

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: EPM 9099

COMPANY HOLDING TITLE: J.F.E Kingsley

COMPANY SUBMITTING REPORT: CRA Exploration Pty Limited

DATE GRANTED: 12/11/1992 **PERIOD:**

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 9 km SW of Raglan

MINING DISTRICT:

MINES/PROSPECTS: Hirons Hill, Hirons South (No. 2), and Hirons No. 3.

EXPLORATION TARGETS\MODELS: Alluvial & hard rock gold, and porphyry copper/gold.

TRANSFERS, JOINT VENTURES, etc: Joint venture between J.F.E Kingsley and CRA Exploration Pty Limited

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File-*

Confidential- C

SUMMARY: - All company reports in this EPM are still confidential.

RECORDER: Paul Blake **DATE:** 01/08/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 202M

COMPANY HOLDING TITLE: Murphyoires Incorporated Pty Ltd

COMPANY SUBMITTING REPORT: Murphyoires Incorporated Pty Ltd

DATE GRANTED: 31/07/1962 **PERIOD:**

1:100 000 SHEET NAME(S): Rockhampton, Cape Capricorn, Bajool, and Gladstone

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Curtis Island

MINING DISTRICT:

MINES/PROSPECTS: Boyne Island, Tannum Sands, Iveragh Holding, Hummock Hill, Rodd's Peninsula, Middle Creek to Round Hill Head, Blind Wild Cattle Island, Bustard Head to Middle Creek, North of the mouth of Jenny Lind Creek, East bank of Pancake Creek, Viper Island, East Middle Island, West Middle Island, Curtis Island, and Wild Cattle Island

EXPLORATION TARGETS\MODELS: Heavy mineral sands

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT: Special Mineral leases were applied for

COMPANY REPORT Nos: *Open File- 2015, 2016*

Confidential-

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To determine the pattern of deposition and the possibilities of economic production of minerals (principally rutile, zircon and ilmenite) in the area.

REGIONAL EXPLORATION

GEOLOGICAL MAPPING - Preliminary investigations using aerial photographs and aerial surveys dictated the position, size and shape of the drilling grid.

DRILLING - Exploration was by hand drilling and core sampling on a surveyed grid pattern.

SAMPLING - Drill core samples were tested, using heavy liquids for separation. Larger bulk samples were tested through the Gladstone Pilot Plant and on a laboratory sized wet tables and magnetic and electrostatic separators since these more closely approximate plant conditions. The results are given below under "Localised Exploration/Prospects".

LOCALISED EXPLORATION/PROSPECTS

1) Boyne Island

GEOLOGY - Fair heavy mineral concentrations occur along high-water mark, but inland the mineral concentrations are rich in patches. Metallurgical tests on heavy mineral concentrate show a much higher magnetite and lower zircon content than other parts of the Authority.

2) Tannum Sands

GEOLOGY - The beach and adjoining dunes are rich in heavy minerals and ore reserve calculations using a cut-off grade of 4% give a total heavy mineral reserve of 76200 tons at an average grade of 15.5%.

3) Iveragh Holding

GEOLOGY - Average depth of water table is approximately 3 m. Some economic concentrations of minerals are present and it is considered that an ore-body of 123 650 tonnes at an average grade of 5.4% heavy mineral could be mined.

4) Hummock Hill Island

GEOLOGY - With a cut-off grade of 4.0% total heavy mineral reserves are an estimated 666 090 tonnes at an average grade of 6.5%. The major part of the mineral reserves lie in the dunes.

5) Rodd's Peninsula

GEOLOGY - A succession of small beaches along the NW coast of the peninsula (Point Richards) contains high grade heavy mineral deposits rich in ilmenite and zircon. Another ore-body of lower grade also containing good ilmenite and zircon lies in the middle of an extensive area of parallel sand dunes W of Pancake Point.

6) Middle Creek to Round Hill Head

GEOLOGY - Some good heavy mineral concentrations occur along high-water mark, and there are some good patches inland but in general the area is fairly poorly mineralised. Considering the haulage distance to Gladstone and the small size of the deposit it is presently considered an uneconomic mining proposition.

7) Blind Wild Cattle Island

GEOLOGY - This is a low sandy island (average elevation of approximately 4.5 m) separated from Wild Cattle Island by a tidal creek and mud flats and from the mainland by Wild Cattle Creek. The average grade of the ore-body, although less than the designated cut-off grade of 4.0%, is considered economic because of its proximity to workable deposits on Wild Cattle Island.

8) Bustard Head to Middle Creek

GEOLOGY - This area contains five distinct parts: **(A) North of the mouth of Jenny Lind Creek** - A small beach facing SE (christened East Bustard Head Beach) shows very high grade heavy mineralised but is very small in area and contains only an estimated 400 tonnes of heavy minerals. There is also a small low grade occurrence just upstream from the mouth of the creek. **(B) A narrow neck of land forming part of the E bank of Pancake Creek** - Except for an isolated occurrence of high concentration there are only low grade deposits of heavy minerals here. **(C) Viper Island** - This is a small island containing good heavy mineral concentrations for an average depth of 3 m to water table. **(D) East Middle Island** - This area has good concentrations of heavy minerals. However, the heavy mineral concentrate was found to contain too low a proportion of marketable material for economic mining. **(E) West Middle Island** - Only isolated patches of good heavy mineral for shallow depths were encountered.

9) Curtis Island

GEOLOGY - Exploration of this part of the Authority was centred on the large transgressive dunes of the Peninsula of Cape Capricorn. As the rocky headlands indicated, rock basement was reached at some quite shallow depths. Beach concentrations are very good, whilst the dunes show lower grades which are considered worthwhile in the N parts because of the large mining faces involved. The area is expected to yield between 3 million and 5 million tonnes of heavy minerals.

10) Wild Cattle Island

GEOLOGY - Some portions of the island contain good heavy mineral concentrations at depths up to 4 m and estimated reserves are 111 050 tonnes of heavy minerals.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Applications for Special Mineral Leases aggregating 23 km² were applied for on 23/04/1966, and the Authority to Prospect terminated on 30/04/1966.

RECORDER: Paul Blake

DATE: 25/10/1994.

COMPANY REPORT SUMMARY SHEET

CR: 2015 **STATUS:** Open

TITLE: Authority to Prospect no. 202M - Gladstone. Final report.

AUTHOR(S): G.H. Fulcher **DATE:** 1966

ATP/EP No.: ATP 202M

COMPANY HOLDING TITLE: Murphyores Incorporated Pty Ltd

COMPANY SUBMITTING REPORT: Murphyores Incorporated Pty Ltd

DATE GRANTED: 31/07/1962 **PERIOD:**

1:100 000 SHEET NAME(S): Rockhampton, Cape Capricorn, Bajool, and Gladstone

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Curtis Island

MINING DISTRICT:

MINES/PROSPECTS: Boyne Island, Tannum Sands, Iveragh Holding, Hummock Hill, Rodd's Peninsula, Middle Creek to Round Hill Head, Blind Wild Cattle Island, Bustard Head to Middle Creek, North of the mouth of Jenny Lind Creek, East bank of Pancake Creek, Viper Island, East Middle Island, West Middle Island, Curtis Island, and Wild Cattle Island

EXPLORATION TARGETS/MODELS: Heavy mineral sands

SUMMARY:

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FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Applications for Special Mineral Leases aggregating 23 km² were applied for on 23/04/1966, and the Authority to Prospect terminated on 30/04/1966.

RECORDER: Paul Blake **DATE:** 24/10/1994.

COMPANY REPORT SUMMARY SHEET

CR: 2016 **STATUS:** Open

TITLE: Report on Mineral Sands Project - Gladstone No. 202M.

AUTHOR(S): **DATE:** 1963 to 1965

ATP/EP No.: ATP 202M

COMPANY HOLDING TITLE: N.S.W. Rutile Mining Company Pty Ltd/Murphyores Incorporated Pty Ltd

COMPANY SUBMITTING REPORT: N.S.W. Rutile Mining Company Pty Ltd/Murphyores Incorporated Pty Ltd

DATE GRANTED: 31/07/1962 **PERIOD:**

1:100 000 SHEET NAME(S): Rockhampton, Cape Capricorn, Bajool, and Gladstone

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Curtis Island

MINING DISTRICT:

MINES/PROSPECTS: Boyne Island, Tannum Sands, Iveragh Holding, Hummock Hill, Rodd's Peninsula, Middle Creek to Round Hill Head, Blind Wild Cattle Island, Bustard Head to Middle Creek, North of the mouth of Jenny Lind Creek, East bank of Pancake Creek, Viper Island, East Middle Island, West Middle Island, Curtis Island, and Wild Cattle Island

EXPLORATION TARGETS\MODELS: Heavy mineral sands

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - This company report covers the exploration carried out over the ATP during the years from 1963 to 1965 leading to the results given in CR 2015.

RECORDER: Paul Blake **DATE:** 25/10/1995.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 397M

COMPANY HOLDING TITLE: Noranda Australia Limited

COMPANY SUBMITTING REPORT: Noranda Australia Limited

DATE GRANTED: 01/05/1967 **PERIOD:**

1:100 000 SHEET NAME(S): Biloela, Calliope & Bajool

1:250 000 SHEET NAME(S): Monto & Rockhampton

LOCATION: Galloway Plains (Area 1), Calliope (Area 2) & Many Peaks (Area 3)

MINING DISTRICT:

MINES/PROSPECTS: Alma Creek, Diglum Creek, Many Peaks, Mt Rose, Riverston, Specimen Hill, and Wildhorse.

EXPLORATION TARGETS\MODELS: Porphyry Copper Deposits

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File- 2536, 2873, 3263, 3959*

SUMMARY: ATP 397 occurs as 6 separate blocks at various localities along E Queensland, but only the area on the Biloela, and Calliope 1:100000 Sheet areas will be summarised. These are Areas 1, 2, and 3 from the company report.

REASON FOR ACQUISITION OF TITLE - To explore for porphyry copper deposits.

GEOLOGY -

MINERALISATION/ALTERATION - A considerable number of mineral prospects and occurrences are widely scattered throughout Areas 1, 2, and 3. Copper and gold are the principle metals of the district with minor silver, lead, and zinc. There are several different types of deposits documented in the area, these are; **(1)** Massive Sulphide Lode Deposits (Many Peaks copper deposits), **(2)** Contact Metasomatic Deposits (Glassford Creek copper deposit, Mt Hector copper deposit, Diglum copper occurrence, Mt Grim, and other small occurrences), **(3)** Fracture Filled and Disseminated Deposits (Mt Cannindah copper deposits, Mt Sugarloaf and Dooboon areas, Alma Creek area, Riverton Creek, Bompa silver-lead prospect, Pinnacles copper workings, and other occurrences), **(4)** Siliceous Lode Deposits (Milton (Norton) Goldfield, Calliope area, Maxwellton Goldfield, Monal Creek-Munholme Creek area, Tableland Gold, and Bompa gold prospects), and **(5)** Placer Deposits (Calliope area, Mt Rainbow Goldfield, and Rodd's Bay area). Non-metal deposits in the area include brown coal to the NE of Ubobo, and large masses of limestone between Calliope and Boynedale.

REGIONAL EXPLORATION

GEOLOGICAL MAPPING - The area was covered by a photo-geological survey, based on the assumption that porphyry copper mineralisation is most likely to occur in areas that are intensely brecciated. Zones of brecciation were targeted on the photos for further work.

GEOCHEMISTRY

- **stream sediment and soil sampling** - In most cases, all secondary and tertiary drainages were sampled. The -80 mesh fraction was assayed for one or more of the following elements, Cu, Pb, Zn, Mo, and Ni. Less than 5% of the samples collected were soil samples.

LOCALISED EXPLORATION/PROSPECTS

1) Alma Creek area (NW part of Area 1)

GEOLOGY - In the N half of the area, a series of Devonian-Carboniferous volcanic and sedimentary rocks crops out. These rocks are intruded by the Galloway Plains Granodiorite which outcrops poorly in the S half of the area. Mineralisation has been located in the area around Mt Grim which consists of a series of acid to intermediate volcanic flows, agglomerates and tuffs. The rocks have been silicified and metamorphosed to mid-greenschist facies grade. Disseminated pyrite is common, but chalcopyrite is rare. Interbedded with the volcanic rocks are lenses of massive recrystallised limestone. Adjacent to the limestones are small areas of garnet-wollastonite skarn and magnetite lenses. In two areas the skarns have been pitted. In the S of the area, near the "Ayrdrrie" turnoff, there is an occurrence of malachite staining in granodiorite. NW of Figtree homestead, copper mines are reported to exist in the volcanic sequence. However, these are not believed to be the same type as those at Mount Grim. The mineralised areas are small and very low grade. It is recommended that this block be relinquished.

GEOCHEMISTRY - Drainage and soil geochemical surveys were carried out in the area. Slightly higher values for copper were obtained from soil over a circular fracture pattern W of Mt Grim (70 to 200 ppm Cu), and scattered high values (171 to 180 ppm Cu) were obtained in the Alma Creek area

near known copper mineralisation. Rock chip samples from the pits in the skarns at Mt Grim returned 500 ppm Cu. A specimen of andesitic agglomerate with pyrite, chalcopyrite, and malachite contained 700 ppm Cu. Other rocks from the Mt Grim area contained only 40 ppm Cu. Soil samples from near the "Ayrdrrie" turnoff returned only 22 to 61 ppm Cu.

2) Diglum Creek

GEOLOGY - Devonian-Carboniferous Yarrol Basin rocks and two periods of intrusion (the Diglum Granodiorite and a later dyke swarm) are represented in the area. The Diglum Granodiorite is probably related to the Galloway Plains Granodiorite, straddles the axial region of a major anticline, and its emplacement was probably controlled by the intersection of the axis and a cross structure. The dyke intrusion is one of the last episodes of the geological history in this area, and intrude both the granodiorite and surrounding sediments and volcanics. The dykes were intruded along fractures in the granite, and along major structures (block faults?) in the volcanics. S of Diglum Homestead are several minor occurrences of copper mineralisation in the granodiorite contact zone, and in associated roof pendants. The mineralisation occurs as carbonate staining at the surface, and chalcopyrite about a metre beneath the surface. From the limited size, scattered distribution and lack of continuity of the occurrences, the area has no further interest.

GEOCHEMISTRY - 204 stream sediment and 25 rock chip samples were collected from the area. Background values were found over most of the area, except for one anomalous zone which returned 65 to 100 ppm Cu, which is 2 to 3 times background. The zinc and molybdenum values did not develop any significant trends. The rock chip results show the granodiorite to have a higher background in copper than the surrounding volcanics, but a lower background in zinc. The samples from the mineralised skarn zones returned 0.2% to >1% Cu, and <0.2% Zn. The results indicate that no economic potential exists in the skarn zones.

3) Eastern Boyne area (S part of Area 2)

GEOCHEMISTRY - This area gave slightly higher than normal values for zinc over the Calliope beds (60 to 80 ppm Zn compared to 45 to 55 ppm Zn). The copper content of soil in parts of the area was also shown to be much higher (70 to 120 ppm Cu compared to 25 to 40 ppm).

4) Glassford Granodiorite (in Area 3)

GEOLOGY - The photo-geological survey over this area located 13 targets for reconnaissance. The Glassford Granodiorite occurs in the central and NW parts of this area.

GEOCHEMISTRY - 538 drainage and soil samples were collected for assay. 7 rock specimens were collected for petrographic studies. Geochemical results from the Glassford Granodiorite show a relatively high copper content 30 to 60 ppm Cu. The Mt Sugarloaf syenite-monzonite intrusive showed background values of 80 to 150 ppm Cu, and the few samples analysed for Pb and Zn indicate a background of 20 to 40 ppm Pb and 35 to 50 ppm Zn. This intrusive is the only one which gave indications of molybdenum - <1 to 7 ppm Mo. The syenitic areas within the Mt Sugarloaf intrusive generally return higher Cu values than the monzonite areas. Copper gossans within the syenite returned values in excess of 1000 ppm Cu. One gossan indicated 4900 ppm Cu, 29 ppm Pb, and 233 ppm Zn.

5) Many Peaks

GEOLOGY - The work in this area was divided into 3 subareas (A-C); **(A)** The area near the contact of the Barmundoo beds and the Glassford Granodiorite is of some interest because of the occurrence of copper and molybdenum mineralisation at three separate locations. The Barmundoo beds close to the contact are moderately to highly metamorphosed. Copper and molybdenum occur in quartz veins, the diorite, and metasomatised sediments, approximately 6 km W of Ubobo. About 3.5 km SW of this showing is outcrops of diorite carrying copper mineralisation. The copper is mostly tenorite with occasional blebs of chalcopyrite disseminated through the rock. **(B)** Traversing was carried out N, E & W of ATP 341M, held by Mt Isa Mines Ltd, over the Mt Cannindah copper mine. The mineralisation occurs in a brecciated tuffaceous mudstone along the edge of a porphyritic dacite intrusion, in

metasomatic deposits and possibly as fracture fillings and disseminations in the porphyritic dacite. Just N of Kalpower is a fine grained intrusive of trachyte or microsyenite which is almost certainly genetically related to the mineralising dacite at Mt Cannindah and is therefore of some interest. E of Kalpower, a monotonous sequence of porphyritic andesite with lesser tuff, basalt, and chlorite schist crop out. These are correlated with the Muncon Volcanics. Just N of ATP 341M, tuffaceous sediments (Caswell Creek Group) and an andesite-basalt sequence (? Muncon Volcanics) come in contact. Immediately W of ATP 341M lies the Caswell Creek Group (a sequence of shales, siltstone, ?tuff, limestone, arenite, greywacke, pebbly arenite, feldspathic arenite, and conglomerate). This sequence contains a few gossanous outcrops, mostly goethitic, but some with haematite. To the E of ATP 341M is traces of chalcopryrite and malachite in a skarn outcrop. (C) The Many Peaks Mine area was also investigated. Thin section work in the mine area indicates a soda-rich volcanic-sedimentary sequence, locally altered by contact metamorphism, metasomatism, and hydrothermal alteration. To the NW of Many Peaks town, the rocks appear more basic. Tuffaceous sediments, agglomerates and impure limestones become more common W and SW of the Many Peaks mine. The volcanics are separated from a sequence of siltstone, limey arenite and limestone to the E by a thin zone of massive quartz, probably representing silicification along a major fault. Between the Hospital and the most northerly large tailings dump at the mine, there are two small strongly mineralised outcrops. The one closest to the mine consists of a few feet of goethite gossan. A shaft sunk here to 18 m penetrated massive sulphides with some copper, and old records indicate gossan, copper-bearing gossan, and copper-bearing? country rock bounded by hanging wall serpentinite containing copper. Near the hospitable, a 1.5 m wide strongly cupriferous serpentinite shear is in contact with a gossan from 0.3 to 1.5 m wide. Additional mineralisation located includes gold-copper with dioritic plugs near Yarrol, copper in skarns and fracture zones at Kalpower, copper-lead-silver in a shear zone at Sugarbag Creek, a pyritic body about 800 m N of Barrimoon Station. The various mineral occurrences are controlled by at least 3 different geological conditions; shearing (as at Many Peaks mine), brecciation (as at Mt Cannindah), and favourable lithology (as at Apple Tree Creek). It is recommended that ground be retained for further exploration in four areas; (a) Sugarbag Creek - to cover the main fracture zone. (b) Many Peaks - to cover the lode. (c) Kalpower - to cover known and inferred mineralisation around the Mt Isa Leases. (d) Yarrol - to cover the copper bearing dioritic plugs.

