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Report EPL-04/160

AN ASSESSMENT OF THE TIN POTENTIAL OF THE CORONET HILL AREA (including EL 10004)

by

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for

ARAFURA RESOURCES N.L.

1:250,000 Mount Evelyn SD 53-5
1:100,000 Ranford Hill

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INTRODUCTION

BACKGROUND

EL 10004 is one of the original tenements included in the initial public offer of Arafura Resources NL. The tenement has been extensively explored for base metals and gold previously with little success. The tin potential of the area was noted by Drummond (2003) in his Independent Consulting Geologists Report for the Arafura prospectus. This report details the work done previously for tin and outlines the potential for tin deposits in the area.

LOCATION & ACCESS

The Coronet Hill area is located about 60 km east of Pine Creek and about 220 km SE of Darwin (figure 1).

Access to Coronet Hill from Darwin, the capital of the Northern Territory, is by the sealed Stuart and Kakadu Highways for a combined distance of 250 kilometres and thence by 20 kilometres of unsealed tracks from the Kakadu Highway to the old mining area.

CLIMATE

The area lies in the tropical monsoon rain belt of northern Australia. Annual rainfall is about 1200-1400 millimetres. The bulk of this falls between December and March. Pre-monsoon tropical storms occur in October and November and can restrict activities temporarily. Virtually no rain falls between the start of May and the end of August. Temperatures range from 20-38°C in summer ("wet season") and 10-30°C in winter ("dry season").

TOPOGRAPHY AND VEGETATION

Topographically the area consists of steep strike ridges, low hills and undulating rubble-strewn rises with a well developed dendritic pattern of drainage. Good outcrop is present along the creeks and on the crests of the ridges, while the hill slopes are covered with a thin veneer of near residual skeletal lithosols and colluvial/elluvial gravels. The rocks are deeply weathered in places. Transported soils are restricted to the main flood plain of the Little Mary River and to the lower portions of the larger tributary creeks.

Vegetation consists of open eucalypt woodland and tall perennial grasses typical of the open savannah of tropical Northern Australia.

QUALIFICATIONS

The author has extensive experience in exploration for tin. He was employed by Carpentaria Exploration Company between 1980 and 1985 to explore for tin deposits in the Northern Territory (Yeuralba and

Maranboy) and North Queensland. The grassroots exploration campaign in North Queensland led to the discovery of the Jeannie River Tinfield (Lord and Fabray 1990). Subsequent exploration in the area proved the existence of a number of zones of primary tin mineralisation and pre-feasibility studies were underway when the tin market crashed in late 1985. The author visited all of the underground tin mines in operation in Cornwall, UK at the time ie: Geevor, Wheal Jane and South Crofty. He has also visited Ardlethan tin mine in NSW and Renison Bell mine in Tasmania, as well as numerous tin and tungsten prospects around Australia.

SUMMARY

EL 10004 is located about 60 km east of Pine Creek on the Mary River Pastoral Lease. The tenement was granted on 19th August 2002 for 6 years and was recently reduced in area to 9 blocks.

The tenement covers a major mineralised structure known as the Coronet Fault which trends NW-SE. The area was mined intermittently for silver, copper and tin between 1888 and 1918. The potential for significant economic base metal mineralisation in the area is considered to be low due to the narrow lodes, the intermittent development of high-grade zones and the presence of significant amounts of arsenic and bismuth in the ore.

Alluvial tin was produced from workings at the Mary River Camp and small amounts of tin were mined at the Ross mine.

Drummond in his Independent Consultants Report for the Arafura Resources NL prospectus noted the potential for tin mineralisation in the area. The recent rise in the price of tin now makes ore deposits of this metal valid exploration targets.

Previous exploration work in the area has been predominantly for base metals and gold. Tin exploration has been intermittent and done as an adjunct to other exploration. The work that has been done showed that significant portions of the Coronet Fault system were strongly anomalous for tin. Values of up to 1.95% Sn were found in rock chips from the outcropping lodes.

No systematic exploration for tin mineralisation has been done over the prospective part of the Coronet Fault system. This report concludes that there is a good chance that a hard rock tin resource will be found in the area. There is also potential for economic concentrations of alluvial tin to occur in the creek at Mary River Camp.

A programme of detailed grid soil sampling and mapping has been recommended for two areas within the Coronet Fault zone. Some work has also been recommended on assessing the alluvial tin potential of Mary River Camp area. [redacted]

CONCLUSIONS

- A ten kilometre section of the Coronet Fault system is strongly anomalous for tin. Most of this zone is located within EL 10004 owned by Arafura.

- No systematic exploration for tin mineralisation has been conducted over the prospective part of the Coronet Fault system.

- There are strong prospects that a hard rock economic tin resource can be discovered in this area.

- The alluvial tin potential is high in Tin Creek where previous extraction of alluvial tin has occurred..

- The zone of tin mineralisation extends to the south into adjoining ground not currently owned by Arafura.

- The three northernmost blocks of EL 10004 have been adequately tested for the presence of tin mineralisation and are not considered to be prospective.

- The base metal potential of the area has been extensively tested by previous explorers. The Coronet Hill lodes contain intermittent zones of high-grade copper, lead and silver, however the presence of high levels of arsenic and bismuth in the ore intersections would lead to problems selling any concentrate produced.

- Extensive exploration of the area has failed to find any significant zones of gold mineralisation. It appears likely that minor gold values occur with the base metal mineralisation in the lodes.

RECOMMENDATIONS

[redacted]

- Conduct systematic exploration for tin over two sections of the Coronet Fault system which have previously returned strongly anomalous tin values.

- Carry out detailed grid mapping and soil sampling to define zones of tin mineralisation within the outcropping lodes at **Zone 1**, which is located within block 6 of EL 10004 and contains a 1.6 km section of the Coronet Fault system. Use the old Aztec grid to control this work..

- Collect soil samples sieved to –40# at 25 m intervals on section lines 50 m apart over the prospective area. Analyse the samples for tin by XRF or ICP-MS. Conduct geological mapping over the extended grid.

- Sample any old workings not previously examined by Aztec and assay the samples for tin.

- Conduct a similar programme to that detailed above over **Zone 2**, which is located within block 9 of EL 10004 and contains a 1.2 km section of the Coronet Fault system.

- Assess the alluvial tin potential of the portion of Tin Creek where the Mary River Camp alluvial workings are located.

[redacted]

- Call a public meeting in Pine Creek in accordance with Condition 18 of Schedule 2 of the grant conditions, prior to the commencement of significant on-ground activities, to explain to registered Native Title Claimants and other stakeholders the proposed exploration activities.

- Conduct a search of the AAPA Sacred Sites register before conducting any significant exploration activities.

- Commission a sacred sites clearance by the Aboriginal Areas Protection Authority prior to undertaking any exploration activity that involves substantial disturbance of the ground away from existing areas of disturbance.

TENURE

MINING/MINERAL RIGHTS

Arafura Resources N.L has title to EL 10004 which covers the majority of the old Coronet Hill mining field. This EL was granted on 19th August 2002 for 6 years and was reduced in area to 9 blocks commencing on the second anniversary date.

