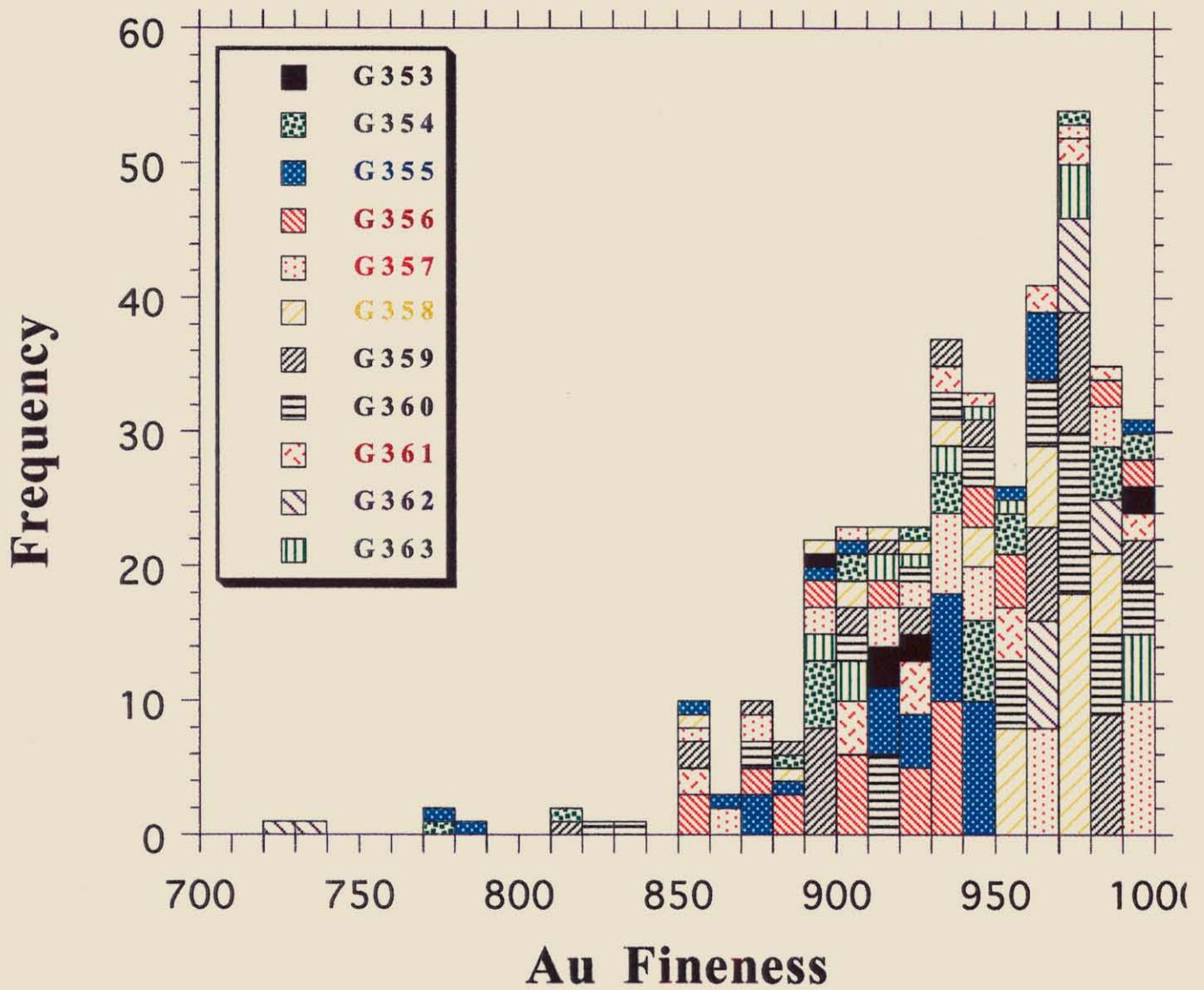


Figure 3. Histogram of gold fineness for all gold grains.

TABLE 1: FINENESS VARIATION

SAMPLE NO.	MEAN	RANGE	RIM TO CORE RANGE	RIM TO CORE AV. VARIATION
<b>G353</b> (4 grains)	939 (n=7)	898 to 999	3 to -20 (n=3)	-6.0
<b>G354</b> (15 grains)	931 (n=30)	776 to 999	+49 to -38 (n=15)	-0.3
<b>G355</b> (22 grains)	922 (n=44)	777 to 999	+38 to -30 (n=22)	-0.5
<b>G356</b> (22 grains)	923 (n=44)	852 to 997	71 to -37 (n=22)	3.2
<b>G357</b> (22 grains)	946 (n=43)	857 to 999	+92 to -43 (n=20)	12.4
<b>G358</b> (25 grains)	957 (n=49)	850 to 986	4 to -101 (n=24)	-7.2
<b>G359</b> (25 grains)	944 (n=50)	819 to 999	+81 to -74 (n=25)	1.7
<b>G360</b> (25 grains)	950 (n=48)	829 to 998	87 to -5 (n=23)	13.3
<b>G361</b> (12 grains)	938 (n=24)	852 to 998	+38 to -7 (n=7)	6.3
<b>G362</b> (10 grains)	948 (n=20)	728 to 986	+3 to -1 (n=9)	0.3
<b>G363</b> (10 grains)	948 (n=21)	893 to 996	46 to -7 (n=10)	9.1
<b>AVERAGE</b>	<b>941</b> (n=387)	<b>728 to 999</b>	<b>92 to -101</b>	<b>3.3</b>

The nature of mineral inclusions could be useful in the interpretation of the source for and genesis of gold mineralisation in the region. The abundance of quartz inclusions would tend to indicate that either gold deposition occurred within quartz veins, silica replacement, or quartz-rich host-rocks. It would appear less probable that quartz was picked up during travel damage as most grains exhibit only nil-minor evidence for reworking. The presence of goethite after pyrite ( $\pm$  pyrrhotite) with gold inclusions along primary growth zones indicates that some gold deposition was coeval with sulphide deposition. Such conclusions are supported by the occurrence of minor chalcopyrite and galena inclusions within gold grains. The fact that higher gold fineness is associated with chalcopyrite rather than galena could most likely indicate a temperate constraint on gold and sulphide deposition. The existence of a range of carbonate inclusions in gold could be associated with carbonate replacement mineralisation as noted for the silica flour deposit at Corinna (Zaw, 1990). Bottrill et al. (1992) for example has hypothesised that gold deposition in the area might be associated with Carlin-style mineralisation (i.e., disseminated gold in limestone). The existence of a minor number of talc/tremolite inclusions in gold could be further evidence for carbonate replacement mineralisation, or equally support a metamorphic origin for gold mineralisation. Rutile, minor spinel and possible K-feldspar inclusions could similarly be associated with metamorphic events, or hypothetical felsic intrusives. Finally, the detection of two pure platinum grains within gold could be indicative of basic to ultrabasic sources for gold mineralisation.

The variation in gold fineness within most grains from core to rim is typically minimal with minor exceptions. It was noted that in all epoxy probe mounts that there was almost an equal proportion of gold grains that increased in fineness from core to rim as there were gold grains that decreased in fineness from core to rim. Increases in gold fineness are typically associated with changes in colour to darker coloured rims and greater sphericity and roundness. The logical conclusion being that increases in gold fineness from core to rim are associated with minor travel damage and supergene enrichment, where in oxidising environments silver is more mobile and has been removed from the rim of the grains. Rose (1987) in describing Alaskan gold placer deposits made an empirical observation that for each kilometre of transport from the source region actually caused an increase of fineness by five points. Applying this interpretation to the majority of the gold grains analysed in the Whyte River-Pieman River area would indicate that most grains have travelled less than 1-2 km from the source. Decreases in gold fineness from core to rim, on the other hand, are thought to be a primary feature associated with gold deposition in the region and may reflect a decrease in temperature during gold deposition.

## CONCLUSIONS

The characteristically high and consistent average gold fineness, and narrow fineness ranges for gold specimens from the Whyte River - Pieman River regions are comparable to the hypogene depth class of Fisher (1945) and corresponds to similar values for the Archaean (including Witwatersrand), Slate Belt and Plutonic classes of Morrison (1991). The systematic decrease in gold fineness from core to rim in almost half of all gold grains might indicate that gold deposition was controlled by falling temperatures. This interpretation

is supported by decreases in gold fineness for grains containing galena inclusions relative to chalcopyrite inclusions. However, the presence of goethite after pyrite ( $\pm$  pyrrhotite), together with other sulphides, suggests that gold precipitation was associated with sulphidation reactions. The presence of carbonate inclusions too could indicate that cooling together with an increase in pH due to carbonate wall-rock reactions may have played a role in gold deposition. Based on fluid inclusion studies for silica flour replacement of dolomites by Zaw (1990) the potential fluids responsible for gold mineralisation may have been at  $\sim 300^{\circ}\text{C}$  and  $\text{CO}_2 \pm \text{CH}_4$  bearing weakly-moderately saline brines. Such fluids could either have been associated with plutonism or metamorphism and the final conclusions are still equivocal. The presence of quartz, rutile, minor spinel and possibly K-feldspar inclusions in gold grains neither supports nor detracts from both models. In fact, it may be that two sources for gold mineralisation exist in this region! The occurrence of two platinum grains could also be indicative of a third gold source associated with basic to ultrabasic rocks.

Finally, minor increases in gold fineness from core to rim in a large number of gold grains together with evidence for minor travel damage suggests that supergene processes have occurred and that travel distances were minimal, perhaps less than 1-2 km from source.

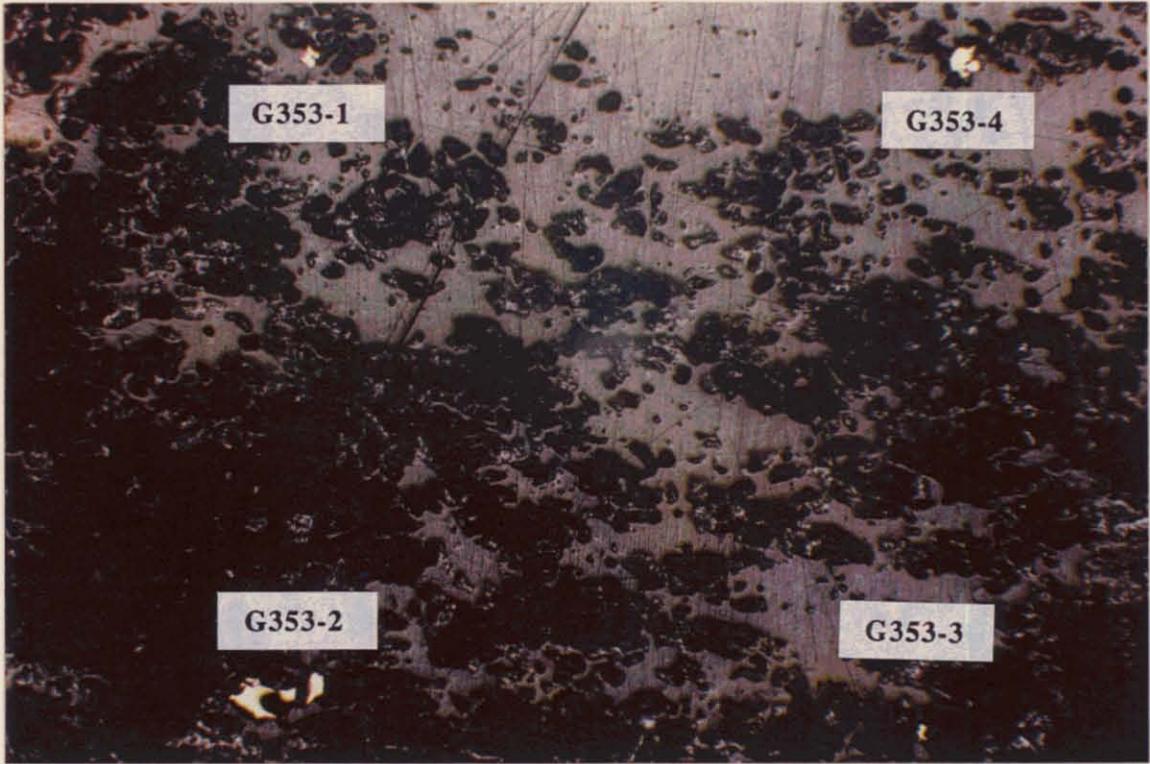
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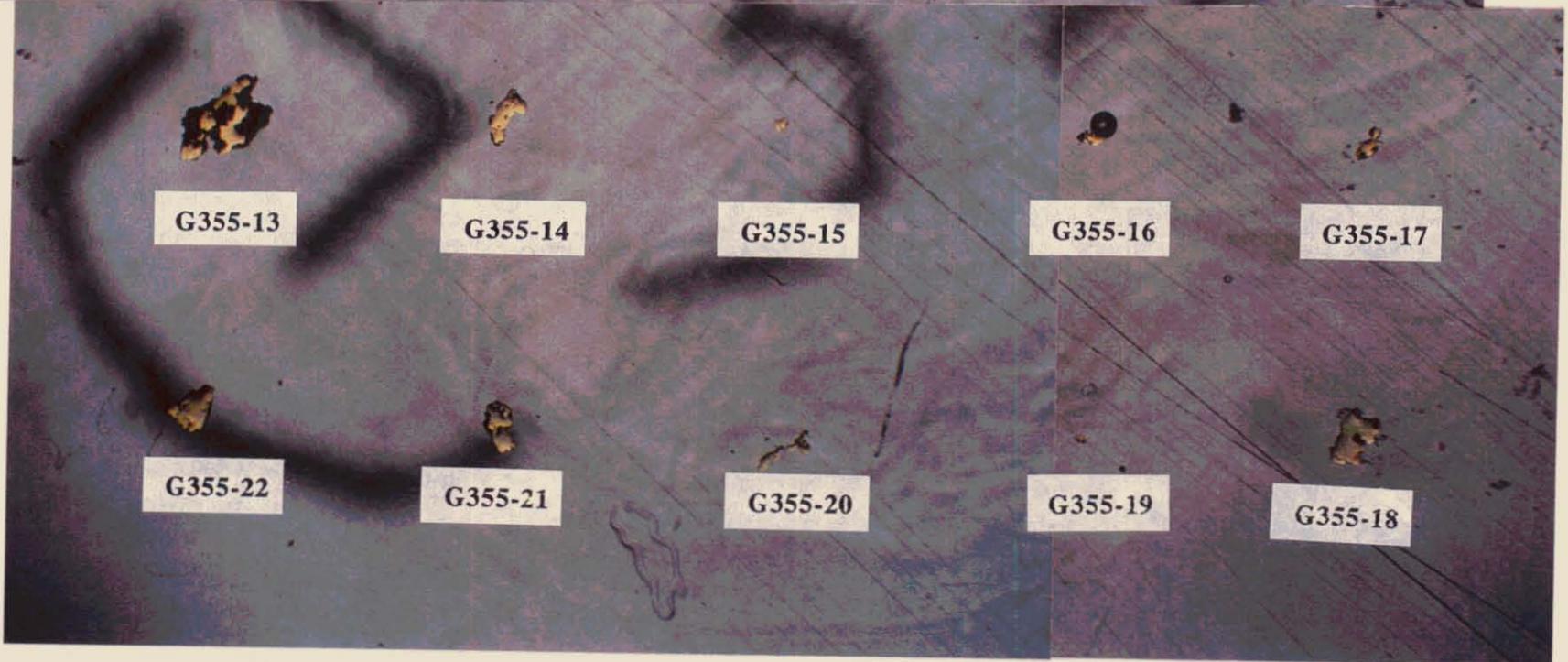
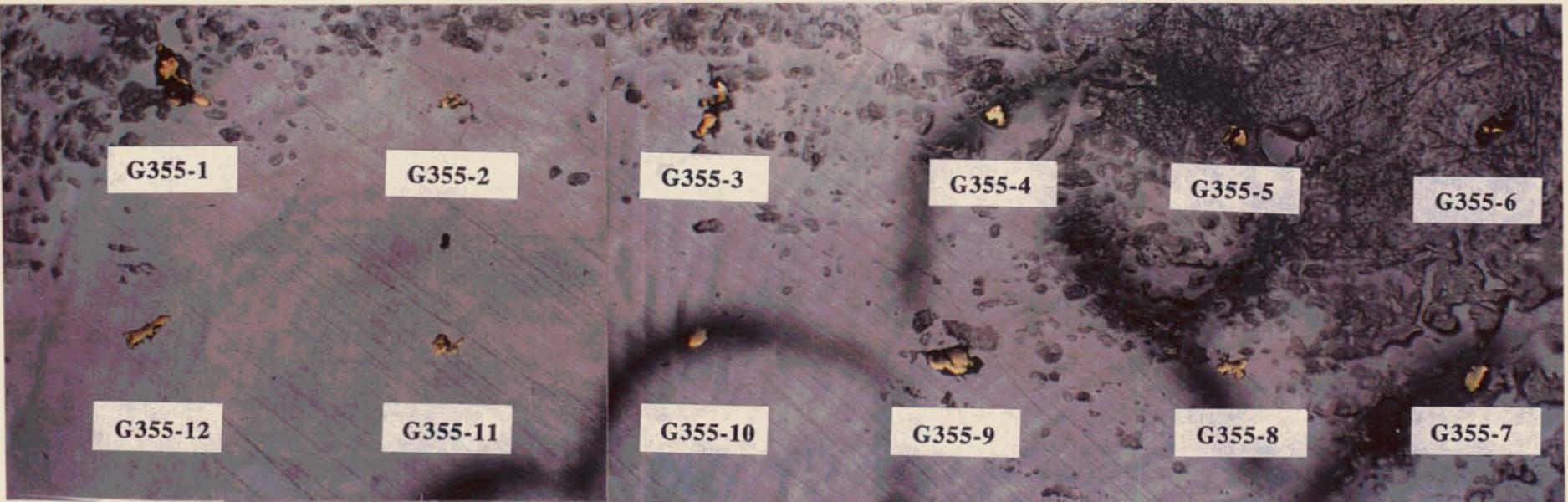
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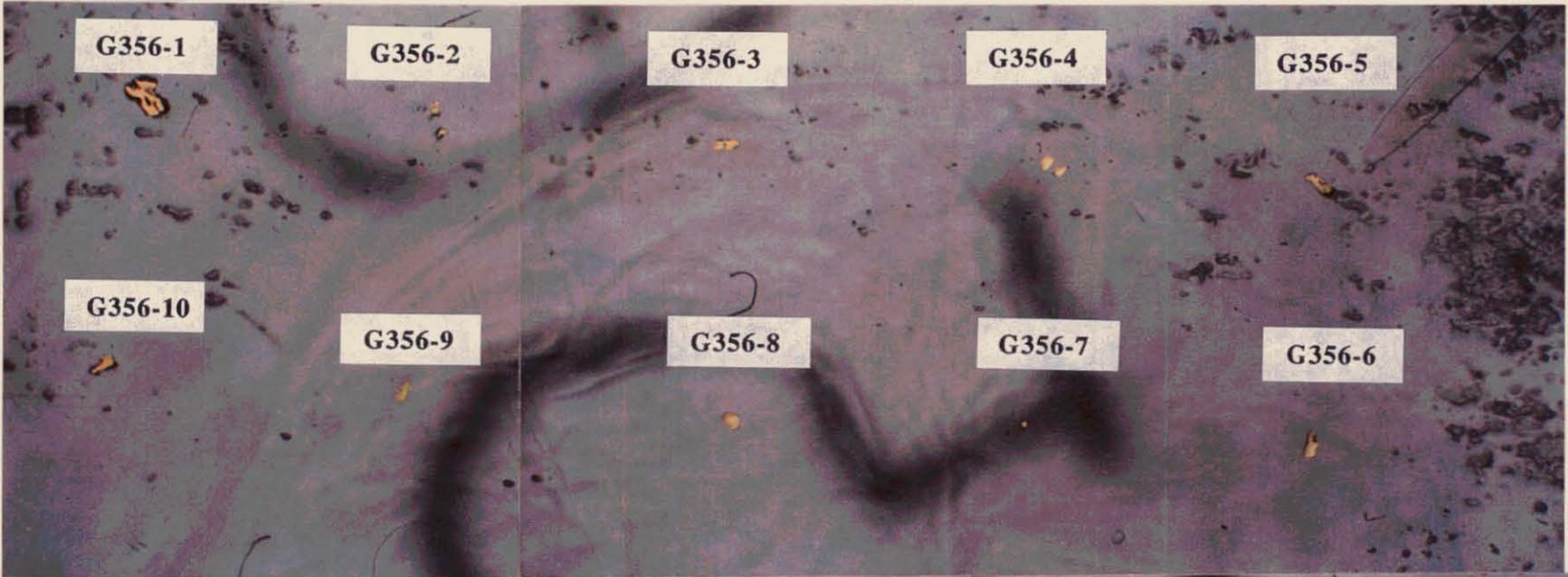
## PLATES

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- Plate 1.** G353 - Classification: Pale colour (x25; reflected light).
- Plate 2.** G354 - Classification: Rich colour (x25; reflected light).
- Plate 3.** G355 - Classification: Medium colour, nil travel damage (x25; reflected light).
- Plate 4.** G356 - Classification: Medium colour, minor travel damage (x25; reflected light).
- Plate 5.** G357 - Classification: Medium colour, medium travel damage (x25; reflected light).
- Plate 6.** G358 - Classification: Medium colour, minor travel damage, 80% crystallinity (x25; reflected light).
- Plate 7.** G359 - Classification: Medium colour, moderate travel damage, 50% crystallinity (x25; reflected light).
- Plate 8.** G360 - Classification: Medium colour, moderate travel damage, nil crystallinity (x25; reflected light).
- Plate 9.** G361 - Classification: Medium colour, minor-major travel damage (x25; reflected light).
- Plate 10.** G362 - Classification: Gold intergrown with other minerals (x25; reflected light).
- Plate 11.** G363 - Classification: Gold with etched surfaces (x25; reflected light).