GEOCHEMISTRY - Stream sediment sampling was carried out over the whole Many Peaks area. Results indicate that the drainage systems from the Many Peaks and Mt Cannindah Mines both have copper contents of greater than ten times local background, but there is no corresponding increase in lead or zinc concentrations. The intensity of these anomalies has been accentuated by mining operations. Apart from the two old mining districts, five significant anomalies were delineated. (1) **Yarrol** - Eight samples gave Cu values between 2 and 3 times background. This area coincides with the two cupriferous diorite plugs. (2) **Kalpower** - Five streams draining Noranda's area gave copper anomalies ranging from five to ten times local background. In addition, samples draining Mt Isa's leases gave Cu values around four times background. (3) **Mt Goondicum Complex** - results up to two times background lead and zinc were obtained along with some exceptionally high copper values. In addition, a solitary molybdenum anomaly of 100 ppm was obtained. No mineralisation has been located in the vicinity, and it has been suggested that the anomalies are due to contamination by agricultural activities. (4) **Sugarbag Creek** - A copper-lead anomaly coincides with an area of known mineralisation. Copper values were up to 1300 ppm, and lead values up to 240 ppm also occur. (5) **Barney Creek** - In this region, a widespread anomaly of 6 to 20 times background was outlined in the Boiling Creek Group. The area has been thoroughly traversed and no sign of mineralisation was seen. It is tentatively concluded that the anomaly results from dioritic intrusions in the vicinity. Samples taken from streams in the vicinity of the Yarrol Fault were analysed for nickel. Background values in the geosynclinal sediments are in the range of 15 to 30 ppm Zn, while in sequences containing basaltic lavas they range from 40 to 70 ppm Zn. Samples taken adjacent to known serpentinite bodies have nickel contents greater than 100 ppm. Rock chip and soil sampling was carried out in the three areas described above under geology with the following results; (A) Rock chip samples from the diorite which contained tenorite and rare chalcopryrite, returned 505 to 3700 ppm Cu. A soil survey was also carried out over this area returning a maximum value of 400 ppm Cu. Copper values in rock ranged from 505 to 3700 ppm Cu, and it is obvious that copper is not being trapped in the soil in this area. (B) Two rock chip samples from the skarn to the E of ATP 341M returned 475 and 430 ppm Cu, and 440 and 130 ppm Pb. 500 m to the NE is an area of poor outcrop, and a rock chip sample of gossan scree assayed 1650 ppm Cu, but the source of the scree has not been located. Two outcrops just W of ATP

341M assayed 650 & 590 ppm Cu. A rock chip of fractured goethitic sediments nearby assayed 390 ppm Cu, and accessory chalcopyrite is inferred in the primary zone in this area. An isolated rock chip sample from a fractured goethitic siltstone returned 33 ppm Ag. The presence of sulphides in moderate amounts, together with some anomalous amounts of Cu and Ag, show the area W of ATP 341M to be worthy of follow up work. (C) A soil sampling survey was carried out over the area between Many Peaks mine and the Hospital. The results disclosed a copper anomaly centred on surface showing of copper near the Hospital. The anomaly suggests that the mineralisation is more extensive than outcrops indicate, and a sharp drop off in values to the N may be due to a structural cutoff.

6) Mt Rose

GEOLOGY - Sediments and volcanics of the Caswell Creek Group or the Dawes Range Formation occupy most of the area. A porphyritic rhyolite mass appears to intrude the sedimentary sequence along Langtry Gully. Some metasomatism is present, particularly near Three Moon Creek, and the intrusive is associated with mineralisation. The area comprises part of the Cania and Kroombit Gold and Mineral Field, and alluvial gold workings are common in Three Moon Creek, Four Mile Creek, and Langtry Gully. Lode gold has been worked on both sides of Langtry Gully, and at Mt Rose. Copper mineralisation has been observed in association with the gold, especially near Langtry Gully. Skarn outcrops carrying copper mineralisation occur near the E edge of the rhyolite. Work in the area indicated no economic sized deposits. It is recommended that the area be relinquished.

GEOCHEMISTRY - 30 stream sediment samples were collected. Four weakly anomalous copper values (60 to 90 ppm) and one weakly anomalous zinc value (87 ppm) was returned.

7) Mt Seaview (58 km SW of Calliope)

GEOLOGY - This area occurs wholly within the Yarrol Basin, and on the W flank of the Yarrol-Mt Morgan arch. The sediments and volcanics in the area are Carboniferous. Two limestone lenses were located in the area. Both are recrystallised to marble, and one contains appreciable skarn material, and is the host for the Lightning Ridge mineralisation. This mineralisation occurs as copper carbonate. Intruding this sequence are bodies of intermediate to acid granitic rocks of probable Permian age. All the sedimentary and volcanic rocks in the area are altered to some degree by the intrusion. The most wide spread alteration is silicification. The largest intrusion in the area is the Mt Seaview Complex. This body consists of an adamellite core surrounded by a fringe of diorite. Gold mineralisation is hosted in quartz veins in the adamellite (Cattle Creek section of the Tablelands Gold Field) and diorite (Callide Creek Flats of the Tablelands Gold Field) differentiates. On the flanks of Mt Pack are two intrusions of muscovite granite called the Crow Creek Granite. The W most body is the host of the Mt Pack gold reefs, but the E granite is free from mineralisation except along the walls of a siliceous zone. In the NW corner of the area, two slightly altered adamellite plugs were located. Along the N boundary of the area is another intrusion of syenite, diorite and monzonite. The granitic rocks are intruded by swarms of trachyandesite dykes.

GEOCHEMISTRY - Stream samples revealed that anomalous copper results in the Tableland Field are in the range of 100 to 250 ppm, and those in the Crow Creek area returned 50 to 70 ppm Cu. One other area on the N border contains values in the 100 to 120 ppm Cu range. The zinc and molybdenum do not show any significant results. Rock chip samples were collected from most of the dumps and also from the veins exposed. The results indicate: The area has low potential for copper; economic concentrations appear restricted to the narrow quartz-sulphide veins; and the Pb, Zn, and Ag values at the W end of Cattle Creek alteration zone show it is worth further work.

8) Munholme Creek 36.5 km N of Monto

GEOLOGY - Present in the area are two Lower Carboniferous formations (Crana beds and Caswell Creek Group) and the intrusive Munholme Creek Complex. The rock types in the intrusive vary from diorite, quartz diorite to feldspar porphyry. The quartz diorite has in part been extensively altered to a pyrite bearing phase, which is bordered by a weak zone of propylitic alteration. The conclusions from mapping in the area are; (a) The pyritic alteration zone is considered to be structurally controlled and is extensive enough to warrant further investigation. (b) Copper mineralisation within the Munholme

Creek Complex is limited in both intensity and extent. (c) In the two Carboniferous formations, copper mineralisation is confined to faults. No occurrence investigated is considered to be of economic importance. ML 460, 470, 473, and 559 cover parts of this area.

GEOCHEMISTRY - 41 drainage samples were collected. 5 samples from the intrusive returned anomalous values for copper (60 to 100 ppm Cu), and one sample returned anomalous lead (100 ppm Pb). 4 samples from the Caswell Creek Group returned weakly anomalous copper (60 to 70 ppm Cu), 3 returned weakly anomalous lead (75 to 112 ppm Pb), 1 returned very weakly anomalous zinc (100 ppm Zn), and two samples returned very weakly anomalous molybdenum (3 ppm Mo).

9) Ridler Creek

GEOLOGY - Mapping of the syenite-monzonite intrusive at Mt Sugarloaf has indicated that it may be more extensive than previously thought, and it contains several different phases. As most phases contain traces of copper mineralisation an understanding of the phase distribution and relationship will be important in evaluating the economic potential. Four areas of copper concentrations occur in this area; (1) Burns Spur mine area, (2) Number 2 Gossan (670 m SW of the Burns Spur mine), (3) Number 3 Gossan (1150 m SW of the Burns Spur mine), and (4) Number 4 Outcrop (1300 m SW of Burns Spur mine). The Ridler Creek was described in some reports as part of the Many Peaks area. Large bodies of disseminated sulphides and oxides were tested by drilling, but were found to contain low copper values.

GEOCHEMISTRY - In the Burns Spur mine area, sampling of the best gossan returned 30 m of 1.6% Cu and 6.8 dwt Ag. On the centre of the gossan, the bottom of a shaft underlying to the N assayed 2.4% Cu and 11.7 dwt Ag. A high grade chalcocite area in the old open cut, assayed about 35% Cu and 45.7 dwt Ag, over 1 m. Adit sampling W of the outcrop showed lower values in limonitic syenite. A soil sampling survey over the mine showed a copper anomaly about 300 m by 115 m centred around the outcropping gossans. This anomaly ranged from 450 to >2000 ppm Cu. The anomaly indicates no major extension of the outcropping mineralisation. Chip sampling of Number 3 Gossan assayed 15 m of 0.7% Cu & 2 dwt Ag.

GEOPHYSICS - The Ridler Creek Prospect was covered by ground magnetic and IP surveys. The magnetics results were found to be ambiguous. The IP survey identified three areas of anomalous response; (a) A broad anomaly, roughly 330 by 200 m, containing the Burns Spur mine. Drilling indicated enough pyrite and magnetite to account for this broad anomaly. (b) The second anomaly was too small to be considered worthy of drilling. (c) This anomaly was broad, approximately 330 by 130 m. Drilling again indicated that the anomaly was due to disseminated pyrite and magnetite without significant chalcopyrite. Therefore the area was relinquished.

DRILLING - Six percussion drill holes totalling 540 m were completed but only low copper values were encountered.

10) Riverston (6.5 km SW of Benaraby)

GEOLOGY - The oldest unit cropping out in the area is the Port Curtis Formation of Silurian age, which is equivalent to the Neranleigh-Fernvale group of the Brisbane region. This unit consists of cleaved and silicified argillites in which all traces of bedding have been obscured. Intruding the argillites is a 3 km by 1.5 km elliptical body of diorite porphyry of probable Triassic age. The contact is marked by a well developed aureole of bleached and silicified argillites. Intruding the diorite and to a lesser extent, the argillites, are dykes and plugs of rhyolite and dacite. After the emplacement of the dykes, a period of hydrothermal activity took place which fractured and altered the rhyolites to a quartz-sericite-kaolin rock and introduced pyrite, chalcopyrite, and gold mineralisation. The economic minerals appear to be restricted to a late stage zone of quartz fracture filling, which was intensively worked for gold. Outside of the copper-gold zone is a pyritic halo, as evidenced by iron oxides disseminated throughout the altered rhyolite. This period of mineralisation is probably related to the intrusion of the nearby Castletower Granite. Along the W boundary of the area is the contact between the Silurian Coastal block sediments and the Devonian-Carboniferous sediments of the Yarrol Basin. This contact is regarded as a thrust, which is possibly the northward continuation of the Mt Perry-Many Peaks structure. Associated with this fault structure is a serpentine intrusion located just outside the area. It

was concluded that the host of mineralisation was too small and the indicated grade too weak to warrant subsurface investigation. Therefore it is recommended that the area be relinquished.

GEOCHEMISTRY - Anomalous stream sediment results in copper are associated with the altered rhyolite, and the three highest are all from gullies that drain the zone of late quartz veination and minor copper staining. Soil sampling was carried out over the altered rhyolite. The results define the late quartz zone as the source of the high stream sediment anomalies. This area has a core of +1000 ppm Cu, which fade out to less than 100 ppm on the edges. One other area in the grid has a few 500 ppm Cu results, which probably represent a similar type of mineralisation though of much smaller size. The rock chips from the area of high soil results show values ranging from 800-2000 ppm Cu. The rocks that were sampled were highly leached and therefore the grade of the primary mineralisation could be economic. Outside the soil anomaly the altered rhyolite rock samples produced results of 130 to 200 ppm Cu.

11) Riverston Creek Intrusive (NW part of Area 2)

GEOLOGY - The Riverston Creek Intrusive is a multiple intrusion.

GEOCHEMISTRY - Soil development over the main intrusive mass, a dark diorite porphyry, shows a background of 30 to 40 ppm Cu, 10 ppm Pb, 25 to 40 ppm Zn, and <1 ppm Mo. A granite-rhyolite intruding the diorite returned soil values of approximately 80 to 120 ppm Cu, 4 to 6 ppm Pb, 10 to 25 ppm Zn, and <1 ppm Mo. Assays from a highly altered and leached breccia zone containing gold-copper mineralisation, returned 100 to 1000 ppm Cu, 10 to 50 ppm Pb, and 15 to 30 ppm Zn.

12) Specimen Hill (W slope of the Calliope Range, 5 km E of the Biloela-Gladstone Highway)

GEOLOGY - In the S of the area are a series of Lower Permian andesitic tuffs and lavas which were intruded by the Galloway Plains Granodiorite. The granodiorite is overlain by the Triassic Muncon Volcanics, which are made up of acid to basic volcanic rocks, the most common types being basalt, vesicular basalt and andesite. Alluvial gold has been produced from the decomposed granite. Copper and scheelite are reported to occur in the area, but these were not seen. It was decided that the area had been adequately investigated and that it should be relinquished.

GEOCHEMISTRY - A rock chip from the Galloway Plains Granodiorite returned 250 ppm Cu.

13) Ten Men's Creek area (immediately W of Riverstone Creek Intrusive)

GEOCHEMISTRY - The Calliope beds in this area returned values of 60 to 70 ppm Cu, compared to the normal 25 to 40 ppm Cu.

14) Wildhorse (40 km S of Calliope)

GEOLOGY - The N part of the area is underlain by the Permian Castletower Granite. It is a pink, leucocratic granite characterised by the presence of quartz, tourmaline, and mica. The later suggests pneumatolytic action. The granite forms high topography. The S and W are the Calliope beds consisting of andesitic flows, tuffs and agglomerates, and limestones. Volcanic breccia zones were noted in the Calliope beds, usually forming higher knolls in the andesitic flows. Extensive limestone zones striking NNW can be traced to the SE. S of the Calliope beds are the Nagoorin beds, consisting of gravel, sandstone, siltstone and mudstone. Pyrite with minor chalcopryrite occur in andesite in the Calliope beds. Minor chalcopryrite alone is associated with epidote veins. Copper carbonates were found associated with the chalcopryrite-epidote veins. Native copper occurs as fine disseminations and fracture fillings in fragmental volcanic rocks. These occurrences are all non-economic and are considered adequate to explain the weak stream silt anomalies. To the S of the area, gold mineralisation is found in N-S striking quartz veins in andesite-dacite. Silicification is related to these structures, hence the quartz veins are tightly fused to the wall rock. Minor pyrite and pyrrotite are found. The vein structures strike N-S but apparently do not extend into the Wildhorse area.

GEOCHEMISTRY - Stream silt sampling results indicate complete lack of mineralisation in the Castletower Granite. Values varied between 4 and 6 ppm Cu. Elsewhere in the area, geochemical results were weak and can be explained by the mineralisation in the Calliope beds.

RECORDER: Paul Blake

DATE: 21/11/1994.

COMPANY REPORT SUMMARY SHEET

CR: 2536 **STATUS:** Open

TITLE: Annual Report, Authority to Prospect No. 397M, Queensland

AUTHOR(S): G.C. Battey, J. Erdmanis, D.F. Irving, R.C. Neale, & P.J. O'Rourke **DATE:** June 1968

ATP/EP No.: ATP 397M

COMPANY HOLDING TITLE: Noranda Australia Limited

COMPANY SUBMITTING REPORT: Noranda Australia Limited

DATE GRANTED: 01/05/1967 **PERIOD:**

1:100 000 SHEET NAME(S): Biloela, Calliope & Bajool

1:250 000 SHEET NAME(S): Monto & Rockhampton

LOCATION: Galloway Plains (Area 1), Calliope (Area 2) & Many Peaks (Area 3)

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: Porphyry Copper Deposits

SUMMARY: ATP 397 occurs as 6 separate blocks at various localities along E Queensland, but only the area on the Biloela, and Calliope 1:100000 Sheet areas will be summarised. These are Areas 1, 2, and 3 from the company report.

REASON FOR ACQUISITION OF TITLE - To explore for porphyry copper deposits.

GEOLOGY -

MINERALISATION/ALTERATION - A considerable number of mineral prospects and occurrences are widely scattered throughout Areas 1, 2, and 3. Copper and gold are the principle metals of the district with minor silver, lead, and zinc. There are several different types of deposits documented in the area, these are; **(1)** Massive Sulphide Lode Deposits (Many Peaks copper deposits), **(2)** Contact Metasomatic Deposits (Glassford Creek copper deposit, Mt Hector copper deposit, Diglum copper occurrence, Mt Grim, and other small occurrences), **(3)** Fracture Filled and Disseminated Deposits (Mt Cannindah copper deposits, Mt Sugarloaf and Dooboon areas, Alma Creek area, Riverton Creek, Bompas silver-lead prospect, Pinnacles copper workings, and other occurrences), **(4)** Siliceous Lode Deposits (Milton (Norton) Goldfield, Calliope area, Maxwellton Goldfield, Monal Creek-Munholme Creek area, Tableland Gold, and Bompas gold prospects), and **(5)** Placer Deposits (Calliope area, Mt Rainbow Goldfield, and Rodd's Bay area). Non-metal deposits in the area include brown coal to the NE of Ubobo, and large masses of limestone between Calliope and Boynedale.