[redacted]

LAND TENURE

Background land tenure for EL 10004 is Pastoral Lease (NT Portion 1631) operated as Mary River

This tenement is affected by Native Title Claim DC00/18 Mary River made on behalf of the Jawoyn People which was accepted for registration by the National Native title tribunal on 04/01/01.

ABORIGINAL SACRED SITES

It is not known whether there are any significant aboriginal sites present in the tenement. A search of the AAPA Sacred Sites register should be undertaken before conducting any significant exploration activities.

GEOLOGICAL SETTING

REGIONAL GEOLOGY

Table 1: Stratigraphic Relationships, Pine Creek Inlier
(From Pine Creek 1:100 000 Geological Series Map, BMR/NTGS, 1985, and other sources)

RECENT
Laterite

Unconformity

MESOZOIC
Petrel and Bathurst Island Formation
Mullaman Beds
Unconformity

CAMBRIAN
Daly River Group
Unconformity

MESOPROTEROZOIC
Katherine River Group, Tolmer Group

Unconformity

PALAEOPROTEROZOIC
Mount Davis Granite
Cullen Batholith

TOP END OROGENY - Major episode of deformation and regional metamorphism - 1870-1810 Ma

PALAEOPROTEROZOIC
Finniss River Group
Burrell Creek Formation/Welltree Metamorphics?

South Alligator Group
Mt Bonnie Formation, Gerowie Tuff, Koolpin Formation

Mount Partridge Group
Wildman Siltstone, Mundogie Sandstone

The area is located in the southern part of the Pine Creek Inlier. The inlier contains Early Proterozoic metasedimentary rocks which overlie a gneissic to granitic Archaean basement. The metasediments represent a basinal sequence about 10 km thick which was deformed and metamorphosed during a major structural event (Top End orogeny) between 1870 and 1810 Ma.

The sedimentary rocks consist of shale, siltstone, sandstone, conglomerate, carbonate rocks and iron formation. Felsic to mafic volcanics and tuffaceous sediments also occur in the sequence.

The sedimentary sequence is intruded by pre-tectonic dolerite sills (Zamu Dolerite) and syn- to post- tectonic granitic plutons (Cullen Batholith) and dolerite lopoliths and dykes.

LOCAL GEOLOGY

(italicised from Drummond 2003)

The tenement is predominantly underlain by greywacke, siltstone and mudstone of the Burrell Creek Formation of the Finniss River Group. *There is a dominant NW-SE grain provided by tight folding and parallel fault structures. The Mount Bonnie Formation of the South Alligator Group is exposed in anticlinal cores and in up-thrust blocks. The most economically important of the latter is that afforded by the Coronet Fault system.*

Detailed mapping around the Coronet Hill mines by Aztec Mining Co Ltd has revealed a more complex picture. The mapping showed that *the oldest sediments exposed are carbonaceous and lesser dolomitic mudstones of the Koolpin Formation which are conformably overlain by mudstone. chert and albitic chert of the Gerowie Tuff. Overlying these sediments are mudstones and banded iron formation of the Mount Bonnie Formation, and then the Burrell Creek Formation.*

The Mount Davis Granite (part of the Cullen Batholith) *intrudes the sequence and the nearest edge of the granite is about two kilometres south-west of the main Coronet Hill workings.* The pluton consists of medium to coarse grained biotite leucogranite and coarse porphyritic biotite leucogranite. The granite is altered with chloritisation of mafic minerals, Greisen, quartz veins and stockworks are common. *It is interpreted from geophysical evidence that depth to granite basement under the area is quite shallow.* The contact aureole of the granite extends into the mineralised zone and the rocks are affected by the albite-epidote hornfels metamorphic zone.

MINERALISATION

The Coronet Hill area is located within the Cullen Mineral Field (Stuart-Smith et al 1993).

Base metal and silver mineralisation at Coronet Hill is contained within a number of parallel sulphide-bearing quartz veins which occur within the Coronet Fault system. The veins strike NW-SE and generally dip steeply to the SW, and were mined between 1888 and 1918 over a strike length of about 4 km. Ore shoots within the veins varied in thickness from 0.3 to 3.5 m and plunged to the southeast in the plane of the structure. The primary ore contained chalcopyrite, covellite, enargite, cuprite, arsenopyrite, pyrite, pyrrhotite, tetrahedrite, galena and minor sphalerite. On the surface the lodes consisted of quartz, massive scorodite and gossan (Stuart-Smith et al, 1988).

Lode and alluvial tin was produced from the Mary River Camp. Production between 1910 and 1913 was mainly from alluvial concentrations in the creeks, but some mining was done on cassiterite-bearing quartz veins which were probably the source of the alluvial deposits (Stuart-Smith et al, 1988). Minor amounts of tin were produced from quartz-tourmaline veins at the Ross Mine. The veins were about 0.3 m wide and contained cassiterite, arsenopyrite and chalcopyrite and trended NW.

The main types of hydrothermal tin deposits found in the Cullen Mineral Field have been described by Stuart-Smith et al (1993). Generally the tin deposits occur within the contact aureole of the granite batholiths and are concentrated between 500 and 1000 m from granite contacts. Minor tin mineralisation is also found within the granite. Most of the tin deposits occur within massive or brecciated quartz veins either filling faults (as is the case at Coronet Hill) or within major shear zones. Cassiterite occurs with pyrite and commonly arsenopyrite and chalcopyrite within the lodes. Other sulphides, wolframite, scheelite, gold, silver and tourmaline have also been found associated with tin mineralisation.

PREVIOUS INVESTIGATIONS

MINING

The history of mining in the area is not well documented.

An early mention of Coronet Hill is given in Jones (1987) who relates that there was an attempt to float the Coronet silver mine in 1888. So there was undoubtedly prospecting activity in the area at this time. A further mention of the area by Jones (1987) relates that, "some thirty-five miles east of Pine Creek, a Darwin syndicate took up the old Coronet Hill silver-lead-copper mine, last worked by Millars (who had tried to float it in 1888), and deepened the shaft with Government assistance during 1912. In the same year, A.Kelly (Kelly's lode?) spent four months in the Territory inspecting mines on behalf of a Victorian syndicate and selected the Coronet Hill property. Huts for a manager and men, store, blacksmith's shop, headgear, pump and engines were erected, all with Government subsidy, and development proceeded until 1914, when the mine closed due to a heavy flow of water. The following year some funds were accumulated by shipping high-grade ore to Port Kembla. In 1918 a pump was installed and mining resumed, about 60 tons of rich copper ore being shipped south each month. .... there were problems in getting enough teamsters to cart the rich ore to the railway, funds became exhausted and the mines closed."

The Coronet Hill lode, which has the longest lengths of massive gossan and scorodite in outcrop, provided the majority of the past production of copper ore. The workings are described in Crohn (1968), and consisted of two adits from which about 300 m of drives and cross-cuts were driven and at least eight shafts, of which the deepest was about 40 m. The lodes averaged less than one metre in width with occasional thicker sections to 3 m. The copper grade probably averaged about 5% with some enriched zones grading up to 16% Cu and 1225 g/t Ag. Less than 250 tonnes of ore grading about 22% Cu and 550g/t Ag were extracted in the period 1916 to 1918. Small amounts of tin were mined from the Ross Mine. More extensive alluvial workings at the Mary River Camp had a total production of 46 tonnes of tin concentrate between 1910 and 1913.

