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GEOLOGY AND MINERAL PROSPECTS
OF THE SCAMANDER DISTRICT
NORTH EASTERN TASMANIA.

BY

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Figure 1 Geologic Map Scamander District

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INTRODUCTION

A regional geological survey and scout of mineralised areas inland from the coastal townships of Scamander and St. Helen's, Northeast Tasmania, (E.L. 7/68) was commenced on January 4th, 1969 and continued through February. This is a preliminary report on progress to February 15th, 1969. There is a body of published and unpublished work on parts of the area but these comments relate to my own field observations.

PURPOSE

The purpose of this work was to select restricted target areas on geologic grounds for detailed prospecting involving geochemistry, geophysics and drilling. This survey gave a geologic base to a concurrent geochemical sampling campaign to be reported on elsewhere.

GENERAL GEOLOGY

SCAMANDER BEDS

Lithology

These sediments are probably members of the Mathinna Group of Silurian age. The outcrop in the area is fair, confined generally to the

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creek beds and road cuttings. The sequence is composed of either massive beds, unstratified in outcrop, or beds monotonous both in lithology and structure. Essentially the sequence is composed of interbedded slate, siltstone and massive quartzites, subgreywackes and sandstones; near contacts with granitic rocks they are thermally altered to spotted slates.

Structure

The sediments generally strike 330° - 340° and dip steeply to the west. In the vicinity of granitic contacts they are erratic in strike and dip. The strata are folded into similar folds, the axes of which are commonly parallel to the bedding plane. Buckling and warping of the limb strata is common through the sequence.

In the district a system of three sets of parallel joints have been developed and may be related to the same stress field.

The first set is usually prominent intraformationally. The more competent beds within the sequence have developed within them small fractures, which are usually at right angles to the bedding plane. The more incompetent shales have developed a slaty cleavage parallel to the bedding plane.

The beds are also characterised by a stronger joint pattern associated with which quartz-veining commonly occurs. This system of major

joints has one set parallel to the bedding plane and another at right angles to it. Associated with the quartz veining some minor mineralisation commonly occurs. Parallel to these master joints are sets of sheared zones or faults. These strike approximately in a N.E. or N.W. direction. It is believed that along these fracture zones, the major mineralisation in the area occurs. These shears are most obvious in the more competent rocks, especially the quartzites where they result in the production of what is known locally as "Mathinna Stone". This rock is essentially a breccia filled with quartz or dark material (tourmaline and chlorite?) and at times carrying some mineralisation (commonly tin).

GRANITIC ROCKS

These are two principal types of Devonian granitic rocks in the area - a porphyritic adamellite and a finer leucocratic granite.

The field relationships between the two have not been closely examined at this date, but it is believed the porphyritic adamellite was emplaced first and later intruded by the leucocratic granite and late phase development of griesens, pegmatites, aplites, quartz veins and mineralisation are associated with the latter intrusion (Groves, 1966).

The porphyritic adamellite has outcrop characteristics of many granite rocks-outcropping as large tors. Macroscopically it appears rather

monotonous in general texture with little development of quartz pegmatites or aplites. An occasional quartz tourmaline mass was seen, and a coarse pegmatite (of quartz, orthoclase, muscovite, with tourmaline and rare garnet or ?sphen.)

The non-porphyrific, leucocratic granite usually occurs in well-jointed outcrops, commonly of the whaleback type. It has associated many late-phase variants. These appear most commonly in the contact zones. The late phase variants commonly consist of quartz, muscovite and tourmaline assemblages of varying proportions with some assemblages dominated almost completely by one of the above minerals. Aplite dykes are also commonly associated with this leucocratic granite especially along fractures and are often offset by later fractures.

Small outlying cupolas and apophyses are also common throughout the area. In fact it appears that the Scamander Beds throughout the district may be closely underlain by granite, as the development of spotted slates is widespread. This most likely is a thermal metamorphic feature as the normal rocks in and beyond the area do not show this type of metamorphism as a regional feature. Petrography will of course establish the metamorphic facies and grade from the mineralogical assemblage.

TERTIARY RIVER GRAVELS

These unconsolidated sediments lie unconformably on the Scamander Beds and the granitic rocks. They are widely distributed in the area, but relate mainly to old river courses. They consist of boulders and pebbles of quartz, quartzite and sandstone, in a matrix of sand, clay or gravel. These deposits of river gravels have been previously worked for alluvial tin at several localities.