REGIONAL EXPLORATION

GEOLOGICAL MAPPING - The area was covered by a photo-geological survey, based on the assumption that porphyry copper mineralisation is most likely to occur in areas that are intensely brecciated. Zones of brecciation were targeted on the photos for further work.

GEOCHEMISTRY

- **stream sediment and soil sampling** - In most cases, all secondary and tertiary drainages were sampled. The -80 mesh fraction was assayed for one or more of the following elements, Cu, Pb, Zn, Mo, and Ni. Less than 5% of the samples collected were soil samples.

LOCALISED EXPLORATION/PROSPECTS

1) Mt Grim-Alma Creek area (NW part of Area 1)

GEOLOGY - A photo-geological study of the N part of this area was completed, but the general lack of topographic expression resulted in planning a regional study rather than a study of photo-selected targets. Photo studies did however result in the selection of two targets. The Galloway Plains Granodiorite occurs in the N and central part of this area.

GEOCHEMISTRY - Drainage and soil geochemical surveys were carried out in the area. Slightly higher values for copper were obtained from soil over a circular fracture pattern W of Mt Grim (70 to 200 ppm Cu), and scattered high values (171 to 180 ppm Cu) were obtained in the Alma Creek area near known copper mineralisation. A small copper-bearing acidic intrusive in the area was not geochemically examined.

2) Riverston Creek Intrusive (NW part of Area 2)

GEOLOGY - The Riverston Creek Intrusive is a multiple intrusion.

GEOCHEMISTRY - Soil development over the main intrusive mass, a dark diorite porphyry, shows a background of 30 to 40 ppm Cu, 10 ppm Pb, 25 to 40 ppm Zn, and <1 ppm Mo. The granite-rhyolite intruding the diorite returned soil values of approximately 80 to 120 ppm Cu, 4 to 6 ppm Pb, 10 to 25 ppm Zn, and <1 ppm Mo. Assays from a highly altered and leached breccia zone containing gold-copper mineralisation, returned 100 to 1000 ppm Cu, 10 to 50 ppm Pb, and 15 to 30 ppm Zn.

3) Ten Men's Creek area (immediately W of Riverstone Creek Intrusive)

GEOCHEMISTRY - The Calliope beds in this area returned values of 60 to 70 ppm Cu, compared to the normal 25 to 40 ppm Cu.

4) Eastern Boyne area (S part of Area 2)

GEOCHEMISTRY - This area gave slightly higher than normal values for zinc over the Calliope beds (60 to 80 ppm Zn compared to 45 to 55 ppm Zn). The copper content of soil in parts of the area was also shown to be much higher (70 to 120 ppm Cu compared to 25 to 40 ppm).

5) Glassford Granodiorite (in Area 3)

GEOLOGY - The photo-geological survey over this area located 13 targets for reconnaissance. The Glassford Granodiorite occurs in the central and NW parts of this area.

GEOCHEMISTRY - 538 drainage and soil samples were collected for assay. 7 rock specimens were collected for petrographic studies. Geochemical results from the Glassford Granodiorite show a relatively high copper content 30 to 60 ppm Cu. The Mt Sugarloaf syenite-monzonite intrusive showed background values of 80 to 150 ppm Cu, and the few samples analysed for Pb and Zn indicate a background of 20 to 40 ppm Pb and 35 to 50 ppm Zn. This intrusive is the only one which gave indications of molybdenum - <1 to 7 ppm Mo. The syenitic areas within the Mt Sugarloaf intrusive generally return higher Cu values than the monzonite areas. Copper gossans within the syenite returned values in excess of 1000 ppm Cu. One gossan indicated 4900 ppm Cu, 29 ppm Pb, and 233 ppm Zn.

RECORDER: Paul Blake

DATE: 02/11/1994.

COMPANY REPORT SUMMARY SHEET

CR: 2873 **STATUS:** Open

TITLE: Annual report, Authority to Prospect No. 397M, Queensland.

AUTHOR(S): G.C. Battey, P.J. O'Rourke, D. Richards, S. Roderick, L. Szoke, & K. Troensegaard

DATE: June 1969

ATP/EP No.: ATP 397M

COMPANY HOLDING TITLE: Noranda Australia Limited

COMPANY SUBMITTING REPORT: Noranda Australia Limited

DATE GRANTED: 01/05/1967 **PERIOD:**

1:100 000 SHEET NAME(S): Biloela, Calliope & Bajool

1:250 000 SHEET NAME(S): Monto & Rockhampton

LOCATION: Galloway Plains (Area 1), Calliope (Area 2) & Many Peaks (Area 3)

MINING DISTRICT:

MINES/PROSPECTS: Alma Creek, Diglum Creek, Many Peaks, Mt Rose, Riverston, Specimen Hill, and Wildhorse.

EXPLORATION TARGETS\MODELS: Porphyry Copper Deposits

SUMMARY:

LOCALISED EXPLORATION/PROSPECTS

1) Alma Creek area

GEOLOGY - In the N half of the area, a series of Devonian-Carboniferous volcanic and sedimentary rocks crops out. The rocks in the area are predominantly of volcanic origin, and can be broadly subdivided into a N more basic unit of andesite, andesitic tuff and basalt, and a S more acid unit, which contains a greater proportion of rhyolite and dacite. These rocks are intruded by the Galloway Plains Granodiorite which outcrops poorly in the S half of the area and is comprised of a hornblende-biotite granodiorite. Mineralisation has been located in the area around Mt Grim. The Mt Grim area consists of a series of acid to intermediate volcanic flows, agglomerates and tuffs. The rocks have been silicified and metamorphosed to mid-greenschist facies grade. Disseminated pyrite is common, but chalcopyrite is rare. Interbedded with the volcanic rocks are lenses of massive recrystallised limestone. Adjacent to the limestones are small areas of garnet-wollastonite skarn and magnetite lenses. In two areas the skarns have been pitted. In the S of the area, near the "Ayrdrrie" turnoff, there is an occurrence of malachite staining in granodiorite. NW of Figtree homestead, copper mines are reported to exist in the volcanic sequence. However, these are not believed to be the same type as those at Mount Grim.

GEOCHEMISTRY - Rock chip samples from the pits in the skarns at Mt Grim returned 500 ppm Cu. A specimen of welded andesitic agglomerate with pyrite, chalcopyrite, and malachite contained 700 ppm Cu. Other rocks from the Mt Grim area contained only 40 ppm Cu. Soil samples taken near the "Ayrdrrie" turnoff returned only 22 to 61 ppm Cu.

2) Specimen Hill (W slope of the Calliope Range, 5 km E of the Biloela-Gladstone Highway)

GEOLOGY - In the S of the area are a series of Lower Permian andesitic tuffs and lavas which were intruded by the Galloway Plains Granodiorite, which is a hornblende-biotite granodiorite. The

granodiorite is overlain by the Triassic Muncon Volcanics, which are made up of acid to basic volcanic rocks, the most common types being basalt, vesicular basalt and andesite. These form flat-lying capping. Alluvial gold has been produced from the decomposed granite. Copper and scheelite are reported to occur in the area, but these were not seen.

GEOCHEMISTRY - A specimen from the Galloway Plains Granodiorite returned 250 ppm Cu.

3) Riverston (6.5 km SW of Benaraby)

GEOLOGY - The oldest unit cropping out in the area is the Port Curtis Formation of Silurian age, which is equivalent to the Neranleigh-Fernvale group of the Brisbane region. This unit consists of cleaved and silicified argillites in which all traces of bedding have been obscured. However, the absence of phosphatic horizons which mark the base of the formation elsewhere, suggest that the beds in this area are Upper Port Curtis Formation. Intruding the argillites is a 3 km by 1.5 km elliptical body of diorite porphyry of probable Triassic age. The contact is marked by a well developed aureole of bleached and silicified argillites. Intruding the diorite and to a lesser extent, the argillites are dykes and plugs of rhyolite and dacite. After the emplacement of the dykes, a period of hydrothermal activity took place which fractured and altered the rhyolites to a quartz-sericite-kaolin rock and introduced pyrite, chalcopyrite, and gold mineralisation. The economic minerals appear to be restricted to a late stage zone of quartz fracture filling, which was intensively worked for gold. Outside of the copper-gold zone is a pyritic halo, as evidenced by iron oxides disseminated throughout the altered rhyolite. This period of mineralisation is probably related to the intrusion of the nearby Castletower Granite. Along the W boundary of the area is the contact between the Silurian Coastal block sediments and the Devonian-Carboniferous sediments of the Yarrol Basin. This contact is regarded as a thrust, which is possibly the northward continuation of the Mt Perry-Many Peaks structure. Associated with this fault structure is a serpentine intrusion located just outside the area.

GEOCHEMISTRY - 23 stream, 326 soil and 22 rock chip samples were collected. Anomalous stream sediment results in copper are associated with the altered rhyolite, and the three highest are all from gullies that drain the zone of late quartz veination and minor copper staining. Soil sampling was carried out over the altered rhyolite. The results define the late quartz zone as the source of the high stream sediment anomalies. This area has a core of +1000 ppm Cu, which fade out to less than 100 ppm on the edges. One other area in the grid has a few 500 ppm results, which probably represent a similar type of mineralisation though of much smaller size. The rock chips from the area of high soil results show values ranging from 800-2000 ppm Cu. The rocks that were sampled were highly leached and therefore the grade of the primary mineralisation could be economic. The dimensions of the zone as shown by the soil sampling would contain an orebody containing 45000 tonnes per vertical metre. Outside the soil anomaly the altered rhyolite rock samples produced results of 130 to 200 ppm Cu.

4) Wildhorse (40 km S of Calliope)

GEOLOGY - The N part of the area is underlain by the Permian Castletower Granite. It is a pink, leucocratic granite characterised by the presence of quartz, tourmaline, and mica. The later suggests pneumatolytic action. The granite forms high topography. The S and W are the Calliope beds consisting of andesitic flows, tuffs and agglomerates, and limestones. Interlayers of minor chert and conglomerate also occur, along with quartz-porphyry and dacitic rocks. Epidote type alteration is common in the volcanic rocks. Volcanic breccia zones were noted in the Calliope beds, usually forming higher knolls in the andesitic flows. Extensive limestone zones striking NNW can be traced to the SE. S of the Calliope beds are the Nagoorin beds, consisting of gravel, sandstone, siltstone and mudstone. Pyrite with minor chalcopyrite occur in the Calliope beds andesite. Minor chalcopyrite alone is associated with epidote veins. Copper carbonates were found associated with the chalcopyrite-epidote veins. Native copper occurs as fine disseminations and fracture fillings in fragmental volcanic rocks. These occurrences are all non-economic and are considered adequate to explain the weak stream silt anomalies. To the S of the area, gold mineralisation is found in N-S striking quartz veins in andesite-dacite. Silicification is related to these structures, hence the quartz veins are tightly fused to the wall rock. Minor pyrite and pyrrothite are found. The vein structures strike N-S but apparently do not extend into the Wildhorse area.

GEOCHEMISTRY - 30 stream silt samples and 6 rock chip samples were collected. Stream silt sampling results indicate complete lack of mineralisation in the Castletower Granite. Values varied between 4 and 6 ppm Cu. Elsewhere in the area, geochemical results were weak and can be explained by the mineralisation in the Calliope beds.

5) Diglum Creek

GEOLOGY - Devonian-Carboniferous Yarrol Basin rocks occur in the area. These rocks consist mainly of tuffs and agglomerates, argillaceous sediments, limestones, and intermediate flows. The limestones occur as beds that are traceable for 3 to 5 km as small lenses. Their best development is in the vicinity of the Diglum Creek workings, where they are altered to garnetiferous marble with lenses of epidote-garnet or garnet-wollastonite skarn. Two periods of intrusion are represented in the area, the Diglum Granodiorite and a later dyke swarm. The Diglum Granodiorite is a biotite-hornblende granodiorite that locally changes in composition to a mafic-rich diorite and a pink monzonite. It is probably related to the Galloway Plains Granodiorite. The Diglum intrusion straddles the axial region of a major anticline, and its emplacement was probably controlled by the intersection of the axis and a cross structure. The dyke intrusion is one of the last episodes of the geological history in this area, and intrude both the granodiorite and surrounding sediments and volcanics. The dykes were intruded along fractures in the granite, and along major structures (block faults?) in the volcanics. S of Diglum Homestead are several minor occurrences of copper mineralisation in the granodiorite contact zone, and in associated roof pendants. The mineralisation occurs as carbonate staining at the surface, and chalcopyrite about a metre beneath the surface. From the limited size, scattered distribution and lack of continuity of these occurrences, it is concluded that they are of no further interest.

GEOCHEMISTRY - 204 stream sediment and 25 rock chip samples were collected from the area. Background values were found over most of the area, except for one anomalous zone which returned 65 to 100 ppm Cu, which is 2 to 3 times background. The zinc and molybdenum values did not develop any significant trends. The rock chip results show the granodiorite to have a higher background in copper than the surrounding volcanics, but a lower background in zinc. The samples from the mineralised skarn zones returned 0.2% to >1% Cu, and <0.2% Zn. The results indicate that no economic potential exists in the skarn zones.

6) Munholme Creek 36.5 km N of Monto

GEOLOGY - Most of the area comprises sediments and volcanics of the Crana beds, with lesser amounts of the Caswell Creek Group. A granodiorite plug in the N part of the area contains Cu, Pb, Zn, Ag, Au, and Ba anomalies. This anomalous area mostly lies on disputed ground and geological investigation was deferred until the Minister's decision on Mining Lease Applications.

GEOCHEMISTRY - 41 drainage samples were collected. The undifferentiated granodiorite returned background values of 15 to 30 ppm Cu, 25 to 75 ppm Pb, 25 to 50 ppm Zn, and <1 to 2 ppm Mo. 5 samples returned anomalous values for copper (60 to 100 ppm Cu), and one sample returned anomalous lead (100 ppm Pb). The Caswell Creek Group returned background values of 15 to 49 ppm Cu, 12 to 50 ppm Pb, 12 to 87 ppm Zn, and 1 to 2 ppm Mo. Four samples returned weakly anomalous copper (60 to 70 ppm Cu), 3 returned weakly anomalous lead (75 to 112 ppm Pb), 1 returned very weakly anomalous zinc (100 ppm Zn), and two samples returned very weakly anomalous molybdenum (3 ppm Mo).

7) Many Peaks

GEOLOGY - The work in this area was divided into 4 subareas (A-D); (A) The area near the contact of the Barmundoo beds and the Glassford Granodiorite is of some interest because of the occurrence of copper and molybdenum mineralisation at three separate locations. The Glassford Granodiorite in most of this contact area comprises a mafic-rich diorite or a mafic-rich hornblende-biotite tonalite (?granodiorite). The Barmundoo beds close to the contact are moderately to highly metamorphosed. Copper and molybdenum occur in quartz veins, the diorite, and metasomatised sediments, approximately 6 km W of Ubobo. About 3.5 km SW of this showing is outcrops of diorite carrying copper mineralisation. The copper is mostly tenorite with occasional blebs of chalcopyrite

disseminated through the rock. **(B)** Mapping of the syenite-monzonite intrusive at Mt Sugarloaf has indicated that it may be more extensive than previously thought, and it contains several different phases. As most phases contain traces of copper mineralisation an understanding of the phase distribution and relationship will be important in evaluating the economic potential. Four areas of copper concentrations occur in this area; (1) Burns Spur mine area, (2) Number 2 Gossan (670 m SW of the Burns Spur mine), (3) Number 3 Gossan (1150 m SW of the Burns Spur mine), and (4) Number 4 Outcrop (1300 m SW of Burns Spur mine). **(C)** Traversing was carried out N, E & W of ATP 341M, held by Mt Isa Mines Ltd, over the Mt Cannindah copper mine. The mineralisation occurs in a brecciated tuffaceous mudstone along the edge of a porphyritic dacite intrusion, in metasomatic deposits and possibly as fracture fillings and disseminations in the porphyritic dacite. Just N of Kalpowar a fine grained intrusive of trachyte or microsyenite occurs. This intrusive is almost certainly genetically related to the mineralising dacite at Mt Cannindah and is therefore of some interest. E of Kalpower, a monotonous sequence of porphyritic andesite with lesser tuff, basalt, and chlorite schist crop out. These are correlated with the Muncon Volcanics. Just N of ATP 341M, tuffaceous sediments (Caswell Creek Group) and an andesite-basalt sequence (? Muncon Volcanics) come in contact. Immediately W of ATP 341M lies the Caswell Creek Group (a sequence of shales, siltstone, ?tuff, limestone, arenite, greywacke, pebbly arenite, feldspathic arenite, and conglomerate). This sequence contains a few gossanous outcrops, mostly goethitic, but some with haematite. To the E of ATP 341M is traces of chalcopryrite and malachite in a skarn outcrop. **(D)** The Many Peaks Mine area was also investigated. Thin section work in the mine area indicates a soda-rich volcanic-sedimentary sequence, locally altered by contact metamorphism, metasomatism, and hydrothermal alteration. To the NW of Many Peaks town, the rocks appear more basic. Tuffaceous sediments, agglomerates and impure limestones become more common W and SW of the Many Peaks mine. The volcanics are separated from a sequence of siltstone, limey arenite and limestone to the E by a thin zone of massive quartz, probably representing silicification along a major fault. Between the Hospital and the most northerly large tailings dump at the mine, there are two small strongly mineralised outcrops. The one closest to the mine consists of a few feet of goethite gossan. A shaft sunk here to 18 m penetrated massive sulphides with some copper, and old records indicate gossan, copper-bearing gossan, and copper-bearing? country rock bounded by hanging wall serpentinite containing copper. Near the hospitable, a 1.5 m wide strongly cupriferous serpentinite shear is in contact with a gossan from 0.3 to 1.5 m wide.