EXPLORATION

Drummond (2003) has detailed the previous exploration conducted in the area in his report for the Arafura Resources NL prospectus and the section on Coronet Hill is reproduced in appendix 1. As most of the work done previously was aimed at the base metal and gold potential of the area it is not directly relevant to the current investigation.

Previous exploration for tin in the area has been intermittent and generally done as an adjunct to work on gold and base metal mineralisation. The recent rise in the tin price has reawakened interest in tin deposits as exploration targets.

Australian Coal and Gold Holdings in joint venture with Troy Resources Ltd explored EL 4498 in the period 1985 to 1991. The work was aimed at discovering tin, gold, uranium or diamond deposits. Early work included a stream sediment survey, rock chip sampling and geological mapping. The Mary River Camp tin workings were investigated. This work indicated that the tin mineralisation occurred in a complex system of quartz-tourmaline and quartz veins, and granite dykes. Bulk sampling for tin was undertaken but was unsuccessful. Unfortunately the report on this early work is no longer in the NT Mines

Department library, so this work cannot be corroborated or checked on the ground. Later work by the joint venturers included drilling 18 RC percussion holes on the Coronet Hill lode systems, unfortunately the samples were not assayed for tin.

The most extensive exploration for tin in the area was conducted by Aztec Mining Company Ltd (Aztec), who held a number of exploration licences and mineral claims covering the majority of the field in the period 1990 to 1998. The reports on this exploration work are referenced as Butler, 1993, Butler, 1994a and 1994b, Socic 1997 and Williams 1998. A digital copy of these reports may be found in Appendix 2. Although the exploration was predominantly for base metals and gold, most of the stream sediments and rock chip samples were analysed for tin and tungsten.

In 1991 and 1992 extensive detailed –40# stream sediment surveys were carried out by Aztec over all of the mineral field and its extensions to the north-west and south-east. Most of the samples were analysed for tin and tungsten, except for a zone centred on the main mineralised area which was sampled in 1991 but not analysed for tin or tungsten.. The tin results (Sn ppm) from the stream sediment surveys are shown on plates 2 to 6. The surveys defined strongly anomalous creeks (peak values of 5963 and 6567 ppm Sn) draining portions of the Coronet Hill mineralised zone.

The area of greatest interest lies outside of EL 10004 within block "C" (see figure 2). This area was chip sampled by Aztec and there were wide zones of strongly anomalous tin values (peak values of 9323, 8752 and 7635 ppm Sn over 10m sample widths). Old workings and costeans are shown on Aztec's plan of the area (see plates 7 and 8) and it appears likely that this is one of the areas previously tested by Australian Gold and Coal Holdings in the mid 1980's. There has been no drilling done in this area. No assay data is available for the costeans, however Drummond (2003) notes in his report that *"Drummond made personal enquiries of Aztec's past project manager and it seems that a key report is no longer present in NTDME. In it was described some ?Aztec costeans in which the Sn and W were assessed and found to be confined to the gossanous intervals. Moreover, apparently the gossans "mushroom" laterally at surface and are generally considerably thinner at a metre or so of depth".*

Aztec chip sampled the entire Coronet Hill lode zone at a nominal 30m spacing (see plates 4 and 5) and found considerable lengths (from 200 to 500m) of highly anomalous tin and tungsten values (peak assays of 1.95% Sn and 2.85% W).

The regional stream sediment survey showed that the ground to the north of the main mineralised zone was not anomalous for tin with the creeks generally carrying <5 ppm Sn (blocks 1, 3 and 5 of EL 10004). Anomalous creeks (values of 90, 185 and 2988 ppm Sn) draining from the vicinity of the Mt Davis Granite are of interest (see plates 1 and 3) and this area was not adequately tested by the survey. This area is south of EL 10004 and is shown as blocks "A" and "B" on figure 2. Weaker tin anomalies occur on the north western extension of the mineralised zone in block 2 of EL 10004 (see figure 2).

Aztec drilled 5 holes on the Coronet Hill lodes. Two diamond holes drilled in 1991 on MLN 20 targeted an EM anomaly and were weakly anomalous for tin and tungsten (peak values of 380 ppm Sn and 1350 ppm W over 1 metre in CH2). Three further diamond holes (CH3, 4 and 5) were drilled in 1992 on other parts of the mineralised zone. Peak tin and tungsten values for these holes were found in hole CH5 with 100 ppm Sn and 4800 ppm W over 0.5 metres. The results from the drilling are not particularly encouraging, however the portions of the lodes known to carry higher tin and tungsten values were not specifically targeted.

ASSESSMENT AND PROPOSALS FOR FURTHER INVESTIGATION

The Coronet Fault system is associated with anomalous tin values in stream sediments and rock chips for 10 km of strike length. A tributary of the Mary River, called "Tin Creek" for the purposes of this report (figure 2), reported anomalous tin values wherever it was sampled from its headwaters to its junction with the Mary River, a distance of 15 km. These are substantial anomalies and compare favourably to other tin prospects with which the writer has been involved. Alluvial tin has been produced from a section of Tin Creek. No systematic exploration for primary tin mineralisation has been done over the 10 km of the Coronet Fault system which appears to be prospective. There is a good chance that an economically significant hard rock tin resource can be discovered in this area. Some work should also be undertaken to assess the alluvial tin potential of Tin Creek.

The main targets for tin exploration at Coronet Hill are the major vein systems which have been defined by previous work. Quartz vein stockworks developed over granite cusps may also be present in the area and would be a good exploration target. It seems unlikely that substantial greisens occur, however it has been conjectured that granite occurs at shallow depth below the Coronet Hill area therefore this type of tin deposit may occur and should be kept in mind.

The extended length of the possible tin mineralised zone means that further exploration should be targeted on those portions of the mineralised veins which have reported anomalous tin values during previous exploration. Two particular zones appear to be worthy of further study.

Zone 1 is located within block 6 of EL 10004 and contains a 1.6 km section of the Coronet Fault system. Tin mineralisation occurs on both sides of and within the structure. Chip sampling by Aztec (plate 7) of the main structure gave peak values of 1498 and 3252 ppm Sn. Parallel lodes to the south west of the main structure were sampled by Aztec and carried tin values of up to 8750 ppm. This area is outside of EL 10004, however the lodes trend into the ground held by Arafura and there are some old costeans shown on the plan within Arafura ground. This portion of the mineralised trend was not tested by Aztec. Detailed grid mapping and soil sampling to define the zones of tin mineralisation within the lodes should be done initially to explore this zone.

Zone 2 is located within block 9 of EL 10004 and contains a 1.2 km section of the Coronet Fault system. Chip sampling of the main Coronet Hill lode showed anomalous tin values over the entire section of the structure in this area, with peak values of 9400 ppm, 9600 ppm and 1.95% Sn. A parallel lode about 450 metres to the north east of the main structure gave values of 1.2%, 1.63% and 2.9% Sn. This area has been mapped in detail (see plate 9) and numerous structures are shown on the plan. Detailed grid soil sampling should be done to define tin-bearing lodes with follow-up by drilling.