G356-1

G356-2

G356-3

G356-4

G356-5

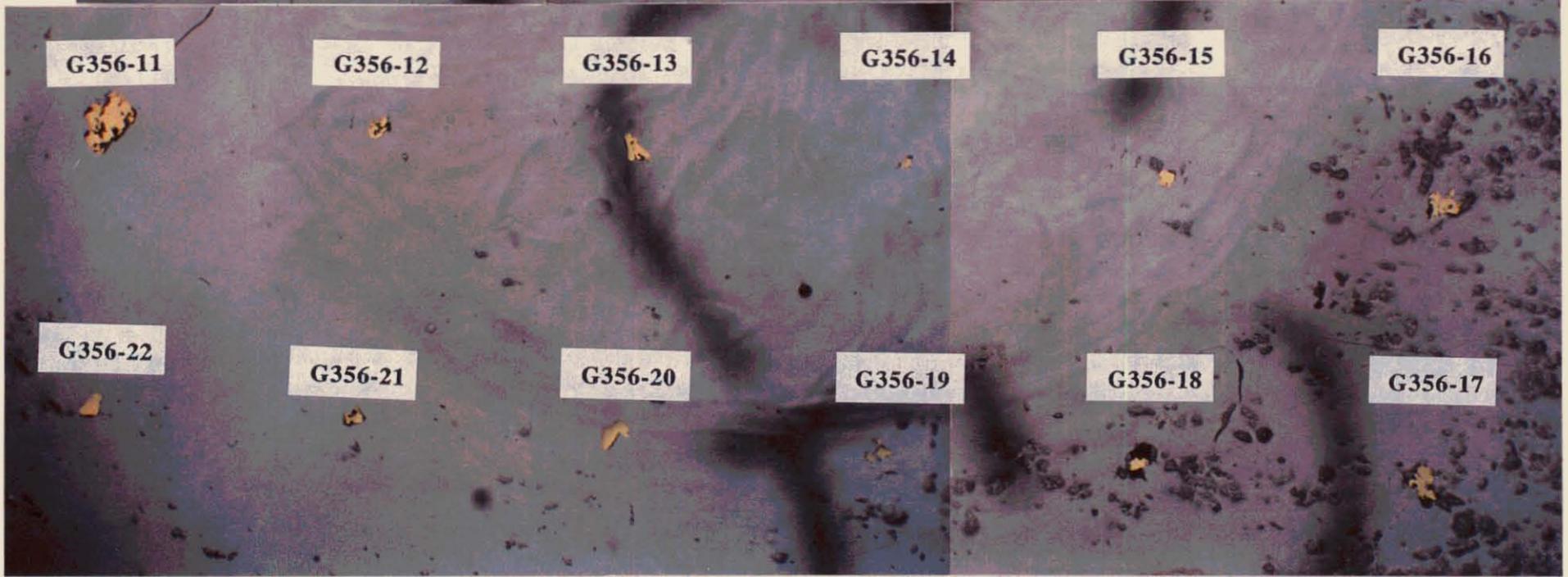
G356-10

G356-9

G356-8

G356-7

G356-6



G356-11

G356-12

G356-13

G356-14

G356-15

G356-16

G356-22

G356-21

G356-20

G356-19

G356-18

G356-17

PLATE 4

276059

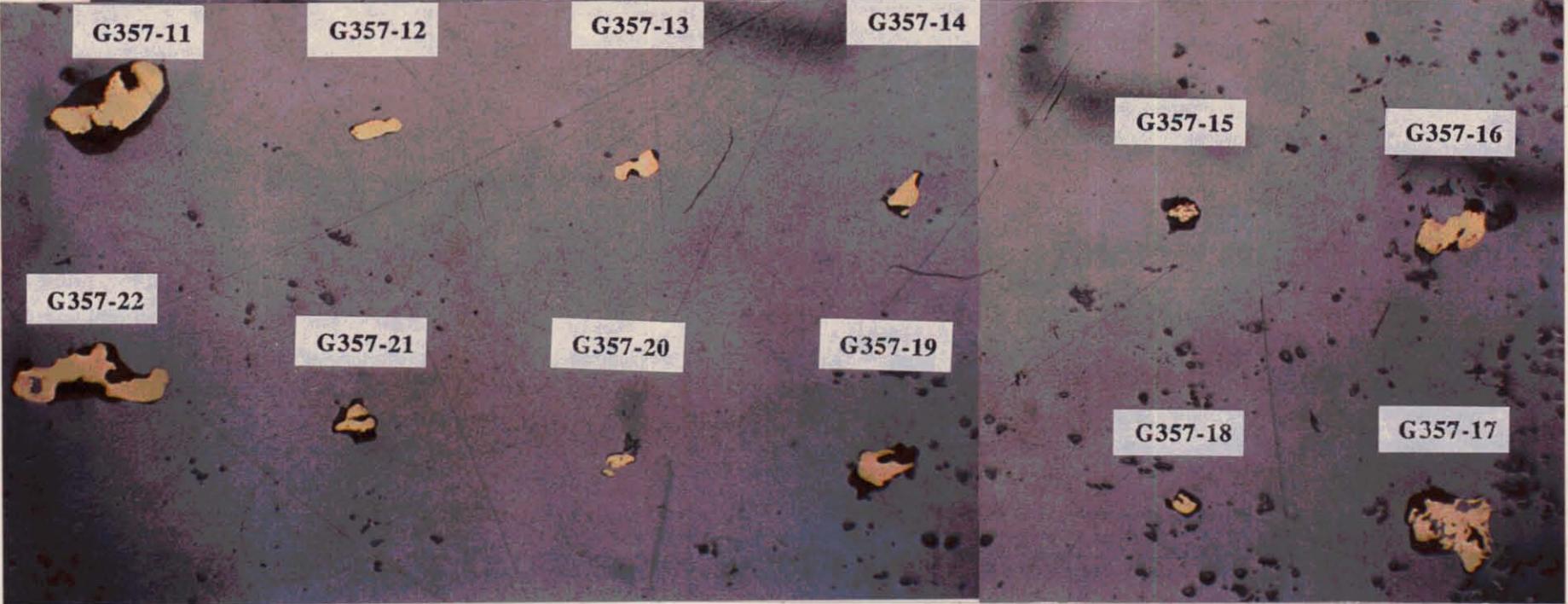


PLATE 5

276060

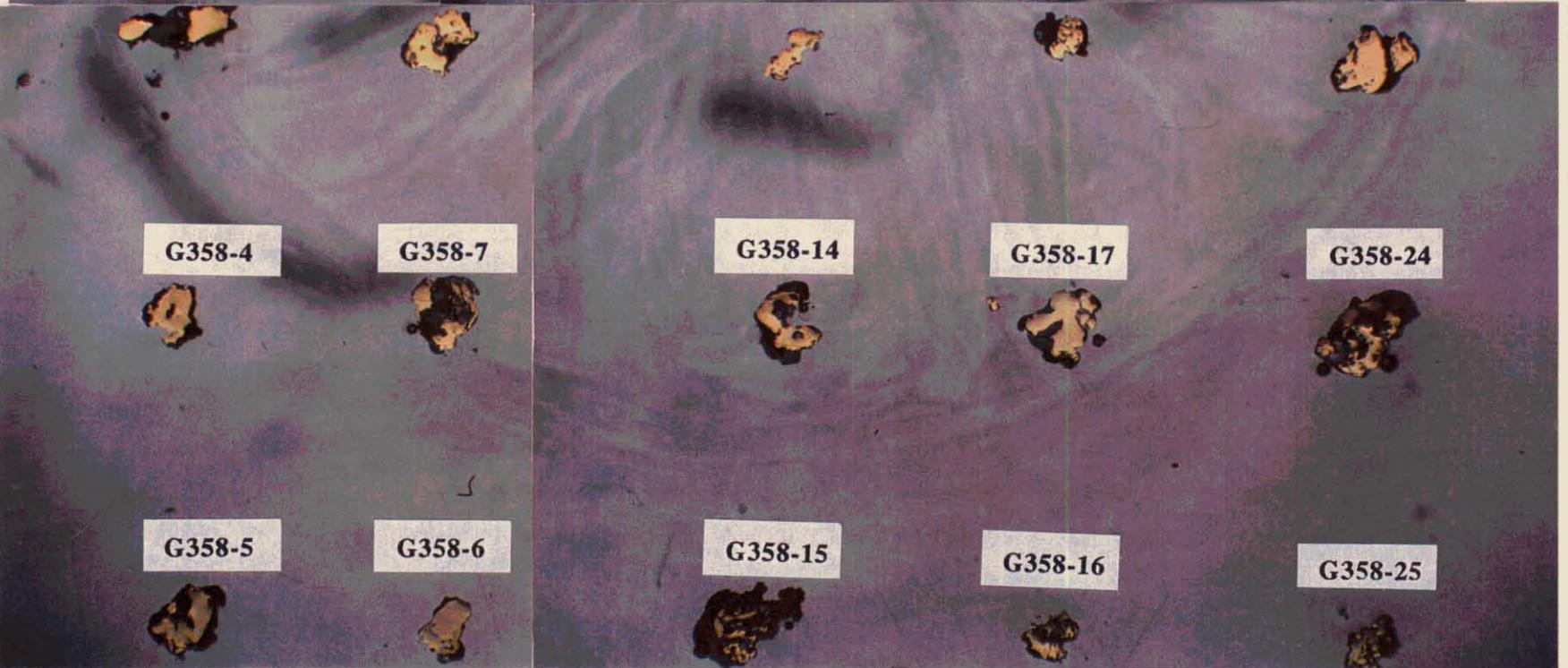
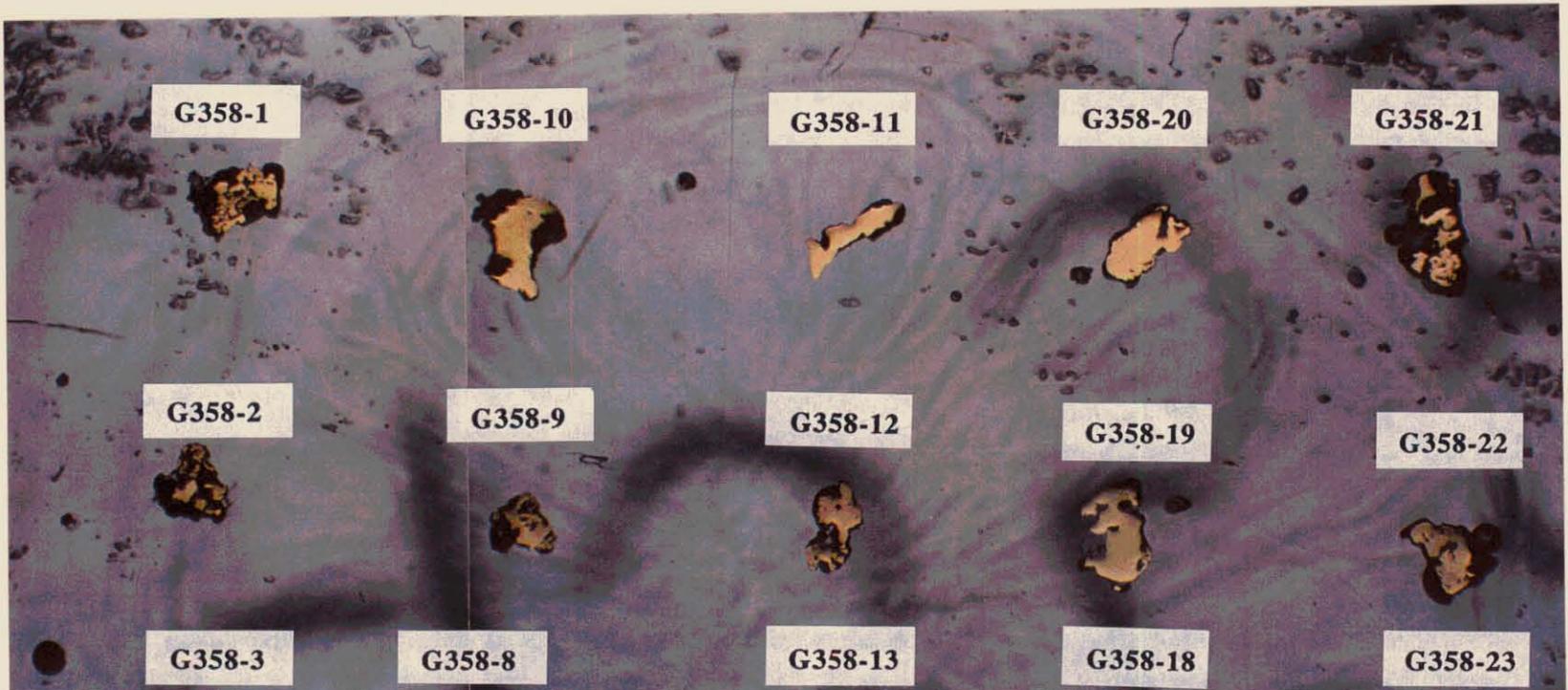
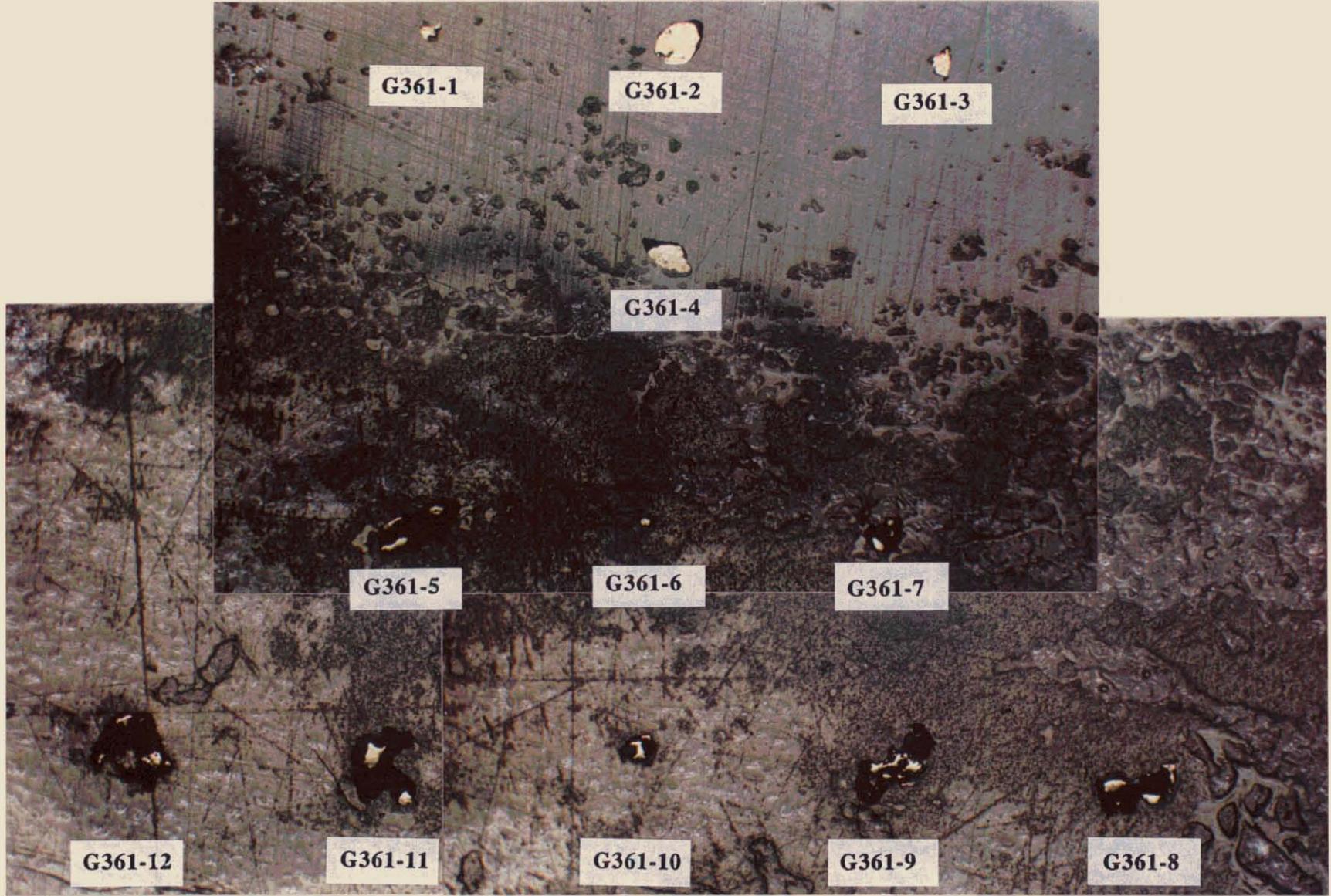


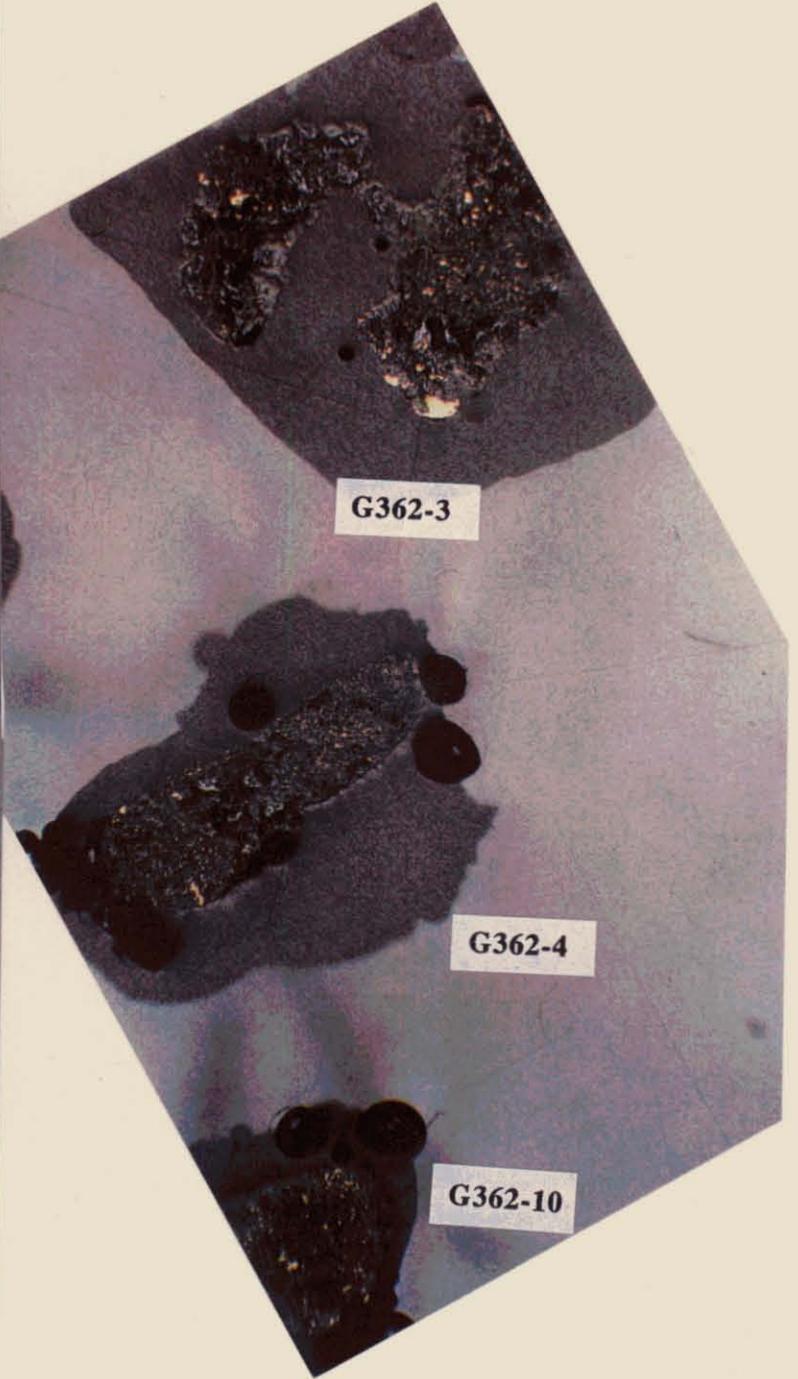
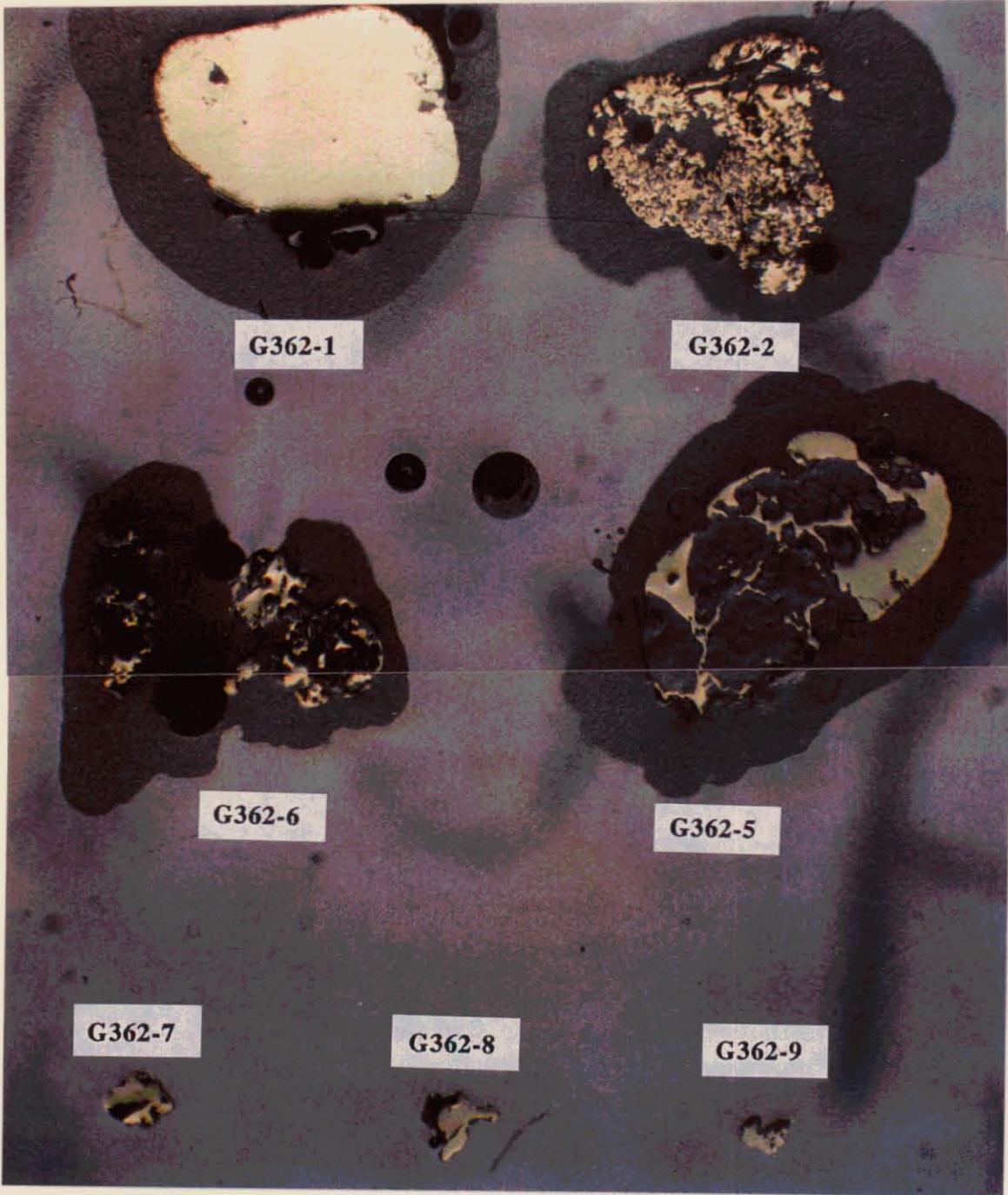


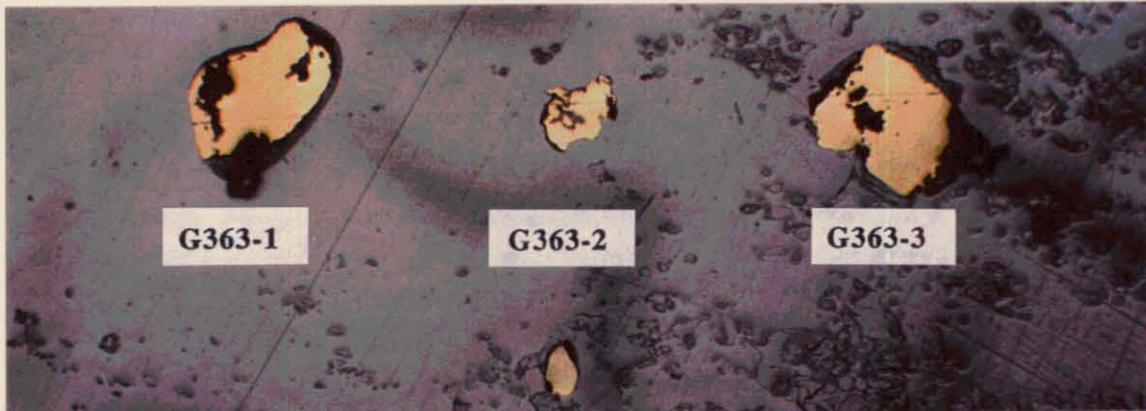


PLATE 8

276063



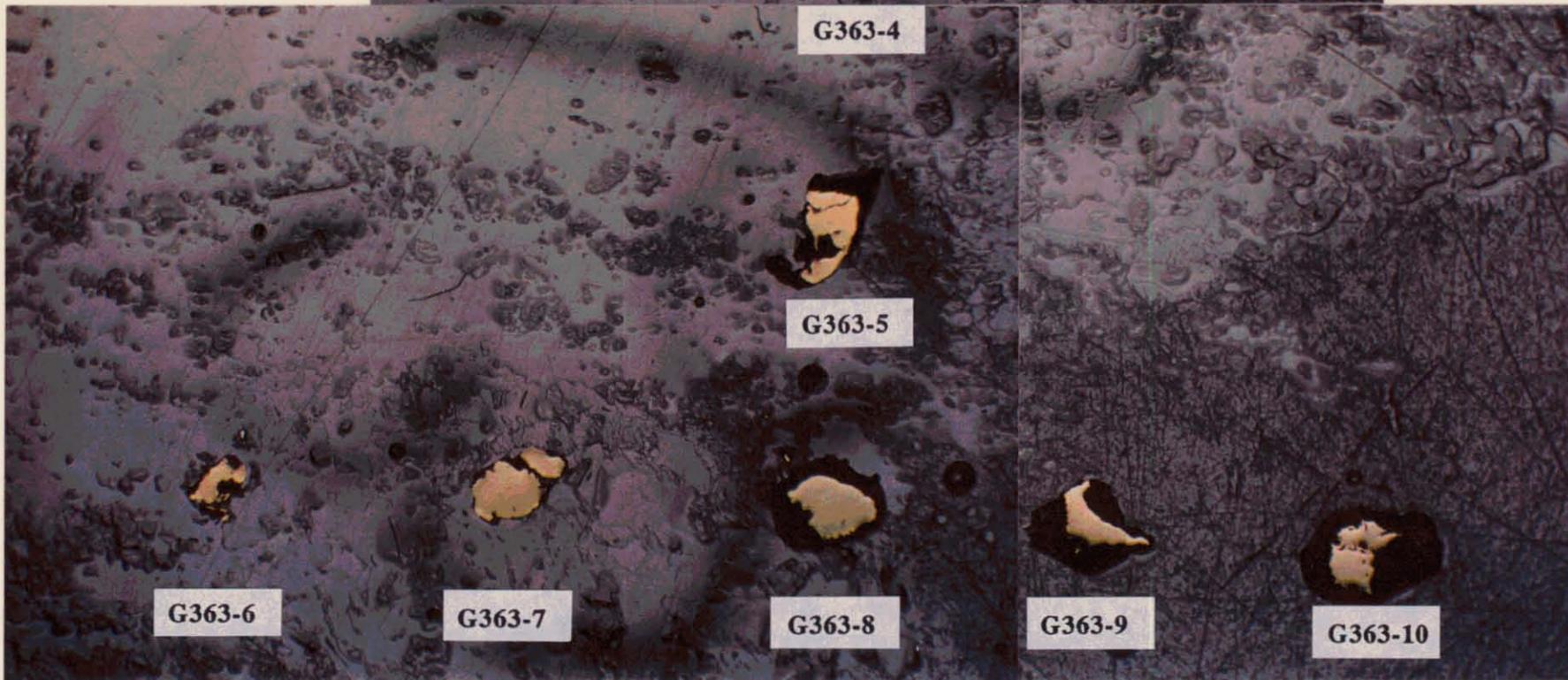




G363-1

G363-2

G363-3



G363-4

G363-5

G363-6

G363-7

G363-8

G363-9

G363-10

No.	Mount	Grain	Field #	Size (µm)	Sphericity	Angularity	Ag	Au	Hg	Fineness	R-C	Comment
ORIGINAL CLASSIF.: Pale Colour												
1	G353	G1C	G154	100	medium	subangular	8.86	91.27	0.08	912		
2	G353	G2C	G302	450x300	low	subangular	7.46	94.16	0.23	927		
3	G353	G2R	G302				7.43	93.30	0.35	926	-1	
4	G353	G3C	G206	100x50	low	subangular	8.33	92.80	0.06	918		
5	G353	G3R	G206				10.14	89.70	0.13	898	-20	
6	G353	G4C	G150	200	spherical	subangular	0.41	101.11	0.23	996		
7	G353	G4R	G150				0.07	100.12	0.00	999	3	
							Mean =	939				
							Range=	898 to 999				
							Rim to core =	+3 to -20 (av. = -6.0)				
ORIGINAL CLASSIF.: Rich Colour												
8	G354	G1C	G158	450x300	medium	well rounded	5.47	95.18	0.24	946		quartz inclusions & Ag-rich chalcopyrite inclusions
9	G354	G1R	G158				5.61	95.31	0.27	944	-2	
10	G354	G2C	G158	500x250	low	well rounded	5.41	93.67	0.33	945		
11	G354	G2R	G158				6.56	93.22	0.57	934	-11	
12	G354	G3C	G158	500x250	medium	subangular	5.29	95.80	0.03	948		quartz inclusions & chalcopyrite inclusions
13	G354	G3R	G158				5.44	95.76	0.04	946	-2	
14	G354	G4C	G148	300x250	medium	well rounded	9.37	90.72	0.17	906		galena inclusions (± chalcopyrite)
15	G354	G4R	G148				9.27	91.04	0.18	908	2	
16	G354	G5C	G172	350x200	low	rounded	7.16	93.43	0.16	929		quartz inclusions & minor Fe-oxide (goethite)
17	G354	G5R	G172				2.23	98.56	0.07	978	49	
18	G354	G6C	G172	200x100	low	subrounded	4.99	95.95	0.19	951		
19	G354	G6R	G172				5.23	95.40	0.16	948	-3	
20	G354	G7C	G174	250x100	low	subrounded	1.69	97.98	0.00	983		
21	G354	G7R	G174				1.45	98.54	0.13	985	2	
22	G354	G8C	G174	250x200	medium	well rounded	4.85	96.34	0.03	952		
23	G354	G8R	G174				4.73	95.57	0.06	953	2	
24	G354	G9C	G318	1500	low	subangular	11.10	90.34	0.22	891		Goethite after pyrite with hematite fractures. Au inclusions along grain rims.
25	G354	G9C2	G318				11.66	88.45	0.10	884	-7	
26	G354	G10C	G294	450x250	low	rounded	0.06	99.58	0.16	999		feldspar inclusion? (Al, Si, K ± Fe)
27	G354	G10R	G294				0.06	100.48	0.17	999	0	
28	G354	G11C	G176	325	high	rounded	6.64	94.94	0.07	935		
29	G354	G11R	G176				6.83	94.35	0.17	933	-2	
30	G354	G12C	G174	325x225	low	subrounded	1.95	98.47	0.08	981		
31	G354	G12R	G174				1.75	98.09	0.15	983	2	
32	G354	G13C	G318	1250x400	low	angular	10.52	89.99	0.12	895		goethite after pyrite; gold has Ag-poor rims (darker) where contacting goethite
33	G354	G13R	G318				10.14	89.20	0.01	898	3	
34	G354	G14C	G328	800x300	low	well rounded	18.65	81.69	0.05	814		quartz inclusion; gold has Ag-poor zones (darker); vuggy
35	G354	G14R	G328				22.80	78.77	0.19	776	-38	
36	G354	G15C	G328	200x100	low	well rounded	10.82	89.86	0.65	893		quartz & Ti-oxide inclusions
37	G354	G15R	G328				10.60	89.80	0.64	894	1	