GEOCHEMISTRY - (A) Rock chip samples from the diorite in the Glassford Granodiorite, which contained tenorite and rare chalcopryrite, returned 505 to 3700 ppm Cu. A soil survey was also carried out over this area returning a maximum value of 400 ppm Cu. Copper values in rock ranged from 505 to 3700 ppm Cu, and it is obvious that copper is not being trapped in the soil in this area. **(B)** In the Burns Spur mine area, sampling of the best gossan returned 30 m of 1.6% Cu and 6.8 dwt Ag. On the centre of the gossan, the bottom of a shaft underlying to the N assayed 2.4% Cu and 11.7 dwt Ag. A high grade chalcocite area in the old open cut, assayed about 35% Cu and 45.7 dwt Ag, over 1 m. Adit sampling W of the outcrop showed lower values in limonitic syenite. A soil sampling survey over the mine showed a copper anomaly about 300 m by 115 m centred around the outcropping gossans. This anomaly ranged from 450 to >2000 ppm Cu. The anomaly indicates no major extension of the outcropping mineralisation. Chip sampling of Number 3 Gossan assayed 15 m of 0.7% Cu & 2 dwt Ag. **(C)** Two rock chip samples from the skarn to the E of ATP 341M returned 475 and 430 ppm Cu, and 440 and 130 ppm Pb. 500 m to the NE is an area of poor outcrop, and a rock chip sample of gossan scree assayed 1650 ppm Cu, but the source of the scree has not been located. Two outcrops just W of ATP 341M assayed 650 & 590 ppm Cu. A rock chip of fractured goethitic sediments nearby assayed 390 ppm Cu, and accessory chalcopryrite is inferred in the primary zone in this area. An isolated rock chip sample from a fractured goethitic siltstone returned 33 ppm Ag. The presence of sulphides in moderate amounts, together with some anomalous amounts of Cu and Ag, show the area W of ATP 341M to be worthy of follow up work. **(D)** A soil sampling survey was carried out over the area between Many Peaks mine and the Hospital. The results disclosed a copper anomaly centred on surface showing of copper near the Hospital. The anomaly suggests that the mineralisation is more extensive than outcrops indicate, and a sharp drop off in values to the N may be due to a structural cutoff.

8) Mt Seaview (58 km SW of Calliope)

GEOLOGY - This area occurs wholly within the Yarrol Basin, and on the W flank of the Yarrol-Mt Morgan arch. The sediments and volcanics in the area are Carboniferous, and consist of fine grained

sandstones, siltstones, graywackes, conglomerates, tuffs, agglomerates, and intermediate volcanic flows. Two limestone lenses were also located in the area. Both are recrystallised to marble, and one contains appreciable skarn material, and is the host for the Lightning Ridge mineralisation. This mineralisation occurs as copper carbonate mineralisation in skarn. Syngenetic pyrite is a common constituent of the sediments and volcanics, and it also replaces fossils in some localities. On the Monto 1:250,000 geology map, these rocks are divided into two units, the Caswell Creek Group and the Crana beds, but these individual units were not identified in the field. Intruding this sequence are bodies of intermediate to acid granitic rocks of probable Permian age. All the sedimentary and volcanic rocks in the area are altered to some degree by the intrusion. The most wide spread alteration is silicification. The largest intrusion in the area is the Mt Seaview Complex. This body consists of an adamellite core surrounded by a fringe of diorite. Gold mineralisation is hosted in quartz veins in the adamellite (Cattle Creek section of the Tablelands Gold Field) and diorite (Callide Creek Flats of the Tablelands Gold Field) differentiates of the Mt Seaview Complex. On the flanks of Mt Pack are two intrusions of muscovite granite called the Crow Creek Granite. The W most body is the host of the Mt Pack gold reefs. The central portion of this body is altered to quartz-kaolin-sericite rocks, as is the portion adjacent to the reefs. The E granite is free from mineralisation or alteration except along the walls of a siliceous zone. In the NW corner of the area, two slightly altered adamellite plugs were located. Along the N boundary of the area is another intrusion of syenite, diorite and monzonite. The granitic rocks are intruded by swarms of trachyandesite dykes.

GEOCHEMISTRY - 205 stream sediment, 30 rock chip and 48 soil samples were collected. The stream samples revealed that anomalous copper results in the Tableland Field are in the range of 100 to 250 ppm, and those in the Crow Creek area returned 50 to 70 ppm Cu. One other area on the N border contains values in the 100 to 120 ppm Cu range. The zinc and molybdenum do not show any significant results. Rock chip samples were collected from most of the dumps and also from the veins exposed. The results indicate: The area has low potential for copper; economic concentrations appear restricted to the narrow quartz-sulphide veins; and the Pb, Zn, and Ag values at the W end of Cattle Creek alteration zone show it is worth further work.

9) Mt Rose

GEOLOGY - Sediments and volcanics of the Caswell Creek Group or the Dawes Range Formation occupy most of the area. Rock types are limestone, oolitic limestone, conglomerate, andesite, trachyandesite, shale, siltstone, ?tuff, arkose, lithic arenite, and pebbly arenite. The sequence is characterised by rapid variations in grain size and the presence of carbonate. A porphyritic rhyolite mass appears to intrude the sedimentary sequence along Langtry Gully. Some metasomatism is present, particularly near Three Moon Creek, and the intrusive is associated with mineralisation. The area comprises part of the Cania and Kroombit Gold and Mineral Field, and alluvial gold workings are common in Three Moon Creek, Four Mile Creek, and Langtry Gully. Lode gold has been worked on both sides of Langtry Gully, and at Mt Rose. Copper mineralisation has been observed in association with the gold, especially near Langtry Gully. Skarn outcrops carrying copper mineralisation occur near the E edge of the rhyolite.

GEOCHEMISTRY - 30 stream sediment samples were collected. Four weakly anomalous copper values (60 to 90 ppm) and one weakly anomalous zinc value (87 ppm) was returned.

RECORDER: Paul Blake

DATE: 15/11/1994.

COMPANY REPORT SUMMARY SHEET

CR: 3263 **STATUS:** Open

TITLE:

AUTHOR(S): **DATE:**

ATP/EP No.: ATP 397M

COMPANY HOLDING TITLE: Noranda Australia Limited

COMPANY SUBMITTING REPORT: Noranda Australia Limited

DATE GRANTED: 01/05/1967 **PERIOD:**

1:100 000 SHEET NAME(S): Biloela, Calliope & Bajool

1:250 000 SHEET NAME(S): Monto & Rockhampton

LOCATION: Galloway Plains (Area 1), Calliope (Area 2) & Many Peaks (Area 3)

MINING DISTRICT:

MINES/PROSPECTS: Alma Creek, Diglum Creek, Many Peaks, Mt Rose, Riverston, Specimen Hill,
and Wildhorse.

EXPLORATION TARGETS\MODELS: Porphyry Copper Deposits

SUMMARY:

There was no written text for this report, only edited maps showing geochemical results in some areas.

RECORDER: Paul Blake **DATE:** 15/11/1994.

COMPANY REPORT SUMMARY SHEET

CR: 3959 **STATUS:** Open

TITLE: Final Report, Authority to Prospect No. 397M, Queensland.

AUTHOR(S): **DATE:** 1971

ATP/EP No.: ATP 397M

COMPANY HOLDING TITLE: Noranda Australia Limited

COMPANY SUBMITTING REPORT: Noranda Australia Limited

DATE GRANTED: 01/05/1967 **PERIOD:**

1:100 000 SHEET NAME(S): Biloela, Calliope & Bajool

1:250 000 SHEET NAME(S): Monto

LOCATION: Galloway Plains (Area 1), Calliope (Area 2) & Many Peaks (Area 3)

MINING DISTRICT:

MINES/PROSPECTS: Alma Creek, Diglum Creek, Many Peaks, Mt Rose, Riverston, Specimen Hill, and Wildhorse.

EXPLORATION TARGETS\MODELS: Porphyry Copper Deposits

SUMMARY:

LOCALISED EXPLORATION/PROSPECTS

1) Alma Creek

GEOLOGY - Reports of mineralisation in the area given by local graziers were followed-up. Malachite was noted in hornblende aggregates in the W portion. Just outside the area, old workings have exposed disseminated chalcopyrite and malachite closely associated with quartz veins infilling fault planes in the granodiorite. The mineralised areas are small and very low grade. It is recommended that this block be relinquished.

2) Specimen Hill

GEOLOGY - The area was briefly reassessed. It was decided that the area had been adequately investigated and that it should be relinquished.

3) Riverston

GEOLOGY - It was concluded that the host of mineralisation was too small and the indicated grade too weak to warrant subsurface investigation. Therefore it is recommended that the area be relinquished.

4) Ridler Creek

GEOLOGY - The Ridler Creek was described in previous reports as part of the Many Peaks area. Large bodies of disseminated sulphides and oxides were tested by drilling, but were found to contain low copper values.

GEOPHYSICS - The Ridler Creek Prospect was covered by ground magnetic and IP surveys. It was found that the magnetics in the area have been influenced by; **(1)** weak introduction of magnetite, **(2)** formation of magnetite during propylitic alteration of mafic minerals, and **(3)** the intrusion of post

alteration magnetite-rich diorite dykes. Because of this magnetic background, and as significant copper segregations were not associated with increased magnetite concentrations, the results of the magnetometer survey were ambiguous. The IP survey identified three areas of anomalous response; **(a)** A broad anomaly, roughly 330 by 200 m, containing the Burns Spur mine. Drilling indicated enough pyrite and magnetite to account for this broad anomaly. **(b)** The second anomaly was too small to be considered worthy of drilling. **(c)** The third anomaly was broad, approximately 330 by 130 m. Drilling again indicated that the anomaly was due to disseminated pyrite and magnetite without significant chalcopyrite. Therefore the area was relinquished.

DRILLING - Six percussion drill holes totalling 540 m were completed but only low copper values were encountered.

5) Diglum Creek

GEOLOGY - One rock chip sample taken in 1969 returned 1700 ppm Cu. Fieldwork was carried out to follow-up this anomalous result. However, no copper mineralisation was found associated with the granodiorite. Minor propylitic alteration was noted, but this is considered to be a marginal contact phenomenon and of no economic importance.

6) Munholme Creek

GEOLOGY - Present in the area are two Lower Carboniferous formations and the intrusive Munholme Creek Complex. The rock types in the intrusive vary from diorite, quartz diorite to feldspar porphyry. The quartz diorite has in part been extensively altered to a pyrite bearing phase, which is bordered by a weak zone of propylitic alteration. The conclusions from mapping in the area are; **(a)** The pyritic alteration zone is considered to be structurally controlled and is extensive enough to warrant further investigation. **(b)** Copper mineralisation within the Munholme Creek Complex is limited in both intensity and extent. **(c)** In the two Carboniferous formations, copper mineralisation is confined to faults. No occurrence investigated is considered to be of economic importance. ML 460, 470, 473, and 559 cover parts of this area.

7) Many Peaks

GEOLOGY - Additional mineralisation located during this year includes gold-copper with dioritic plugs near Yarrol, copper in skarns and fracture zones at Kalpower, copper-lead-silver in a shear zone at Sugarbag Creek, a pyritic body about 800 m N of Barrimoon Station. The various mineral occurrences are controlled by at least 3 different geological conditions; shearing (as at Many Peaks mine), brecciation (as at Mt Cannindah), and favourable lithology (as at Apple Tree Creek). It is recommended that ground be retained for further exploration in four areas; **(a)** Sugarbag Creek - to cover the main fracture zone. **(b)** Many Peaks - to cover the lode. **(c)** Kalpower - to cover known and inferred mineralisation around the Mt Isa Leases. **(d)** Yarrol - to cover the copper bearing dioritic plugs.

GEOCHEMISTRY - Stream sediment sampling indicate that the drainage systems from the Many Peaks and Mt Cannindah Mines both have copper contents of greater than ten times local background, but there is no corresponding increase in lead or zinc concentrations. The intensity of these anomalies has been accentuated by mining operations. Apart from the two old mining districts, five significant anomalies were delineated. **(a)** **Yarrol** - Eight samples gave Cu values between 2 and 3 times background. This area coincides with the two cupriferous diorite plugs. **(b)** **Kalpower** - Five streams draining Noranda's area gave copper anomalies ranging from five to ten times local background. In addition, samples draining Mt Isa's leases gave Cu values around four times background. **(c)** **Mt Goondicum Complex** - results up to two times background lead and zinc were obtained along with some exceptionally high copper values. In addition, a solitary molybdenum anomaly of 100 ppm was obtained. No mineralisation has been located in the vicinity, and it has been suggested that the anomalies are due to contamination by agricultural activities. **(d)** **Sugarbag Creek** - A copper-lead anomaly coincides with an area of known mineralisation. Copper values were up to 1300 ppm, and lead values up to 240 ppm also occur. **(e)** **Barney Creek** - In this region, a widespread anomaly of 6 to 20 times background was outlined in the Boiling Creek Group. The area has been thoroughly traversed and no sign of mineralisation was seen. It is tentatively concluded that the anomaly results from dioritic

intrusions in the vicinity. Samples taken from streams in the vicinity of the Yarrol Fault were analysed for nickel. Background values in the geosynclinal sediments are in the range of 15 to 30 ppm Zn, while in sequences containing basaltic lavas they range from 40 to 70 ppm Zn. Samples taken adjacent to known serpentinite bodies have nickel contents greater than 100 ppm.

8) Mt Seaview

GEOLOGY - The Cattle Creek portion of the Mt Seaview area was investigated. The base metal mineralisation is associated with moderated argillic alteration and both are specifically related to shearing planes within the adamellite. Alteration is not pervasive. Extensions of this restricted mineralisation are possible along the NS shears, but are not worth following up. The area is uneconomic and should be relinquished.

9) Mt Rose

GEOLOGY - Further work in the area indicated no economic sized operations. It is recommended that the area be relinquished.

RECORDER: Paul Blake **DATE:** 21/11/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 402M

COMPANY HOLDING TITLE: Morgan Mining & Industrial Company Pty Limited

COMPANY SUBMITTING REPORT: Morgan Mining & Industrial Company Pty Limited

DATE GRANTED: 01/05/1967 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan & Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Approximately 30 km S of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Anomalous Area 1, Anomalous Area 2, and Crater Grid

EXPLORATION TARGETS\MODELS: Base Metals

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File- 2632*

Confidential-

SUMMARY:

GEOLOGY -

LOCAL - A large part of the area is comprised of a heterogenous assortment of volcanic rocks belonging to the Capella Creek beds. These beds include both primary and reworked volcanic rocks and subordinate sediments. A prominent circular structure which probably represents a volcanic crater, and is observable on aerial photos is located approximately 4.7 km WSW of the Eulogie Park Homestead. In the NE, the Capella Creek beds have been intruded by the Eulogie Park Gabbro of probable Permian age. The gabbro is layered and saucer-shaped, and comprised of olivine gabbro and ferrigabbro, which have been intruded and brecciated in part by a large mass of diorite. A small basalt capping forms a prominent topographic high in the gabbro immediately W of the Eulogie Park Homestead. In the N of the tenement, the Capella Creek beds have been intruded by diorite also of probable Permian age.

MINERALISATION/ALTERATION - Traces of copper mineralisation including chalcopyrite and copper carbonates have been observed in agglomerates and breccias within the Capella Creek beds. These mineral occurrences are invariably in close proximity to dykes. Minor chalcopyrite and bornite associated with epidote were noted in volcanic breccia at the summit of the crater mentioned earlier. Two workings were located in the Capella Creek beds SE of the Eulogie Park Gabbro. One working consisted of an abandoned shaft sunk on minor copper carbonates within andesite and agglomerate. The second workings (held under lease) has had the surface material removed exposing scattered copper carbonates in andesitic rocks adjacent to a large NW-SE trending dyke. Finely disseminated pyrite was observed in hornfels adjacent to the W margin of the Eulogie Park Gabbro. Titaniferous magnetite is a common accessory mineral in the gabbro and in some instances was concentrated in narrow bands, none of which were of sufficient size to warrant testing for other significant elements.

REGIONAL EXPLORATION

GEOLOGICAL MAPPING - Regional geological mapping has been completed over approximately half of the area.

GEOCHEMISTRY

- **stream sediment sampling** - Close interval sediment sampling was employed over the ATP with the exception of an area in the NW where intensive cultivation has resulted in severe disturbance of the soil and drainage channels. Copper and zinc analyses were completed on all samples collected and nickel analyses were done on samples collected from sediments within and adjacent to the Eulogie Park Gabbro. **(A) Copper Results** - A background of 40 to 45 ppm Cu is returned from streams draining the Eulogie Park Gabbro, and 60 to 70 ppm Cu from streams draining the Capella Creek beds. Strongly anomalous copper values were not obtained. Two area associated with weakly anomalous Cu values were followed up and the results indicate that minor and scattered insignificant copper mineralisation caused the anomalies. **(B) Zinc Results** - Four spot high zinc anomalies ranging from 322 to 523 ppm Zn and one strongly anomalous value of 1480 ppm Zn, were recorded from streams draining the Capella Creek beds. **(C) Nickel Results** - Values ranged from nil to 155 ppm Ni. No appreciable difference in values were recorded from sediments draining the Eulogie Park Gabbro to those draining the Capella Creek beds. The copper, and to a lesser extent zinc results, outlined two areas for further investigation, called Anomalous Areas 1 and 2.

LOCALISED EXPLORATION/PROSPECTS

1) Anomalous Area 1

GEOLOGY - The area is comprised of andesite and rhyolite flows and pyroclastics. The andesites are dark, fine grained and sometimes amygdaloidal with quartz and zeolite infillings. They sometimes exhibit flow or jasper banding. The rhyolites are fine grained and light in colour. The pyroclastics consist of breccias, lapilli tuffs, agglomerates, and reworked agglomerates. Quartz veins were noticed in some of the andesites, but were more common in the rhyolites. Many of the rock types contain abundant epidote often accompanied by introduce silica. The rocks dip gently to the W and are intruded by several microdiorite dykes striking generally NNW-SSE. Minor copper mineralisation was noted as malachite infillings of fractures within andesites and as small blebs of chalcopyrite in a small boulder of flow breccia.