[redacted]

The main potential for alluvial tin is in block 4 of EL 10004 where the Mary River Camp alluvial workings are located. Australian Coal and Gold Holdings reportedly tested this area in the mid 1980's by

bulk sampling but were not successful in proving an economic resource. It should be remembered that the tin price collapsed around this time and this may have affected the outcome of their assessment. Alluvial tin can be hard to quantify and it is proposed that a programme of detailed stream sediment sampling, excavator pitting and panning followed by aircore drilling if required should be undertaken along Tin Creek where the previous workings are located. This work could be extended upstream if the initial work proves successful.

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Appendix 1

Andrew Drummond & Associates Pty Ltd

Independent Consulting Geologists Report

THE CORONET HILL PROJECT

Introduction

Arafura's EL10004 is an application, and it covers the old Coronet Hill Cu and Ag mining field some 60 kms east of Pine Creek. A stepwise western boundary of the tenement allows access to the majority of the target Coronet Hills Fault. The eastern boundary is the Little Mary River. This Project is not to be confused with the major Au-Pt discovery (as yet undeveloped for political reasons) at Coronation Hill. The latter lies some 25 km NE on a parallel fault zone.

Geology

The district geological framework is provided by the BMR/NTDME Ranford Hill 1:100 000 sheet. Within the tenement area, there is a dominant NW-SE grain provided by tight folding and parallel fault structures. Most of the tenement is underlain by the slaty to phyllitic mudstone, siltstone and greywacke of the Burrell Creek Formation. The underlying Mount Bonnie Formation of the South Alligator Group is exposed in anticlinal cores and in up-thrust faulted blocks. The most economically important of the latter is that afforded by the Coronet Hills Fault system.

However, detailed mapping around the Coronet Hills mines by Aztec Mining Company Limited has revealed a more complex picture there. It found that the oldest sediments exposed are carbonaceous and lesser dolomitic mudstones of the Koolpin Formation, which are conformably overlain by mudstone, chert and albitic chert of the Gerowie Tuff Formation. Overlying these sediments are mudstones and BIF of the Mt Bonnie Formation, and then the Burrell Creek Formation.

The Mt Davis Granite intrudes the sequence and the nearest edge of the granite to the tenement is about two kilometres south-west of the main Coronet Hill workings. It is interpreted from geophysical evidence that depth to granitic basement under the tenement is quite shallow.

Topographically the area consists of low hills and undulating country with a well developed dendritic pattern of drainage. Good outcrop is present along the creeks and on the crests of the ridges, while the hill slopes are covered with a thin veneer of near residual skeletal lithosols and colluvial/eluvial gravels. Transported soils are restricted to the main floodplain of the Mary River and to the lower portions of the larger tributary creeks. These conditions apparently provide excellent media for geochemical exploration.

Mineralisation and the Mines

Base metal (Cu, As, lesser Pb, Bi and Zn), Sn, W and precious metal (Ag ± Au) mineralisation occurs in the Coronet Hill area. It is structurally controlled and occurs in a number of sulphide bearing veins within lodes over a strike length of over 4 kms. The area was originally mined for Ag then later for Cu and Sn. According to Ruxton and Shields (BMR Record 1962/31) and the NTGS Mineral Deposit Series - Mt Evelyn, the mineralisation is fault-controlled and fault parallel.

Two outer sets of quartz-tourmaline veins, named the Eastern and the Western Lodes, converge north-westerly towards the main Coronet Hill Fault and enclose a central set of sulphide-bearing veins. Five of the sulphide-bearing veins overlap each other and are arranged en echelon over the length of the field. The sulphide-bearing veins also converge north-west, and the Main Lode and Kelly's Lode join into a composite quartz-tourmaline, sulphide-bearing vein named the North Lode. With few exceptions all the mineral veins dip steeply in a south-westerly direction. Although the quartz-tourmaline veins can attain thicknesses well in excess of a metre, they are commonly less than 30 cm. Much of the North Lode is in

siltstone: Kelly's Lode is on the boundary between siltstone and chert: while most of the Main Lode, Coronet Hill Lode and South Lode are within chert. These lodes are usually straight and regular, consisting of silicified chert (or siltstone) and vein quartz with local developments of massive scorodite (an iron-As oxide) or gossan.

Past production of Cu ore came entirely from the Coronet Hill Lode: 252t of 22% Cu and 550 g/t Ag from a swell in the lode at No. 2 Adit, and 27.5t of 18% Cu from a swell in the lode at South Extended Shaft. In outcrop the longest lengths of rich gossan and massive scorodite are found on the Coronet Hill Lode. Mineralisation is both primary and secondary. A grade of 5% Cu is indicated by the available data. Scorodite occurs prominently at the surface.

Sn has been worked on a small scale at the Ross Mine near the Coronet Hill Copper Mine and at the Mary River Camp Mine. The geological setting of the Sn mineralisation is very similar to that of the Cu -Pb-As mineralisation.

Past Exploration

(a) Early Government Investigations

In 1919 Dr Jensen, the Chief Geologist of the Home & Territories Department of the Commonwealth visited the district and in his report (Bulletin of the Northern Territory, No 19, 1919) he praised the potential of the Coronet Hills area, advocating it as a site for a smelter to service the mines of the district and recommending a light railway connection to Pine Creek.

In 1951 (McDonald, Report GS 51/2) the NTGS recommended exploration of and development on the lodes.

In 1962 (Ruxton & Shields, Record 1962/31) BMR mapping and appraisal of the vein systems was carried out and a drilling programme was promoted but apparently not carried out.

Finally, in 1982 (Crohn, BMR Bulletin 82) the investigations to that date were summarised. He noted that :

> "The workings extend intermittently over a total length of about 2½ miles, and consist of two adits from which about 1000 feet of drives and cross-cuts have been driven, and at least eight shafts, of which the deepest is about 120 feet. Most of the work appears to have been done between 1916 and 1918.
>
> The lodes average 2 to 3 feet thick, with occasional bulges up to 10 feet, but assay values are very erratic. Of a group of 35 samples taken in 1961, 12 gave assays of over 5 percent Cu. 20 contained 8 to 30 oz Ag per ton, and 2 contained over 15 percent Pb (Ruxton & Shields, 1962, unpubl.). Pyrite and arsenopyrite are always present in the primary ore, and scorodite (iron arsenate) commonly occurs in the oxidised zone. Au is generally low (less than 1 dwt per ton), but up to 0.7 per cent Bi and traces of antimony may be present."

(b) United Uranium N L, 1967. CR67-049

UUNL was able to secure tenure not only over Coronet Hill, but also other fields in the district and revisited the idea of a central treatment plant. Using known parameters of the Coronet Hill field, including a postulated productive length of 3000', a width of 3', a mineable depth of 3000', an in situ Cu grade of 5%, and allowing for low grade material to be left as pillars, mining dilution etc, UUNL postulated that 3.8 million tons of 4.2% Cu and 12 ozs Ag/ton material might be found, mined and milled. A drilling programme to delineate reserves was proposed, but apparently not carried out.