No.	Mount	Grain	Field #	Size (µm)	Sphericity	Angularity	Ag	Au	Hg	Fineness	R-C	Comment
							Mean = 931					
							Range= 776 to 999					
							Rim to core = +49 to -38 (av. = -0.3)					
ORIGINAL CLASSIF.: Medium Colour; Nil Travel Damage												
38	G355	G1C	G172	350x200	very low	very angular	3.92	97.55	0.14	961		vuggy
39	G355	G1R	G172				3.66	97.91	0.07	964	3	
40	G355	G2C	G172	200x70	low	subrounded	4.95	96.24	0.29	951		vuggy
41	G355	G2R	G172				5.18	95.88	0.00	949	-2	
42	G355	G3C	G172	250x100	low	angular	5.70	95.34	0.17	944		
43	G355	G3R	G172				5.58	95.77	0.09	945	1	
44	G355	G4C	G172	200	high	subrounded	8.33	92.94	0.15	918		vuggy
45	G355	G4R	G172				8.02	93.08	0.19	921	3	
46	G355	G5C	G172	200	high	subangular	5.84	94.49	0.14	942		vuggy
47	G355	G5R	G172				6.16	95.54	0.05	939	-3	
48	G355	G6C	G172	200x60	low	subangular	3.26	98.15	0.25	968		vuggy
49	G355	G6R	G172				3.61	96.87	0.06	964	-4	
50	G355	G7C	G172	350x50	low	subangular	12.51	88.28	0.00	876		
51	G355	G7R	G172				12.90	89.03	0.12	873	-3	
52	G355	G8C	G172	300x100	low	angular	5.64	95.58	0.25	944		Ti-oxide? inclusion; vuggy
53	G355	G8R	G172				5.73	95.33	0.18	943	-1	
54	G355	G9C	G172	450x200	low	subangular	14.79	87.57	0.00	856		vuggy
55	G355	G9R	G172				12.61	89.55	0.00	877	21	
56	G355	G10C	G172	200x150	med	subangular	8.03	92.57	0.27	920		
57	G355	G10R	G172				8.24	93.29	0.34	919	-1	
58	G355	G11C	G172	200	high	subangular	5.54	95.65	0.12	945		vuggy
59	G355	G11R	G172				8.68	93.44	0.01	915	-30	
60	G355	G12C	G172	500x100	very low	subrounded	5.28	96.36	0.04	948		vuggy
61	G355	G12R	G172				5.28	95.38	0.11	948	0	
62	G355	G13C	G174	400x200	low	subangular	11.71	89.14	0.18	884		vuggy
63	G355	G13R	G174				14.03	87.55	0.04	862	-22	
64	G355	G14C	G174	450x150	low	subrounded	6.28	95.61	0.38	938		
65	G355	G14R	G174				5.89	93.11	0.43	941	3	
66	G355	G15C	G174	100	high	subangular	22.20	78.85	0.38	780		gold has Ag-poor zones (darker); vuggy
67	G355	G15R	G174				22.62	78.67	0.51	777	-3	
68	G355	G16C	G174	200x100	low	subrounded	7.26	94.34	0.00	929		mottled Ag-poor zones throughout (darker)
69	G355	G16R	G174				7.97	93.68	0.00	922	-7	
70	G355	G17C	G174	350x150	low	subangular	6.77	94.43	0.09	933		
71	G355	G17R	G174				6.67	93.43	0.00	933	0	
72	G355	G18C	G174	450x300	medium	subangular	3.94	98.41	0.12	961		gold has Ag-poor rims (darker); vuggy
73	G355	G18R	G174				0.12	101.87	0.09	999	38	
74	G355	G19C	G174	100x70	low	well rounded	9.03	92.29	0.00	911		gold has Ag-poor rims (darker); vuggy
75	G355	G19R	G174				8.75	91.72	0.00	913	2	
76	G355	G20C	G174	200x100	low	angular	6.47	94.73	0.26	936		quartz inclusions; vuggy

276068

No.	Mount	Grain	Field #	Size (µm)	Sphericity	Angularity	Ag	Au	Hg	Fineness	R-C	Comment
77	G355	G20R	G174				6.36	93.55	0.38	936	0	
78	G355	G21C	G174	500x200	low	rounded	9.83	90.20	0.64	902		vuggy
79	G355	G21R	G174				10.15	89.59	0.60	898	-4	
80	G355	G22C	G174	450x300	low	subrounded	6.52	95.30	0.00	936		chalcopyrite inclusion; vuggy
81	G355	G22R	G174				6.53	94.79	0.19	936	0	
							Mean =		922			
							Range=		777 to 999			
							Rim to core =		+38 to -30 (av. = -0.5)			
<b>ORIGINAL CLASSIF.: Medium Colour; Minor Travel Damage</b>												
82	G356	G1C	G172	400x200	low	subrounded	7.50	92.80	0.25	925		quartz inclusion; vuggy
83	G356	G1R	G172				7.74	93.85	0.15	924	-1	
84	G356	G2C	G172	100x50	low	subangular	11.22	89.46	0.48	889		quartz inclusion; vuggy
85	G356	G2R	G172				9.98	91.93	0.08	902	19	
86	G356	G3C	G172	200x100	low	subangular	9.76	91.43	0.44	904		minor vugs
87	G356	G3R	G172				10.07	90.48	0.37	900	-4	
88	G356	G4C	G172	100	high	rounded	8.91	93.96	0.15	913		
89	G356	G4R	G172				12.67	89.28	0.13	876	-37	
90	G356	G5C	G172	300x100	low	subrounded	12.77	89.79	0.24	876		vuggy
91	G356	G5R	G172				5.61	96.09	0.04	945	71	
92	G356	G6C	G172	250x100	low	rounded	5.48	92.65	0.12	944		
93	G356	G6R	G172				5.66	96.30	0.22	945	1	
94	G356	G7	G172	50	high	subangular	0.34	99.94	0.09	997		too small to analyse 2 points
95	G356	G8C	G172	150	high	well rounded	10.92	88.75	0.15	890		
96	G356	G8R	G172				11.87	89.07	0.11	882	-8	
97	G356	G9C	G172	200x100	low	subangular	9.41	90.83	0.09	906		vuggy
98	G356	G9R	G172				9.73	91.61	0.17	904	-2	
99	G356	G10C	G172	250x100	low	well rounded	4.25	97.31	0.07	958		
100	G356	G10R	G172				4.36	97.67	0.12	957	-1	
101	G356	G11C	G174	550x400	med	subrounded	15.07	86.53	0.22	852		Fe+Mg-rich inclusion? Gold has Ag-poor rims (darker); vuggy
102	G356	G11R	G174				0.24	102.14	0.18	998	46	
103	G356	G12C	G174	250x150	low	subangular	14.82	86.82	0.10	854		very vuggy
104	G356	G12R	G174				15.09	86.99	0.19	852	-2	
105	G356	G13C	G174	350x150	low	subrounded	6.44	94.78	0.11	936		quartz inclusion; Ag-poor zones throughout (darker); vuggy
106	G356	G13R	G174				6.69	94.92	0.00	934	-2	
107	G356	G14C	G174	100x80	low	angular	11.25	90.04	0.15	889		
108	G356	G14R	G174				10.80	91.19	0.17	894	5	
109	G356	G15C	G174	150	high	rounded	1.09	100.24	0.12	989		
110	G356	G15R	G174				1.31	100.59	0.00	987	-2	
111	G356	G16C	G174	300x250	med	subangular	4.89	97.21	0.23	952		vuggy
112	G356	G16R	G174				5.00	96.54	0.27	951	-1	
113	G356	G17C	G174	350x200	low	angular	7.00	93.26	0.78	930		vuggy
114	G356	G17R	G174				6.84	93.15	0.86	932	2	
115	G356	G18C	G174	200x150	med	subrounded	6.66	93.87	0.63	934		

No.	Mount	Grain	Field #	Size (µm)	Sphericity	Angularity	Ag	Au	Hg	Fineness	R-C	Comment
116	G356	G18R	G174				6.64	94.44	0.58	934	0	
117	G356	G19C	G174	300x250	med	angular	9.17	92.24	0.13	910		vuggy
118	G356	G19R	G174				9.56	90.74	0.27	905	-5	
119	G356	G20C	G174	350x150	low	subrounded	6.45	93.59	0.57	936		
120	G356	G20R	G174				6.61	94.88	0.32	935	-1	
121	G356	G21C	G174	200x150	med	subangular	6.86	95.30	0.01	933		vuggy
122	G356	G21R	G174				6.82	94.41	0.16	933	0	
123	G356	G22C	G174	200x250	med	well rounded	7.24	95.35	0.23	929		
124	G356	G22R	G174				7.26	93.62	0.25	928	-1	
125	G356	G22R A	G174				7.21	95.05	0.34	929	0	
							Mean =			923		
							Range=	852	to	997		
							Rim to core =	+71	to	-37	(av. = + 3.2)	
<b>ORIGINAL CLASSIF.: Medium Colour; Medium Travel Damage</b>												
126	G357	G1C	G172	600x350	low	subrounded	0.55	101.69	0.04	995		quartz inclusion; Ag-poor zone in middle (darker); vuggy
127	G357	G1R	G172				0.17	96.81	0.25	998	3	
128	G357	G2C	G172	450x150	low	angular	3.25	94.58	0.26	967		goethite inclusion; vuggy
129	G357	G2R	G172				3.24	93.89	0.09	967	0	
130	G357	G3C	G172	300x250	med	subangular	8.27	90.87	0.12	917		quartz inclusion; vuggy
131	G357	G3R	G172				9.08	92.50	0.20	911	-6	
132	G357	G4C	G172	700x200	low	rounded	13.52	87.56	0.19	866		quartz inclusion; minor vugs
133	G357	G4R	G172				12.43	87.23	0.00	875	9	
134	G357	G5C	G172	500x300	low	rounded	5.46	94.97	0.09	946		spinel inclusion; Ag-poor rim (darker); minor vugs
135	G357	G6C	G172	750x300	low	subrounded	6.29	94.47	0.56	938		quartz inclusion; Ag-poor rim (darker); minor vugs
136	G357	G6R	G172				0.05	100.47	0.11	999	6 1	
137	G357	G7C	G172	250x200	med	wellrounded	10.08	91.22	0.20	900		
138	G357	G7R	G172				14.44	86.83	0.30	857	-43	
139	G357	G8C	G172	650x250	low	rounded	3.78	95.71	0.19	962		minor vugs
140	G357	G8R	G172				3.82	98.29	0.00	962	0	
141	G357	G9C	G172	250	high	angular	7.11	89.46	0.00	926		Ti-oxide inclusions (lots); vuggy
142	G357	G10C	G172	650x500	med	subrounded	3.26	98.49	0.13	968		quartz inclusions (lots); vuggy
143	G357	G10R	G172				3.15	97.67	0.27	989	1	
144	G357	G11C	G174	1200x500	low	rounded	13.48	87.40	0.10	866		galena, goethite & Ca-carbonate inclusions; some Ag-poor zones (darker); vuggy
145	G357	G11R	G174				12.35	88.89	0.05	878	12	
146	G357	G12C	G174	500x150	low	well rounded	7.00	93.87	0.07	931		chalcopyrite inclusion
147	G357	G12R	G174				7.05	93.64	0.04	930	-1	
148	G357	G13C	G174	450x200	low	rounded	0.36	99.81	0.16	996		
149	G357	G13R	G174				0.34	100.12	0.19	997	1	
150	G357	G14C	G174	400x200	low	subrounded	10.21	90.05	0.10	898		minor Ag-poor zones on rim (darker)
151	G357	G14C A	G174				10.41	90.43	0.05	897		
152	G357	G14R	G174				1.12	99.92	0.00	989	92	
153	G357	G15C	G174	300x200	med	subangular	7.16	93.91	0.16	929		Ti-oxide - lots intergrown; extensive Ag-poor zones (darker); vuggy-brain rock
154	G357	G15R	G174				0.31	101.72	0.08	997	68	

No.	Mount	Grain	Field #	Size (µm)	Sphericity	Angularity	Ag	Au	Hg	Fineness	R-C	Comment
155	G357	G16C	G174	700x300	low	subrounded	0.55	100.48	0.16	995		vuggy
156	G357	G16R	G174				0.14	98.23	0.00	999	4	
157	G357	G17C	G174	900x500	med	subrounded	6.72	93.44	0.00	933		chalcopyrite & quartz inclusions; very vuggy
158	G357	G17R	G174				6.87	93.34	0.31	931	-2	
159	G357	G18C	G174	200x150	med	rounded	3.82	97.64	0.14	962		
160	G357	G18R	G174				4.04	96.59	0.15	960	-2	
161	G357	G19C	G174	550x300	low	subrounded	2.51	97.87	0.24	975		
162	G357	G19R	G174				0.32	99.96	0.10	997	22	
163	G357	G20C	G174	300x150	low	rounded	8.60	92.66	0.33	915		Ag-poor zones on rim areas (darkø); vuggy
164	G357	G20R	G174				5.53	95.55	0.34	945	30	
165	G357	G21C	G174	400x250	low	rounded	4.80	89.05	0.12	949		vuggy
166	G357	G21R	G174				5.28	95.80	0.01	948	-1	
167	G357	G22C	G174	1500x300	very low	subrounded	2.03	99.34	0.10	980		
168	G357	G22R	G174				2.04	99.28	0.14	980	0	

Mean = 946

Range= 857 to 999

Rim to core = +92 to -43 (av. = +12.4)

ORIGINAL CLASSIF.: Medium Colour; Minor Travel Damage; 80% Crystal.

169	G358	G1C	G190A	600x400	low	subrounded	5.80	96.37	0.00	943		vuggy-brain rockl
170	G358	G1R	G190A				6.05	97.87	0.09	942	-1	
171	G358	G2C	G190A	500x400	med	subangular	2.08	100.24	0.17	980		vuggy-brain rockl
172	G358	G2R	G190A				2.15	99.33	0.02	979	-1	
173	G358	G3C	G190A	1000x300	very low	subrounded	4.42	97.88	0.18	957		
174	G358	G3R	G190A				6.06	95.30	0.17	940	-17	
175	G358	G4C	G190A	500x400	med	angular	3.56	98.12	0.14	965		Pt inclusion; minor vugs
176	G358	G4R	G190A				3.47	98.67	0.01	966	1	
177	G358	G5C	G190A	600x450	low	angular	3.01	98.44	0.10	970		vuggy
178	G358	G5R	G190A				2.98	98.61	0.09	971	1	
179	G358	G6C	G190A	550x350	low	subrounded	3.11	98.91	0.00	969		minor vugs
180	G358	G6R	G190A				3.19	99.10	0.00	969	0	
181	G358	G7C	G190A	700	high	angular	3.02	99.18	0.00	970		Pt inclusion; vuggy-brain rockl
182	G358	G7R	G190A				3.02	98.84	0.00	970	0	
183	G358	G8C	G190A	600x400	low	angular	1.42	100.81	0.02	966		vuggy
184	G358	G8R	G190A				1.37	99.81	0.00	966	0	
185	G358	G9C	G190A	600x300	low	subangular	2.16	100.46	0.14	979		
186	G358	G9R	G190A				2.21	100.60	0.06	979	0	
187	G358	G10C	G190A	850x300	low	angular	9.50	93.10	0.16	907		
188	G358	G10R	G190A				10.37	91.81	0.41	898	-9	
189	G358	G11C	G190A	1000x200	very low	subangular	8.85	92.83	0.29	913		
190	G358	G11R	G190A				9.38	92.45	0.32	908	-5	
191	G358	G12C	G190A	800x300	low	angular	2.14	100.98	0.02	979		vuggy
192	G358	G12R	G190A				2.10	100.58	0.00	980	1	
193	G358	G13C	G190A	600x200	low	angular	2.18	99.65	0.00	979		quartz inclusion; vuggy

No.	Mount	Grain	Field #	Size (µm)	Sphericity	Angularity	Ag	Au	Hg	Fineness	R-C	Comment
194	G358	G14C	G190A	600x400	med	angular	2.89	99.70	0.00	972		vuggy
195	G358	G14R	G190A				2.78	98.35	0.04	972	0	
196	G358	G15C	G190A	550	high	angular	4.48	97.68	0.16	956		vuggy-brain rockl
197	G358	G15R	G190A				4.58	97.46	0.00	955	-1	
198	G358	G16C	G190A	450x350	med	angular	4.50	96.70	0.30	956		Fe-Mn-Mg-rich carbonate inclusion; vuggy
199	G358	G16R	G190A				4.76	96.94	0.00	953	-3	
200	G358	G17C	G190A	650	high	angular	7.81	94.36	0.38	924		vuggy
201	G358	G17R	G190A				11.37	90.68	0.46	889	-35	
202	G358	G18C	G190A	400x300	med	subangular	3.75	98.56	0.23	963		vuggy-brain rockl
203	G358	G18R	G190A				3.76	97.56	0.09	963	0	
204	G358	G19C	G190A	800x400	low	subangular	4.95	96.50	0.07	951		vuggy
205	G358	G19R	G190A				15.26	86.19	0.25	850	-101	
206	G358	G20C	G190A	750x350	low	rounded	2.09	100.59	0.18	980		minor vugs
207	G358	G20R	G190A				2.21	99.11	0.00	978	-2	
208	G358	G21C	G190A	1000x300	very low	subangular	4.42	97.78	0.21	957		vuggy-brain rockl
209	G358	G21R	G190A				4.81	96.74	0.00	953	-4	
210	G358	G22C	G190A	700x350	low	rounded	2.89	99.28	0.02	972		vuggy-brain rockl
211	G358	G22R	G190A				3.03	98.71	0.10	970	-2	
212	G358	G23C	G190A	800x500	low	subrounded	2.32	100.23	0.12	977		vuggy
213	G358	G23R	G190A				2.27	99.97	0.02	978	1	
214	G358	G24C	G190A	850x600	med	subangular	2.22	99.72	0.04	978		very vuggy-brain rockl
215	G358	G24R	G190A				2.13	99.25	0.00	979	1	
216	G358	G25C	G190A	600x350	low	angular	6.45	95.67	0.00	937		vuggy-brain rockl
217	G358	G25R	G190A				6.85	95.44	0.08	933	4	

Mean = 957  
Range= 850 to 986  
Rim to core = +4 to -101 (av. = -7.2)

ORIGINAL CLASSIF.: Medium Colour; Moderate Travel Damage; 50% Crystal.												
218	G359	G1C	G190A	900x800	med	subrounded	9.65	90.70	0.30	904		vuggy
219	G359	G1R	G190A				10.17	90.59	0.27	899	-5	
220	G359	G2C	G190A	700x200	low	rounded	9.37	91.54	0.12	907		quartz inclusion; Ag-poor zones around vugs and rim (darker)
221	G359	G2R	G190A				1.17	100.45	0.00	988	81	
222	G359	G3C	G190A	450x400	med	subangular	10.36	90.30	0.08	897		minor vugs
223	G359	G3R	G190A				10.28	88.70	0.00	896	-1	
224	G359	G4C	G190A	550x500	med	subrounded	3.25	98.35	0.04	968		minor vugs
225	G359	G4R	G190A				3.30	99.01	0.00	968	0	
226	G359	G5C	G190A	250x150	low	subrounded	0.33	98.10	0.00	997		goethite with hematite after pyrite with Au inclusions on margins
227	G359	G5R	G190A				0.03	101.82	0.09	999	2	
228	G359	G6C	G190A	550x400	low	subangular	2.07	99.65	0.13	980		vuggy
229	G359	G6R	G190A				2.09	97.69	0.00	979	-1	
230	G359	G7C	G190A	700x250	low	subangular	2.14	99.61	0.05	979		vuggy
231	G359	G7R	G190A				2.00	99.65	0.20	980	1	
232	G359	G8C	G190A	600x300	low	subangular	1.58	100.48	0.00	984		vuggy

No.	Mount	Grain	Field #	Size (µm)	Sphericity	Angularity	Ag	Au	Hg	Fineness	R-C	Comment
233	G359	G8R	G190A				1.59	100.20	0.00	984	0	
234	G359	G9C	G190A	1000x400	low	subrounded	3.09	98.07	0.08	969		vuggy
235	G359	G9R	G190A				2.73	98.37	0.31	973	4	
236	G359	G10C	G190A	900x300	low	subrounded	1.39	99.40	0.07	986		quartz inclusion; vuggy
237	G359	G10R	G190A				1.62	98.97	0.13	984	-2	
238	G359	G11C	G190A	350x200	low	subrounded	2.11	98.48	0.03	979		vuggy
239	G359	G11R	G190A				2.20	98.77	0.03	978	-1	
240	G359	G12C	G190A	600x300	low	subangular	14.83	85.92	0.04	853		
241	G359	G12R	G190A				14.50	87.44	0.00	858	5	
242	G359	G13C	G190A	750x250	low	subangular	3.30	98.57	0.06	968		vuggy
243	G359	G13R	G190A				3.40	97.76	0.08	966	-2	
244	G359	G14C	G190A	700x400	low	angular	1.74	99.76	0.07	983		vuggy
245	G359	G14R	G190A				1.63	100.80	0.00	984	1	
246	G359	G15C	G190A	900x250	very low	subangular	10.23	91.28	0.00	899		quartz inclusion; Ag-poor zones on rim (darker); vuggy
247	G359	G15R	G190A				12.12	89.78	0.21	881	-18	
248	G359	G16C	G190A	500x400	med	subangular	10.53	90.93	0.19	896		Ag-poor zones on rim (darker); minor vugs
249	G359	G16R	G190A				10.63	90.47	0.04	895	-1	
250	G359	G17C	G190A	700x400	low	subrounded	6.89	94.20	0.18	932		vuggy
251	G359	G17R	G190A				6.81	94.57	0.03	933	1	
252	G359	G18C	G190A	600x300	low	subrounded	2.93	98.23	0.08	971		very vuggy
253	G359	G18R	G190A				2.72	99.25	0.11	973	2	
254	G359	G19C	G190A	600x450	med	subrounded	7.83	92.95	0.17	922		vuggy
255	G359	G19R	G190A				8.29	93.53	0.09	919	-3	
256	G359	G20C	G190A	700x250	low	rounded	3.28	98.09	0.00	968		minor vugs
257	G359	G20R	G190A				3.09	98.24	0.01	969	1	
258	G359	G21C	G190A	700x250	low	subrounded	5.42	95.73	0.02	946		vuggy-brain rockl
259	G359	G21R	G190A				5.55	96.08	0.00	945	-1	
260	G359	G22C	G190A	900x400	low	rounded	7.35	94.81	0.00	928		vuggy
261	G359	G22R	G190A				0.16	100.97	0.00	998	70	
262	G359	G23C	G190A	1200x350	low	rounded	3.05	97.82	0.27	970		quartz inclusion; vuggy
263	G359	G23R	G190A				3.01	97.38	0.02	970	0	
264	G359	G24C	G190A	700x200	low	subrounded	10.61	90.72	0.15	895		vuggy
265	G359	G24R	G190A				18.30	82.86	0.09	819	-74	
266	G359	G25C	G190A	700x300	low	subrounded	10.63	90.93	0.40	895		
267	G359	G25R	G190A				12.17	88.71	0.56	879	-16	