GEOCHEMISTRY - Further stream sediment samples were collected but the low order copper anomalies indicated from the regional program were not confirmed. Only 2 copper values over 100 ppm were obtained, these being spot highs of 120 and 130 ppm Cu. The highest zinc value obtained was a spot high of 120 ppm Zn.

2) Anomalous Area 2

GEOLOGY - The area chiefly consists of pyroclastics and andesite flows. The pyroclastics, which were intruded in the N by small offshoots of the Eulogie Park Gabbro, are extremely variable, ranging from tuffs to agglomerates and breccias. Epidote and quartz veins are common. The andesite flows are dark,

fine grained and rarely porphyritic. They are sometimes vesicular with the vesicles rarely filled with quartz, chlorite, and zeolites. The andesites are often rich in epidote and rarely exhibit flow and jasper banding. Andesite, porphyritic andesite and microdiorite dykes are common and generally strike NNW-SSE. Malachite and azurite were noted in andesites and agglomerates adjacent to dykes. The copper carbonates occur as vesicle infillings in the pyroclastics and along joint planes in the andesite. A narrow copper bearing vein was traced over a distance of 8 m.

GEOCHEMISTRY - Further stream sediment samples were collected from the area, confirming the copper anomaly. The maximum values obtained were 205 ppm Cu and 185 ppm Zn.

3) Crater Grid

GEOLOGY - Owing to shallow soil cover over much of the grid, rock outcrop was scant. However, the surrounding lip of the crater was comprised of andesite flows, agglomerates, breccias and lapilli tuffs. Traces of chalcopyrite and bornite were observed in one small portion of the grid.

GEOCHEMISTRY - A small grid was established over the area and soil sampled. The maximum copper values was only 315 ppm Cu, with the background being approximately 70 to 80 ppm Cu. The maximum zinc values was 792 ppm Zn, and the overall background was in the range of 70 to 80 ppm Zn.

GEOPHYSICS - A magnetometer survey was conducted over the grid and only narrow, sharp fluctuations were recorded on an otherwise featureless profile.

RECORDER: Paul Blake **DATE:** 26/10/1994.

COMPANY REPORT SUMMARY SHEET

CR: 2632 **STATUS:** Open

TITLE: Final Report. Authority to Prospect 402M.

AUTHOR(S): **DATE:** October 1968

ATP/EP No.: ATP 402M

COMPANY HOLDING TITLE: Morgan Mining & Industrial Company Pty Limited

COMPANY SUBMITTING REPORT: Morgan Mining & Industrial Company Pty Limited

DATE GRANTED: 01/05/1967 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan & Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Approximately 30 km S of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Anomalous Area 1, Anomalous Area 2, and Crater Grid

EXPLORATION TARGETS\MODELS: Base Metals

SUMMARY:

GEOLOGY -

LOCAL - A large part of the area is comprised of a heterogenous assortment of volcanic rocks belonging to the Capella Creek beds. These beds include both primary and reworked volcanic rocks and subordinate sediments. A prominent circular structure which probably represents a volcanic crater, and is observable on aerial photos is located approximately 4.7 km WSW of the Eulogie Park Homestead. Andesite flows, lapilli tuffs, flow breccias and agglomerates form prominent outcrops on and adjacent to this crater. In the NE, the Capella Creek beds have been intruded by the Eulogie Park Gabbro of probable Permian age. The gabbro is layered and saucer-shaped, and comprised of olivine gabbro and ferrigabbro, which have been intruded and brecciated in part by a large mass of diorite. A small basalt capping forms a prominent topographic high in the gabbro immediately W of the Eulogie Park Homestead. In the N of the tenement, the Capella Creek beds have been intruded by diorite also of probable Permian age.

MINERALISATION/ALTERATION - Traces of copper mineralisation including chalcopyrite and copper carbonates have been observed in agglomerates and breccias within the Capella Creek beds. These mineral occurrences are invariably in close proximity to dykes. Minor chalcopyrite and bornite associated with epidote were noted in volcanic breccia at the summit of the crater mentioned earlier. Two workings were located in the Capella Creek beds SE of the Eulogie Park Gabbro. One working consisted of an abandoned shaft sunk on minor copper carbonates within andesite and agglomerate rock types. The second workings (held under lease) has had the surface material removed exposing scattered copper carbonates in andesitic rocks adjacent to a large NW-SE trending dyke. Finely disseminated pyrite was observed in hornfels adjacent to the W margin of the Eulogie Park Gabbro. Titaniferous magnetite is a common accessory mineral in the gabbro and in some instances was concentrated in narrow bands, none of which were of sufficient size to warrant testing for other significant elements.

REGIONAL EXPLORATION

GEOLOGICAL MAPPING - Regional geological mapping has been completed over approximately half of the area.

GEOCHEMISTRY

- **stream sediment sampling** - Close interval sediment sampling was employed over the ATP with the exception of an area in the NW where intensive cultivation has resulted in severe disturbance of the soil and drainage channels. Copper and zinc analyses were completed on all samples collected and nickel analyses were done on samples collected from sediments within and adjacent to the Eulogie Park Gabbro. **(A) Copper Results** - A background of 40 to 45 ppm Cu is returned from streams draining the Eulogie Park Gabbro, and 60 to 70 ppm Cu from streams draining the Capella Creek beds. Strongly anomalous copper values were not obtained. Two areas associated with weakly anomalous Cu values were followed up and the results indicate that minor and scattered insignificant copper mineralisation caused the anomalies. **(B) Zinc Results** - Four spot high zinc anomalies ranging from 322 to 523 ppm Zn and one strongly anomalous value of 1480 ppm Zn, were recorded from streams draining the Capella Creek beds. **(C) Nickel Results** - Values ranged from nil to 155 ppm Ni. No appreciable difference in values were recorded from sediments draining the Eulogie Park Gabbro to those draining the Capella Creek beds. The copper, and to a lesser extent zinc results, outlined two areas for further investigation, called Anomalous Areas Nos 1 and 2.

LOCALISED EXPLORATION/PROSPECTS

1) Anomalous Area 1

GEOLOGY - The area is comprised of andesite and rhyolite flows and pyroclastics. The andesites are dark, fine grained and sometimes amygdaloidal with quartz and zeolite infillings. They sometimes exhibit flow or jasper banding. The rhyolites are fine grained and light in colour. The pyroclastics consist of breccias, lapilli tuffs, agglomerates, and reworked agglomerates. Quartz veins were noticed in some of the andesites, but were more common in the rhyolites. Many of the rock types contain abundant epidote often accompanied by introduced silica. The rocks dip gently to the W and are intruded by several microdiorite dykes striking generally NNW-SSE. Minor copper mineralisation was noted as malachite infillings of fractures within andesites and as small blebs of chalcopyrite in a small boulder of flow breccia.

GEOCHEMISTRY - Further stream sediment samples were collected but the low order copper anomalies indicated from the regional program were not confirmed. Only 2 copper values over 100 ppm were obtained, these being spot highs of 120 and 130 ppm Cu. The highest zinc value obtained was a spot high of 120 ppm Zn.

2) Anomalous Area 2

GEOLOGY - The area chiefly consists of pyroclastics and andesite flows. Three sequences were recognised in the area; a thick sequence of pyroclastics, a second sequence of interbedded andesites and pyroclastics and a third sequence of andesites capped by pyroclastics. The pyroclastics, which were intruded in the N by small offshoots of the Eulogie Park Gabbro, are extremely variable, ranging from tuffs to agglomerates and breccias. The fragments which are up to 1 m in diameter are often rich in epidote. Epidote and quartz veins are both common. The andesite flows are dark, fine grained and rarely porphyritic. They are sometimes vesicular with the vesicles rarely filled with quartz, chlorite, and zeolites. The andesites are often rich in epidote and occasionally exhibit flow and jasper banding. Andesite, porphyritic andesite and microdiorite dykes are common in the area and generally strike NNW-SSE. Malachite and azurite were noted in andesites and agglomerates adjacent to dykes. The copper carbonates occur as vesicle infillings in the pyroclastics and along joint planes in the andesite. A narrow copper bearing vein was traced over a distance of 8 m.

GEOCHEMISTRY - Further stream sediment samples were collected from the area, confirming the copper anomaly. The maximum values obtained were 205 ppm Cu and 185 ppm Zn.

3) Crater Grid

GEOLOGY - Owing to shallow soil cover over much of the grid, rock outcrop was scant. However, the surrounding lip of the crater was comprised of andesite flows, agglomerates, breccias and lapilli tuffs. Traces of chalcopyrite and bornite were observed in one small portion of the grid.

GEOCHEMISTRY - A small grid was established over the area and soil sampled. The maximum copper values was only 315 ppm Cu, with the background being approximately 70 to 80 ppm Cu. The maximum zinc values was 792 ppm Zn, and the overall background was in the range of 70 to 80 ppm Zn.

GEOPHYSICS - A magnetometer survey was conducted over the grid and only narrow, sharp fluctuations were recorded on an otherwise featureless profile.

RECORDER: Paul Blake **DATE:** 26/10/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 403M

COMPANY HOLDING TITLE: Morgan Mining & Industrial Company Pty Ltd

COMPANY SUBMITTING REPORT: Geopeko Limited

DATE GRANTED: **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan & Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Struck Oil area, Walterhall area, Hamilton Creek grid

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: Copper, zinc

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File- 2624, 2635*

SUMMARY:

GEOLOGY -

REGIONAL - A sequence of interbedded sediments and volcanics intruded by the Mount Morgan complex. The sedimentary sequence consists of sandstones, siltstones, fine grained quartzites, conglomerates, and breccias with interbedded limestones lenses. Regional strike is NNW, overall bedding and structure is indistinct, although on the E boundary of the ATP beds dip NE between 50°-60°. An Upper Devonian age was given based on rugose and tabulate coral determinations (Jell, 1967), and conodont determinations (Druce, 1967). The volcanic sequence consists of quartz porphyries, andesites, andesitic agglomerates (epiclastics) and tuffs. The Mount Morgan Complex, elongate parallel to regional strike, is mainly composed of quartz diorite and tonalite, with more acidic and basic variants of those rock-types. Intermediate, basic and aplite veins are present.

MINERALISATION/ALTERATION - Gold, copper, lead, zinc, and molybdenum have been reported in the area. The periods 1901-1902 and 1934-1944, 325 698 cubic metres of gravel and 124 134 g of Au was dredged from Cavial Creek. Gold was also sought from prospective alluvium and veins. Copper and molybdenum were generally found in veins in an area immediately E of Mount Morgan. Trace copper found in association with some gold workings. Minor lead-zinc noted in quartz veins in some pits sunk on gold indications along the Dee River.

REGIONAL EXPLORATION

GEOCHEMISTRY

- **stream sediment sampling** - Drainage geochemical sampling was taken for both copper and zinc - two anomalies were found. Follow up work was commenced at Struck Oil and Walterhall. The former had copper values up to 512 ppm (background 60-80 ppm), the latter 300 ppm (background 50-60 ppm).

GEOPHYSICS

- **ground surveys** - December 1967 Hasting Dearing - Queensland Pty Ltd conducted a seismic investigation (seven traverses) for Mount Morgan & Industrial Co. Pty. Ltd. of a portion of Gavial Creek. Tabulated results are in the report.

LOCALISED EXPLORATION/PROSPECTS

1) Struck Oil Area -

GEOLOGY - To the west Mount Morgan Complex intrudes into quartz porphyries and 'rhyolites' of the Moongan Corridor. Also present are the interbedded sequence of sediments and volcanics defined previously. Dioritic dykes are evident in the east of the area. Gold was sought for last century with the presence of numerous pits, mostly dug in veins. Few minerals were found in the pit other than gold. Some copper, molybdenum and silver were also recorded (see Figure 1).

GEOCHEMISTRY - Soil sampling to 30 cm and profiling to 90 cm was conducted on a ridge and spur basis with analysis for Cu, Zn, Mo. Copper highs trending E-W were evident from the results.

GEOPHYSICS - An orientation survey was carried out on three traverses. The results show a magnetic high exists in close proximity to the geochemical anomaly.

2) Walterhall Area -

GEOLOGY - Quartz diorite and tonalite (with basic and acidic variants) comprise most of the area. NE and NW trending microdiorite and andesite dykes intrude the quartz diorite. Aplite and quartz veins are common to the area. Quartz veins and stringers worked over with presence of chalcopyrite, magnetite and molybdenite. (See Figure 2).

GEOCHEMISTRY - Closer stream sediment sampling was done to confirm the anomaly. Ridge and spur soil sampling was carried out to determine its extent. Some values as high as 1 000 ppm and 1 330 ppm copper were recorded.

3) Hamilton Creek Grid - In the SW of the Authority traces of chalcopyrite associated with magnetite were noted in the brecciated contact between granite and siliceous volcanics. A 244 m x 732 m grid was soil surveyed for copper, zinc and nickel, and was also covered by magnetometer and self potential methods. Strongest magnetic and self potential anomalies coincide with areas of observed magnetic-rich zones. Off-set copper and zinc anomalies can be related to this zone.

RECORDER: Simon Crouch **DATE:** 28/03/1994.

COMPANY REPORT SUMMARY SHEET

CR: 2624 **STATUS:** Open

TITLE: Final report - Authority to Prospect 403M

AUTHOR(S): **DATE:** October, 1968

ATP/EP No.: ATP 403M

COMPANY HOLDING TITLE: Morgan Mining & Industrial Company Pty Ltd

COMPANY SUBMITTING REPORT: Geopeko Limited

DATE GRANTED: **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan & Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Struck Oil area, Waltherhall area, Hamilton Creek grid

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: Copper, zinc

SUMMARY:

GEOLOGY -

REGIONAL - A sequence of interbedded sediments and volcanics intruded by the Mount Morgan complex. The sedimentary sequence consists of sandstones, siltstones, fine grained quartzites, conglomerates, and breccias with interbedded limestones lenses. Regional strike is NNW, overall bedding and structure is indistinct, although on the E boundary of the ATP beds dip NE between 50°-60°. An Upper Devonian age was given based on rugose and tabulate coral determinations (Jell, 1967), and conodont determinations (Druce, 1967). The volcanic sequence consists of quartz porphyries, andesites, andesitic agglomerates (epiclastics) and tuffs. The Mount Morgan Complex, elongate parallel to regional strike, is mainly composed of quartz diorite and tonalite, with more acidic and basic variants of those rock-types. Intermediate, basic and aplite veins are present.

MINERALISATION/ALTERATION - Gold, copper, lead, zinc, and molybdenum have been reported in the area. The periods 1901-1902 and 1934-1944, 325 698 cubic metres of gravel and 124 134 g of Au was dredged from Cavial Creek. Gold was also sought from prospective alluvium and veins. Copper and molybdenum were generally found in veins in an area immediately E of Mount Morgan. Trace copper found in association with some gold workings. Minor lead-zinc noted in quartz veins in some pits sunk on gold indications along the Dee River.

REGIONAL EXPLORATION

GEOCHEMISTRY

- **stream sediment sampling** - Drainage geochemical sampling was taken for both copper and zinc - two anomalies were found. Follow up work was commenced at Struck Oil and Waltherhall. The former had copper values up to 512 ppm (background 60-80 ppm), the latter 300 ppm (background 50-60 ppm).

GEOPHYSICS

- **ground surveys** - December 1967 Hasting Dearing - Queensland Pty Ltd conducted a seismic investigation (seven traverses) for Mount Morgan & Industrial Co. Pty. Ltd. of a portion of Gavial Creek. Tabulated results are in the report.

LOCALISED EXPLORATION/PROSPECTS

1) Struck Oil Area -

GEOLOGY - To the west Mount Morgan Complex intrudes into quartz porphyries and 'rhyolites' of the Moongan Corridor. Also present are the interbedded sequence of sediments and volcanics defined previously. Dioritic dykes are evident in the east of the area. Gold was sought for last century with the presence of numerous pits, mostly dug in veins. Few minerals were found in the pit other than gold. Some copper, molybdenum and silver were also recorded (see Figure 1).

GEOCHEMISTRY - Soil sampling to 30 cm and profiling to 90 cm was conducted on a ridge and spur basis with analysis for Cu, Zn, Mo. Copper highs trending E-W were evident from the results.

GEOPHYSICS - An orientation survey was carried out on three traverses. The results show a magnetic high exists in close proximity to the geochemical anomaly.

2) Walterhall Area -

GEOLOGY - Quartz diorite and tonalite (with basic and acidic variants) comprise most of the area. NE and NW trending microdiorite and andesite dykes intrude the quartz diorite. Aplite and quartz veins are common to the area. Quartz veins and stringers worked over with presence of chalcopyrite, magnetite and molybdenite. (See Figure 2).

GEOCHEMISTRY - Closer stream sediment sampling was done to confirm the anomaly. Ridge and spur soil sampling was carried out to determine its extent. Some values as high as 1 000 ppm and 1 330 ppm copper were recorded.

3) Hamilton Creek Grid - In the SW of the Authority traces of chalcopyrite associated with magnetite were noted in the brecciated contact between granite and siliceous volcanics. A 244 m x 732 m grid was soil surveyed for copper, zinc and nickel, and was also covered by magnetometer and self potential methods. Strongest magnetic and self potential anomalies coincide with areas of observed magnetic-rich zones. Off-set copper and zinc anomalies can be related to this zone.

RECORDER: Simon Crouch **DATE:** 28/03/1994.

COMPANY REPORT SUMMARY SHEET

CR: 2635 **STATUS:** Open

TITLE: Final report - Authority to Prospect 403M

AUTHOR(S): **DATE:** October, 1968

ATP/EP No.: ATP 403M

COMPANY HOLDING TITLE: Morgan Mining & Industrial Company Pty Ltd

COMPANY SUBMITTING REPORT: Geopeko Limited

DATE GRANTED: **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan & Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Struck Oil area, Waltherhall area, Hamilton Creek grid

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: Copper, zinc

SUMMARY:

GEOLOGY -

REGIONAL - A sequence of interbedded sediments and volcanics intruded by the Mount Morgan complex. The sedimentary sequence consists of sandstones, siltstones, fine grained quartzites, conglomerates, and breccias with interbedded limestones lenses. Regional strike is NNW, overall bedding and structure is indistinct, although on the E boundary of the ATP beds dip NE between 50°-60°. An Upper Devonian age was given based on rugose and tabulate coral determinations (Jell, 1967), and conodont determinations (Druce, 1967). The volcanic sequence consists of quartz porphyries, andesites, andesitic agglomerates (epiclastics) and tuffs. The Mount Morgan Complex, elongate parallel to regional strike, is mainly composed of quartz diorite and tonalite, with more acidic and basic variants of those rock-types. Intermediate, basic and aplite veins are present.