(c) Geopeko, 1981

A report on Geopeko's work was not able to be sourced from the NTDME by Drummond, and the number of the mining title is unknown. However, other subsequent explorers refer to Geopeko's work and this summary is taken from them.

The area was explored in 1981 by Geopeko as part of a large regional programme searching for Mt Bonnie stratiform base metal style mineralisation associated with Gerowie Tuff and Mt Bonnie Formation of the South Alligator Group. They concluded that a significant tonnage of ore grade material may be present at Coronet Hill and that the Gerowie Tuff was prospective for stratiform base metal mineralisation: however the target was not considered worthy of exploration at the time.

(d) Australian Coal & Gold Holdings Ltd and Troy Resources Ltd (1985-1991) EL4498 CR88-147, 89-341, 90-523, 91-008

EL4498 originally covered all of the area now Arafura's EL10004. Initial target commodities included Sn, Au, U and diamonds. Its early exploration consisted of gridding; detailed geological mapping; rock chip sampling; stream sediment sampling with geochemical analysis of the fine fraction and mineralogical examination of the coarse, heavy mineral fraction; and an airborne magnetometric/radiometric survey.

The Mary River Camp Sn occurrences were gridded and geologically mapped. This indicated a complex system of quartz-tourmaline veins, quartz veins and granite dykes with associated Sn mineralisation. Sn values of up to 3.3% resulted from sampling of shallow prospecting pits.

By the third year, a low density BLEG Au sampling programme located two weak anomalies within the EL10004 area. Bulk sampling for Sn at Mary River Camp was unsuccessful.

In 1988 - 1989, the joint venturers undertook a rock chip sampling programme over gossanous cherts over a strike length of 900 m, with the cherts occurring about 500 m north-east of the Coronet Hill line of lode. Assays peaked at 1.54% Pb, 1910 ppm Zn and 37.5 ppm Ag. Drilling follow-up was proposed but not undertaken.

Prospecting and gossan or rock chip sampling were carried out on the main Coronet Hill line. Eight RC holes for a total of 427 m were drilled into the best prospects. Three holes were drilled at Kelly's Lode, two at South Shaft and two at South Extended Shaft. The eighth tested a small gossan zone about 100 m west of Kelly's adit.

The drilling beneath the gossan outcrops intersected massive and disseminated sulphide mineralisation consisting dominantly of arsenopyrite and pyrite. The zones of massive sulphide were thin (1.0 to 1.5 m

true thickness). Best values of economic significance were in MRRC - 16 which gave 2.96% Cu, 0.6% Pb, 0.7% Zn, 0.9% As and 6.9 oz/t Ag over a 5 m down-hole interval and 1.5 m true width.

(e) Mineral Resources Corporation Pty Ltd and Kakadu Resources N L (1988 - 1990) EL5220. CR90-166

The tenement was originally assessed by a 55 sample stream BLEG survey

During the second year, 84 soil samples and 24 rock chip samples were taken in the northern parts of the tenement and along the north-western extent of the Coronet Fault. No near surface indication of extensive economic mineralisation was found.

(f) Aztec Mining Co Ltd, Dominion Mining Limited, Territory Goldfields N L and Northern Gold N L (1990 - 1996) EL7481. CR93-738, 94-869, 95-803, 96-861

This tenement generally lay north-west of EL10004. Detailed stream sampling of -40 mesh material was carried out, with a sample 170 - 250 metres apart in all streams draining off or alongside the Coronet Hill Fault. Although Drummond considers that BLEG analysis is a preferred technique, the very detailed sampling pattern (73 samples in a three square kilometre block) would have overcome any relative inefficiency of the higher threshold analytical technique used. The north-western extent of the Fault was not found to be anomalous. Lead and Sn stream anomalies were confined to the historically mined areas.

Dominion then carried out a lag sampling programme on a 200 m x 700 m basis, apparently without success. In the final year, Northern Gold undertook a 500 m x 100 m soil BLEG programme for Au, As and base metals, covering the Coronet Fault and east of it. The results were discouraging. Although this EL covered only one block of EL10004, it did cover a strike length of two kilometres of the Coronet Fault 8 kms north-west of the main workings. The repetitive and intensive geochemical campaigns can be regarded as having eliminated any chance of near surface mineralisation in that block.

(g) Aztec Mining Co Ltd, Normandy Metals Ltd and Northern Gold NL (1992 - 1996) EL7740. CR93-379, 94-514, 94-576, 96-445

This tenement covered only the most south-easterly block of EL10004. A first pass rock chip programme found significant Pb, As and Sn anomalies associated with the south-eastern end of the Coronet Hill Fault, and a second parallel zone some 400 m south-westerly - and beyond EL10004. Stream BLEG Au values were not anomalous. The area common to EL7740 and EL10004 was relinquished without further work. It seems to Drummond that there is still remnant potential in this ± one sq km part of a block - although probably not much more than for any other part of the Coronet Hill system.

(h) Aztec Mining Company Ltd and Normandy Metals (1991 - 1994) EL7773. CR93-525, 94-668

EL7773 again only coincides with EL1004 over one block - this one being diagonally south-east of the one comprehensively surface tested in EL7481. A very detailed stream sediment programme, at a sampling density of ±16/sq km, was completed. The stream sediment analysis revealed a broadly

coincident area of anomalous Pb and Sn that is located over and adjacent to the Coronet Hill Fault zone. The anomalous Pb (>100 ppm) occurs over a strike length of 1.3 km with a maximum level of 322 ppm. Cu, Zn, Ag, As, Bi and Au were at background levels.

In the second year, a small rock chip programme and a single soil sampling traverse verified that the source of the anomalies was the Coronet Hill structures. Apparently no further follow-up work was undertaken.

(i) Troy Resources, Aztec Mining Co Ltd and Northern Gold N L (to 1992) EL6391

EL6391 was originally held by Messrs Young & Woodbridge, and exploration was carried out by Troy Resources N L in conjunction with work on EL4498 (see (d) above). Troy undertook mapping and rock chipping programmes concentrating on the Coronet Hill Fault zone, as well as undertaking the EL4498 drilling programme discussed above.

This work revealed the Coronet Hill area is geochemically highly anomalous and defined a coincident Pb and Sn stream geochemical anomaly that required follow-up exploration. A metal zonation was recognised and areas with high base metals but low As were indicated. Anomalous areas were pegged with Mineral Claims in order to carry out further exploration (see Section (j)).

(j) Aztec Mining Co Ltd, Troy Resources N L and Northern Gold N L (to 1998). Mineral Claims N4076 - 4079 and 4088 - 4103 and N20. CR94-877, 97-597, 98-408

This area was originally part of EL6391 which had been explored by Troy. In order to maintain tenure over core ground in the face of statutory EL partial relinquishment requirements, the area was pegged with Mining Claims. In 1993, Aztec undertook gridding, mapping, detailed stream sediment sampling, gossan rock chip sampling and follow-up diamond drilling. The mapping was detailed, and supported the close spaced stream sediment sampling (125 samples at 300 - 400 m spacing in all drainages along and off the Coronet Hill Fault). The gossans were systematically rock chipped at intervals of 30 - 40 m.