Mean = 944

Range= 819 to 999

Rim to core = +81 to -74 (av. = +1.7)

ORIGINAL CLASSIF.: Med-rich Colour; Moderate Travel Damage; Nil Crystal

268	G360	G1C	G190A	1000x500	low	subrounded	6.54	96.23	0.19	936		
269	G360	G1R	G190A				6.50	96.18	0.05	937	1	
270	G360	G2C	G190A	800x300	low	rounded	9.32	91.69	0.33	908		Ag-poor rims (darker); minor vugs
271	G360	G2R	G190A				0.56	102.44	0.05	995	87	

No.	Mount	Grain	Field #	Size (µm)	Sphericity	Angularity	Ag	Au	Hg	Fineness	R-C	Comment
272	G360	G3C	G190A	300	high	rounded	2.72	98.79	0.27	973		
273	G360	G4C	G190A	450x300	med	rounded	5.66	95.58	0.11	944		
274	G360	G5C	G190A	1000x550	low	rounded	12.94	89.28	0.00	873		quartz & Ti-oxide inclusions; minor Ag-poor rims (darker); vuggy
275	G360	G5R	G190A				12.82	89.07	0.30	874	1	
276	G360	G6C	G190A	550x600	high	rounded	1.36	100.51	0.20	987		vuggy
277	G360	G6R	G190A				1.17	99.40	0.14	988	1	
278	G360	G7C	G190A	400x300	low	subangular	2.69	100.01	0.12	974		vuggy
279	G360	G7R	G190A				2.72	95.95	0.19	972	-2	
280	G360	G8C	G190A	400x300	med	well rounded	3.85	98.41	0.34	962		Ag-poor zone around central vug (darker)
281	G360	G8R	G190A				4.04	98.06	0.37	960	-2	
282	G360	G9C	G190A	350	high	rounded	8.53	93.76	0.00	917		goethite
283	G360	G9R	G190A				8.60	93.18	0.06	916	-1	
284	G360	G10C	G190A	500x250	low	subangular	8.44	93.59	0.22	917		quartz inclusion (+ Al-oxide - polish?); minor vugs
285	G360	G10R	G190A				8.39	93.82	0.00	918	1	
286	G360	G11C	G190A	700x550	med	rounded	2.62	99.94	0.00	974		
287	G360	G11R	G190A				2.79	99.54	0.21	973	-1	
288	G360	G12C	G190A	600x350	low	rounded	3.19	99.30	0.00	969		vuggy
289	G360	G12R	G190A				2.65	99.60	0.08	974	5	
290	G360	G13C	G190A	500x400	med	subrounded	2.23	99.63	0.00	978		vuggy
291	G360	G13R	G190A				1.88	99.45	0.00	982	4	
292	G360	G14C	G190A	550x400	med	subangular	8.53	94.16	0.00	917		
293	G360	G14R	G190A				8.60	92.24	0.18	915	-2	
294	G360	G15C	G190A	900x400	low	rounded	5.93	96.58	0.18	942		Ti-oxide inclusion; vuggy
295	G360	G15R	G190A				5.39	95.99	0.11	947	5	
296	G360	G16C	G190A	500x300	med	well rounded	4.84	97.59	0.07	953		quartz inclusions; Ag-poor rims (darker)
297	G360	G16R	G190A				0.17	102.34	0.02	998	45	
298	G360	G17C	G190A	600x450	med	well rounded	9.88	92.71	0.00	904		minor Ag-poor rims (darker)
299	G360	G17R	G190A				3.56	99.14	0.14	965	61	
300	G360	G18C	G190A	1500x350	very low	subangular	8.15	93.94	0.08	920		Ag-poor rims (darker); minor vugs
301	G360	G18R	G190A				0.20	102.86	0.14	998	78	
302	G360	G19C	G190A	450x350	med	well rounded	17.00	85.47	0.11	834		Ag-poor rims in areas (darker)
303	G360	G19R	G190A				17.46	84.88	0.04	829	-5	
304	G360	G20C	G190A	850x300	low	rounded	2.21	99.13	0.18	978		minor vugs
305	G360	G20R	G190A				2.36	100.97	0.21	977	-1	
306	G360	G21C	G190A	650	high	subrounded	2.74	99.47	0.31	973		
307	G360	G21R	G190A				0.37	102.33	0.00	996	23	
308	G360	G22C	G190A	700x400	low	subangular	2.15	99.43	0.03	979		minor vugs
309	G360	G22R	G190A				1.35	100.77	0.08	987	8	
310	G360	G23C	G190A	750x350	low	subrounded	1.55	100.67	0.29	985		minor vugs
311	G360	G23R	G190A				1.67	100.80	0.47	984	-1	
312	G360	G24C	G190A	500x400	med	rounded	4.05	97.43	0.03	960		
313	G360	G24R	G190A				4.27	97.84	0.35	958	-2	
314	G360	G25C	G190A	600x550	med	well rounded	4.36	99.86	0.01	958		minor vugs
315	G360	G25R	G190A				4.30	97.67	0.10	958	0	

276074

No.	Mount	Grain	Field #	Size (µm)	Sphericity	Angularity	Ag	Au	Hg	Fineness	R-C	Comment
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Mean = 950  
 Range= 829 to 998  
 Rim to core = +87 to -5 (av. = +13.3)

ORIGINAL CLASSIF.: Medium Colour; Minor-Major Travel Damage

316	G361	G1C	G312	200x50	low	angular	6.44	95.06	0.39	937		
317	G361	G1R	G312				6.50	94.70	0.34	936	-1	
318	G361	G2C	G312	450	high	subrounded	4.52	95.05	0.39	955		quartz inclusions; Ag-poor rims (darker)
319	G361	G2R	G312				0.69	100.74	0.01	993	38	
320	G361	G3C	G312	250x200	med	angular	2.68	99.21	0.00	974		Ca-Mn-Fe-rich carbonate (+Al-oxide - polish?)
321	G361	G3R	G312				2.69	99.53	0.00	974	0	
322	G361	G4C	G314	500x300	low	angular	1.30	99.70	0.06	987		
323	G361	G4R	G314				0.24	101.88	0.26	998	11	
324	G361	G5C	G316	300x100	low	subangular	3.96	97.39	0.20	961		Si-Al-Fe±K-rich inclusions; Ca-carbonate inclusion; vuggy
325	G361	G5C2	G316				3.93	95.64	0.31	961		
326	G361	G6C	G316	100	high	subangular	4.58	97.30	0.25	955		goethite ± Ag inclusions on fractures; vuggy
327	G361	G6R	G316				5.28	95.72	0.37	948	-7	
328	G361	G7C	G316	150	high	subangular	14.72	85.93	0.27	854		vuggy
329	G361	G7C2	G316				15.01	86.10	0.22	852		
330	G361	G8C	G318	250x100	low	subrounded	4.66	96.53	0.08	954		goethite after Fe-Si-Al-K-rich inclusion; vuggy
331	G361	G8C2	G318				4.80	95.88	0.08	952		
332	G361	G9C	G318	550x300	low	angular	9.72	90.51	0.17	903		Si-Al-rich inclusion (± minor Ag); very vuggy
333	G361	G9R	G318				9.51	91.46	0.42	906	3	
334	G361	G10C	G318	200x100	med	subrounded	7.31	94.02	0.07	928		
335	G361	G10R	G318				7.35	94.15	0.21	928	0	
336	G361	G11C	G318	200x250	med	angular	7.49	93.88	0.20	926		quartz inclusion; vuggy
337	G361	G11C2	G318				7.15	93.48	0.10	929		
338	G361	G12C	G318	200	high	subrounded	9.65	90.60	0.35	904		goethite inclusion; vuggy
339	G361	G12C2	G318				9.56	91.14	0.18	905		

Mean = 938  
 Range= 852 to 998  
 Rim to core = +38 to -7 (av. = +6.3)

ORIGINAL CLASSIF.: Gold Intergrown Other Minerals

340	G362	G1C	G190B	2800x2000	med	rounded	27.39	73.37	0.02	728		rim of goethite (± Si, Al, P) corroding margins and intergrown with Ag-poor gold (darker)
341	G362	G1R	G190B				27.10	73.67	0.12	731	3	
342	G362	G2C	G190B	2000	high	subrounded	3.67	97.36	0.14	864		taic/tremolite matrix; quartz & goethite (± Si, Al, P) inclusions; spongy-brain rockl; 50% Au
343	G362	G2R	G190B				3.63	97.20	0.00	964	0	
344	G362	G2RR	G190B				3.76	98.12	0.00	963		
345	G362	G3C	G190B	3000x2200	low	subrounded	3.23	98.74	0.25	968		solid goethite phase & spongy goethite (± Si, Al, P) after pyrrhotite; 5% Au
346	G362	G3R	G190B				2.83	93.93	0.18	971	3	
347	G362	G4R	G190B	3000x800	low	rounded	3.20	97.37	0.12	968		solid goethite phase & spongy goethite (± Si, Al, P) after pyrrhotite; 5% Au
348	G362	G4C	G190B				3.19	97.57	0.07	968	0	
349	G362	G5C	G190B	3400x1800	med	rounded	2.84	98.17	0.06	972		30% Au in goethite fractures; minor quartz inclusions

No.	Mount	Grain	Field #	Size (µm)	Sphericity	Angularity	Ag	Au	Hg	Fineness	R-C	Comment
350	G362	G5R	G190B				2.89	98.17	0.00	971	-1	
351	G362	G6C	G190B	1600x1000	low	subrounded	2.49	96.98	0.01	975		35% Au in goethite fractures; minor quartz inclusions
352	G362	G6R	G190B				2.47	95.42	0.10	975	0	
353	G362	G7R	G190A	650	high	angular	1.53	97.21	0.00	984		talc/tremolite inclusions; vuggy
354	G362	G8C	G190A	700x300	low	angular	2.18	98.11	0.06	978		talc/tremolite inclusions
355	G362	G8R	G190A				2.30	99.32	0.00	977	-1	
356	G362	G9C	G190A	450x300	med	subrounded	1.39	99.31	0.00	986		goethite (±Al-oxide - polish?); vuggy
357	G362	G9R	G190A				1.48	98.15	0.00	985	-1	
358	G362	G10C	G190B	2000x1500	med	rounded	3.25	97.29	0.02	968		spongy goethite after pyrrhotite (±Al-oxide - polish?); 10% Au
359	G362	G10R	G190B				3.16	96.98	0.25	968	0	

Mean = 948

Range= 728 to 986

Rim to core = +3 to -1 (av. = +0.33)

ORIGINAL CLASSIF.: Etched Surfaces

360	G363	G1C	G334	1400x800	low	rounded	2.48	98.12	0.24	975		vuggy
361	G363	G1R	G334				2.11	97.52	0.39	979	4	
362	G363	G2C	G334	650x450	low	angular	9.50	91.55	0.39	906		Ag-poor rims to vugs
363	G363	G2R	G334				9.17	92.38	0.08	910	4	
364	G363	G3C	G334	1000x900	med	angular	2.46	97.83	0.48	975		vuggy
365	G363	G3R	G334				2.24	97.65	0.75	978	3	
366	G363	G4C	G340	400x250	low	rounded	10.24	90.68	0.36	899		
367	G363	G4R	G340				10.77	89.89	0.43	893	-6	
368	G363	G5C	G346	900x500	low	angular	5.48	95.93	0.31	946		quartz inclusions in cracks; Ag-poor rims; vuggy
369	G363	G5R	G346				0.79	100.60	0.00	992	46	
370	G363	G6C	G348	500x300	low	very angular	4.37	96.39	0.22	957		quartz inclusions in cracks; vuggy
371	G363	G6R	G348				0.36	97.26	0.00	996	39	
372	G363	G7	G348	900x600	med	subangular	1.06	99.92	0.00	990		Ag-poor zone (darker) in core
373	G363	G7C	G348				7.72	94.40	0.27	924		
374	G363	G7R	G348				8.35	91.67	0.10	917	-7	
375	G363	G8C	G348	900x500	med	angular	9.60	92.11	0.22	906		Ag-poor rim regions (darker)
376	G363	G8R	G348				9.36	80.90	0.19	907	1	
377	G363	G9C	G348	1000x300	low	angular	8.21	95.09	0.24	939		Ag-poor rim region on single side (darker)
378	G363	G9R	G348				6.37	94.57	0.00	937	2	
379	G363	G10C	G348	700x450	med	very angular	1.00	99.86	0.12	990		spongy texture; vuggy
380	G363	G10R	G348				0.49	101.09	0.00	995	5	

Mean = 948

Range= 893 to 996

Rim to core = +46 to -7 (av. = +9.1)

276076

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Appendix 3 of Turner, N.J. 1997. Exploration Licence No 43/94, Corinna, Tasmania. Annual Report 4/1/97. Goldstream Mining NL and Titan Resources NL. Volume 2 of 3 of the annual report.

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21 OCT 1997

**MICROSCOPIC EXAMINATION OF GOLD  
PARTICLES IN PANNED CONCENTRATE SAMPLES**

by

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March 1996

97-4074

PETROGRAPHIC & GEOCHEM INVESTIGATION  
OF GOLD - EL 43/94 - GOLDSTREAM MINING  
RESOURCES - N J TURNER - VOL 3 OF 3

This appendix was assembled by N. J. Turner Geological Services Pty Ltd from material provided by H. D. Nolan. August 1997.

***CONTENTS***

<b>1.0</b>	<b>Introduction</b>	<b>2</b>
<b>2.0</b>	<b>Sample descriptions</b>	<b>2 - 18</b>
<b>3.0</b>	<b>Photographs</b>	<b>19 - 32</b>
<b>4.0</b>	<b>Field numbers and probe mount numbers.</b>	<b>33</b>
<b>5.0</b>	<b>References</b>	<b>34</b>

## 1.0 Introduction

This examination of panned concentrate field samples was undertaken for the purpose of identifying and describing the physical properties of alluvial gold particles. Examination was undertaken using an Olympus 10-40x zoom stereo microscope.

The aim of the examination has been to identify those gold particles having physical characteristics consistent with local primary derivation. Low levels of travel damage, often combined with distinct or complete crystallinity, are thought to generally reflect short transportation and thus, to mostly indicate fairly local derivation of the gold. Colour of the surface of the grains correlates with travel damage with rich colours generally corresponding to major travel damage and pale colours to lower levels of travel damage.

Tertiary gravels, often mildly auriferous, cover a significant proportion of the exploration tenement. Apart from gold, these gravels host an extensive suite of generally well rounded mineral grains. The most common minerals are spinel, chromite, ilmenite, corundum, rutile, cassiterite, zircon, garnet, topaz and tourmaline. The component of this Tertiary gravel heavy mineral suite (TGHMS) is commented upon by sample.

Representative gold grains were separated from the panned concentrates and mounted on double sided tape. Photographs of a subset of the mounted grains are presented in section 3 of this appendix.

The tape-mounted grains were transferred directly to epoxy resin mounts for polished thin section description and electron microprobe work by Paul Kitto, University of Tasmania (see Appendix 4). Probe mount numbers and corresponding field sample numbers are listed in section 4 of this appendix.

See Appendix 1 of Turner (1997) for the AMG co-ordinates of the sites at which the panned concentrate samples were collected.

## 2.0 Sample descriptions

Sample descriptions take the following format;

Brief description of dominant and any anomalous mineralisation in the panned concentrate.

Total number of gold grains observed.

A dissection of the total grain count according to physical characteristics.

The following scales are used in this report for describing the physical characteristics of gold grains.

CRYSTALLINTY	TRAVEL DAMAGE	COLOUR
complete	nil	pale
distinct	minor	medium
remnant	moderate	rich
nil	major	

<b>PANNED CONCENTRATE</b>	<b>GOLD GRAINS</b>	<b>CRYSTAL -LINTY</b>	<b>TRAVEL DAMAGE</b>	<b>COLOUR</b>
<b>G102</b> Predominantly hematite & iron pyrite. Minor TGHMS.	nil			
<b>G104</b> Hematite, minor magnetite, epidote & mica. Minor TGHMS	nil			
<b>G106</b> As per sample G104	nil			
<b>G108</b> Hematite, magnetite, epidote & mica. Minor TGHMS	nil			
<b>G110</b> Magnetite & hematite dominant, epidote Moderate TGHMS	1	nil	major	medium
<b>G112</b> Hematite, magnetite, epidote. Minor TGHMS	nil			
<b>G114</b> Hematite, mica, magnetite, epidote. Minor TGHMS	nil			
<b>G116</b> As per sample G114	nil			
<b>G118</b> As per sample G114	nil			
<b>G120</b> Hematite, mica, magnetite, epidote. Moderate TGHMS	1	nil	major	medium
<b>G122</b> As per sample G120	2	distinct	minor	medium

<b>PANNED CONCENTRATE</b>	<b>GOLD GRAINS</b>	<b>CRYSTAL -LINITY</b>	<b>TRAVEL DAMAGE</b>	<b>COLOUR</b>
<b>G122A</b> Hematite, mica, magnetite, epidote, minor iron pyrite. Moderate TGHMS	nil			
<b>G124</b> Hematite, mica, magnetite, epidote. Dominant TGHMS	nil			
<b>G126</b> Hematite, magnetite, epidote. Very minor TGHMS	nil			
<b>G128</b> As per sample G126	nil			
<b>G130</b> As per sample G126	nil			
<b>G132</b> Hematite, magnetite, epidote. Fine crystalline cassiterite. Minor fine chalcopyrite. Strong TGHMS	1	distinct	minor	medium
<b>G134</b> Hematite, magnetite, epidote. Very minor fine chalcopyrite. Strong TGHMS	1	nil	moderate	medium
<b>G134A</b> As per sample G134	nil			
<b>G136</b> Hematite, magnetite, epidote. Minor TGHMS	nil			
<b>G138</b> Hematite, magnetite, epidote. High cassiterite. Strong TGHMS	26 / 4 2 20	distinct remnant nil	minor moderate moderate	medium medium medium

<b>PANNED CONCENTRATE</b>	<b>GOLD GRAINS</b>	<b>CRYSTAL -LINTY</b>	<b>TRAVEL DAMAGE</b>	<b>COLOUR</b>
<b>G140</b> Hematite, magnetite, epidote, mica. Moderate TGHMS	nil			
<b>G142</b> Hematite, magnetite, epidote. High fine rutile. Moderate TGHMS	7	3 4	distinct nil	minor moderate medium medium
<b>G144</b> As per sample G142	1		nil	major medium
<b>G146</b> Hematite, magnetite, epidote. Strong TGHMS	3		distinct	minor medium
<b>G148</b> Hematite, magnetite, epidote. Abundant rutile. Moderate TGHMS	6	2 3 1	distinct remnant nil	minor moderate major medium medium rich
<b>G150</b> Hematite, epidote. Very minor fine chalcopryrite. Negligible TGHMS	1		distinct	minor pale
<b>G152</b> Hematite, magnetite, epidote. High rutile. Moderate TGHMS	3	1 1 1	complete distinct remnant	nil minor moderate medium medium medium
<b>G152A</b> Hematite, magnetite, epidote. Moderate TGHMS	1		nil	major medium
<b>G154</b> Hematite, magnetite, epidote. Very minor fine chalcopryrite. Moderate TGHMS	9	1 5 3	complete distinct remnant	nil minor moderate pale medium medium

PANNED CONCENTRATE	GOLD GRAINS	CRYSTAL -LINITY	TRAVEL DAMAGE	COLOUR
<b>G156</b> Hematite, magnetite, epidote. Minor TGHMS	4	remnant	moderate	medium
<b>G158</b> Hematite, epidote. Iron pyrite. Minor chalcopyrite. Strong TGHMS	6	1 distinct 2 remnant 3 nil	minor moderate major	medium medium rich
<b>G160</b> Epidote, hematite. High fine cassiterite. Minor TGHMS	4	nil	moderate	medium
<b>G162</b> Epidote, hematite, magnetite, minor mica-hematite composite. Minor TGHMS	5	2 remnant 3 nil	minor moderate	medium medium
<b>G164</b> Hematite, magnetite, minor epidote & mica -hematite composite. Minor TGHMS	7	2 distinct 3 remnant 2 nil	minor moderate moderate	medium medium medium
<b>G166</b> Hematite, magnetite, minor epidote. High crystalline rutile. Strong TGHMS	8	2 remnant 6 nil	moderate moderate	medium medium
<b>G168</b> Hematite, magnetite, minor epidote. High crystalline rutile. Moderate TGHMS	12	8 remnant 4 nil	moderate moderate	medium medium
<b>G170</b> Hematite, magnetite, minor epidote. Minor TGHMS	nil			

<b>PANNED CONCENTRATE</b>	<b>GOLD GRAINS</b>	<b>CRYSTAL -LINTY</b>	<b>TRAVEL DAMAGE</b>	<b>COLOUR</b>	
<b>G172</b> Hematite, magnetite, minor epidote. High crystalline rutile. Minor TGHMS	44	15 11 10 6 2	complete distinct remnant nil nil	nil minor moderate moderate major	medium medium medium medium rich
<b>G174</b> Hematite, magnetite, minor epidote. High crystalline rutile. Moderate TGHMS	60	12 15 14 16 3	complete distinct remnant nil nil	nil minor moderate moderate major	medium medium medium medium rich
<b>G176</b> Hematite, magnetite. High iron pyrite & rutile. Moderate TGHMS	2	1 1	remnant nil	moderate major	medium rich
<b>G176A</b> A well travelled pebble of hematite & iron pyrite.	nil				
<b>G178</b> Minor mica & hematite. Dominant TGHMS	24	6 18	remnant nil	moderate moderate	medium medium
<b>G180</b> Hematite, magnetite, minor epidote. Minor TGHMS	3		remnant	moderate	medium
<b>G182</b> Negligible local mineral component. Dominant TGHMS	4		nil	moderate	medium
<b>G184</b> Magnetite, hematite. Very minor TGHMS	nil				
<b>G184A</b> Hematite, magnetite, minor epidote. Minor TGHMS	nil				

PANNED CONCENTRATE	GOLD GRAINS	CRYSTAL -LINITY	TRAVEL DAMAGE	COLOUR
<b>G186</b> Hematite, magnetite, minor epidote. Minor TGHMS	3	distinct	minor	medium
<b>G188</b> Hematite, magnetite, minor epidote. High fine iron pyrite. Moderate TGHMS	4	2 2 remnant nil	moderate major	medium medium
<b>G190</b> Magnetite, minor hematite & epidote. Strong TGHMS	3	remnant	moderate	medium

G190A, G190B, G190C, ARE FROM MATERIAL OBTAINED BY SUCTION DREDGING IN THE ROCKY RIVER.

#### G190A

A 93 gramme sample of relatively fine-grained heavy mineral concentrate containing small particles of gold. These particles were separated from the concentrate and examined by microscope. A total of 147 particles were recovered and these were divided into three groups.

- 46 particles - Having crystalline form to 80%+ of the particle surface. Travel damage minor to negligible. Colour medium.
- 70 particles - Having crystalline form to approximately 50% of the particle surface. Travel damage moderate. Colour medium.
- 31 particles - Having no crystalline form, however not substantially rounded, flattened or polished. Colour medium to rich.

PANNED CONCENTRATE	GOLD GRAINS	CRYSTAL -LINITY	TRAVEL DAMAGE	COLOUR
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**G190B**

Seven particles of gold in ironstone ranging in size from 2mm to 8mm.

All display substantial rounding from travel damage on exposed ironstone and gold surfaces. Protected surfaces display crystalline gold.

Fracture of one particle confirms the ironstone as the host rock. The fractured faces display crystalline gold richly disseminated throughout the particle.

In each particle, with the exception of one, the gold is hosted in either limonite or goethite. In the exception, the gold is disseminated throughout mica rich limonite. The light grey coloured mica being an equal gold host to the limonite.

The less weathered particles respond readily to a magnet, which suggests a magnetite host.

**G190C**

A reasonably well rounded rock from the bed of the Rocky River.

Massive iron pyrite with sufficient disseminated magnetite for the sample to respond to a magnet. Minor mica & quartz.