MINERALISATION/ALTERATION - Gold, copper, lead, zinc, and molybdenum have been reported in the area. The periods 1901-1902 and 1934-1944, 325 698 cubic metres of gravel and 124 134 g of Au was dredged from Cavial Creek. Gold was also sought from prospective alluvium and veins. Copper and molybdenum were generally found in veins in an area immediately E of Mount Morgan. Trace copper found in association with some gold workings. Minor lead-zinc noted in quartz veins in some pits sunk on gold indications along the Dee River.

REGIONAL EXPLORATION

GEOCHEMISTRY

- **stream sediment sampling** - Drainage geochemical sampling was taken for both copper and zinc - two anomalies were found. Follow up work was commenced at Struck Oil and Waltherhall. The former had copper values up to 512 ppm (background 60-80 ppm), the latter 300 ppm (background 50-60 ppm).

GEOPHYSICS

- **ground surveys** - December 1967 Hasting Dearing - Queensland Pty Ltd conducted a seismic investigation (seven traverses) for Mount Morgan & Industrial Co. Pty. Ltd. of a portion of Gavial Creek. Tabulated results are in the report.

LOCALISED EXPLORATION/PROSPECTS

1) Struck Oil Area -

GEOLOGY - To the west Mount Morgan Complex intrudes into quartz porphyries and 'rhyolites' of the Moongan Corridor. Also present are the interbedded sequence of sediments and volcanics defined previously. Dioritic dykes are evident in the east of the area. Gold was sought for last century with the presence of numerous pits, mostly dug in veins. Few minerals were found in the pit other than gold. Some copper, molybdenum and silver were also recorded (see Figure 1).

GEOCHEMISTRY - Soil sampling to 30 cm and profiling to 90 cm was conducted on a ridge and spur basis with analysis for Cu, Zn, Mo. Copper highs trending E-W were evident from the results.

GEOPHYSICS - An orientation survey was carried out on three traverses. The results show a magnetic high exists in close proximity to the geochemical anomaly.

2) Walterhall Area -

GEOLOGY - Quartz diorite and tonalite (with basic and acidic variants) comprise most of the area. NE and NW trending microdiorite and andesite dykes intrude the quartz diorite. Aplite and quartz veins are common to the area. Quartz veins and stringers worked over with presence of chalcopyrite, magnetite and molybdenite. (See Figure 2).

GEOCHEMISTRY - Closer stream sediment sampling was done to confirm the anomaly. Ridge and spur soil sampling was carried out to determine its extent. Some values as high as 1 000 ppm and 1 330 ppm copper were recorded.

3) Hamilton Creek Grid - In the SW of the Authority traces of chalcopyrite associated with magnetite were noted in the brecciated contact between granite and siliceous volcanics. A 244 m x 732 m grid was soil surveyed for copper, zinc and nickel, and was also covered by magnetometer and self potential methods. Strongest magnetic and self potential anomalies coincide with areas of observed magnetic-rich zones. Off-set copper and zinc anomalies can be related to this zone.

RECORDER: Simon Crouch **DATE:** 28/03/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 404M

COMPANY HOLDING TITLE: Noranda Australia Limited

COMPANY SUBMITTING REPORT: Noranda Australia Limited

DATE GRANTED: 01/05/1967 **PERIOD:** 4 years

1:100 000 SHEET NAME(S): Mount Morgan & Banana

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: Rannes area.

MINING DISTRICT:

MINES/PROSPECTS: Grids 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, and 12

EXPLORATION TARGETS\MODELS: Base metals

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To explore for economic deposits of copper and other base metals.

GEOLOGY -

LOCAL - The volcanic and sedimentary rocks which cover most of the ATP have an overall NNW trend. The age, stratigraphic position and inter-relationship of these rocks is controversial. Based on fossils found in the area, the rocks are considered equivalent to the upper part of the Camboon Andesite. Overlying and interfingering with the Camboon Andesite area the Rannes beds, an argillaceous sequence with lenses of volcanic rocks and limestones. Unconformably overlying both the Camboon Andesite and the Rannes beds is the Early Permian Rookwood Volcanics. This unit comprises basic volcanic rocks and crops out along the E edge of the ATP. The Late Permian Back Creek Group overlies the Camboon Andesite, Rannes beds, and the Rookwood Volcanics. Several small syenite, diorite and trachyte plutons intruded in the vicinity of the ATP during the Triassic and Cretaceous. The palaeozoic and Mesozoic rocks in the ATP region are unconformably overlain by the freshwater Tertiary Biloela beds and Tertiary basalt flows. The main periods of deformation in the region appear to have been in the Early Permian and possibly during the major phase of deformation of the Bowen Basin in the Late Triassic.

MINERALISATION/ALTERATION - Copper mineralisation occurs in the Camboon Andesite, Rannes beds and the Rookwood Volcanics. As a rule, the mineralisation occurs in, or is associated with the volcanic rocks of these units. The mineralisation is most extensive in the Camboon Andesite, where it generally occurs in the unweathered flows, and is strongest near the contacts of these rocks with the younger units, or along faults. Surface mineralisation consists of malachite, less common azurite and rare cuprite of fracture surfaces, disseminated or filling vesicles in the vesicular flows. Veins of malachite up to 5 mm thick, and veins of cuprite sometimes occur. Chrysocolla was found in several localities, in one instance associated with box works. Native copper occurs associated with malachite, either as discrete disseminated flakes, or filling vesicles in vesicular rocks. Pyrite mineralisation was seen in all rock units. In the volcanic rocks it is either finely disseminated or occurs as discrete crystals ranging up to 1 cm. In the sedimentary rocks and the cherts it is very finely disseminated.

REGIONAL EXPLORATION

GEOCHEMISTRY

- **stream sediment sampling** - Geochemical stream silt samples were collected from the ATP and assayed for copper. The sample results were statistically studied for background and anomaly values. In many areas, streams with anomalous or sub-anomalous sample values contained a "crust" of calcareous rich sediment on the banks and on the outcropping rocks in the bottom of the streams. These areas were examined for copper mineralisation and where no mineralisation was found, which was in the majority of cases, it was assumed that the high values were the result of the concentration in the calcareous "crust" of small amounts of copper from the breakdown of nearby rocks.

LOCALISED EXPLORATION/PROSPECTS

1) Grid 1 - Beaumont Prospect (approximately 1.5 km S of Rannes)

GEOLOGY - The grid lies in the Camboon Andesite adjacent to the boundary with the Rannes beds. The Camboon Andesite was divided into 4 units; (1) a wide belt of andesite flows, (2) andesitic tuff, (3) slate, and (4) andesite flows. Copper mineralisation is not abundant. Malachite is found in the eastern andesite flow rocks, adjacent to the tuff as staining on shear and joint planes.

GEOCHEMISTRY - Silt samples taken from the stream in the E of the grid have Cu values 10 to 15 ppm higher than the average background of 75 ppm Cu. Rock chip samples taken from the andesite flow with malachite returned 0.01% to 0.05% Cu. Soil sampling delineated two anomalous areas with copper values rising above 200 ppm. The first area lies in the andesitic tuff, and no copper mineralisation could be found on the surface. The second area centres on the mineralisation discussed above. It is considered that the area is not big enough, the surface mineralisation not consistent enough, and the anomalies not high enough to be of economic significance.

2) Grid 2 - Beaumont Prospect (approximately 5 km S of Rennes)

GEOLOGY - The mineralisation in this prospect is extremely patchy. The most extensive mineralised zone (Locality A) extends for approximately 100 m in length and 25 m in width. The mineralisation is patchy and distributed unevenly through the area along a contact between foliated and massive andesite. A shallow pit has been sunk at one point where mineralisation is strong. The mineralisation consists of 90 to 95% malachite, distributed in wispy fractures in the more massive flow andesites, and as paint or in thin streams parallel to foliation planes within the more foliated andesites. Occasionally where mineralisation is well developed, cuprite is present as thin high grade veinlets or kernels, and a few small isolated grains of native copper were seen. One observation of primary sulphides was made, consisting of coarse grains of chalcopyrite in a quartz vein. Therefore the deposit is considered to be one in which the copper occurs in very limited and isolated amounts. The primary mineralisation is probably disseminated chalcopyrite in a few quartz veins, and weathering of these within the top layer of the crust has built up a patchy showing of carbonates.

GEOCHEMISTRY - Stream silt samples from streams draining the prospect have an average value of 90 ppm Cu. Apart from Locality A, all the mineralised outcrops were chip sampled over approximately twice the width of the observed mineralisation. The analyses averaged 0.01 to 0.02% with rare samples having results of 0.1 to 0.5% Cu.

3) Grid 3 - Woolein Creek Reserve (next to Banana-Dululu Road, approximately 8 km S of Rennes)

GEOLOGY - The grid is entirely in the Camboon Andesite, and the main rock types are andesite, tuff, lithic tuff, and agglomerate. Malachite, azurite, cuprite, chalcocite and chrysocolla were identified in a number of patchy showings which extend across a band of andesitic tuff.

GEOCHEMISTRY - About 90 soil samples were collected from the area. The higher general level of geochemical soil values is reflected by better grade copper mineralisation in hand specimen. The survey emphasised the transgressive trend of the mineralisation and eliminated continuation along strike. Because of its transgressive arrangement, general lack of continuity and ill defined widths, this prospect is not considered to be of economic importance.

4) Grid 4 - Jim Creek (located in the centre of the extreme S of the ATP)

GEOLOGY - The area was investigated to follow up numerous spot occurrences of copper mineralisation and a shallow pit. The grid is wholly within the Camboon Andesite. The most common rock type is massive andesite with lesser andesitic tuff and siliceous andesite. Copper mineralisation consists of malachite and azurite either disseminated or as staining on the joint planes of massive andesite and siliceous andesite. Native copper and sulphides are rare. Because of the lack of continuity between mineral occurrences and the unfavourable soil sample values, the area is not considered to be of economic importance.

GEOCHEMISTRY - Stream silt samples taken for the drainage off the area did not give high values (average 75 ppm Cu), but the values are consistently higher than values from adjacent streams draining the same lithology (average of 40 ppm Cu). A rock chip sample from the pit returned 6.55% Cu.

5) Grid 5 (about 3 km E of the SE corner of the ATP)

GEOLOGY - The grid lies across the inferred boundary between the Camboon Andesite and the Rannes beds. In this area the boundary cannot be mapped accurately because both units contain similar rock types, but the boundary can be extrapolated from relationships observed further N. The most common rock type is massive andesite with small amounts of andesitic tuff, sheared andesite, vesicular andesite and lithic tuff. Only one area of copper mineralisation was found in the NE part of the grid area where malachite and azurite occur as coatings on the joint and shear planes in sheared andesite

GEOCHEMISTRY - Several of the stream silt samples from the area exceeded 100 ppm Cu, in a local background of 75 ppm Cu. Soil sampling delineated two anomalous copper areas. One of these was associated with the copper mineralisation mentioned above. The area is not considered to be of economic significance.

6) Grid 6 - (approximately 5 km WSW of Rannes)

GEOLOGY - The area was investigated because of copper sulphides and oxides associated with a large NNW trending fault. The grid in the area lies within the Camboon Andesite, but the fault has caused the exposure of a narrow band of slate and limestone which presumably belongs to the Rannes Beds. The Camboon Andesite can be subdivided into two units. The western unit consists of vesicular andesite, lithic tuff, agglomerate and small amounts of andesite. The other is made up almost entirely of massive andesite and andesitic tuff. In addition to the major fault, several parallel or sub-parallel faults have also been mapped. The most important mineralisation in the area is found in two pits adjacent to the fault zone where malachite and azurite stain massive andesite. Also quartz veins with chalcocite, covellite, bornite, tenorite and cuprite were noted. Additional small areas of mineralisation were found in the S of the grid where malachite occurs as staining on massive andesite or siliceous andesite. Traces of sulphide are found here. One occurrence of malachite filling vesicles in the vesicular andesite was found in the south of the area, and in the E of the grid area is a small occurrence of malachite staining on the joints of siliceous andesite.

GEOCHEMISTRY - Stream silt samples over the area average 40-50 ppm Cu and give no indication of the presence of copper mineralisation. In only three sites did the copper content of the soil exceed 100 ppm Cu, and none of these coincide with the major fault. Two of the sites showed no surface evidence of mineralisation and the third site lies close to the E mineralisation occurrence. None of the anomalies are considered to be of economic significance.

7) Grid 8 (approximately 5 km NW of Rannes Township)

GEOLOGY - The grid area lies wholly within the Camboon Andesite. Five N trending units were mapped, and from W to E, they are; **Unit 1** comprises massive andesite with andesite tuff. **Unit 2** comprises massive andesite, sheared andesite and vesicular andesite. **Unit 3** is a highly sheared andesite and andesitic tuff. **Unit 4** is the same as Unit 1. **Unit 5** comprises coarse grained acid tuff with lithic tuff and small amounts of andesite. Copper mineralisation found in the area is restricted to three "spot" occurrences in the Unit 2 where malachite and small amounts of native copper fill vesicles in vesicles in andesite, and one occurrence in the sheared andesite to the E of the area where extensive malachite staining occurs on the shear planes.

GEOCHEMISTRY - Several stream silt samples yielded values of more than 100 ppm Cu in a local background of 70 to 80 ppm Cu. Soil sampling returned low values over most of the area except for a few sites in the N part of the grid, over very sheared rocks (Unit 3). This N part was sampled in greater detail and the results revealed a fairly extensive area in, and adjacent to, the very sheared rocks. The soil sample values exceeded 100 ppm Cu, but no surface mineralisation could be found to explain the anomalous results. It may be that the intense shearing process may result in the slight enrichment to the copper content of the rocks. The area is not considered to be of economic importance.

8) Grid 9 (approximately 8 km NW of Rannes)

GEOLOGY - The grid area crosses the boundary between the Camboon Andesite and the Rannes beds. The Rannes beds outcrop very poorly and consist of slate and siltstone with minor sandstone and chert. The Camboon Andesite consists mainly of andesite and andesitic tuff with minor terrigenous sediments.

The contact between the two formations is not definite because of the amount of interbedding. No copper mineralisation was found during the mapping.

GEOCHEMISTRY - Stream silt samples from the area returned several anomalous values (150 ppm Cu). Soil samples did not indicate mineralisation.

9) Grid 10 - Spring Creek (approximately 8 km NE of Rannes)

GEOLOGY - The grid area crosses the boundary between the Camboon Andesite and the Rannes beds. The bulk of the area is Camboon Andesite where the most common rock type present is massive andesite. The Rannes are almost entirely made up of slate. Copper mineralisation in the area is rare. In the Camboon Andesite a spot occurrence of malachite on the joint planes of slightly weathered massive andesite was found in the central N of the area. In the Rannes beds, 33 m from the contact with the Camboon Andesite, is a narrow band of sheared andesite containing malachite staining on shear planes over its whole length and some chrysocolla is also present.

GEOCHEMISTRY - Stream silt samples returned values in excess of 100 ppm Cu from this area, in a local background of approximately 50 ppm Cu. Soil samples gave low values except for a few localities in the Camboon Andesite where copper was present in excess of 100 ppm Cu. No copper mineralisation could be found on the surface in these anomalous areas. The sheared andesite band in the Rannes beds returned a very high value of 1400 ppm Cu. The area is not considered to be economically important.

10) Grid 11 (approximately 4 km from Rannes along the Rannes-Baralaba Road)

GEOLOGY - The area was investigated because geological mapping located numerous sites with malachite staining with native copper and rare sulphide mineralisation. The area lies wholly within the Camboon Andesite. Rock types present are andesitic tuff and massive, vesicular, siliceous, and sheared andesite. Copper mineralisation occurs over most parts of the E and NW grid area. Usually it is associated with the massive unweathered andesite and occurs as malachite staining on joint planes. Sulphides are rare. In all cases the mineralisation is an aggregate of spot occurrences, there being no continuous mineralisation. In the brecciated area, malachite is associated with the brecciated rocks. Because of the lack of continued mineralisation and low order soil anomalies the area is not considered to have economic significance.

GEOCHEMISTRY - The stream silt samples from this area averaged 55 ppm Cu and gave no indication of mineralisation. Soil sample copper values were low except in four isolated areas, two of which showed no sign of mineralisation. The other two areas can be explained in terms of known mineralisation

11) Grid 12 - Kauffmanns Diggings (approximately 8 km S of Rannes)

GEOLOGY - The area contains numerous small abandoned mines usually 2 to 3 m deep. These were worked for gold at the turn of the century. No gold mineralisation was observed during the examination of the prospect. The grid lies with in the Camboon Andesite. Rock types present are andesite and andesitic tuff. Sheared andesite, andesitic tuff with quartz, and siliceous andesite are associated with a fault zone. The old mines usually lie in the quartz which is often brecciated or iron stained and commonly contains fragments of andesite or andesitic tuff. Copper mineralisation was found as malachite in sheared andesite.

GEOCHEMISTRY - A grid was laid out over the old workings to check whether copper mineralisation was associated with the gold. The soil samples were all low with only one high value (100 ppm Cu). This locality was examined but no mineralisation could be seen. This prospect is not considered to be of economic importance.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The evaluation of the above prospects indicated that there are no deposits of economic significance in the ATP.

RECORDER: Paul Blake

DATE: 28/10/1994.

COMPANY REPORT SUMMARY SHEET

CR: 2422 **STATUS:** Open

TITLE: Report on Authority to Prospect No. 404M, Rannes, Central Queensland.

AUTHOR(S): G. Campe & D. Richards **DATE:** January 1968

ATP/EP No.: ATP 404M

COMPANY HOLDING TITLE: Noranda Australia Limited

COMPANY SUBMITTING REPORT: Noranda Australia Limited

DATE GRANTED: 01/05/1967 **PERIOD:** 4 years

1:100 000 SHEET NAME(S): Mount Morgan & Banana

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: Rannes area.