In the Constable's Creek area a small outcrop of poorly sorted, angular quartz and quartzite pebbles has been cemented with ferruginous material.

ECONOMIC GEOLOGYTINAlluvial Tin

Cassiterite is found in the Tertiary gravel deposits especially where the old rivers drained catchments in which granitic outcrop is distributed in large measure. Production has been sporadic and prospects for unworked deposits with other than marginal values have not been considered by other workers to be high.

The St. Helen's Bay area appears to be the most prospective area yet unworked. The absence of a true Thureau's Deep Lead has been reported Jack (1963) near St. Helen's. This makes it appear unlikely that sufficient quantities of tin would be brought and concentrated in the Bay area.

In the Scamander River Basin the Tertiary gravels have not been strongly exploited. This is probably due to the fact that tin concentrations are not high because firstly the Scamander River only drains relatively small areas of bedrock carrying tin and secondly the thicker alluvial concentrations are distant from higher source areas. Unless reworking of the gravels has occurred along the coastal plain the tin values would be low and no further work is recommended in this area.

Vein Tin

Small veins of cassiterite, or cassiterite bearing quartz, are common in the area and may be worth further appraisal though several companies have abandoned the more obvious showings as uneconomic. These are usually lodes associated with shear zones, or occur along major joint planes in a coarse stock-work type of occurrence.

(1) Great Pyramid Mine

The main known tin occurrence in the area is the Great Pyramid Tin Mine, Upper Scamander. This mine was worked extensively between 1928 and 1936 when 331 tons of ore were removed with a recovery grade of 0.88% Sn. the

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head grade average was possibly near 1.5%. The tin is confined to sandstone units, especially those that show strong silicification and fracturing. The tin occurs as a coating on joints and fractures and in gouge material in shear zones associated with these beds. Drilling, sampling and assaying in the area has confirmed the presence of a significant tonnage of low grade tin mineralisation.

An appraisal of the area by B.H.P. revealed a zone of high zinc concentration in one bore - 1.1 ft. of massive sulphide at 665.7 ft. containing Sn 1.33%, Zn 38.3%, Cu 1.23%. The drill hole revealed medium to low grade sections of tin but only averaged 0.35% Sn over 3 small sections.

Percussion drill holes revealed no high grade sections, but a number of medium-low grade sections in the ^{range?} large 0.3 to 0.5% Sn were defined over limited thicknesses.

It is recommended that no further work be carried out in this area which is held under Mineral Lease.

(2) Loila Tier Tin Prospect

Along shear planes in the Loila Tier area small veins of quartz and cassiterite occur. The cassiterite occurs massive, as disseminated crystalline aggregates, or encrustations in cavities in a shear zone. These

mineralised shear zones are usually found in the quartzites. Apparently when this competent rock fractured, the breccia developed proved favourable for the deposition of cassiterite from tin bearing solutions.

Also in the area is a 5 ft. wide shear zone carrying arsenopyrite and pyrite in a quartz gangue. This zone is sub-parallel to the tin bearing shear zone. Other excavations in the area have proved small quantities of tin in breccia zones. Along the main shear zone in the area costeaning has revealed the lateral extent of the tin bearing lode, but no depth studies have been carried out. Geochemical sampling of the area by Goldfields Consolidated did not reveal signs of major mineralisation. Until the existing exploration reports have been appraised in detail no further work should be carried out in the area.

(3) Pinnacle Tin Prospect

This consists of surface floaters containing cassiterite. B.H.P. placed percussion drill holes in the area but these proved no mineralisation of significance.

TUNGSTEN, MOLYBDENUM AND BISMUTH OCCURRENCES

Constable's Creek Area

Tungsten and minor molybdenite occurs in quartz veins in the

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joint planes of a granite cupola. The cupola in fact is regularly jointed along directions 105° to 115° .

The main mineralisation consists of small quartz veins of varying thickness occurring along the joint planes. The veins are mineralised to different degrees. Wolframite and molybdenite are the main minerals; scheelite and bismuthinite also occur. (Walker, 1953) with some arsenopyrite and pyrite in a gangue of quartz. The host rock is a mixture of griesen, aplite and muscovite.

From observations most joints in the cupola are filled with quartz, but in one instance minor mineralisation was seen, (arsenopyrite and pyrite) in a quartz vein 15" wide.