A transient electromagnetic (TEM) survey was carried out at Coronet Hill using 25 traverses of about one kilometre in length, and spaced 100 m apart. Several conductors were revealed, located above a consistent deeper conductor, which was present over the entire length of the survey grid. Of the shallower conductors one is prominent. It was tested by two diamond holes within MLN 20 but they indicated that the conductors were carbonaceous black shale. Hole CHD2 returned 1.8% Cu and 7.2% As over the interval 264 - 266 m.

CHD 3/3A were targeted to test Coronet Hill structures in albitic chert beds below a strong Zn, Pb and Cu rock chip anomaly. Thin sulphide veinlets with galena, sphalerite, chalcopyrite and arsenopyrite were intersected however there were no economically significant grades. CHD4 was targeted to test down dip from gossan developed on the surface in a shear link structure between Kelly's Lode and Main Lode. The hole was abandoned at 151 m as it had become too steep. A second hole, CHD 5, was collared close-by and was drilled to test the same target. Narrow sulphide filled veins (predominantly pyrite and arsenopyrite) were intersected throughout the hole, but with no encouraging assays.

Aztec generally concluded in 1994 that :

- The Coronet Hill mineralisation is polymetallic and there is good potential to locate areas of significant mineralisation with the lower penalty metals (i.e. As and Bi).
- A lateral mineral zonation was revealed.
- The EM conductive anomalies are caused by carbonaceous mudstone, however there are discrete subtle responses that could reflect sulphide mineralisation and still require explanation.
- The mineralisation style is similar to Aztec's then-producing base metal mine Woodcutters. It occurs in dextral (right hand movement) strike slip faults and is best developed in northerly trending shear link structures that cross cut the north west trend.
- The diamond drilling revealed wide alteration zones although the base metal sulphide-filled veins are only thin (<1 m).
- Geological mapping and airborne magnetics indicate the Mt Diamond granite shallowly underlies most of the mapped area.

In 1996 and 1997 Northern Gold undertook a detailed soil sampling programme. Lines were spaced at 400 m; samples were collected every 25 m and composited to 100 m. They were assayed for BLEG Au, As and for base metals and volatile elements. Low level Au mineralisation was indicated with spot highs of 6.6 ppb and 4.9 ppb. The tenements were relinquished in 1998.

(k) Dominion Mining and Minotaur Gold N L (1994 - 1996), EL8486. CR95-209, 96-193, 96-588

This tenement covered all but the southern portion of EL10004. The tenement was initially subject to a lag geochemical sampling programme. A number of weak zones of Au and incoherent base metal anomalies resulted. Follow-up was a low key reconnaissance soil sampling and rock chip sampling programme which did not provide any encouragement.

The companies also held tenure near the Moline field and found the Coronet results fared poorly in comparison. The tenement was relinquished.

Overview of Past Work

Successive waves of geochemical sampling, combined with mapping in this area of good outcrop, have clearly defined the target base metal and silver zones. Although drilling has been limited, the dozen holes to date have not indicated any reason to believe that the thin mineralised lodes seen at surface may thicken to more economically encouraging widths at depth.

To the east of the Coronet Hill Fault, the surface geochemistry has indicated anomalous - but relatively poorly so - Sn and base metal responses. They remain to be drilled.

Although the more favoured BLEG Au analytical technique has not been widely used, the data density with other techniques is such that it seriously downgrades the likelihood of discovery of a Au deposit within the tenement. Drummond cannot see any evidence that would lend strong support for a search for a higher tonnage/higher grade style of mineralisation such as a Mt Bonnie stratiform polymetallic deposit or a volcanogenic or SEDEX type.

The Sn and W in the lodes may well be a profitable exploration avenue as there are long identified zones in the mineralised structures at a combined grade of interest. Tonnage would be the key and this would likely require the presence of Sn and scheelite laterally into wall rock. There is no evidence in the reports reviewed to indicate that this could not be the case. However Drummond made personal enquiries of Aztec's past project manager and it seems that a key report is no longer present in NTDME. In it was described some Aztec costeans in which the Sn and W were assessed and found to be confined to the gossanous intervals. Moreover, apparently the gossans "mushroom" laterally at surface and are generally considerably thinner at a metre or so of depth.

Overall, the Coronet Hill mineralised system is inherently interesting because of its length, grades and polymetallic nature. However, surface investigations of it have been intense, and outcrop is good. Drilling density is very low for a system of this size, but results have been disappointing, allowing little cause for optimism that mineralisation widths and/or grades would improve at depth.
While a thorough compilation of all historic work is certainly justified, unless targets for superior mineralisation positions can be generated, the only way to assess base metal potential may be an extensive - and expensive - drilling programme.

The Sn and W potential does not appear to have been as strongly assessed in the past as the Au and base metals, and their combined grades are often economically interesting. Drummond considers that they may offer the best potential. In view of the detailed and repetitive programmes which unsuccessfully sought Au, there seems little chance of discovery of a Au deposit that has any significant surface geochemical expression.

EL 7481

RELINQUISHED AREA

EL 7481

RELINQUISHED AREA

COLONEL FAULT

EL 10004

TIN CREEK ALLUVIAL TIN

EL 7473

EL 7240

COLONEL FAULT

AREA RELINQUISHED END YEAR TWO

MARY River

LUIS River

> 1000
> 500
> 100
> 50

Area mapped and detailed rock chipped/stream sediment completed 1991.

EM survey 1991

AREA I Detailed Rock Chipping 1993

CR2005 0330

0 500 1000 1500m 2km

Aztec Mining Company Ltd

LITTLE MARY PROJECT
EXPLORATION SUMMARY

PROJ. NAME: LITTLE MARY	NO.
PLATE 1	Enclosure 1
COMPILED: I.K.Buller	SCALE: 1 : 25,000
DRAWN: M.C.B.	DATE: FEB. 1994

CR2005 0330

Eupene Exploration Enterprises

	Init	Date
Geologist	TGS	
Drawn		
Checked		
Approved		

AZTEC MINING LIMITED

EL 7481

Stream Sediment Sample Locations

File : LMTGS

Scale : 1 : 10000

Date : 13 Sep 1992

PLATE 2

8492000 N

8490000 N

8488000 N

8486000 N

206000 E

204000 E

202000 E

200000 E

198000 E

TIN CREEK

Woodcutters Mine

0 250 500m

	Init	Date
Surveyor	WB	8/93
Drawn	MCB	9/93
Checked		
Approved		

LITTLE MARY PROJECT
SAMPLE LOCATION PLAN
EL 7773

File : EL7773
Scale : 1 : 5000
Date : 07 Sep 1993
Enclosure I PLATE 3

8485000 N
8484000 N
8483000 N
8482000 N
209000 E
208000 E
207000 E
206000 E
205000 E
N
EL 7773

CR2005 0330

Eupene Exploration Enterprises

	Init	Date
Geologist	Mav	
Drawn		
Checked		
Approved		

AZTEC MINING LIMITED
Little Mary Structure
Sample Location Plan - Sheet 1/2

File : LMSLP2
Scale : 1 : 5000
Date : 04 Sep 1992
PLATE 4
Enclosure 6

8482000 N
212000 E
210000 E
208000 E
8480000 N

EL 6391
MCN 4097
MCN 4078
MCN 4376
MCN 4094
MCN 4077
MCN 4088
MCN 4093
MCN 4076
MCN 4377
MCN 4379
MCN 4089
MCN 4092
MCN 4380
MCN 4090
MCN 4091
MCN 4095
MCN 4382
MCN 4381
MCN 4389
MCN 4390
MCN 4383
MCN 4387
MCN 4388
MCN 4384
MCN 4386
MCN 4385