PANNED CONCENTRATE	GOLD GRAINS	CRYSTAL -LINITY	TRAVEL DAMAGE	COLOUR
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**G192**

Minor hematite, magnetite, epidote. Dominant TGHMS	7	5	distinct	minor	medium
		2	remnant	moderate	medium

**G192A**

Hematite, magnetite, minor epidote. Moderate TGHMS	24	6	complete	nil	medium
		8	distinct	minor	medium
		6	remnant	moderate	medium
		4	nil	moderate	medium

**G194**

Hematite, magnetite, epidote. Negligible TGHMS	nil				
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<b>PANNED CONCENTRATE</b>	<b>GOLD GRAINS</b>	<b>CRYSTAL -LINITY</b>	<b>TRAVEL DAMAGE</b>	<b>COLOUR</b>
<b>G194A</b> Hematite, magnetite, epidote. Negligible TGHMS	1	remnant	moderate	medium
<b>G196</b> As per sample G194A	nil			
<b>G198</b> As per sample G194A	nil			
<b>G200</b> As per sample G194A	1	remnant	moderate	medium
<b>G202</b> As per sample G194A	1	remnant	moderate	medium
<b>G204</b> As per sample G194A	2	nil	moderate	medium
<b>G206</b> Hematite, magnetite, moderate epidote. Negligible TGHMS	3	1 2 complete remnant	nil moderate	pale medium
<b>G208</b> Hematite, magnetite, minor epidote. Negligible TGHMS	1	remnant	moderate	medium
<b>G210</b> Hematite, magnetite, moderate epidote. Negligible TGHMS	6	2 4 distinct remnant	minor moderate	medium medium
<b>G212</b> Hematite, magnetite, minor epidote. Negligible TGHMS	1	remnant	moderate	medium
<b>G214</b> As per sample G212	nil			
<b>G216</b> As per sample G212	nil			

<b>PANNED CONCENTRATE</b>	<b>GOLD GRAINS</b>	<b>CRYSTAL -LINTY</b>	<b>TRAVEL DAMAGE</b>	<b>COLOUR</b>
<b>G218</b> Hematite, magnetite, composite mica- hematite, minor epidote. Negligible TGHMS	1	distinct	minor	medium
<b>G220</b> As per sample G218	2	nil	major	medium
<b>G222</b> As per sample G218	3	remnant	moderate	medium
<b>G224</b> Hematite, magnetite, Mica-hematite composite, epidote. Negligible TGHMS	1	distinct	minor	medium
<b>G226</b> As per sample G224	3	2 1	distinct remnant	minor minor medium medium
<b>G228</b> Hematite, magnetite, epidote. Negligible TGHMS	1	distinct	minor	medium
<b>G230</b> Hematite, magnetite, minor epidote. Strong TGHMS	11	2 7 2	distinct remnant nil	minor moderate moderate medium medium medium
<b>G232</b> Hematite, magnetite, epidote. Moderate TGHMS	16	4 11 1	distinct remnant nil	minor moderate major medium medium medium
<b>G234</b> Hematite, high epidote, minor magnetite. Minor TGHMS	3	remnant	moderate	medium
<b>G236</b> Hematite, epidote, minor magnetite. Minor TGHMS	nil			

<b>PANNED CONCENTRATE</b>	<b>GOLD GRAINS</b>	<b>CRYSTAL -LINITY</b>	<b>TRAVEL DAMAGE</b>	<b>COLOUR</b>
<b>G238</b> Hematite, magnetite, minor epidote. Negligible TGHMS	2	distinct	minor	medium
<b>G240</b> As per sample G238	2	1 distinct 1 remnant	minor moderate	medium medium
<b>G242</b> Hematite, magnetite, epidote. Negligible TGHMS	nil			
<b>G244</b> As per sample G242	nil			
<b>G246</b> Magnetite, hematite, epidote. Hematite rich mica. Minor chalco- pyrite. Negligible TGHMS	nil			
<b>G 248</b> Magnetite, hematite. Minor epidote, iron- pyrite, chalcoppyrite. Negligible TGHMS	nil			
<b>G250</b> Magnetite, hematite, epidote. Minor chalco- pyrite. Negligible TGHMS	1	remnant	moderate	medium
<b>G252</b> Hematite, magnetite, epidote. Negligible TGHMS	nil			
<b>G254</b> Strong iron & chalco- pyrite. Magnetite, epidote. Minor hematite. Negligible TGHMS	nil			

<b>PANNED CONCENTRATE</b>	<b>GOLD GRAINS</b>	<b>CRYSTAL -LINITY</b>	<b>TRAVEL DAMAGE</b>	<b>COLOUR</b>	
<b>G256</b> Hematite, magnetite, epidote. Minor TGHMS	nil				
<b>G258</b> Hematite. Minor magnetite & epidote. Very minor ironpyrite & chalcopyrite. Moderate TGHMS	nil				
<b>G260</b> Strong magnetite & epidote. Hematite. Moderate TGHMS	nil				
<b>G262</b> Hematite, magnetite, epidote. Minor TGHMS	nil				
<b>G264</b> Hematite, magnetite. Minor epidote & iron- pyrite. Minor TGHMS	4	1 2 1	remnant remnant nil	minor moderate moderate	medium medium medium
<b>G266</b> Hematite. Minor magnetite & epidote. Minor TGHMS	nil				
<b>G268</b> Hematite, magnetite, epidote. Very minor ironpyrite & chalco- pyrite. Minor TGHMS	1		distinct	minor	medium
<b>G270</b> Hematite, magnetite, epidote. Negligible TGHMS	nil				
<b>G272</b> Hematite, magnetite. Minor epidote. Negligible TGHMS	nil				

PANNED CONCENTRATE	GOLD GRAINS	CRYSTAL -LINTY	TRAVEL DAMAGE	COLOUR
<b>G274</b> As per sample G272	nil			
<b>G276</b> As per sample G272	2	remnant	moderate	medium
<b>G278</b> Hematite, magnetite, epidote. Very minor ironpyrite. Negligible TGHMS	2	distinct	minor	medium
<b>G280</b> As per sample G278	nil			
<b>G282</b> Hematite, magnetite. Strong epidote. Negligible TGHMS	nil			
<b>G284</b> Hematite, magnetite, epidote. Negligible TGHMS	nil			
<b>G286</b> As per ample G284	nil			
<b>G288</b> Hematite, magnetite, epidote. Strong iron- pyrite. Possibly minor fine chalcopyrite. Negligible TGHMS	nil			
<b>G290</b> Hematite, magnetite. Minor epidote, iron- pyrite, chalcopyrite. Minor TGHMS	1	nil	major	medium
<b>G292</b> Hematite, magnetite, minor epidote. Negligible TGHMS	nil			

<b>PANNED CONCENTRATE</b>	<b>GOLD GRAINS</b>	<b>CRYSTAL -LINITY</b>	<b>TRAVEL DAMAGE</b>	<b>COLOUR</b>
<b>G294</b> Minor hematite, magnetite, epidote. Dominant TGHMS	3    2 1	remnant nil	moderate major	medium rich
<b>G296</b> Hematite, magnetite, epidote. Negligible TGHMS	nil			
<b>G298</b> Hematite, magnetite, minor epidote. Negligible TGHMS	nil			
<b>G300</b> Hematite, magnetite. Minor epidote, iron- pyrite, chalcopyrite. Negligible TGHMS	nil			
<b>G302</b> Magnetite, chalcop- pyrite, ironpyrite. Minor hematite & epidote. Negligible TGHMS	1	complete	nil	pale
<b>G304</b> Hematite, magnetite, epidote. Negligible TGHMS	nil			
<b>G306</b> Hematite, magnetite, epidote. Very minor ironpyrite, chalcop- pyrite. Negligible TGHMS	nil			
<b>G308</b> Hematite, magnetite, epidote. Negligible TGHMS	nil			
<b>G310</b> Very minor hematite, magnetite. Moderate TGHMS	nil			

PANNED CONCENTRATE	GOLD GRAINS	CRYSTAL -LINITY	TRAVEL DAMAGE	COLOUR
<b>G312</b> Hematite, magnetite, epidote. Negligible TGHMS	3	2 1	remnant nil	moderate major medium medium
<b>G314</b> Hematite, magnetite. Minor epidote. Negligible TGHMS	1		remnant	moderate medium
<b>G316</b> Hemate, magnetite, epidote. Negligible TGHMS	3	1 2	distinct remnant	minor moderate medium medium
<b>G318</b> Hematite, magnetite. Minor epidote & ironpyrite. Negligible TGHMS	7	2 3 2	distinct remnant nil	minor moderate major medium medium rich
<b>G320</b> Magnetite, hematite. Very minor epidote. Strong ironpyrite & chalcopyrite. Strong TGHMS.	2	1 1	distinct nil	minor moderate medium medium
<b>G322</b> Hematite, magnetite. Minor epidote. Very minor TGHMS	1		nil	major medium
<b>G324</b> Hematite, magnetite, epidote. Very minor TGHMS	nil			
<b>G326</b> As per sample G324	nil			
<b>G328</b> Negligible hematite, magnetite, epidote. Moderate marcasite/ iron pyrite ? One particle osmiridium. Dominant TGHMS	3		nil	major rich

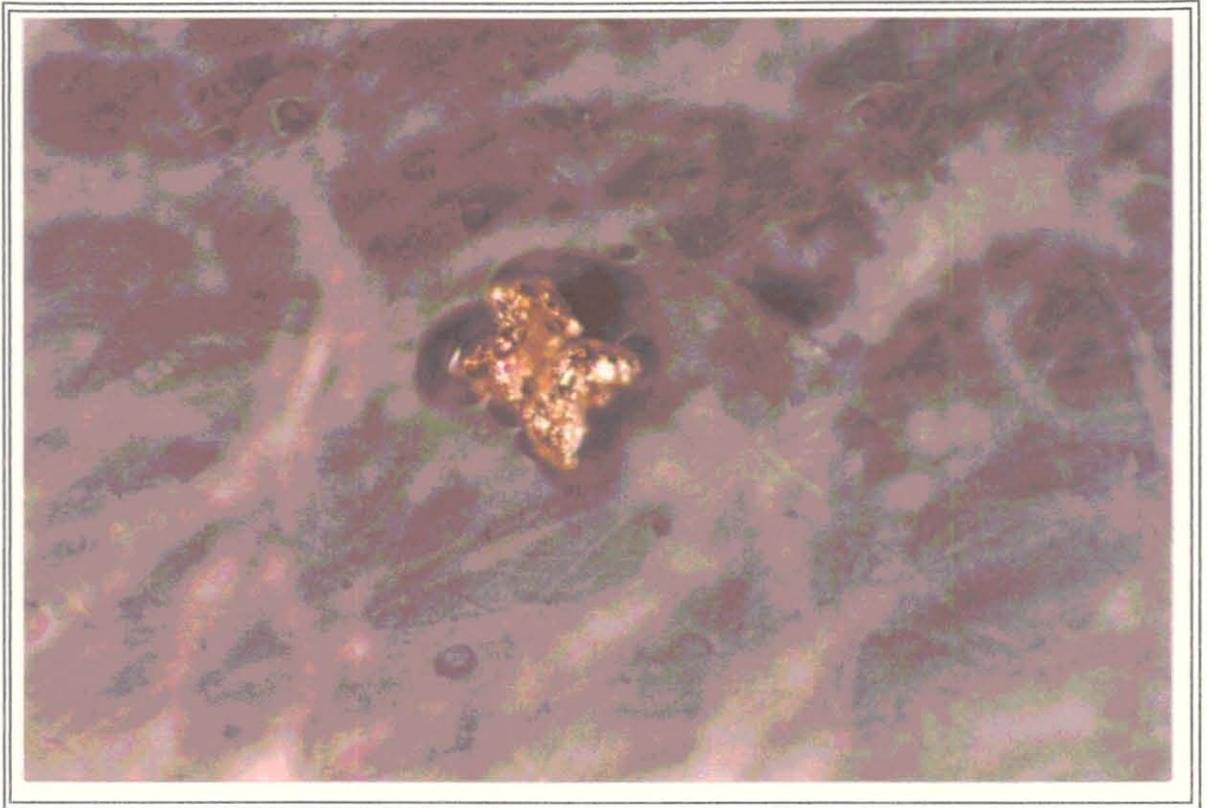
PANNED CONCENTRATE	GOLD GRAINS		CRYSTAL -LINITY	TRAVEL DAMAGE	COLOUR
<b>G330</b> Negligible hematite, magnetite. Moderate epidote. Strong marcasite/ iron pyrite. Dominant TGHMS	nil				
<b>G332</b> Negligible hematite, magnetite. Moderate epidote. Strong TGHMS	nil				
<b>G334</b> Magnetite. Minor hematite, epidote. Moderate marcasite/ iron pyrite? and rutile. The shape of the pale coloured particles is consistent with having travelled some distance however the particle surfaces display a clean undamaged etched appearance. Minor TGHMS	3	1 2	remnant nil	moderate nil?	medium pale
<b>G336</b> Negligible hematite, magnetite, epidote. Dominant TGHMS	nil				
<b>G338</b> Negligible hematite, magnetite, epidote. Negligible TGHMS	nil				
<b>G340</b> Minor hematite & magnetite. Moderate marcasite/iron pyrite. Moderate TGHMS	1		remnant  (etched grain surface)	moderate	medium

PANNED CONCENTRATE	GOLD GRAINS	CRYSTAL -LINTY	TRAVEL DAMAGE	COLOUR
<b>G342</b> Very minor hematite & magnetite. Moderate marcasite/iron pyrite. Moderate TGHMS	nil			
<b>G344</b> Negligible hematite & magnetite. Moderate rutile. Strong marcas- ite/iron pyrite. Moderate TGHMS	nil			
<b>G346</b> As per sample G344	1	nil	major	medium
				(etched grain surface)
<b>G348</b> As per sample G344	5	1 2 2	remnant nil nil	minor moderate moderate
				pale pale medium
				(all grain surfaces etched)
<b>G350</b> Minor hematite & magnetite. Minor iron pyrite. Strong TGHMS	nil			
<b>G352</b> Minor hematite & magnetite. Strong TGHMS	nil			

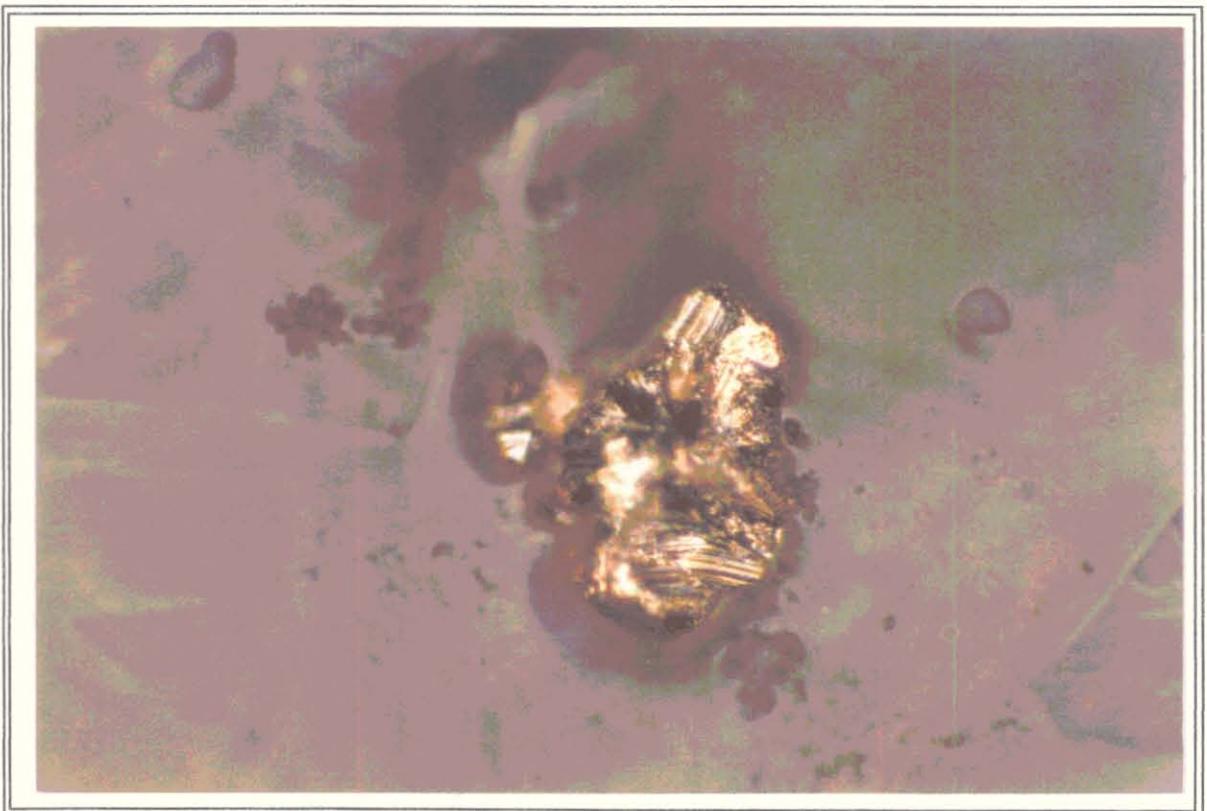
## 3.0 Photographs

Photo	Field No.	Probe No.	Magnification	Area
Nil travel damage, complete crystallinity, pale colour				
1	G154	G353 (1)	x100x4.5	Nancy Creek
2	G206	G353 (3)	x200x4.5	Lucy Spur
Nil travel damage, complete crystallinity, medium colour				
3	G172	G355 (1-12)	x100x4.5	Lucy Spur
4	G174	G355 (13-20)	x100x4.5	Lucy Spur
5	G172	G355 (1-12)	x100x4.5	Lucy Spur
6	G174	G355 (20)	x100x4.5	Lucy Spur
Minor travel damage, medium colour				
7	G174	G356 (11)	x50x4.5	Lucy Spur
8	G172	G356 (1-10)	x50x4.5	Lucy Spur
Moderate travel damage, medium colour				
9	G174	G357 (11-22)	x50x4.5	Lucy Spur
10	G172	G357 (1-10)	x50x4.5	Lucy Spur
11	G174	G357 (11-22)	x50x4.5	Lucy Spur
12	G174	G357 (11-22)	x50x4.5	Lucy Spur
Major travel damage, rich colour				
13	G158	G354 (1)	x50x4.5	Nancy Spur
14	G174	G354 (8)	x50x4.5	Lucy Spur
15	G148	G354 (4)	x25x4.5	Nancy Creek
16	G172	G354 (5)	x50x4.5	Lucy Spur
Gold intergrown with other minerals				
17	G318	G354 (9)	x50x4.5	Owen Meredith River
18	G190B	G362 (?)	x12x4.5	Rocky River
19	G190B	G362 (2)	x12x4.5	Rocky River
20	G190B	G362 (2)	x25x4.5	Rocky River
21	G190B	G362 (5)	x12x4.5	Rocky River
22	G190B	G362 (5)	x25x4.5	Rocky River
Grains from base of Tertiary gravel - etched surfaces				
23	G334	G363 (3)	x25x4.5	Nancy Spur Workings
24	G346	G363 (5)	x50x4.5	Nancy Spur Workings
25	G334	G363 (1,2)	x25x4.5	Nancy Spur Workings
26	G348	G363 (6-10)	x50x4.5	Nancy Spur Workings

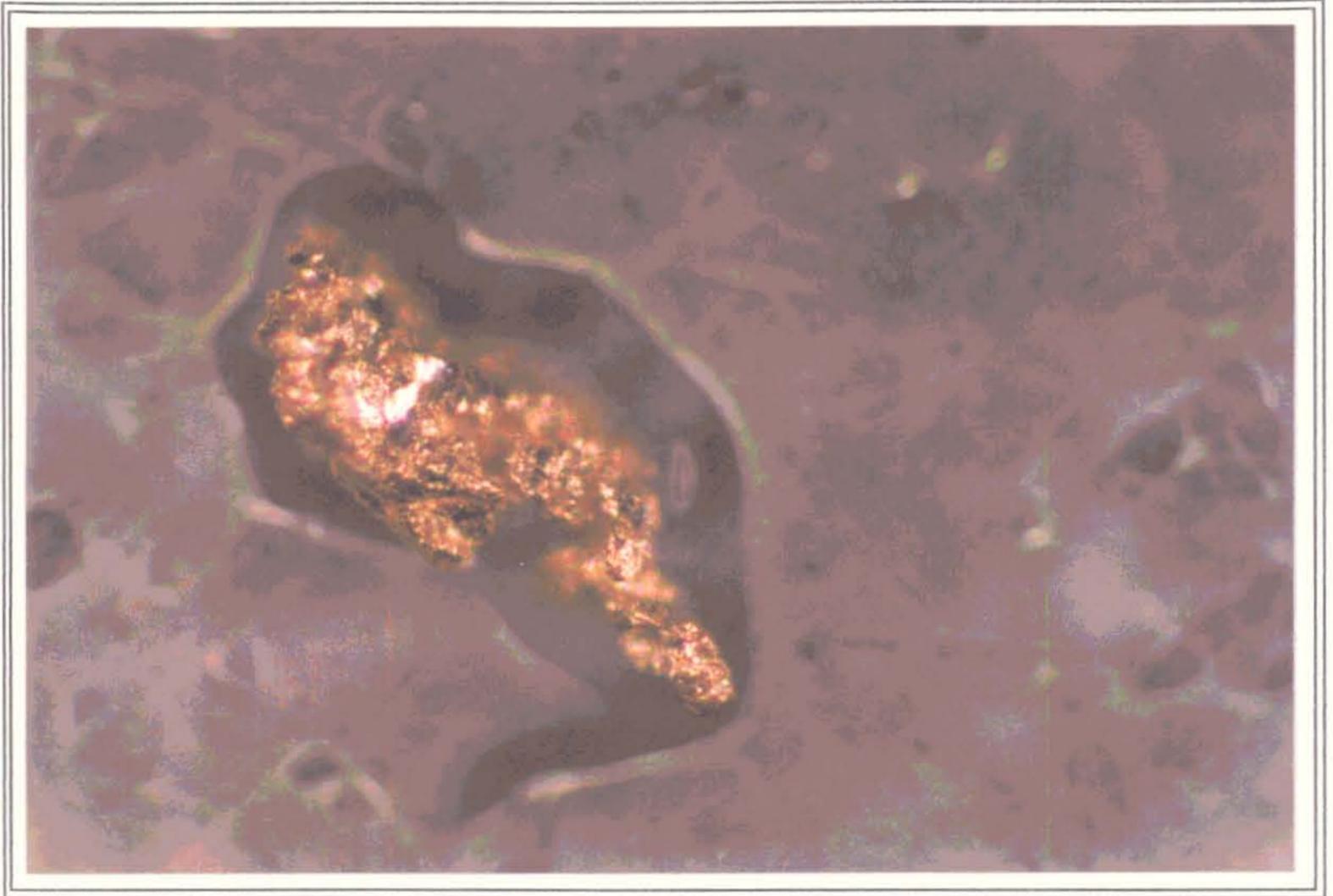
1. Grain colour has not been accurately or consistently rendered in the photographs. In particular, numbers 3-6 are too dark. However, a general impression is still given of the pale, medium and rich colour groupings by the other photographs.
2. The grains were mounted on double sided tape which provides the fibrous backdrop in the photographs.
3. The grains are back-to-front relative to the probe mount photographs in Kitto (1996).
4. Magnification is given as microscope magnification (eg. x50) and printing magnification (x4.5). The latter is an average value.
5. The photographs were taken by R.S. Bottrill, Mineral Resources, Tasmania.
6. See Appendix 1 of Turner (1997) for the AMG co-ordinates of the sample sites.
7. For some grains photographed here the equivalent grain in Kitto's (1996) photographs is not known, only the group of grains containing the equivalent grain. eg the grain in photograph 11 occurs in probe group 357 (11-22).