MINING DISTRICT:

MINES/PROSPECTS: Grids 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, and 12

EXPLORATION TARGETS\MODELS: Base metals

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To explore for economic deposits of copper and other base metals.

GEOLOGY -

LOCAL - The volcanic and sedimentary rocks which cover most of the ATP have an overall NNW trend. The age, stratigraphic position and inter-relationship of these rocks is controversial. Based on fossils found in the area, the rocks are considered equivalent to the upper part of the Camboon Andesite. Overlying and interfingering with the Camboon Andesite area the Rannes beds, an argillaceous sequence with lenses of volcanic rocks and limestones. Unconformably overlying both the Camboon Andesite and the Rannes beds is the Early Permian Rookwood Volcanics. This unit comprises basic volcanic rocks and crops out along the E edge of the ATP. The Late Permian Back Creek Group overlies the Camboon Andesite, Rannes beds, and the Rookwood Volcanics. Several small syenite, diorite and trachyte plutons intruded in the vicinity of the ATP during the Triassic and Cretaceous. The palaeozoic and Mesozoic rocks in the ATP region are unconformably overlain by the freshwater Tertiary Biloela beds and Tertiary basalt flows. The main periods of deformation in the region appear to have been in the Early Permian and possibly during the major phase of deformation of the Bowen Basin in the Late Triassic.

MINERALISATION/ALTERATION - Copper mineralisation occurs in the Camboon Andesite, Rannes beds and the Rookwood Volcanics. As a rule, the mineralisation occurs in, or is associated with the volcanics rocks of these units. The mineralisation is most extensive in the Camboon Andesite, where it generally occurs in the unweathered flows, and is strongest near the contacts of these rocks with the younger units, or along faults. Surface mineralisation consists of malachite, less common azurite and rare cuprite of fracture surfaces, disseminated or filling vesicles in the vesicular flows. Veins of malachite up to 5 mm thick, and veins of cuprite sometimes occur. Chrysocolla was found in several localities, in one instance associated with box works. Native copper occurs associated with malachite, either as discrete disseminated flakes, or filling vesicles in vesicular rocks. Pyrite mineralisation was seen in all rock units. In the volcanic rocks it is either finely disseminated or occurs

as discrete crystals ranging up to 1 cm. In the sedimentary rocks and the cherts it is very finely disseminated.

REGIONAL EXPLORATION

GEOCHEMISTRY

- **stream sediment sampling** - Geochemical stream silt samples were collected from the ATP and assayed for copper. The sample results were statistically studied for background and anomaly values. In many areas, streams with anomalous or sub-anomalous sample values contained a "crust" of calcareous rich sediment on the banks and on the outcropping rocks in the bottom of the streams. These areas were examined for copper mineralisation and where no mineralisation was found, which was in the majority of cases, it was assumed that the high values were the result of the concentration in the calcareous "crust" of small amounts of copper from the breakdown of nearby rocks.

- **soil sampling** - Soil lines were placed over single value anomalies or where warranted by geological mapping. Soil grids were placed over multiple value anomalies, soil line anomalies or where warranted by geological mapping. Several lines were run across areas of the Camboon Andesite. Low order copper anomalies were returned from a sheared andesite flow with minor amounts of strong malachite mineralisation. Combined with the results of the stream silt sampling, it is concluded that copper is not an ideal indicator element in the environment of the ATP.

LOCALISED EXPLORATION/PROSPECTS

1) Grid 1 - Beaumont Prospect (approximately 1.5 km S of Rannes)

GEOLOGY - The grid lies in the Camboon Andesite adjacent to the boundary with the Rannes beds. The Camboon Andesite was divided into 4 units; (1) a wide belt of andesite flows, (2) andesitic tuff, (3) slate, and (4) andesite flows. To the E of these units are the slates of the Rannes beds with a recrystallised and sheared limestone bed at the base. Copper mineralisation is not abundant. Malachite is found in the eastern andesite flow rocks, adjacent to the tuff as staining on shear and joint planes.

GEOCHEMISTRY - Silt samples taken from the stream in the E of the grid have Cu values 10 to 15 ppm higher than the average background of 75 ppm Cu. Rock chip samples taken from the andesite flow with malachite returned 0.01% to 0.05% Cu. Soil sampling delineated two anomalous areas with copper values rising above 200 ppm. The first area lies in the andesitic tuff, and no copper mineralisation could be found on the surface. The second area centres on the mineralisation discussed above. It is considered that the area is not big enough, the surface mineralisation not consistent enough, and the anomalies not high enough to be of economic significance.

2) Grid 2 - Beaumont Prospect (approximately 5 km S of Rannes)

GEOLOGY - The mineralisation in this prospect is extremely patchy. The most extensive mineralised zone (Locality A) extends for approximately 100 m in length and 25 m in width. The mineralisation is patchy and distributed unevenly through the area along a contact between foliated and massive andesite. A shallow pit has been sunk at one point where mineralisation is strong. The mineralisation consists of 90 to 95% malachite, distributed in wispy fractures in the more massive flow andesites, and as paint or in thin streams parallel to foliation planes within the more foliated andesites. Occasionally where mineralisation is well developed, cuprite is present as thin high grade veinlets or kernels, and a few small isolated grains of native copper were seen. One observation of primary sulphides was made, consisting of coarse grains of chalcopyrite in a quartz vein. Therefore the deposit is considered to be one in which the copper occurs in very limited and isolated amounts. The primary mineralisation is probably disseminated chalcopyrite in a few quartz veins, and weathering of these within the top layer of the crust has built up a patchy showing of carbonates.

GEOCHEMISTRY - Stream silt samples from streams draining the prospect have an average value of 90 ppm Cu. Apart from Locality A, all the mineralised outcrops were chip sampled over approximately

twice the width of the observed mineralisation. The analyses averaged 0.01 to 0.02% with rare samples having results of 0.1 to 0.5% Cu.

3) Grid 3 - Woolein Creek Reserve (next to Banana-Dululu Road, approximately 8 km S of Rannes)

GEOLOGY - The grid is entirely in the Camboon Andesite, and the main rock types are andesite, tuff, lithic tuff, and agglomerate. Malachite, azurite, cuprite, chalcocite and chrysocolla were identified in a number of patchy showings which extend across a band of andesitic tuff.

GEOCHEMISTRY - About 90 soil samples were collected from the area. The higher general level of geochemical soil values is reflected by better grade copper mineralisation in hand specimen. The survey emphasised the transgressive trend of the mineralisation and eliminated continuation along strike. Because of its transgressive arrangement, general lack of continuity and ill defined widths, this prospect is not considered to be of economic importance.

4) Grid 4 - Jim Creek (located in the centre of the extreme S of the ATP)

GEOLOGY - The area was investigated to follow up numerous spot occurrences of copper mineralisation and a shallow pit with small concentrated occurrences of malachite with azurite. The grid is wholly within the Camboon Andesite. The most common rock type is massive andesite with lesser andesitic tuff and siliceous andesite. Copper mineralisation in the grid area consists of malachite and azurite either disseminated or as staining on the joint planes of massive andesite and siliceous andesite. Native copper and sulphides are rare. Because of the lack of continuity between mineral occurrences and the unfavourable soil sample values, the area is not considered to be of economic importance.

GEOCHEMISTRY - Stream silt samples taken for the drainage off the area did not give high values (average 75 ppm Cu), but the values are consistently higher than values from adjacent streams draining the same lithology (average of 40 ppm Cu). A rock chip sample from the pit returned 6.55% Cu.

5) Grid 5 (about 3 km E of the SE corner of the ATP)

GEOLOGY - The grid lies across the inferred boundary between the Camboon Andesite and the Rannes beds. In this area the boundary cannot be mapped accurately because both units contain similar rock types, but the boundary can be extrapolated from relationships observed further N. The most common rock type is massive andesite with small amounts of andesitic tuff, sheared andesite, vesicular andesite and lithic tuff. Only one area of copper mineralisation was found in the NE part of the grid area where malachite and azurite occur as coatings on the joint and shear planes in sheared andesite

GEOCHEMISTRY - Several of the stream silt samples from the area exceeded 100 ppm Cu, in a local background of 75 ppm Cu. Soil sampling delineated two anomalous copper areas. One of these was associated with the copper mineralisation mentioned above. The other is in the SE part of the grid. Because of the overall lack of surface evidence of mineralisation, unfavourable copper contents of soil samples, and the low order of the anomalies detected, the area is not considered to be of economic significance.

6) Grid 6 - (approximately 5 km WSW of Rannes)

GEOLOGY - The area was investigated because of copper sulphides and oxides associated with a large NNW trending fault. The grid in the area lies within the Camboon Andesite, but the fault has caused the exposure of a narrow band of slate and limestone which presumably belongs to the Rannes Beds. The Camboon Andesite can be subdivided into two units. The first, on the W half of the grid, consists of vesicular andesite, lithic tuff, agglomerate and small amounts of andesite. The other is made up almost entirely of massive andesite and andesitic tuff. In addition to the major fault, several parallel or sub-parallel faults have also been mapped. The most important mineralisation in the area is found in two pits adjacent to the fault zone where malachite and azurite stain massive andesite. Also quartz veins with chalcocite, covellite, bornite, tenorite and cuprite were noted. Additional small areas of

mineralisation were found in the S of the grid where malachite occurs as staining on massive andesite or siliceous andesite. Traces of sulphide are found here. One occurrence of malachite filling vesicles in the vesicular andesite was found in the south of the area, and in the E of the grid area is a small occurrence of malachite staining on the joints of siliceous andesite.

GEOCHEMISTRY - Stream silt samples over the area average 40-50 ppm Cu and give no indication of the presence of copper mineralisation. A long narrow grid, centred on the fault was laid over the area. In only three sites did the copper content of the soil exceed 100 ppm Cu, and none of these coincide with the major fault. Two of the sites showed no surface evidence of mineralisation and the third site lies close to the E mineralisation occurrence. None of the anomalies are considered to be of economic significance.

7) Grid 8 (approximately 5 km NW of Rannes Township)

GEOLOGY - The grid area lies wholly within the Camboon Andesite. Five N trending units were mapped, and from W to E, they are; **Unit 1** comprises massive andesite with andesite tuff. **Unit 2** comprises massive andesite, sheared andesite and vesicular andesite. **Unit 3** is a highly sheared andesite and andesitic tuff. **Unit 4** is the same as Unit 1. **Unit 5** comprises coarse grained acid tuff with lithic tuff and small amounts of andesite. Copper mineralisation found in the area is restricted to three "spot" occurrences in the Unit 2 where malachite and small amounts of native copper fill vesicles in vesicles in andesite, and one occurrence in the sheared andesite to the E of the area where extensive malachite staining occurs on the shear planes.

GEOCHEMISTRY - Several stream silt samples yielded values of more than 100 ppm Cu in a local background of 70 to 80 ppm Cu. Soil sampling returned low values over most of the area except for a few sites in the N part of the grid, over very sheared rocks (Unit 3). This N part was sampled in greater detail and the results revealed a fairly extensive area in, and adjacent to, the very sheared rocks. The soil sample values exceeded 100 ppm Cu, but no surface mineralisation could be found to explain the anomalous results. It may be that the intense shearing process may result in the slight enrichment to the copper content of the rocks. The area is not considered to be of economic importance.

8) Grid 9 (approximately 8 km NW of Rannes)

GEOLOGY - The grid area crosses the boundary between the Camboon Andesite and the Rannes beds. The Rannes beds outcrop very poorly and consist of slate and siltstone with minor sandstone and chert. The Camboon Andesite consists mainly of andesite and andesitic tuff with minor terrigenous sediments. The contact between the two formations is not definite because of the amount of interbedding. No copper mineralisation was found during the mapping.

GEOCHEMISTRY - Stream silt samples from the area returned several anomalous values (150 ppm Cu). Soil samples did not indicate mineralisation.

9) Grid 10 - Spring Creek (approximately 8 km NE of Rannes)

GEOLOGY - The grid area crosses the boundary between the Camboon Andesite and the Rannes beds. The bulk of the area is Camboon Andesite where the most common rock type present is massive andesite. The Rannes are almost entirely made up of slate. Copper mineralisation in the area is rare. In the Camboon Andesite a spot occurrence of malachite on the joint planes of slightly weathered massive andesite was found in the central N of the area. In the Rannes beds, 33 m from the contact with the Camboon Andesite, is a narrow band of sheared andesite containing malachite staining on shear planes over its whole length and some chrysocolla is also present.

GEOCHEMISTRY - Stream silt samples returned values in excess of 100 ppm Cu from this area, in a local background of approximately 50 ppm Cu. Soil samples gave low values except for a few localities in the Camboon Andesite where copper was present in excess of 100 ppm Cu. No copper mineralisation could be found on the surface in these anomalous areas. The sheared andesite band in the Rannes beds returned a very high value of 1400 ppm Cu. The area is not considered to be economically important.

10) Grid 11 (approximately 4 km from Rannes along the Rannes-Baralaba Road)

GEOLOGY - The area was investigated because geological mapping located numerous sites with malachite staining with native copper and rare sulphide mineralisation. The area lies wholly within the Camboon Andesite. Rock types present are andesitic tuff, and massive, vesicular, siliceous, and sheared andesite. Copper mineralisation occurs over most parts of the E and NW grid area. Usually it is associated with the massive unweathered andesite and occurs as malachite staining on joint planes. Sulphides are rare. In all cases the mineralisation is an aggregate of spot occurrences, there being no continuous mineralisation. In the brecciated area, malachite is associated with the brecciated rocks. Because of the lack of continued mineralisation and low order soil anomalies the area is not considered to have economic significance.

GEOCHEMISTRY - The stream silt samples from this area averaged 55 ppm Cu and gave no indication of mineralisation. Soil sample copper values were low except in four isolated areas, two of which showed no sign of mineralisation. The other two areas can be explained in terms of known mineralisation

11) Grid 12 - Kauffmanns Diggings (approximately 8 km S of Rannes)

GEOLOGY - The area contains numerous small abandoned mines usually 2 to 3 m deep. These were worked for gold at the turn of the century. No gold mineralisation was observed during the examination of the prospect. The grid lies with in the Camboon Andesite. Rock types present are andesite and andesitic tuff. Sheared andesite, andesitic tuff with quartz, and siliceous andesite are associated with a fault zone. The old mines usually lie in the quartz which is often brecciated or iron stained and commonly contains fragments of andesite or andesitic tuff. Copper mineralisation was found as malachite in sheared andesite.

GEOCHEMISTRY - A grid was laid out over the old workings to check whether copper mineralisation was associated with the gold. The soil samples were all low with only one high value (100 ppm Cu). This locality was examined but no mineralisation could be seen. This prospect is not considered to be of economic importance.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The evaluation of the above prospects indicated that there are no deposits of economic significance in the ATP.

RECORDER: Paul Blake **DATE:** 28/10/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 480M

COMPANY HOLDING TITLE: Noranda Australia Limited

COMPANY SUBMITTING REPORT: Noranda Australia Limited

DATE GRANTED: 01/01/1968 **PERIOD:**

1:100 000 SHEET NAME(S): Relevant areas are on Mount Morgan & Bajool Sheets

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 3 areas. Two to the SE, and one to the NW of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Ulam, Briggs and Mount Coombs prospects

EXPLORATION TARGETS\MODELS: Gold and Base Metals

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File-* 2823, 3205, 3436

SUMMARY: ATP 480M covers many parts of Queensland, but only the blocks in the Rockhampton area will be summarised here.

LOCALISED EXPLORATION/PROSPECTS

1) Ulam (approximately 37 km SW of Mount Morgan)

GEOLOGY - The Lower to Middle Devonian Mt Holly beds occupies most of this area. They are a sequence of tuffaceous rocks, acid and basic lavas, agglomerate, limestone, shales, siltstones, and arenites. These beds are intruded by the Permian Ulam Complex of quartz diorite, diorite and granodiorite composition. Near the W boundary of the area, a small plug of rhyolite/dacite intrudes the Mt Holly beds. Some copper and gold mineralisation is associated with this plug. In one part of the intrusive, chalcopyrite occurs on joints and fractures in a strongly strongly sheared and silicified zone. Outcrop in this area is badly decomposed with traces of copper carbonates, but the occurrence seems quite small.

GEOCHEMISTRY - A few initial stream sediment samples did not reveal encouraging results. However, one rock sample from the old pit assayed 1200 ppm Cu and deserves follow-up.

2) Briggs (approximately 50 km SE of Mount Morgan)

GEOLOGY - The greater part of the area consists of a continuation of the Devonian-Carboniferous volcanic rocks which crop out in the Alma Creek area. These are chiefly intermediate to basic volcanic flows, tuffs, and agglomerates which have been metamorphosed to mid-greenschist facies grade. Along the S margin of the area, massive magnetite occurs in a diorite gabbro intrusion of unknown extent. In the S, the N part of the Galloway Plains Granodiorite crops out adjacent to an airphoto interpreted diorite intrusion. Towards the centre of the area is a quartz diorite intrusive/volcanic complex made up of quartz diorite and welded acid fragmental rocks. The complex is, in places, pyritic and heavily jointed and has been leached and hydrothermally altered with the formation of sericite and fracture filling quartz veins. It is intruded by hornblende-andesite dykes, pyrite bearing acid dykes and numerous quartz veins which, at one locality, carry sparsely disseminated molybdenite. Copper mineralisation was seen only at one locality, where malachite stained the joint plains of an andesite dyke.

GEOCHEMISTRY - Analysed specimens from the volcanic sequence returned 70 to 80 ppm Cu. A stream sediment sample from the S part of the area contained 171 ppm Cu.

3) Mount Coombs area (approximately 15 km NW of Mount Morgan)

GEOLOGY - The area lies within the Permian Gracemere Granodiorite that intrudes Lower Carboniferous sedimentary and volcanic rocks which lie to the E. In the N, the granodiorite is overlain by the Cretaceous Stanwell Coal Measures, and in the NW, large deposits of Quaternary Alluvium have developed along the course of Sandy Creek. Mount Gordon is an irregularly shaped acid plug which intrudes the granodiorite. The outcrop is gossanous due to the leaching of a sulphide phase which may comprise several % of the fresh rock. Running S from Mt Gordon is an acid dyke which forms the peak of Mt Coombs. Similar dykes orientated E-W branch from it. An abandoned mine is located in hydrothermally altered granite at Mt Coombs close to a small dyke. The feldspars of the granodiorite have been replaced by sericite and several % pyrite. Gold occurs in pyritic quartz veins cutting the altered dykes and granodiorite. Further work is needed to determine whether economic mineralisation is associated with the extensive pyritic phases in the area.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Final phases of exploration in the Ulam, Briggs, and Mount Coombs areas were completed in early 1969. No further work was carried out during the remainder of 1960 and in 1970 the areas were incorporated into ATP 397M.