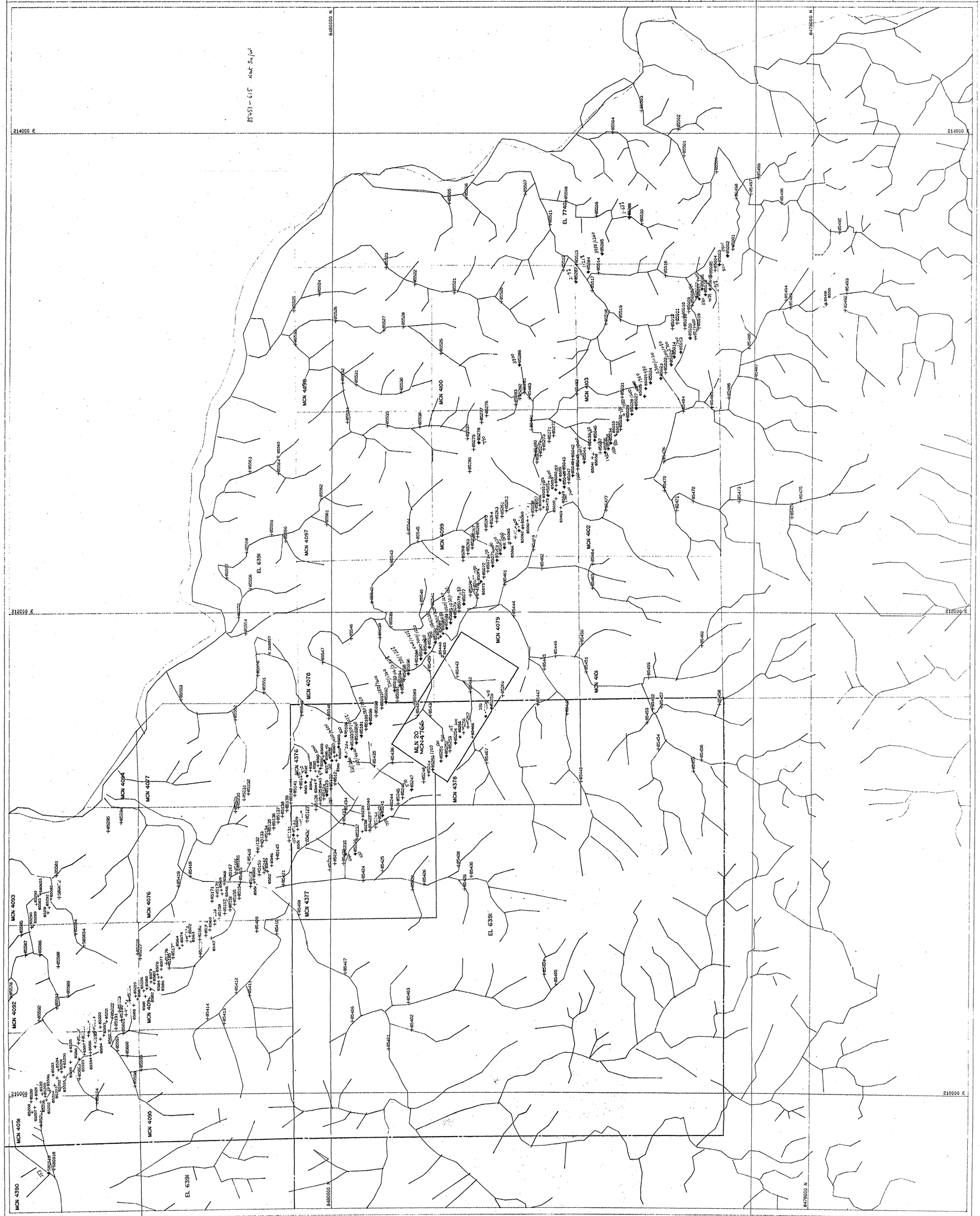
CR2005 0330

Eupene Exploration Enterprises

	Init	Date
Geologist	Maw	
Drawn		
Checked		
Approved		

AZTEC MINING LIMITED
Little Mary Structure
Sample Location Plan · Sheet 2/2

File : LMSLP1
Scale : 1 : 5000
Date : 04 Sep 1992
Enclosure # PLATE 5



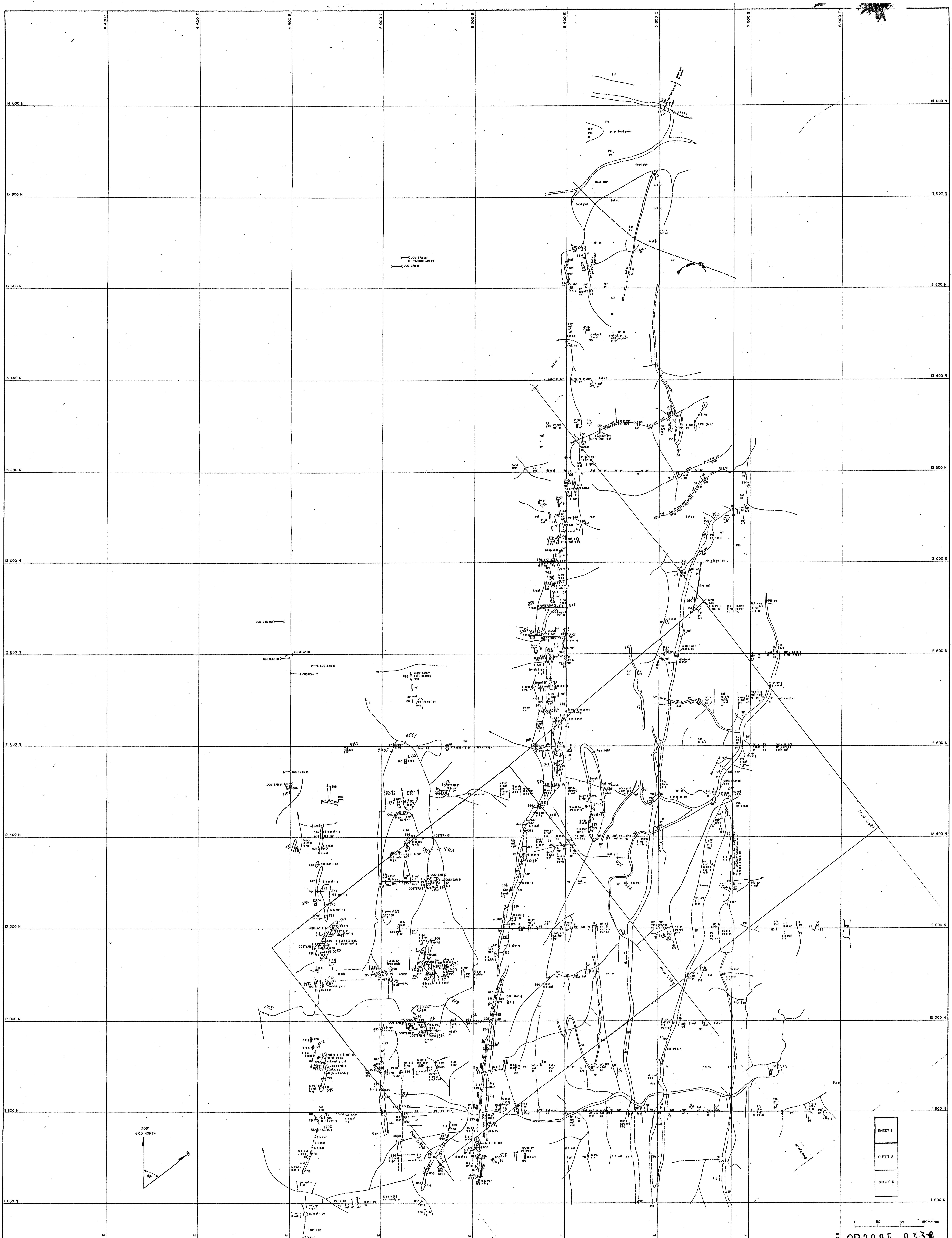
Woodcutters Mine

	Int	Date
Surveyor	JKB	
Drawn		
Checked		
Approved		

EL 7740 - LITTLE MARY PROJECT
STREAM SEDIMENT SAMPLING
SAMPLE LOCATION PLAN

File : EL7740
Scale : 1 : 5000
Date : 14 Apr 1993
Enclosure I Plate 6

213000 E
214000 E
215000 E
216000 E
8480000 N
8479000 N
8478000 N
8477000 N
8476000 N



———	geological boundary - position accurate
- - - -	geological boundary - position approximate
35	bedding showing dip
70	cleavage showing dip
———	lineation
□	pit
◪	shaft
o—>	drill hole showing direction
✕	mineral claim peg
—·—>	creek
— — —	track

al	alluvium	fl	float	inbd	interbeddedd	scor	scorodite		
BIF	banded iron formation	ferr	ferruginous	lt	light	sc	scree		
bk	black	f	fine	lim	limonitic	S	siliceous		
bw	boxworked	Fe	iron	m	medium	slst	siltstone		
br	brown	g	gossan	mst	mudstone	sst	sandstone		
brecc	breccia	gr	grain/ed	min	minor	t	tuffaceous		
b/cl	bedding/cleavage	gn	green	o/c	outcrop	vn	vein		
bnd	band/ed	gy	grey	pk	pink	y	yellow		
crt	chert	gw	greywacke	Pfb	Burrell Creek Formation	wh	white		
crt con	chert concretions	h	hematitic	q	quartz				
DH	drill hole	hst	hornstone	r	red				
dk	dark	is	ironstone	rego	regolith				

Aztec Mining Company Ltd

LITTLE MARY PROSPECT
GEOLOGICAL FACT MAP
Sheet 1

PROJ. NAME: LITTLE MARY — NO. PLATE 7

Enclosure 3

COMPILED: T. Sheldon — SCALE: 1 : 2,500

DRAWN: M.C.B. — DATE: OCT. 1992


LEGEND
SYMBOLS
Geological
geological boundary - position accurate
geological boundary - position approximate
geological boundary - position concealed
fault showing displacement and dip
shear showing dip
breccia
vein showing dip and width in metres
bedding showing dip
cleavage showing dip
joint showing dip
slickensides
lineation
minor anticline showing plunge
minor syncline showing plunge
Mining
shaft
adit
mullock dump
costean
pit showing depth
drill hole showing direction
lease peg
Topographic
creek
track
ABBREVIATIONS
Lithological
BIF banded iron formation
crt chert
hst hornstone
mst mudstone