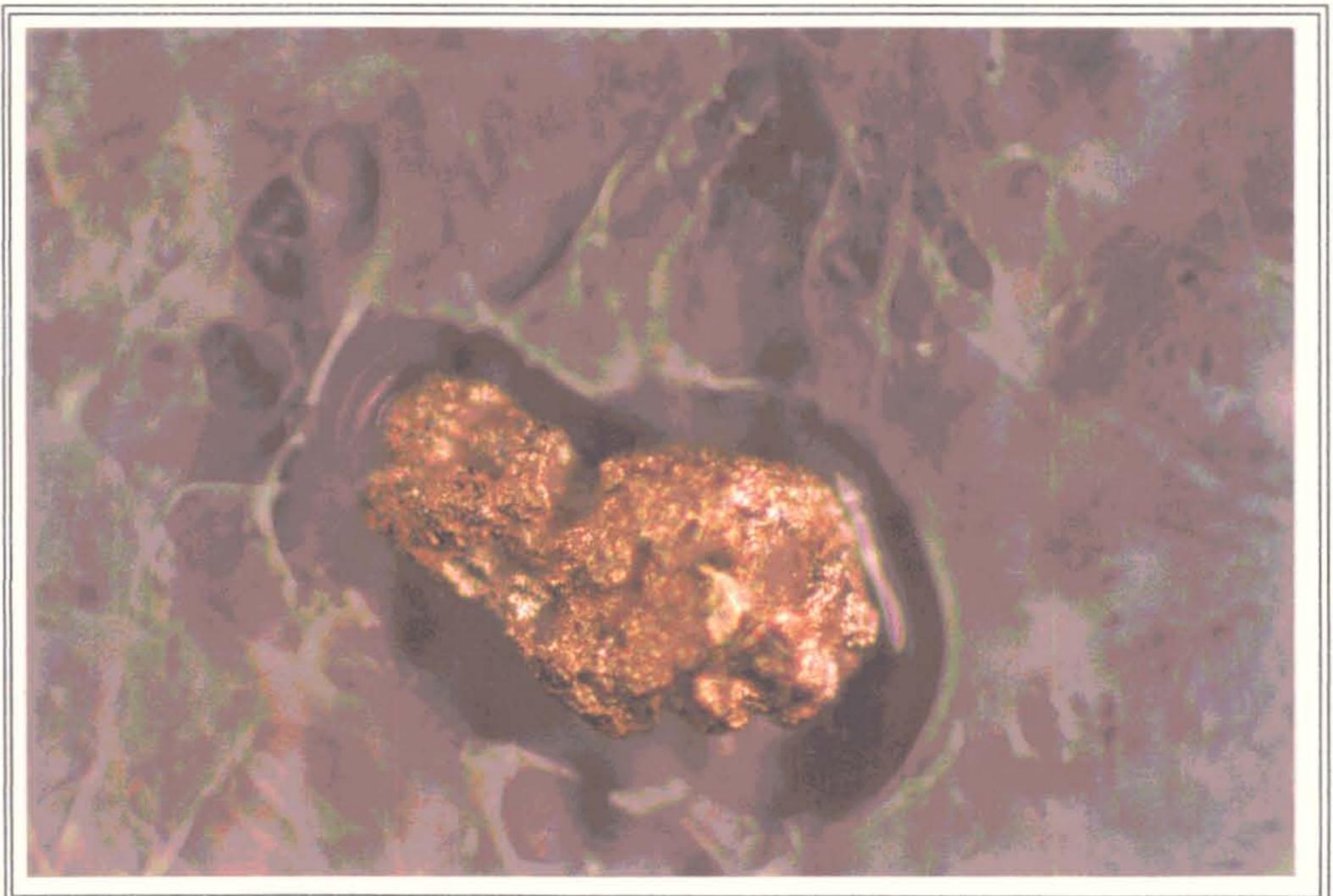
1. Nil travel damage, complete crystallinity, pale colour. Magnification x100x4.5



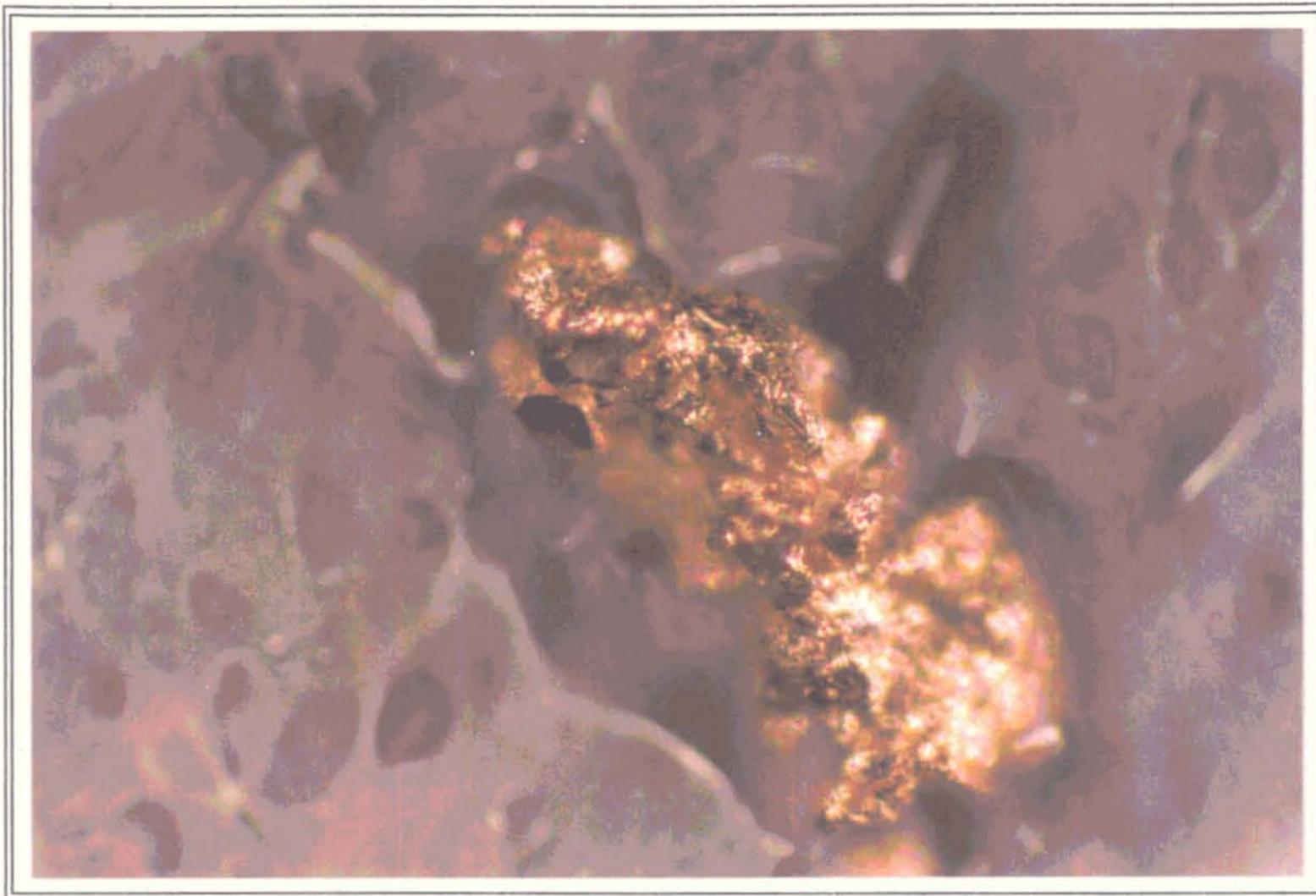
2. Nil travel damage, complete crystallinity, pale colour. Magnification x200x4.5



3. Nil travel damage, complete crystallinity, medium colour. Magnification x100x4.5



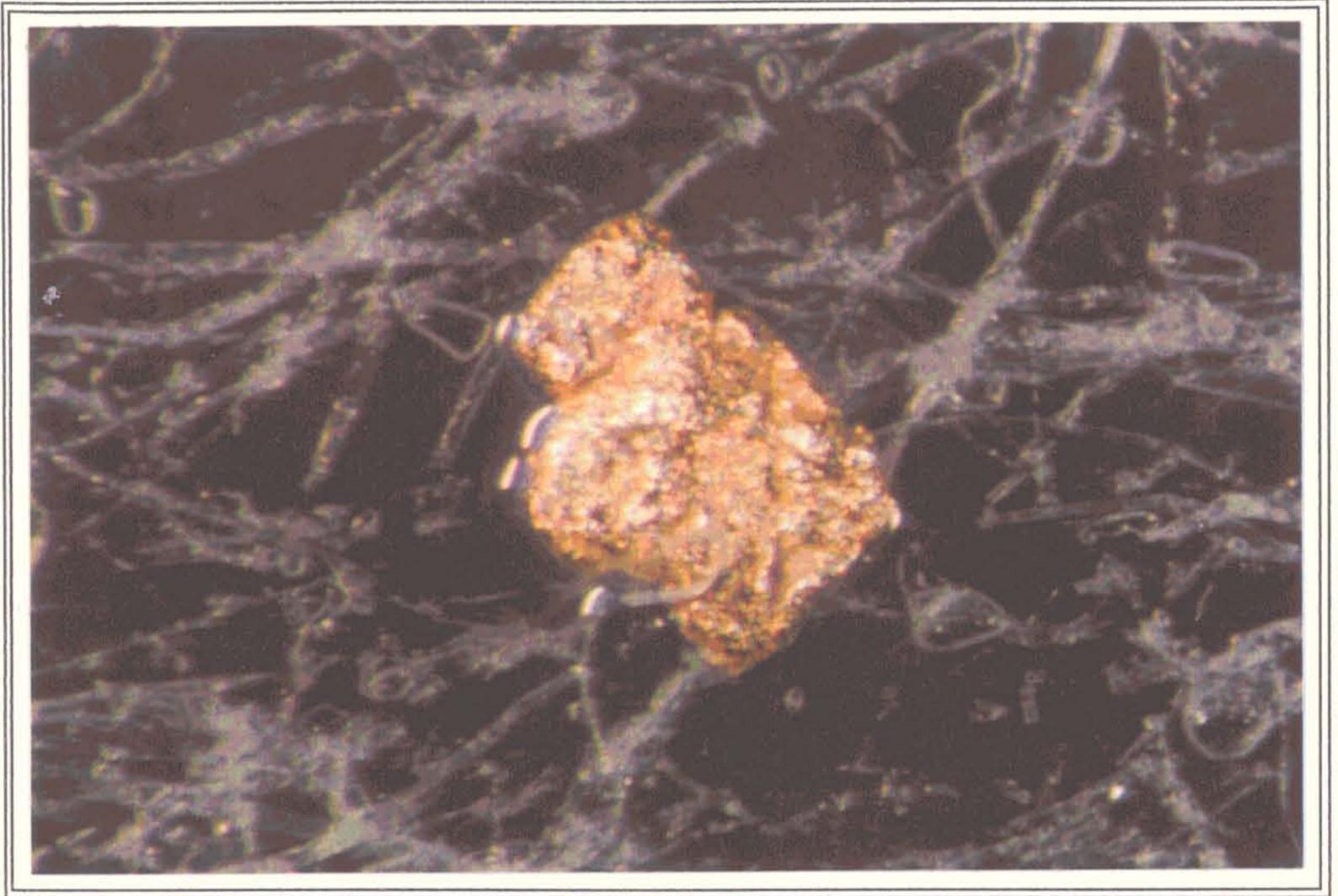
4. Nil travel damage, complete crystallinity, medium colour. Magnification x100x4.5



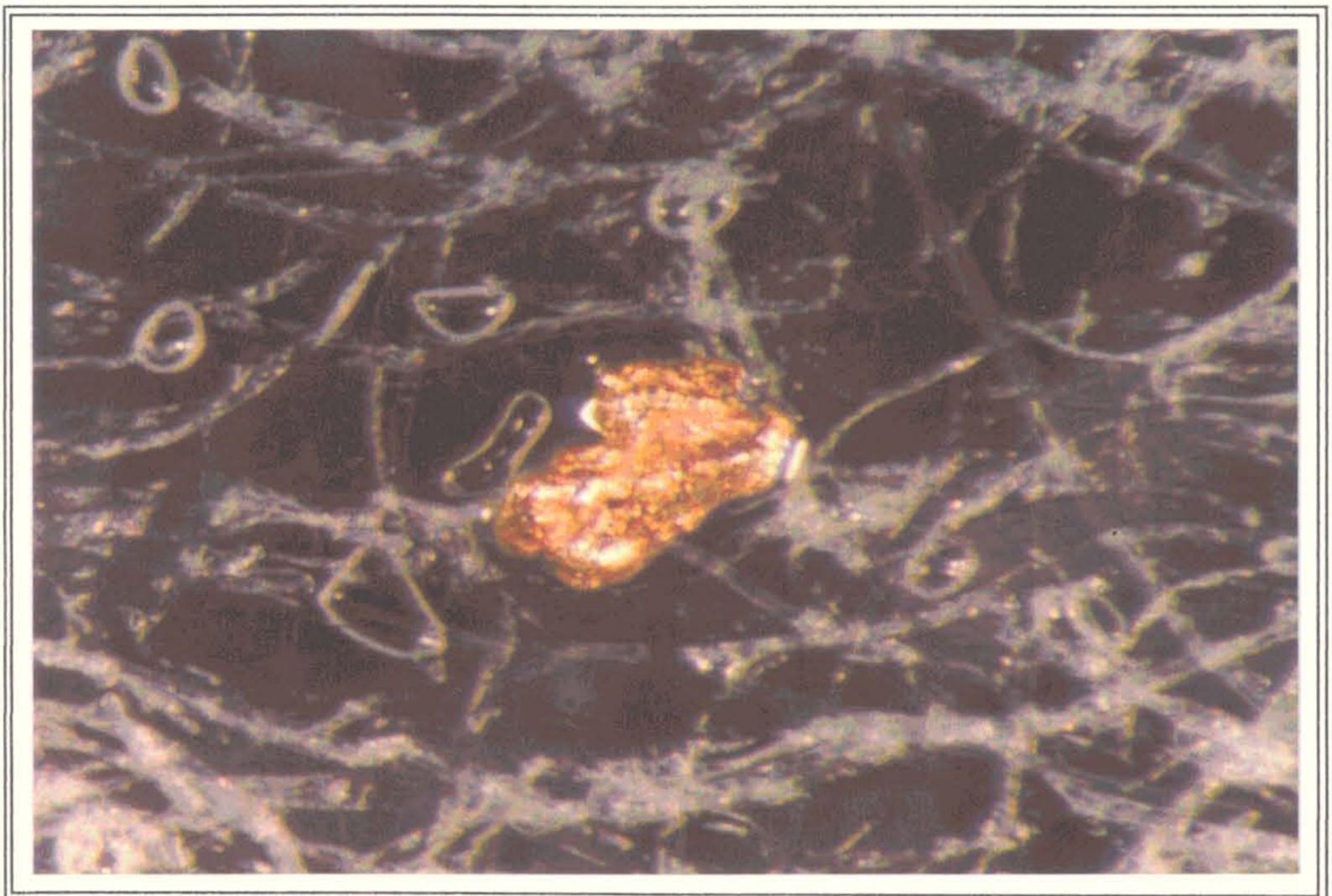
5. Nil travel damage, complete crystallinity, medium colour. Magnification x100x4.5



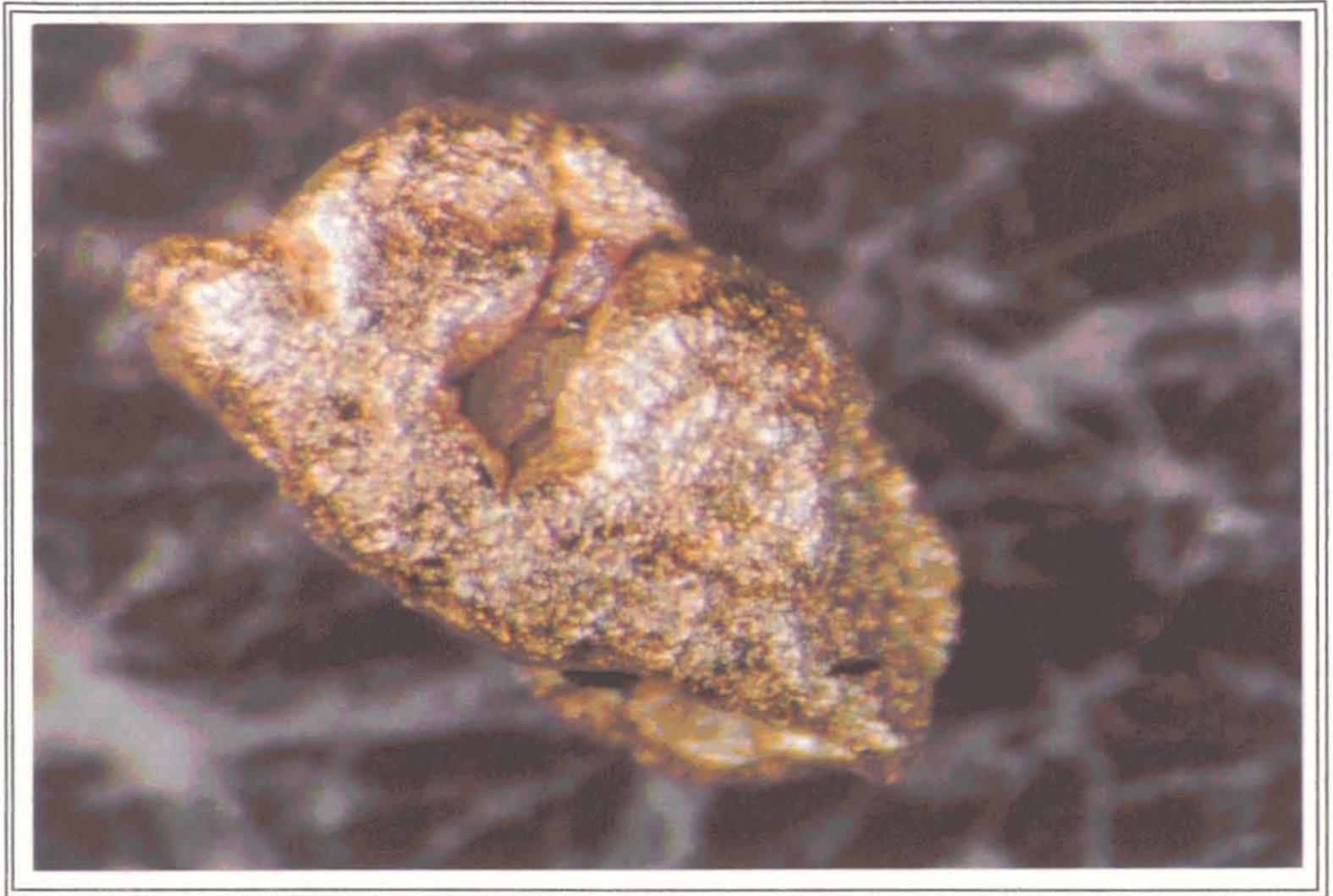
6. Nil travel damage, complete crystallinity, medium colour. Magnification x100x4.5



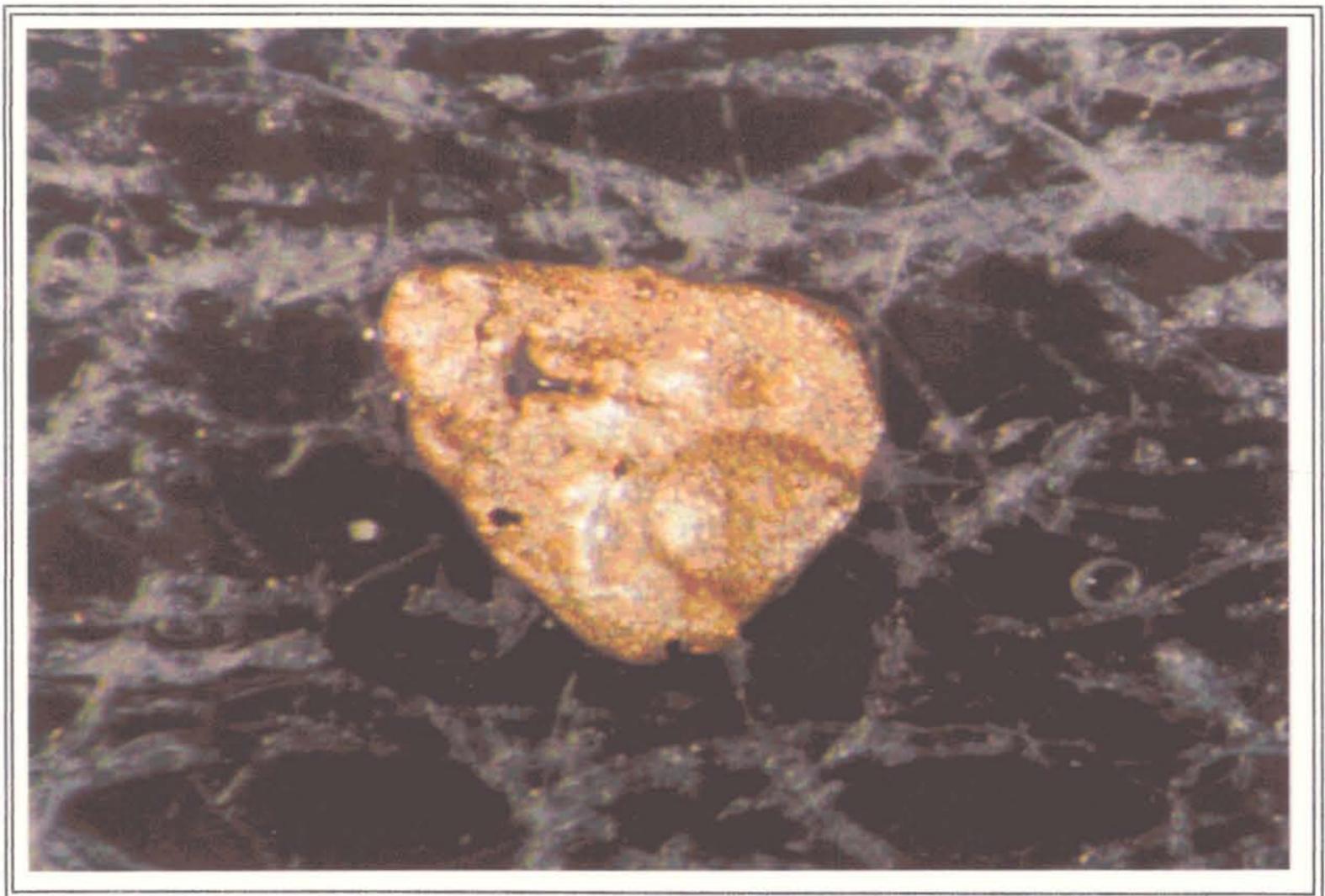
7. Minor travel damage, medium colour. Magnification x50x4.5



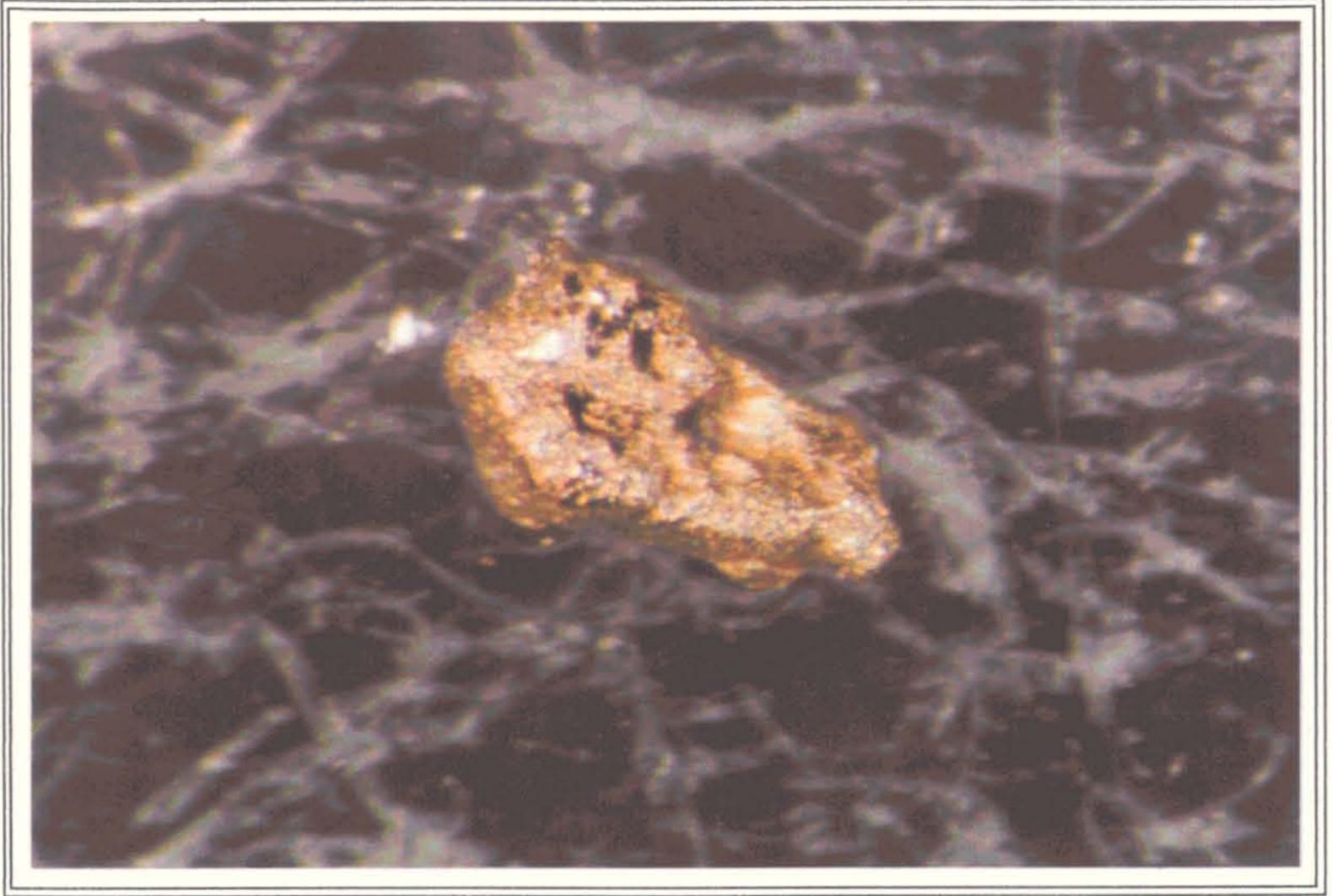
8. Minor travel damage, medium colour. Magnification x50x4.5