Other Areas

In the Wolfram and Fitzgerald Creek areas, veins of quartz carry wolframite, and in some cases also molybdenite. At Wolfram Creek Mine the vein quartz follows a fracture plane which strikes 030° and dips 70° N.W. It has been veined for 500 feet along its length. Several small adits have been placed on parallel quartz veins but no mineralisation encountered. Approximately 1000 bags of wolframite were removed from the mine.

Quartz veins carrying wolframite and molybdenite occurring in the

creek below the Pinnacle have no regular pattern of distribution. They do not appear to follow any joint pattern, but consist of irregular veins of quartz, carrying rich pods of wolframite and minor molybdenite.

East of these workings small veins of quartz carry small amounts of wolframite and usually strike along one of the major joint sets.

COPPER

Nephele Creek Copper Mine (Echo Copper Mine)

In the bed of Nephele Creek an irregular mass of quartz outcrops carrying rich pockets of pyrrhotite, pyrite and some chalcopyrite and arsenopyrite. The joints in the surrounding sediments strike approximately 135° and 050° . The quartz does not appear to have followed either of these features and mining has failed to follow the mineralisation any distance.

Orieco Copper Mine

A mineralised zone can be traced laterally over approximately 2 miles on a N.W. trend by a limonitic gossan. The mined area consists of a group of mineralised veins containing quartz, arsenopyrite, chalcopyrite, pyrite, pyrrhotite and sphalerite, in fissures in the thinly bedded slates. The lateral extent of the ore horizon has been traced. The south east

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it consists principally of galena and pyrite. This deposit is held by other parties and is not recommended for further consideration at this stage.

ZINC

Zinc Lode in the Pyramid Creek Area

A lode of quartz carrying pyrite, sphalerite, galena, chalcopyrite and magnetite was first reported by Twelvetrees in the bed of a tributary of Arm Creek. The minerals occur in a massive sandstone bed which strikes approximately 285°. The Electrolytic Zinc Company placed a borehole on the prospect and no further work is recommended on the area until their reports have been closely examined.

RECOMMENDATIONS ON FURTHER STUDIES

Areas have been selected for further detailed study on the following grounds ,

1. the presence of known mineralisation which although often minor in surface expression may be more promising at depth.
2. (1) favourable geologic features such as an irregular upper surface of the pluton resulting in the development of cupolas and apophyses that would favour localisation of any ores of magnetic genesis from the granite.

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(2) a well developed fracture system in the sediments about the pluton, that may offer conditions favourable for the deposition of ore.

(3) the presence of griesens, aplites and pegmatites which have late stage affinities with ore-bearing solutions.

(4) widespread quartz veining in both the sediments and the granite.

(5) the presence of high-level, "tin granite" and comparison with other regions where its presence has been noted, and its relationship to economic mineralisation in the area is known, such as the Aberfoyle - Storey's Creek district.

Wolfram Creek - Area A

This area is held under lease to Scamander Mineral Development and appears to be the most interesting, as there are a large number of small quartz veins carrying wolframite within the area. Also the fact that it is probably higher above the granite surface than the Constable's Creek Wolfram Mine may mean that the deposits emanate from a central source, with some depth to the veins as above the "aplite" of Aberfoyle. If an option could be arranged further detailed mapping of the area in conjunction with geochemical sampling may give a clearer picture of the prospects of this area. If most quartz veins prove to relate to the one set of joints then drilling at 90° to the strike of the joints would be advisable. If the wolfram-bearing quartz is distributed evenly between the two major sets of joints, then it would be advisable to drill along a line trending at 45° to the strike of both, with the chance of striking a specific target and as joint intersection as well as each joint set.

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Constable's Creek Area - Area B

This area does not appear as favourable as the Wolfram Creek Area as the overlying sediments have been removed to reveal the actual granite of a cupola.

Geochemical sampling of the surrounds of the exposed pluton and the Echo Copper Mine may reveal further mineralisation of the Wolfram Creek type.