slst siltstone
gw greywacke
lat laterite
al alluvium
Sc scree
g gossan
q quartz
h hematitic
ferr ferruginous
geoth goethite
lim limonitic
aspy arsenopyrite
py pyrite
malac malachite
scor scorodite
S siliceous
t tourmaline
carb carbonaceous
brecc breccia
shrd sheared
msv massive
mnr minor
predom predominant
stn stain
i.p. in part
intbd interbedded
+ and
bk black
wh white
lt light
dk dark
pk pink
purp purple
gy gray
SHEET 1
SHEET 2
SHEET 3
GRID NORTH
MN
52°
50 0 50 100 150 200 metres
CR2005 0330
eupene exploration enterprises
Client : Aztec Mining Company Ltd
Scale: 1:2500
Compiled: W. Ormsby
Drawn: C.S.D.S.
Date: 4 November 1991
Enclosure 4
PLATE 8
LITTLE MARY PROSPECT
GEOLOGICAL FACT MAP
Sheet 2
COSTEAN 1
COSTEAN 2
COSTEAN 3
CLIFF
KELLYS
MLN 20
CORONET HILL
Burrell Ck

MLN 20

SOUTH SHAFT

SOUTH EXTENDED SHAFT

MCN 4078

MCN 4079

MCN 4101

MCN 4102

MCN 4103

MCN 4104

MCN 4105

MCN 4106

MCN 4107

LEGEND

SYMBOLS

Geological

- geological boundary - position accurate
- geological boundary - position approximate
- geological boundary - position concealed
- fault showing displacement and dip
- shear showing dip
- breccia
- vein showing dip and width in metres
- bedding showing dip
- cleavage showing dip
- joint showing dip
- slickensides
- lineation
- minor anticline showing plunge
- minor syncline showing plunge

Mining

- shaft
- adit
- mullock dump
- costean
- pit showing depth
- drill hole showing direction

Topographic

- creek
- track

ABBREVIATIONS

Lithological

BIF	banded iron formation
crt	chert
hst	hornstone
mst	mudstone
slst	siltstone
gw	greywacke
lat	laterite
al	alluvium
Sc	scree
q	qossan
q	quartz
h	hematitic
ferr	ferruginous
geoth	goethite
lim	limonitic
aspy	arsenopyrite
py	pyrite
malco	malachite
acor	acorodite
S	siliceous
t	tourmaline
carb	carbonaceous
bracc	breccia
shrd	sheared
msv	massive
mnr	minor
predom	predominant
stn	stain
i.p.	in part
intbd	interbedded
+	and
bk	black
wh	white
lt	light
dk	dark
pk	pink
purp.	purple
gy	grey

SHEET 1

SHEET 2

SHEET 3

GRID NORTH

MN

8p

50 0 50 100 150 200metres

eupene exploration enterprises

Client : Aztec Mining Company Ltd

Scale: 1 : 2500	Compiled: W. Ormsby	Date: 4 November 1981
	Drawn: C.S.D.S.	Enclosure 5

PLATE 9

LITTLE MARY PROSPECT

GEOLOGICAL FACT MAP

Sheet 3

CR2005 0330