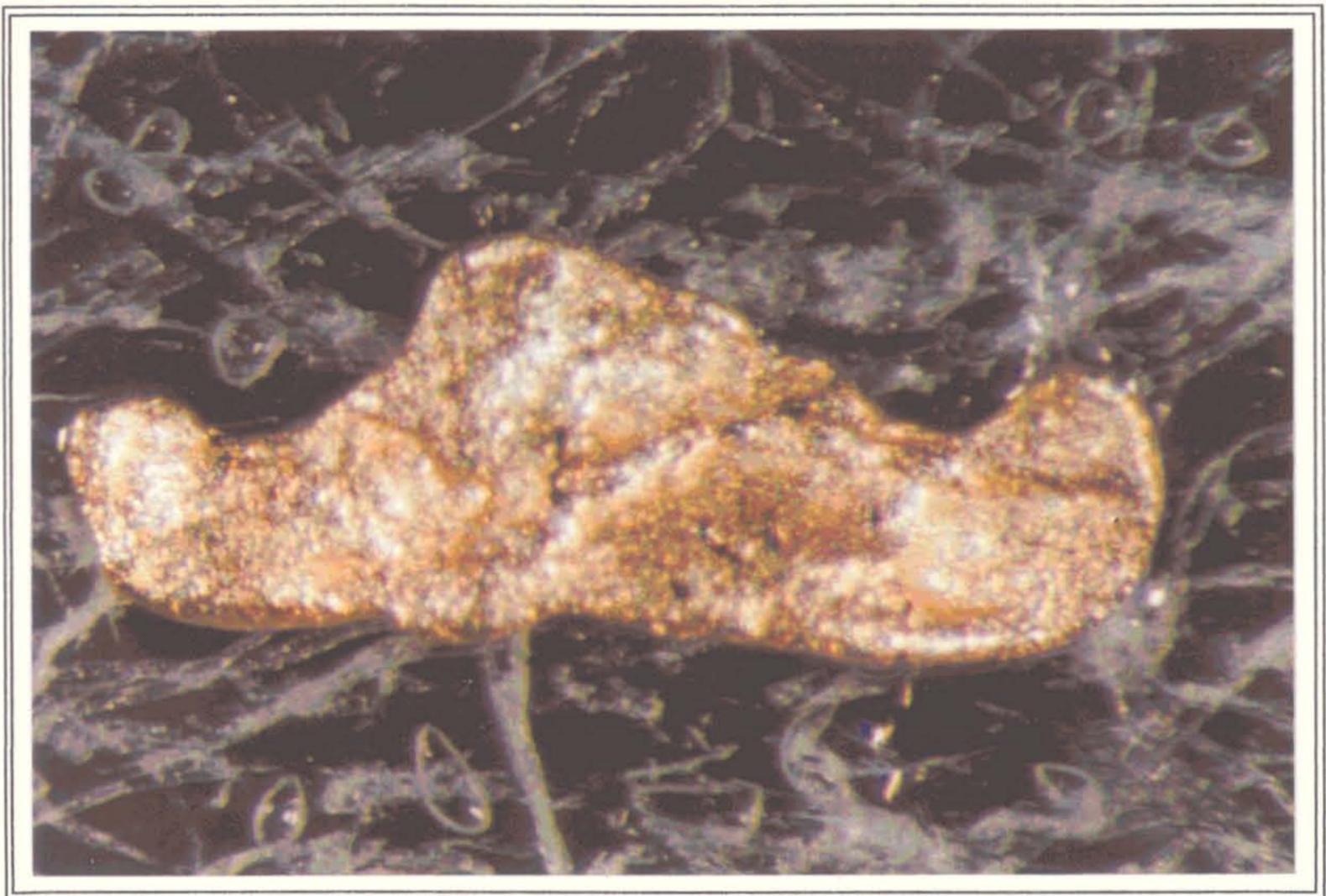
9. Moderate travel damage, medium colour. Magnification x50x4.5



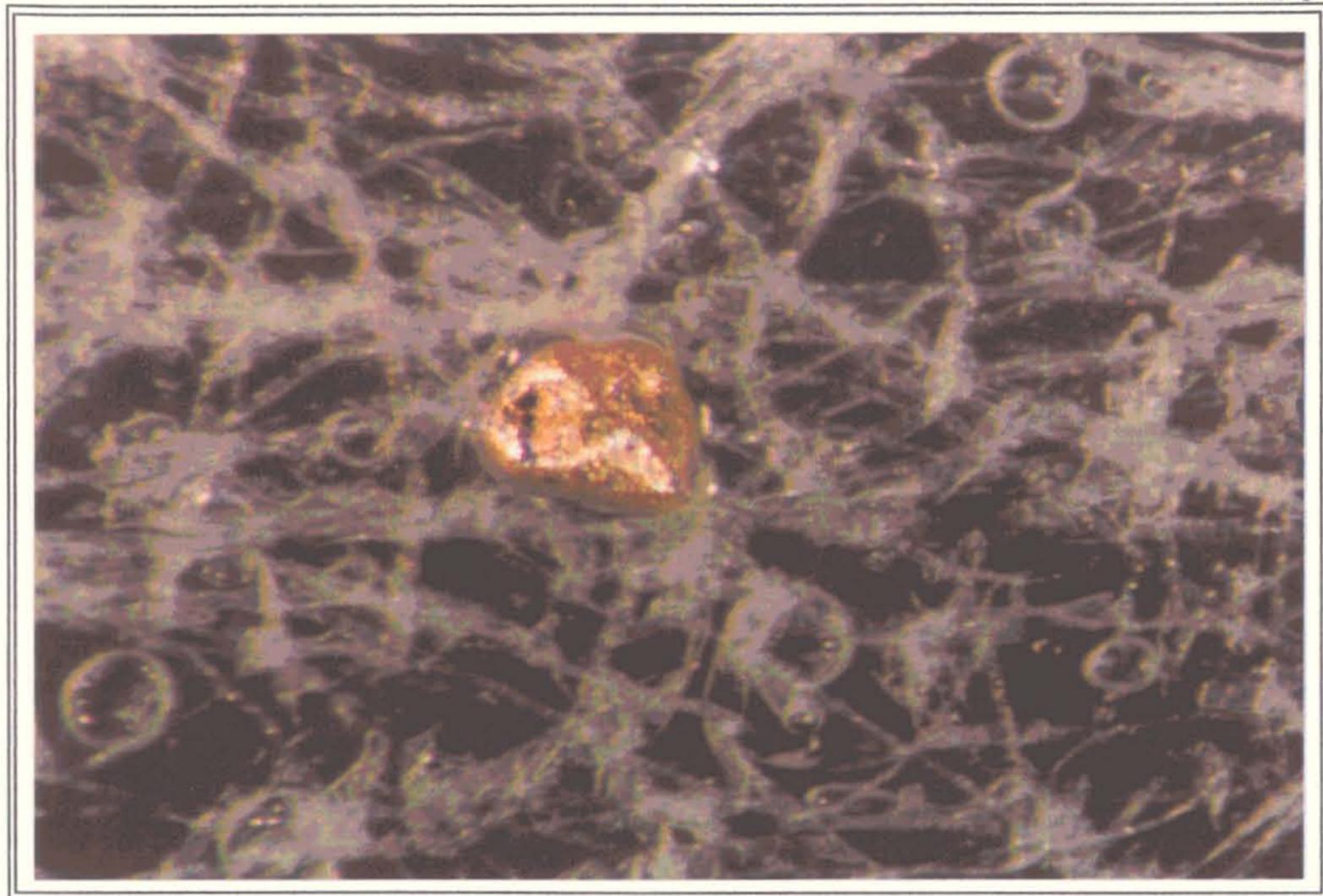
10. Moderate travel damage, medium colour. Magnification x50x4.5



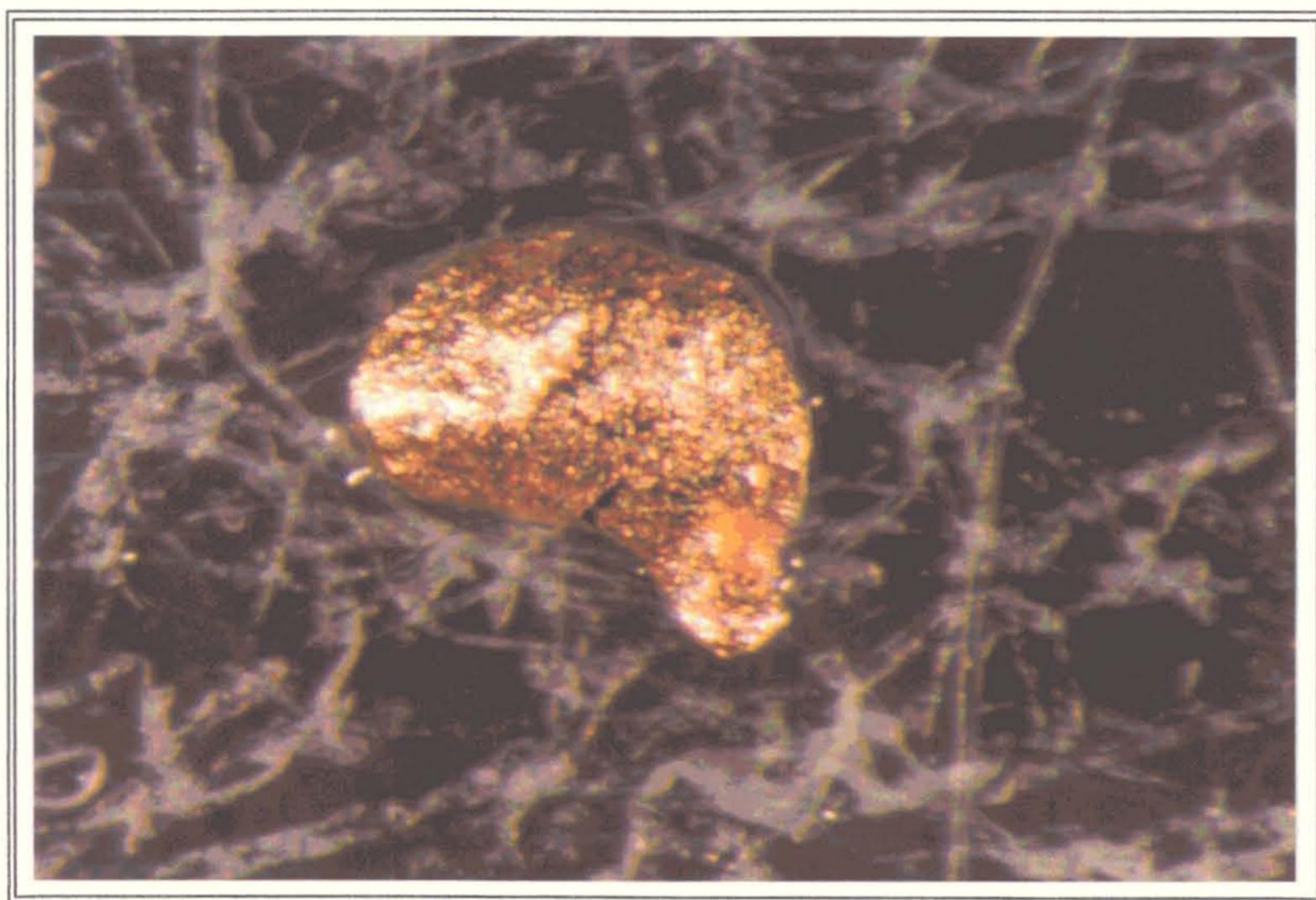
11. Moderate travel damage, medium colour. Magnification x50x4.5



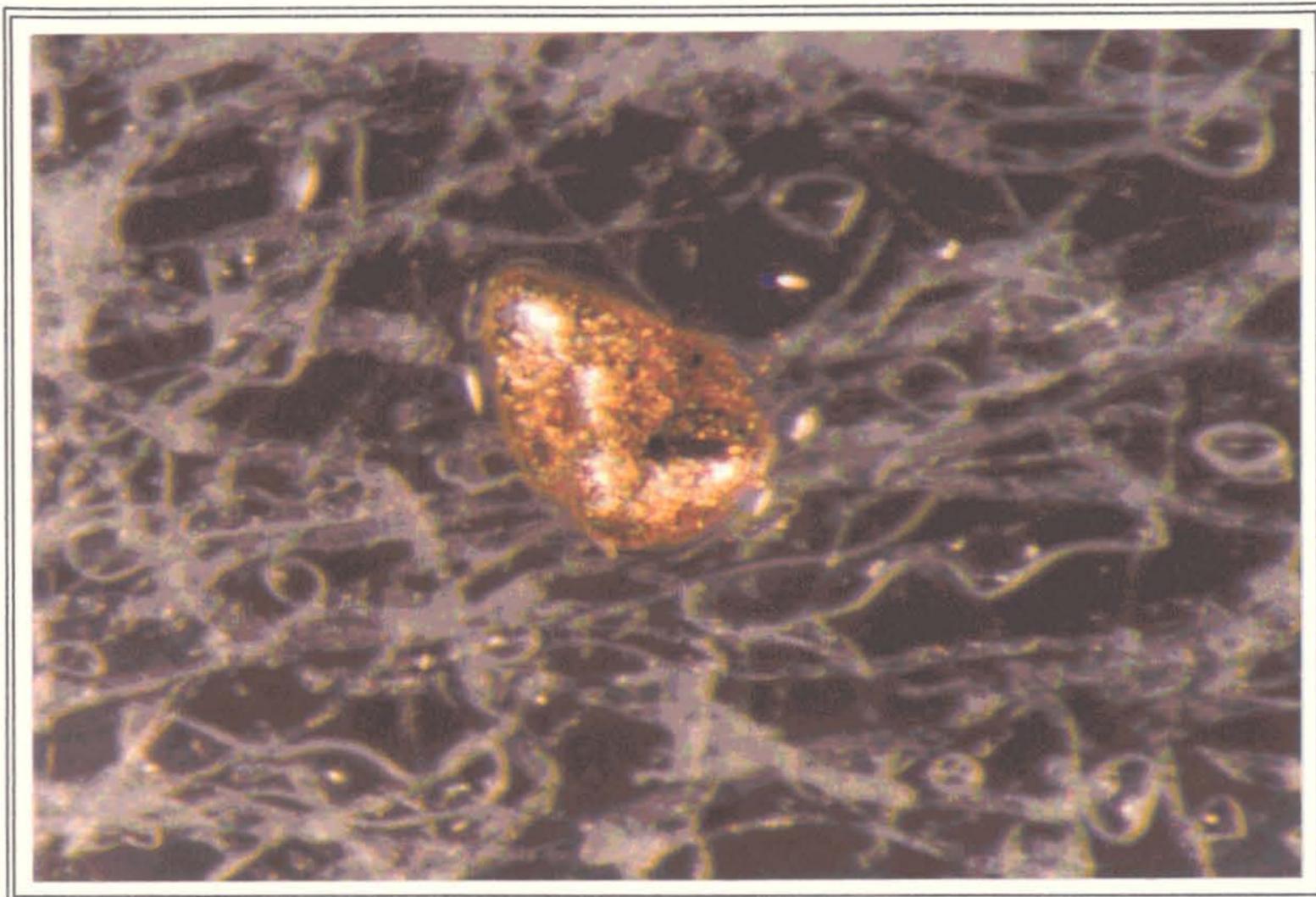
12. Moderate travel damage, medium colour. Magnification x50x4.5



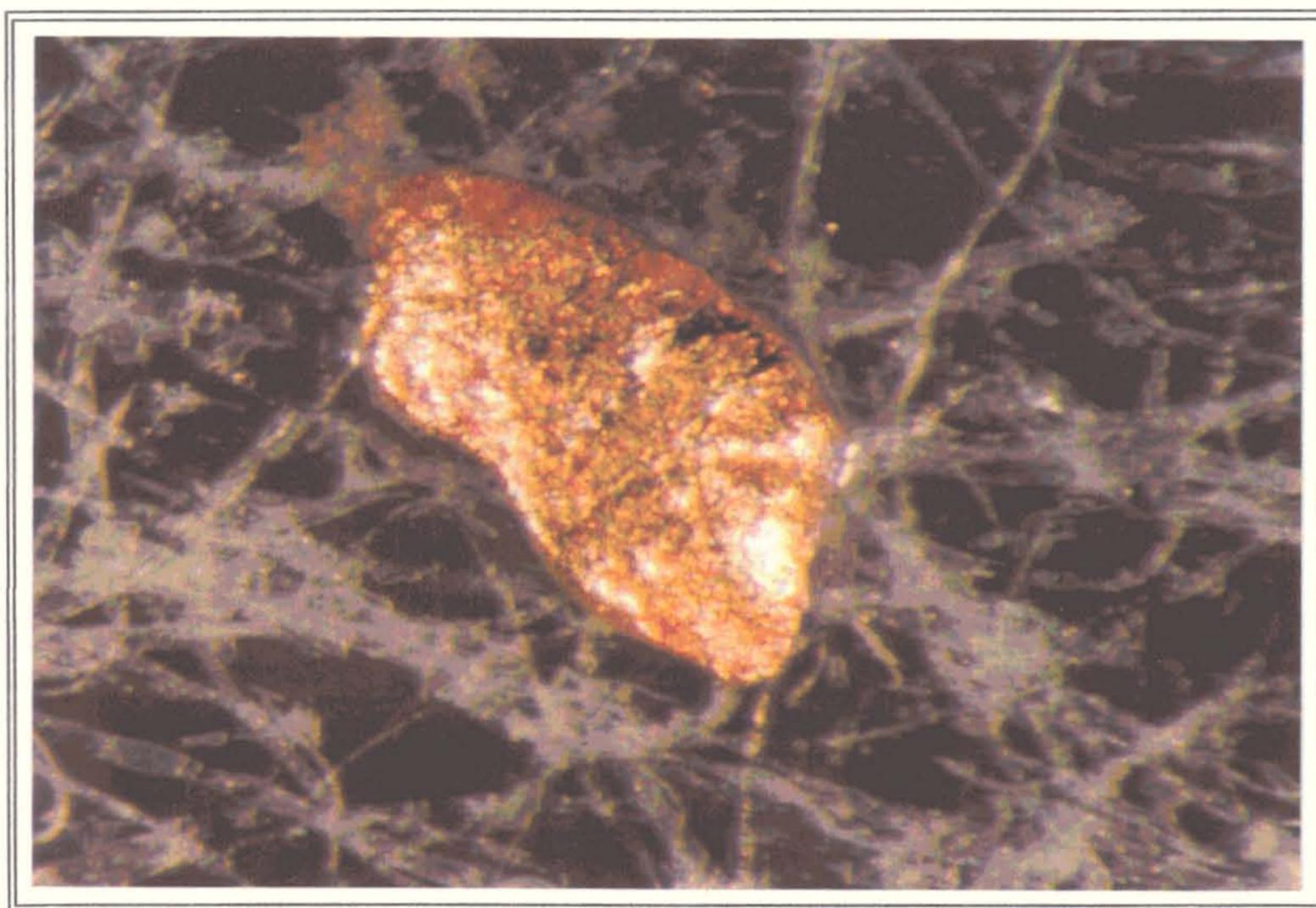
13. Major travel damage, rich colour. Magnification x50x4.5



14. Major travel damage, rich colour. Magnification x50x4.5



15. Major travel damage, rich colour. Magnification  $\times 25 \times 4.5$



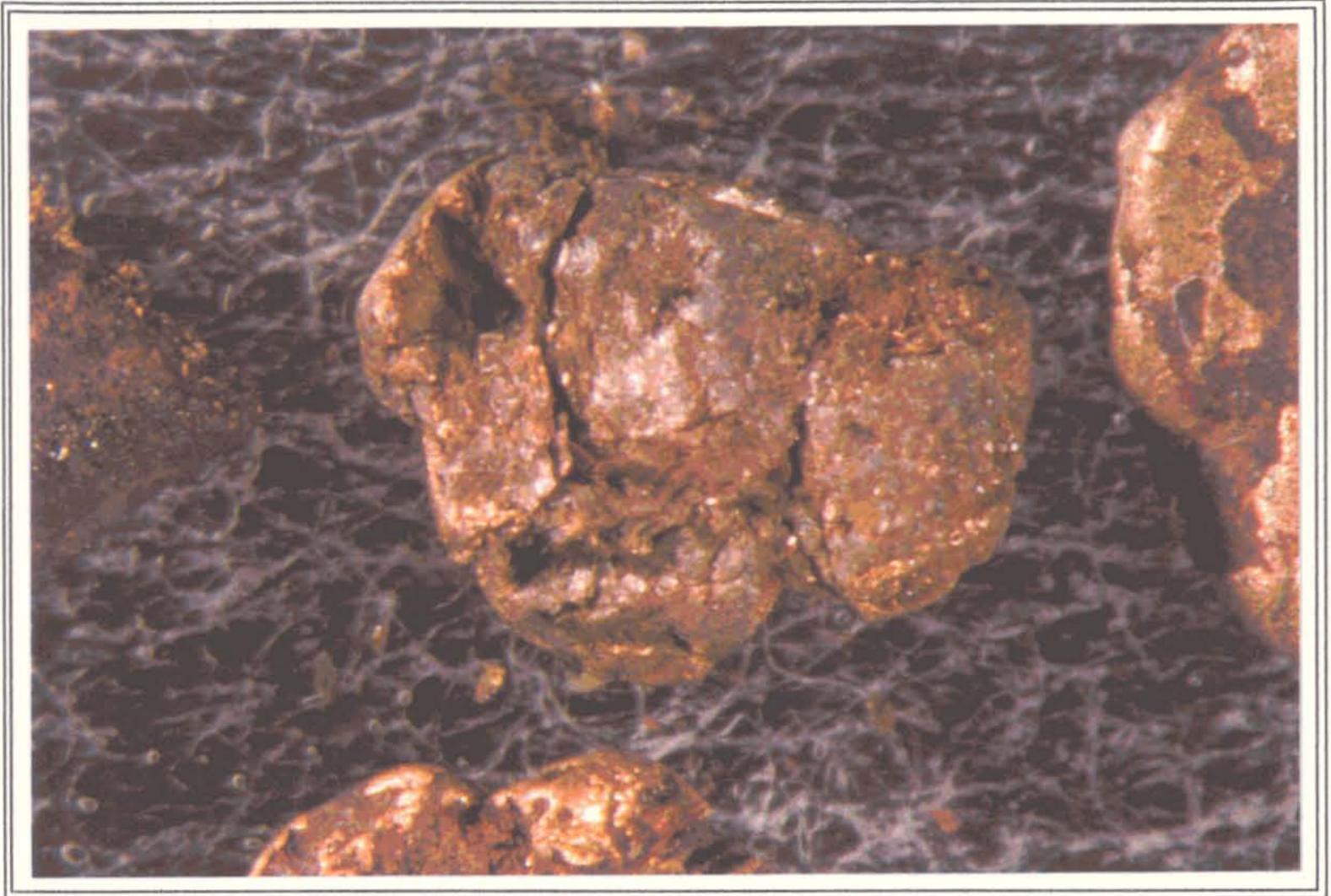
16. Major travel damage, rich colour. Magnification  $\times 50 \times 4.5$



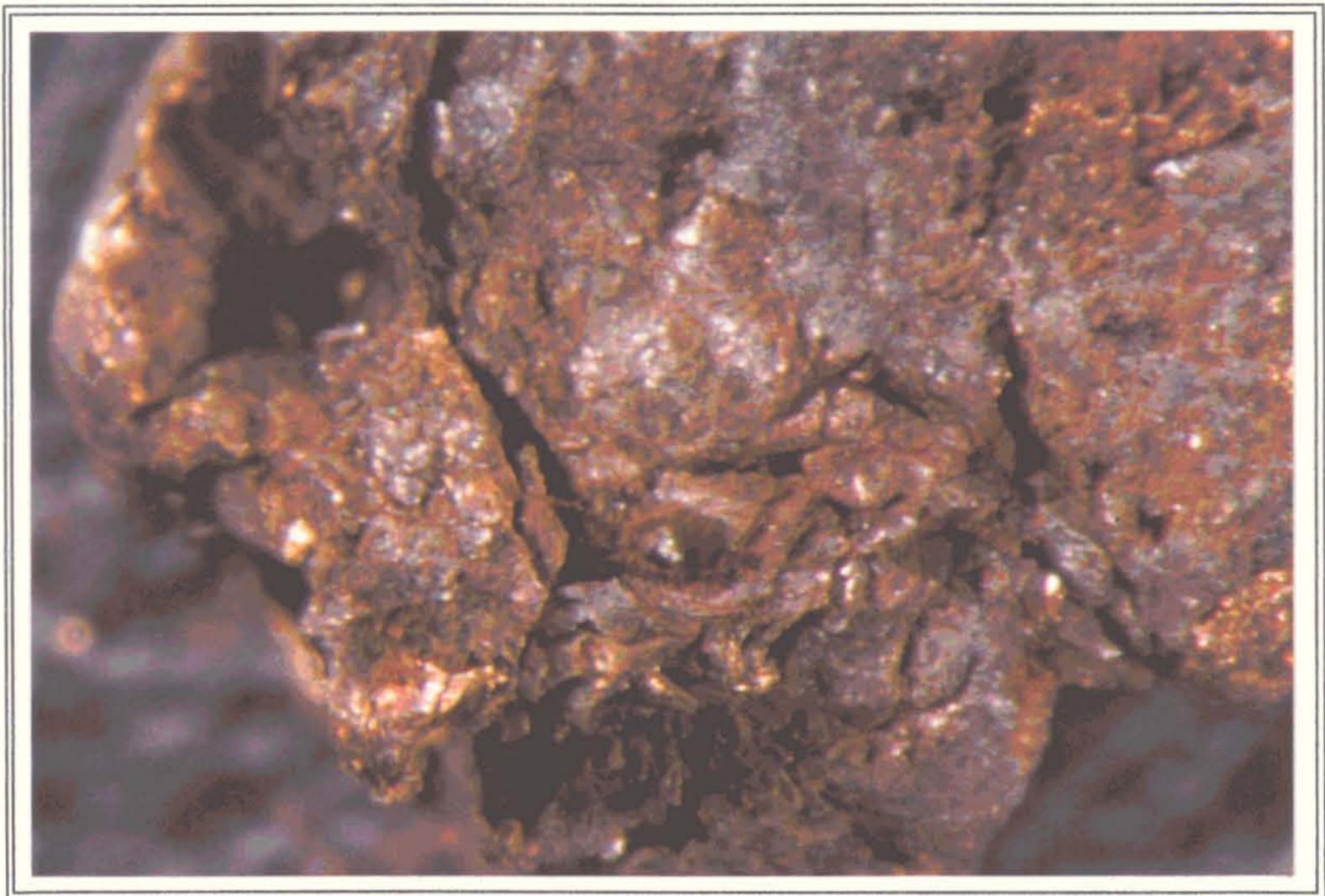
17. Gold intergrown with goethite. The gold is of pale colour beneath a rich coloured skin (see fracture at lower right). Collected 150m down stream of iron formation in Owen Meredith River. Magnification x50x4.5