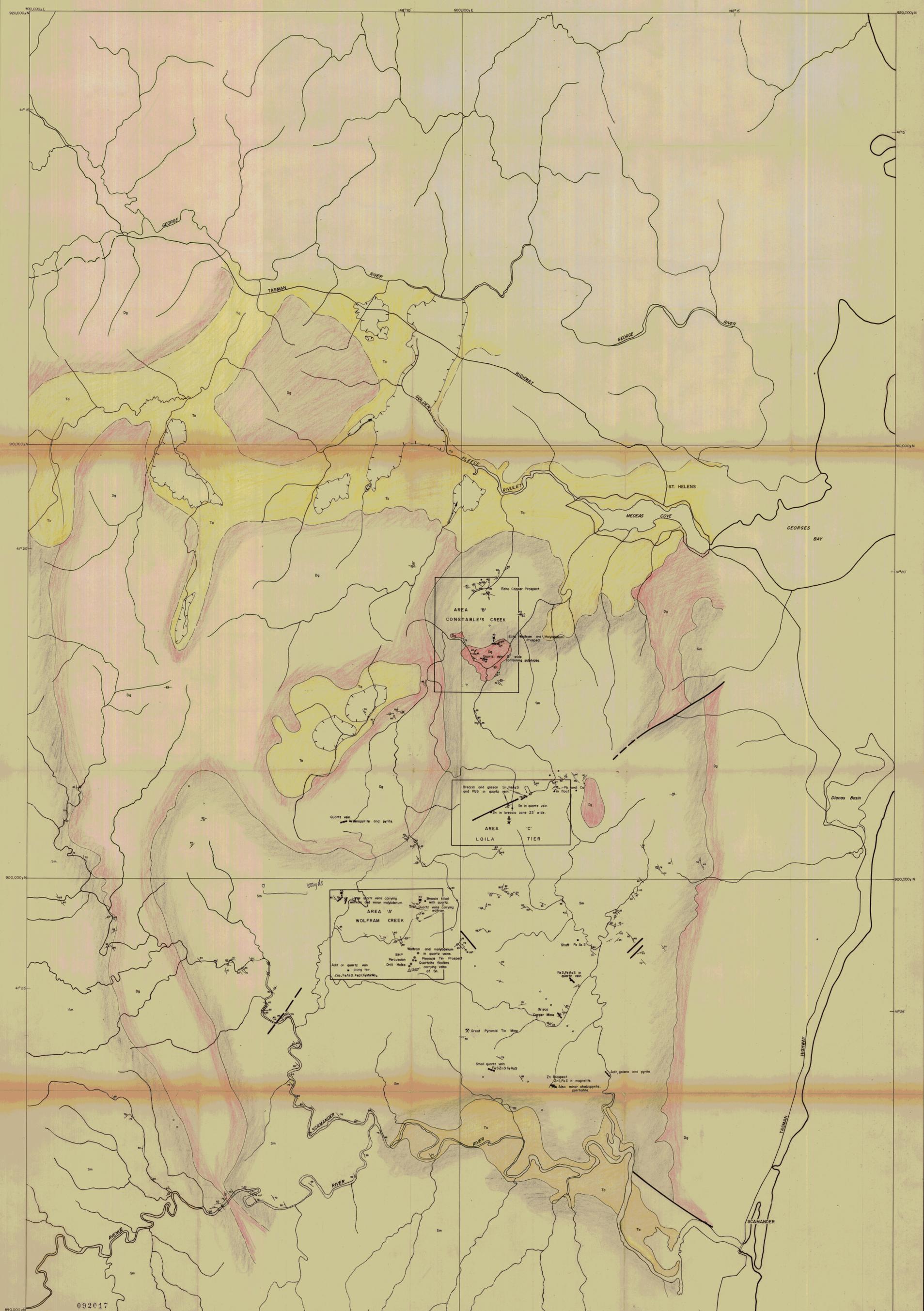
Loila Tier Tin Prospect - Area C

The widespread minor mineralisation along shear zones may become enriched as the granite is approached and may provide a situation similar to the Aberfoyle Mine. Further mapping and drilling in this area is warranted. The New Consolidated Goldfields of Australia Report should also be fully studied and an appraisal made in the light of that companies work.

Drainage Geochemical Anomalies

Full analytical data and its interpretation have yet to be received from our systematic drainage sampling of the Scamander area. Some targets for follow up testing may result from this work.

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GEOLOGIC MAP
OF THE
SCAMANDER AREA EL 6/68, TASMANIA

SCALE: 1:25,000

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LEGEND

Ta Tertiary river gravels

Sd Sediments - Mathinna Group (Scamander slate and quartzite)

Dg Devonian 'granites'

Geological boundary, broken where approximate

Vertical dip

Dip and strike - joints

Vertical joint

Dip and strike - stony cleavage

Vertical stony cleavage

Fault or shear zone, broken where approximate

Ferruginous gossan

Auriferous anomalies

Possible site for diamond drill hole, showing inclination and direction

Alluvial tin workings

Mineralized veins

Shut or edit