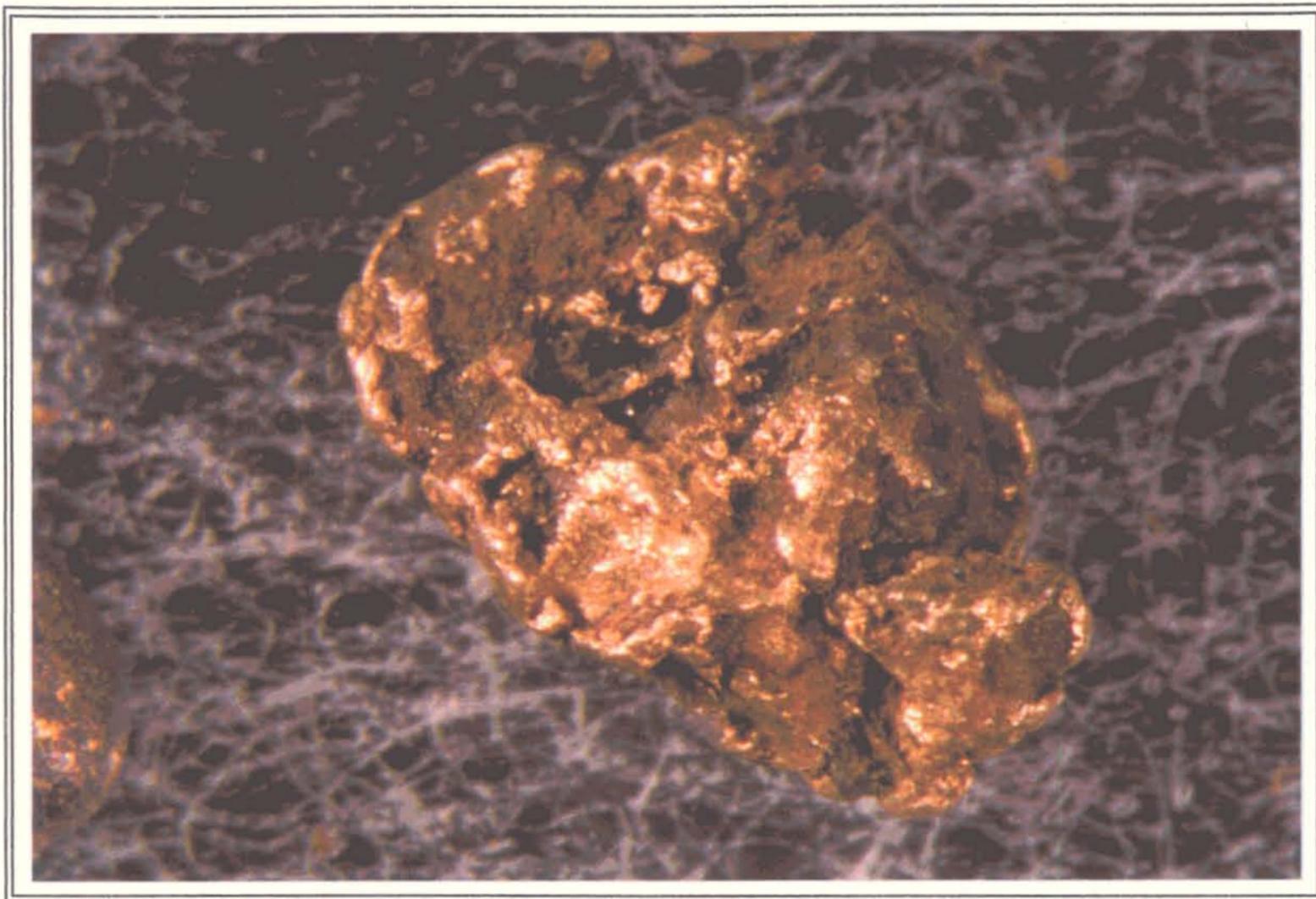
18. Gold with goethite. Collected near iron formations in Rocky River. Magnification x12x4.5



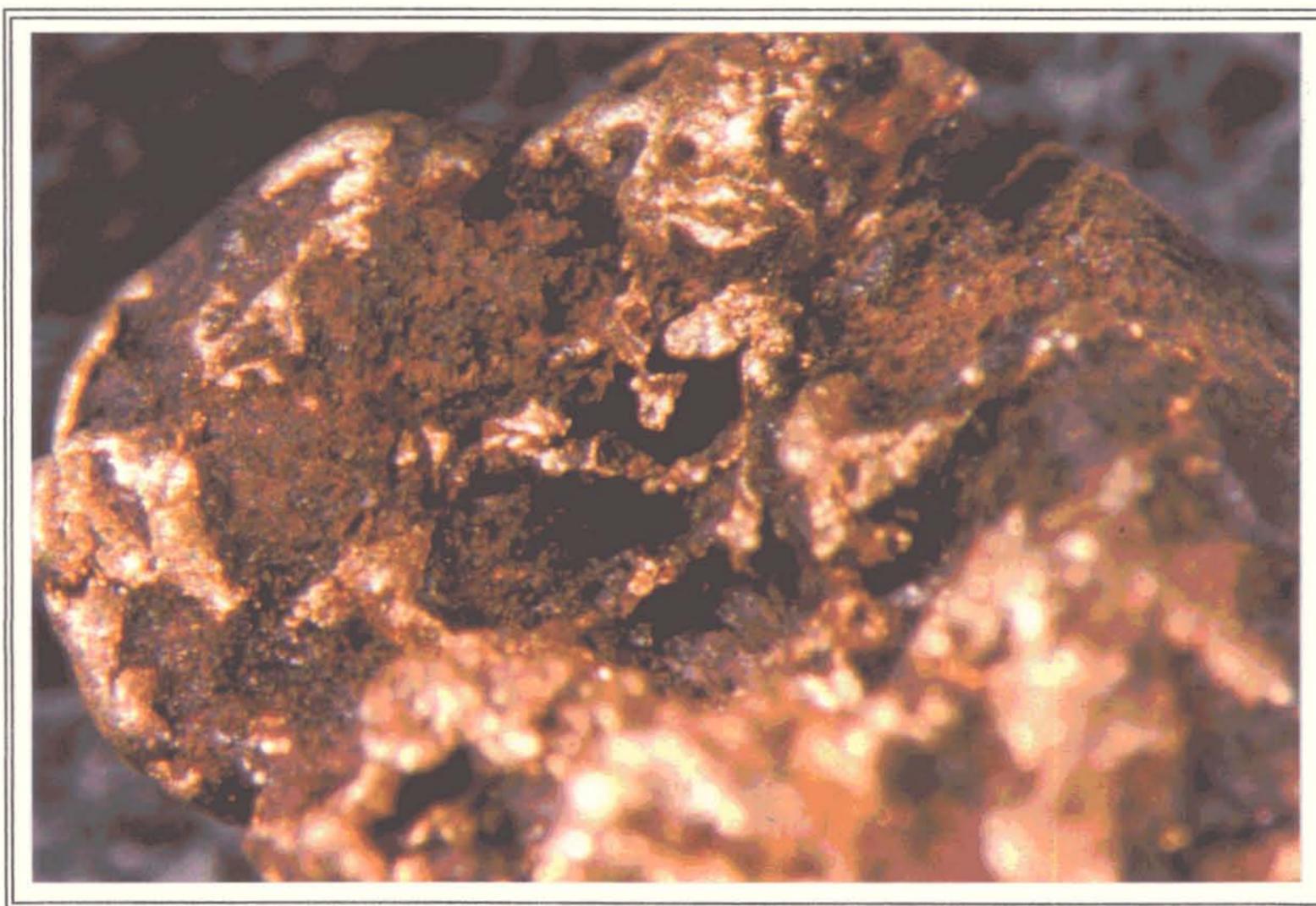
19. Gold subordinate to goethite. Same site as 18. Magnification x12x4.5



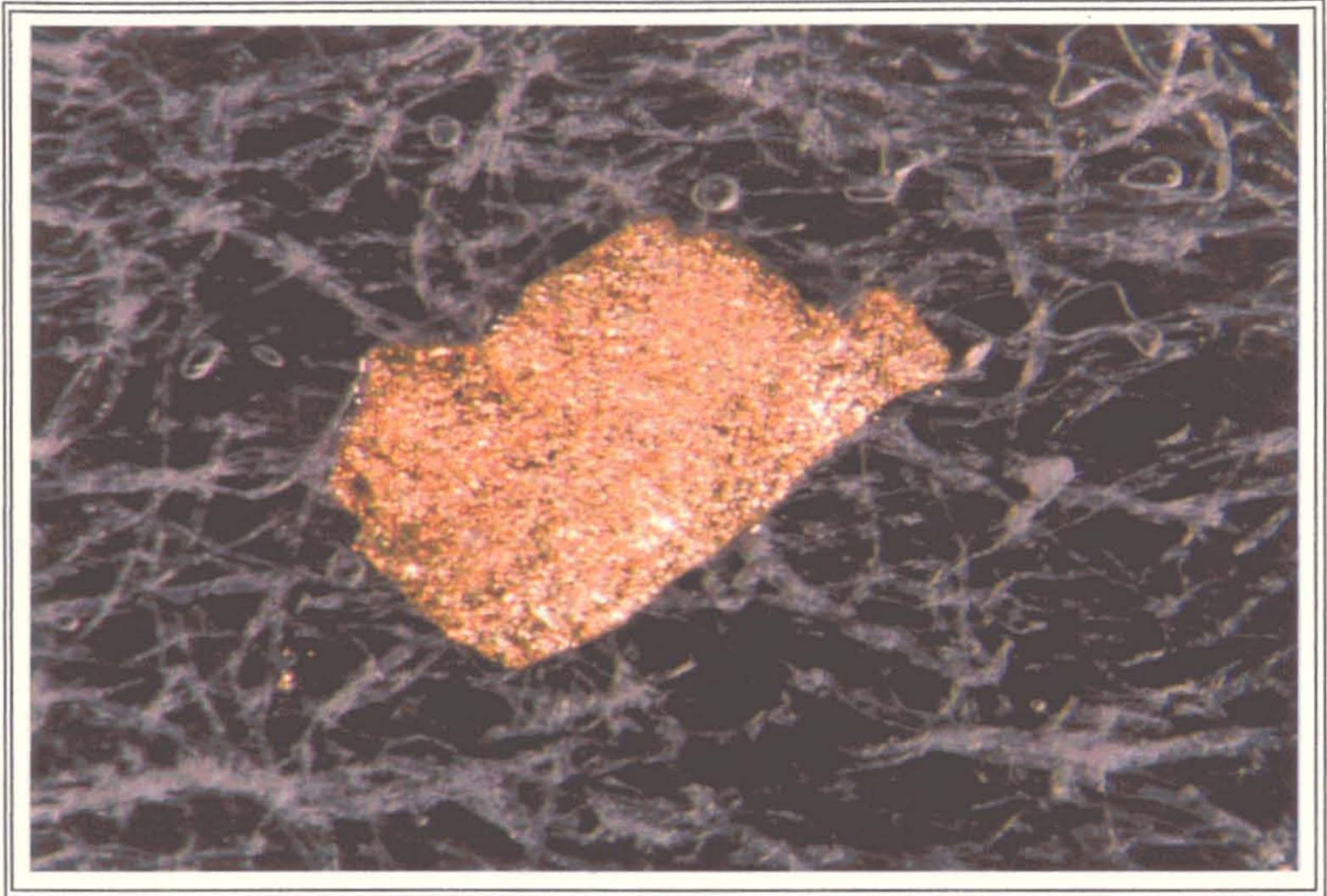
20. Enlargement of 19. Magnification x25x4.5



21. Gold with limonite and goethite. Same site as 18. Magnification x12x4.5

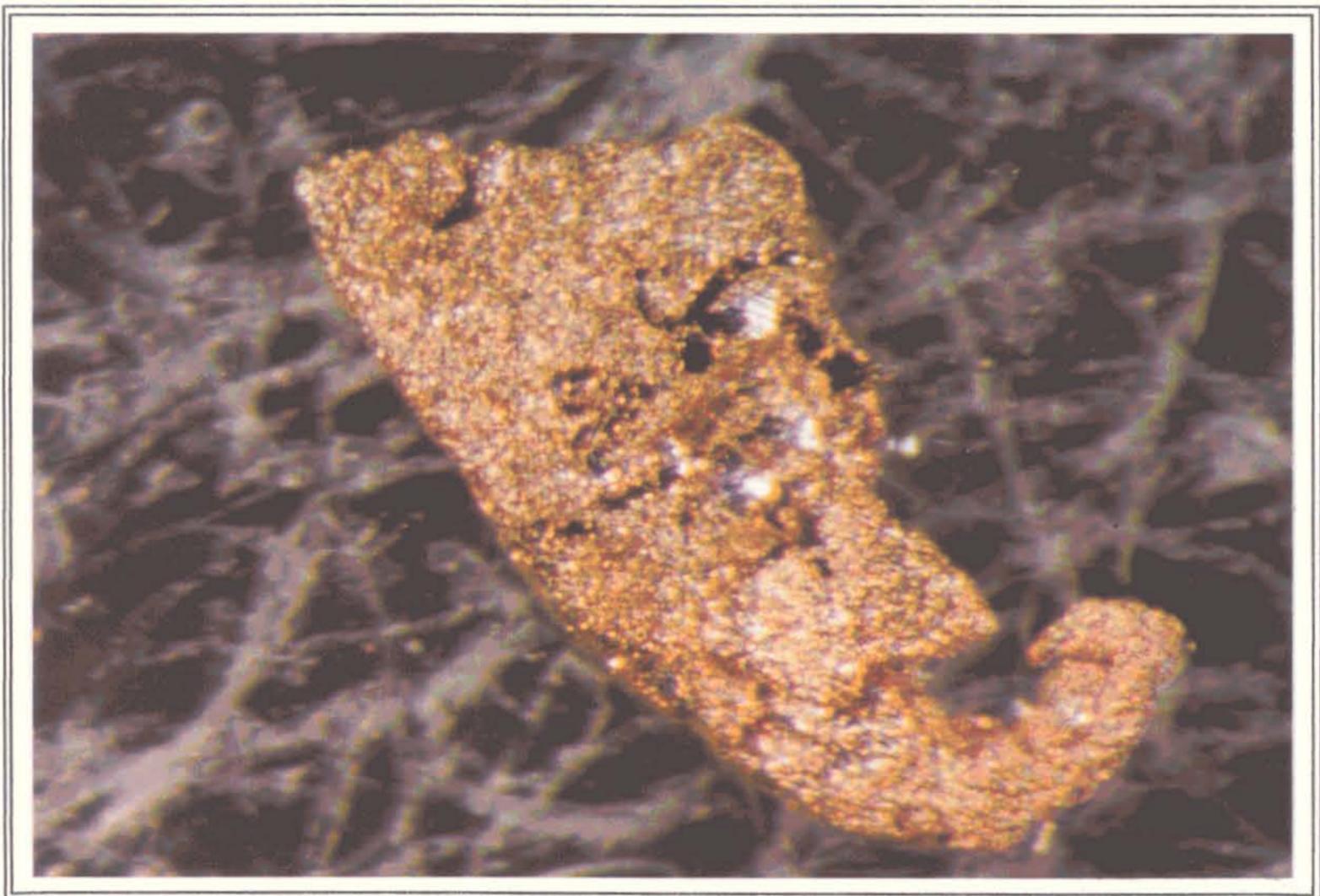


22. Enlargement of 21. Magnification x25x4.5

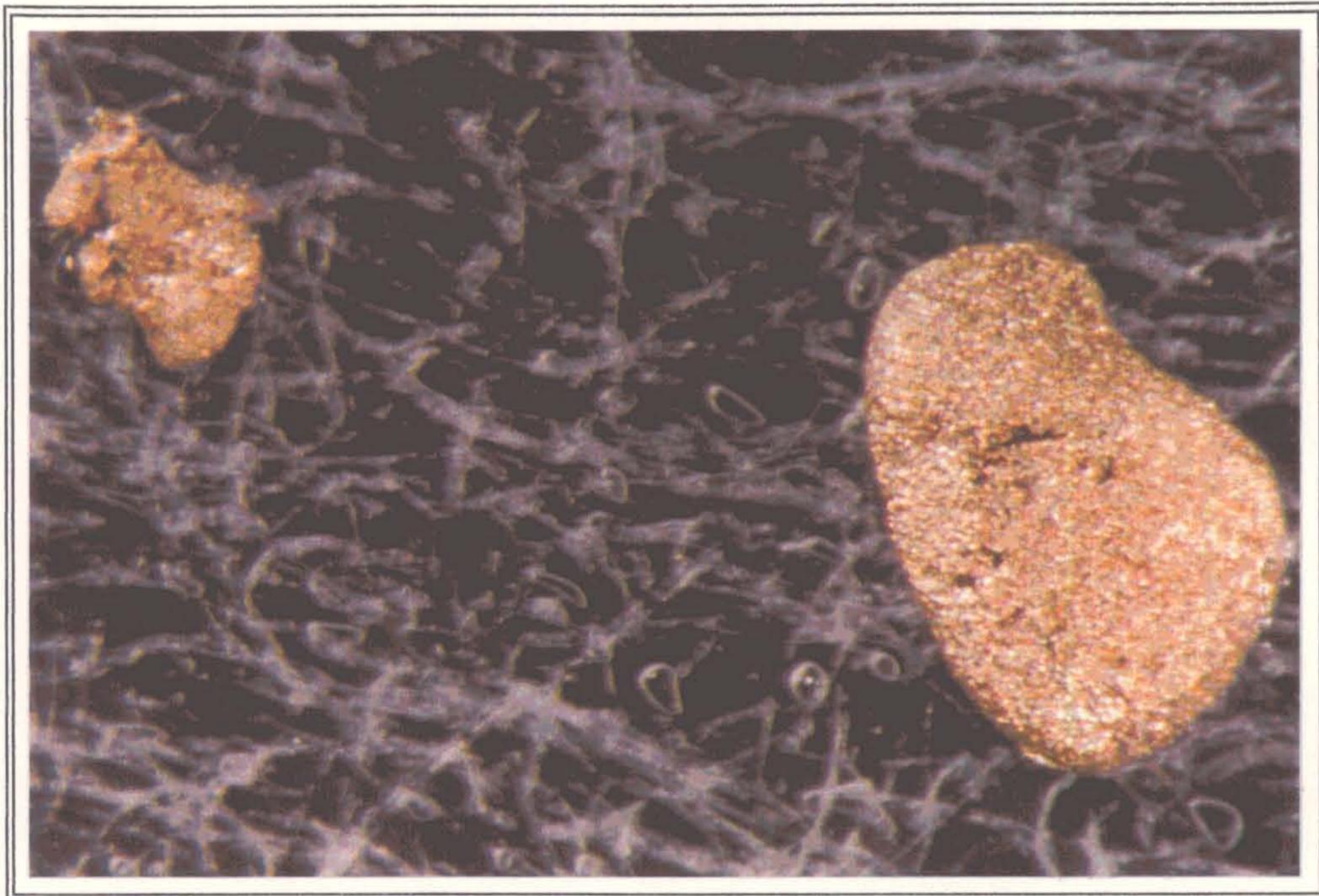


23. Detrital gold from the lowermost few centimetres of Tertiary gravel in the old Frenchmans Peak Ltd. Workings at Lucy Spur. The surface of the grain is distinctively etched (?by groundwater). ↑ Magnification x25x4.5

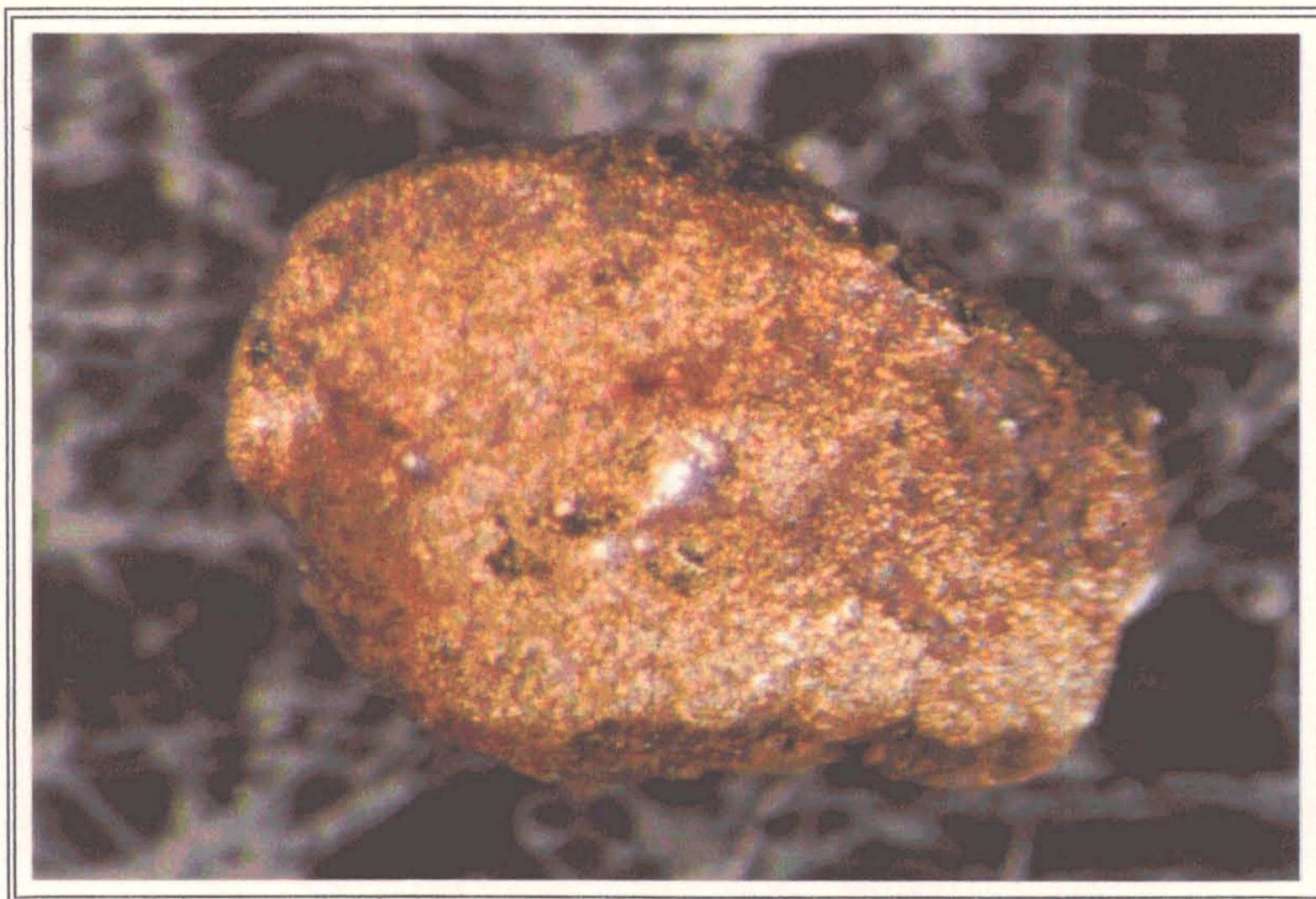
Nancy



24. As for 23. Magnification x50x4.5



25. As for 23. Magnification  $\times 25 \times 4.5$



24. As for 23. Magnification  $\times 50 \times 4.5$

## 4.0 Field numbers &amp; probe mount numbers (Kitto, 1996)

Field Number	Probe Number	Area
Nil travel damage, pale colour		
G154	G353 (1)	Nancy Creek
G302	G353 (2)	Owen Meredith River
G206	G353 (3)	Lucy Spur
G150	G353 (4)	Nancy Creek
Major travel damage, rich colour		
G158	G354 (1-3)	Nancy Spur
G148	G354 (4)	Nancy Creek
G172	G354 (5,6)	Lucy Spur
G174	G354 (7,8,12)	Lucy Spur
G318	G354 (9)	Owen Meredith River
G294	G354 (10)	Lucy Spur North
G176	G354 (11)	Lucy Spur
G318	G354 (13)	Owen Meredith River
G328	G354 (14-16)	Timbs Creek
Nil travel damage, medium colour		
G172	G355 (1-12)	Lucy Spur
G174	G355 (13-22)	Lucy Spur
Minor travel damage, medium colour		
G172	G356 (1-10)	Lucy Spur
G174	G356 (11-22)	Lucy Spur
Moderate travel damage, medium colour		
G172	G357 (1-10)	Lucy Spur
G174	G357 (11-22)	Lucy Spur
Minor travel damage, 80% crystallinity, medium colour		
G190A	G358 (1-25)	Rocky River
Moderate travel damage, 50% crystallinity, medium colour		
G190A	G359 (1-25)	Rocky River
Moderate travel damage, nil crystallinity, medium-rich colour		
G190A	G360 (1-25)	Rocky River
Minor-major travel damage, medium colour		
G312	G361 (1-3)	Owen Meredith River
G314	G361 (4)	Doctors Creek
G316	G361 (5-7)	Finlay Creek
G318	G361 (8-12)	Owen Meredith River
Gold intergrown with other minerals		
G190B	G362 (1-6,10)	Rocky River
G190A	G362 (7-9)	Rocky River
Grains from base of Tertiary gravel - etched surfaces		
G334	G363 (1-3)	Nancy Spur workings
G340	G363 (4)	Nancy Spur workings
G346	G363 (5)	Nancy Spur workings
G348	G363 (6-10)	Nancy Spur workings

See Appendix 1 of Turner (1997) for the AMG co-ordinates of the sample sites.

Kitto, P.A. 1996. *A petrographic and geochemical investigation of gold: Arthur Mobile Belt, western Tasmania*. Appendix 4 in Turner, N. J. 1997. Exploration Licence No 43/94, Corinna, Tasmania. Annual Report 1995-1996. Goldstream Mining NL and Titan Resources NL.

Turner, N. J. 1997. Exploration Licence No 43/94, Corinna, Tasmania. Annual Report 1995-1996. Goldstream Mining NL and Titan Resources NL.