RECORDER: Paul Blake

DATE: 28/10/1994.

COMPANY REPORT SUMMARY SHEET

CR: 2823 **STATUS:** Open

TITLE: Annual Report. Authority to Prospect No. 480M, Queensland

AUTHOR(S): D. Richards & P.J. O'Rourke **DATE:** June 1969

ATP/EP No.: ATP 480M

COMPANY HOLDING TITLE: Noranda Australia Limited

COMPANY SUBMITTING REPORT: Noranda Australia Limited

DATE GRANTED: 01/01/1968 **PERIOD:**

1:100 000 SHEET NAME(S): Relevant areas are on Mount Morgan & Bajool Sheets

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 3 areas. Two to the SE, and one to the NW of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Ulam, Briggs and Mount Coombs prospects

EXPLORATION TARGETS/MODELS: Gold and Base Metals

SUMMARY: ATP 480M covers many parts of Queensland, but only the blocks in the Rockhampton area will be summarised here.

LOCALISED EXPLORATION/PROSPECTS

1) Ulam (approximately 37 km SW of Mount Morgan)

GEOLOGY - The Lower to Middle Devonian Mt Holly beds occupies most of this area. They are a sequence of tuffaceous rocks, acid and basic lavas, agglomerate, limestone, shales, siltstones, and arenites. These beds are intruded by the Permian Ulam Complex of quartz diorite, diorite and granodiorite composition. Near the W boundary of the area, a small plug of rhyolite/dacite intrudes the Mt Holly beds. Some copper and gold mineralisation is associated with this plug. In one part of the intrusive, chalcopyrite occurs on joints and fractures in a strongly strongly sheared and silicified zone. Outcrop in this area is badly decomposed with traces of copper carbonates, but the occurrence seems quite small.

GEOCHEMISTRY - A few initial stream sediment samples did not reveal encouraging results. However, one rock sample from the old pit assayed 1200 ppm Cu and deserves follow-up.

2) Briggs (approximately 50 km SE of Mount Morgan)

GEOLOGY - The greater part of the area consists of a continuation of the Devonian-Carboniferous volcanic rocks which crop out in the Alma Creek area. These are chiefly intermediate to basic volcanic flows, tuffs, and agglomerates which have been metamorphosed to mid-greenschist facies grade. Along the S margin of the area, massive magnetite occurs in a diorite gabbro intrusion of unknown extent. In the S, the N part of the Galloway Plains Granodiorite crops out adjacent to an airphoto interpreted diorite intrusion. Towards the centre of the area is a quartz diorite intrusive/volcanic complex made up of quartz diorite and welded acid fragmental rocks. The complex is, in places, pyritic and heavily jointed and has been leached and hydrothermally altered with the formation of sericite and fracture filling quartz veins. It is intruded by hornblende-andesite dykes, pyrite bearing acid dykes and numerous quartz veins which, at one locality, carry sparsely disseminated molybdenite. Copper

mineralisation was seen only at one locality, where malachite stained the joint plains of an andesite dyke.

GEOCHEMISTRY - Analysed specimens from the volcanic sequence returned 70 to 80 ppm Cu. A stream sediment sample from the S part of the area contained 171 ppm Cu.

3) Mount Coombs area (approximately 15 km NW of Mount Morgan)

GEOLOGY - The area lies within the Permian Gracemere Granodiorite that intrudes Lower Carboniferous sedimentary and volcanic rocks which lie to the E. In the N the granodiorite is overlain by the Cretaceous Stanwell Coal Measures, and in the NW, large deposits of Quaternary Alluvium have developed along the course of Sandy Creek. Mount Gordon is an irregularly shaped acid plug which intrudes the granodiorite. The outcrop is gossanous due to the leaching of a sulphide phase which may comprise several % of the fresh rock. Running S from Mt Gordon is an acid dyke which forms the peak of Mt Coombs. Similar dykes orientated E-W branch from it. The dykes are spherulitic and contain phenocrysts of andesine. An abandoned mine is located in hydrothermally altered granite at Mt Coombs close to a small dyke. The feldspars of the granodiorite have been replaced by sericite and several % pyrite. Gold occurs in pyritic quartz veins cutting the altered dykes and granodiorite. Further work is needed to determine whether economic mineralisation is associated with the extensive pyritic phases in the area.

RECORDER: Paul Blake

DATE: 28/10/1994.

COMPANY REPORT SUMMARY SHEET

CR: 3205 **STATUS:** Opne

TITLE: Report on relinquished areas in ATP 408M.

AUTHOR(S): D. Richards **DATE:**

ATP/EP No.: ATP 480M

COMPANY HOLDING TITLE: Noranda Australia Limited

COMPANY SUBMITTING REPORT: Noranda Australia Limited

DATE GRANTED: 01/01/1968 **PERIOD:**

1:100 000 SHEET NAME(S): Relevant areas are on Mount Morgan & Bajool Sheets

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 3 areas. Two to the SE, and one to the NW of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Ulam, Briggs and Mount Coombs prospects

EXPLORATION TARGETS\MODELS: Gold and Base Metals

SUMMARY: None of the areas covered in this report occur in the Rockhampton area, so this company report was not summarised.

RECORDER: Paul Blake **DATE:** 28/10/1994.

COMPANY REPORT SUMMARY SHEET

CR: 3436 **STATUS:** Open

TITLE: Annual report, Authority to Prospect No. 480M. Queensland.

AUTHOR(S): W.H. Sharp & K. Troensegaard **DATE:** March 1971

ATP/EP No.: ATP 480M

COMPANY HOLDING TITLE: Noranda Australia Limited

COMPANY SUBMITTING REPORT: Noranda Australia Limited

DATE GRANTED: 01/01/1968 **PERIOD:**

1:100 000 SHEET NAME(S): Relevant areas are on Mount Morgan & Bajool Sheets

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 3 areas. Two to the SE, and one to the NW of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Ulam, Briggs and Mount Coombs prospects

EXPLORATION TARGETS\MODELS: Gold and Base Metals

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Final phases of exploration in the Ulam, Briggs, and Mount Coombs areas were completed in early 1969. No further work was carried out during the remainder of 1960 and in 1970 the areas were incorporated into ATP 397M.

RECORDER: Paul Blake **DATE:** 28/10/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 508M

COMPANY HOLDING TITLE: Geopeko Limited

COMPANY SUBMITTING REPORT: Geopeko Limited and Gold Fields Exploration Pty Limited

DATE GRANTED: May 1968 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan, Bajool, Biloela, Calliope

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: The Mount Morgan, and Dee and Ulam Range area

MINING DISTRICT:

MINES/PROSPECTS: Mount Morgan Mine, Morganite, Great Northern Lode, Ajax Mine, Eureka Mine, Queen of Sheba Mine, King Solomon Mine, Diggers Dive Mine, Champion Area (Champion, South Champion, Golden Cross, Welcome, Peuts and Retrieve mines), Mount Usher (Caledonian, Anglo Saxon, Victor, and New Golden Cave workings), and Clanricarde area (Clanricarde, Midas, and Crows Nest Mines); and Mine Anticline, Mine Corridor North, Mine Corridor South, Arnold's Ridge, Linda Gully, Peacock Shaft, Thomases Gossan, Struck Oil, Mount Warner, Mount Bennett, Mount Grim, Fab, Omo, Upper Don, Upper Mundic, Upper Manton Creek, Bouldercombe, Bull Creek, Stockyard Creek,

Hamilton Creek, Horse Creek, Poison Creek, Kangaroo Creek, Quarry Creek, Raspberry Creek, Upper Nine Mile Creek, Archer, Fern Hills, Riverhead, Mannersley, Penumbra, and Limestone Creek areas; Moonmera Porphyry Copper Prospect; and Eulogie Park Gabbro

EXPLORATION TARGETS\MODELS: All metals (but chiefly a Mount Morgan type copper/gold orebody)

TRANSFERS, JOINT VENTURES, etc: JV between Peko Wallsend Operations Limited and Circular Quay Holdings Pty. Limited (represented by Gold Fields Exploration Pty Limited) since October, 1979

LEASES TAKEN OUT: Mount Morgan Mine, Moonmera, Ajax, Quarry Creek, Upper Don, and Fern Hills leases

COMPANY REPORT Nos: *Open File-* 2756, 3182, 3495, 3881, 4341, 4433, 5052, 5157, 5413, 5602, 5684, 5840, 6167, 6502, 6742, 7230, 7337, 7919, 9037, 10687, 11361, 11751, 13443, 13444, 14089

Confidential- C

SUMMARY:

GEOLOGY - See CR 5413 for a summary on the geology of the ATP. A summary of the geology of the Mine Corridor Volcanics which host the Mount Morgan Mine is given in CR 6167.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Walmul Copper Company (ATP 279M); and Morgan Mining & Industrial Co. P/L (ATP 302M, 352M, 402M, & 403M).

GEOLOGICAL MAPPING - Most of the ATP was geologically mapped in detail.

GEOCHEMISTRY

- **stream sediment sampling** - A regional stream sediment survey conducted over several years was carried out to locate areas of anomalous geochemistry. The copper plan shows the obvious area of smelter contamination SW of the Mt Morgan mine; the Bouldercombe contamination; the Dee Range anomalous zone comprising Moongan-Struck Oil-Mt Warner trend; the Fern Hills anomalous area; a broad zone of apparent high background in andesitic rocks of the Dee Volcanics and Pond Formation; the Riverhead-Divide anomalous area which is the most pronounced copper zone in the ATP; small anomalous zones associated with the contact zones in the Galloway Plains Tonalite; high back ground values in the Ayrdrrie Andesite; and a discreet anomaly associated with the Mannersley Porphyry copper prospect. The zinc plan shows a similar area of smelter contamination to the copper plan; a trend of anomalous zinc roughly follows the Moongan Rhyolite, and is contiguous across the Station Creek Granodiorite with the Dee Range which is the largest zinc anomaly in the ATP, including the Mt Warner, Mt Alexander, and Fab areas; the Fern Hills anomalous zone occurring as a discrete area; a broad area of anomalous values on the W side of the Eulogie Gabbro, thought to represent high background in the Dee Volcanics; an anomaly in the Upper Don area thought to be associated with the Moongan Rhyolites; and a trend reflecting high background values in mainly sedimentary rocks overlying the Ayrdrrie Andesite.

- **soil sampling** - A major program of ridge and spur soil sampling was carried out along the Dee Range from Mt Alexander to the Ajax Mine. Four zones of anomalous geochemistry were delineated within the acid volcanic rocks of the Moongan Rhyolite, and one anomalous zone apparently relates to intermediate volcanics of the Upper Capella Creek beds. The five zones have been named the Omo, Ajax, Fab, Drive, and Grillo Hill.

GEOPHYSICS

- **airborne surveys** - Originally an airborne magnetic survey was completed over the area by Geophysical Resources Development Company of Sydney. Magnetic anomalies of variable character were outlined, some of which were followed up on the ground. Later, an airborne electromagnetic, magnetic and radiometric survey was carried out by Geotrex Ltd. over the major part of the ATP.

LOCALISED EXPLORATION/PROSPECTS

1) Ajax Mine area - 4 km SE of Mt Hopeful television tower.

GEOLOGY - The area is comprised of acid volcanics (aphanitic, porphyritic and fragmental varieties) of the Devonian Moongan Rhyolite sequence, mafic dykes, and a limited development of garnet-epidote skarns. The area lies near the junction of the Fern Hills Fault and an un-named linear lying to the W of it. The mine occurs in a SW dipping sequence of rhyolite to dacitic rocks which are intensely altered in the mineralised area. Small pods of high-grade copper and zinc mineralisation occur in a concordant alteration zone up to 100 m thick. Mineralisation is confined to a shear zone, coincident with an area of sericitic and siliceous alteration localised within a quartz-feldspar porphyry. Along strike to the NW the lode passes into unaltered, pyritic quartz-feldspar porphyry and to the S is covered by alluvium. A small rich pod of massive chalcocite associated with a banded pyritic zinc lode was removed from the mine. Production from the mine for the period 1.7.75 to 30.6.76 was 17.8 g Au, 2661.6 g Ag, and 3.82 t Cu from 49.8 t of ore.

GEOCHEMISTRY - Soil samples were collected from the auger drilling. The results are <2 to 880 ppm Cu, 5 to 1600 ppm Pb, and 15 to 8200 ppm Zn. The best results from the percussion and diamond drilling was 0.71% Cu, 360 g/t Ag, 10% Zn, 1.1% Pb, and 6.0 g/t Au.

GEOPHYSICS - Trans-electromagnetics and self-potential surveys were carried out over the area. One traverse of IP was carried out over the main peak of the trans-EM anomaly N of the old workings. No response of significance was recorded. A ground radioactivity survey was conducted over the area, indicating a distinct potassic radiometric anomaly around the ore-bearing horizon, apparently reflecting sericitic alteration. A broad zone of anomalous potassic radiation also occurs in the SW part of the grid, also apparently reflecting sericitic alteration. An EM survey was carried out and the results revealed a small discrete anomaly associated with the known mineralisation and a number of larger anomalies. Some of the other anomalies are associated with observations of alteration and pyritisation.

DRILLING - Auger drilling was conducted over the grid. A large program of percussion and diamond drilling was carried out in the area. Up to 17 m of mineralisation was intersected in some holes drilled near old workings, but most holes did not intersect significant mineralisation.

2) Arnold's Ridge area

GEOLOGY - The area comprises Mine Corridor rocks with a zone of silicification and ferruginisation.

GEOCHEMISTRY - A low-order, broad zone of anomalous Se and Te has been shown by preliminary reconnaissance to be associated with the zone of silicification and ferruginisation.

DRILLING - A diamond drill hole was put down on the Arnold's Ridge alteration zone to test the IP anomaly and the alteration zone.

3) Baree area - 1 to 2 km N and E of the Mt Morgan Mine, in the NW part of the Mine Corridor.

GEOLOGY - The area is underlain by coarse quartz-feldspar porphyry of the UMP, the Arnold's Ridge Felsite, and the Baree Felsite. Aplite granite bounds the acid volcanics of the Corridor Rocks on the NE. The Corridor rocks are intruded by (early) latites and (late) Permian dykes of andesitic composition.

GEOCHEMISTRY - A discrete zone of copper-zinc anomalism was confirmed in this area; it had been previously reported by C.R.A. Soil sampling was carried out over the area. Copper and zinc values

show broad, nearly coincident anomalies which tend to be associated with latite intrusions and also occur within the granite. Se and Te were only sampled in the lower part of the grid. Peak values of 1300 and 150 ppb, respectively, were reproduced over an area of alteration (silicification and ferruginisation) in the Arnold's Ridge Felsite. These results were disappointingly low compared to the rock chip values in the area, which reached peaks of 7000 and 1250 ppb, respectively, in previous years.

4) Belgamba area - occurs in the ranges immediately S of Bouldercombe

GEOLOGY - This area was investigated as the apparent source area for the Dee River alluvial gold deposits. A grid was surveyed to cover a lobe of acid volcanic rocks containing pyritic chert and jasper adjacent to the Struck Oil fault in the area just SW of Bouldercombe. S of the Dee River the rocks are all andesitic (Capella Creek beds) which are apparently nearly flat lying. A series of faults mark the boundaries of the lobes of acid volcanic rocks within the grid. The westernmost lobe consists of fine quartz-feldspar crystal tuff, which contains rare thin jasper beds and is weakly altered, bleached, and silicified. The central lobe is similar but is less altered with no jasper. The southernmost area of acid volcanic rocks consist of quartz-feldspar crystal ash tuff which is more chloritic and somewhat coarser. N of the acid volcanic lobes the rocks are all andesite, andesitic tuff, apparently equivalent to the andesitic tuff S of the Dee River.

GEOCHEMISTRY - Chip samples of the pyritic cherts and jaspers did not return any anomalous base metal values. The area was soil sampled, and copper values are low over the grid, with values in the andesitic rocks in the W slightly higher than values in the acid rocks on the E of the grid. Lead and silver values are uniformly low. Zinc values are slightly higher in the W of the grid but could not be considered anomalous, and the area is low in gold. This indicates that the acid volcanics are not the provenance of the alluvial gold.

GEOPHYSICS - A magnetic and IP survey were carried out. The magnetics revealed no discrete contourable anomalies. The local highs and sharp contrasts appear to relate to the fault zones. The only conclusive trend in the IP survey was low resistivity in alluvium. The centre of the grid shows a comparatively high chargeability, but the implications of this response are uncertain.

5) Bell Top area - this area is 12.8 km SE of Mount Morgan near Nine Mile Creek, and just to the N of Bull Creek.

GEOCHEMISTRY - A grid was set up over this area and geochemical sampling was carried out. The results returned were 8 to 4000 ppm Cu (most are less than 200 ppm Cu), and 0 to 4770 ppm Zn (most are less than 270 ppm Zn). Rock chip sampling was carried out in the area returning 0 to 4770 ppm Zn and 13 to 4000 ppm Cu.

6) Bouldercombe area - 12 km NNE of Mount Morgan.

GEOLOGY - This area occurs over the contact between the Bouldercombe diorite and surrounding metamorphosed intermediate volcanic rocks.

GEOCHEMISTRY - Samples were collected from the auger drilling but most values were not considered significant. Stream sediment and rock chip sampling was carried out, indicating the presence of a strong zinc anomaly with, in certain area, anomalous copper values.

GEOPHYSICS - A magnetic survey was carried out over the area.

DRILLING - Auger drilling was carried out over the area.

7) Bull Creek Grid - This area was previously reported in the final report on ATP 279M.

GEOLOGY - Two quartz diorite batholiths occur in the area. The small one in the W referred to as the Bull Creek quartz diorite, while the one in the E, being an extension of the Mine and Town quartz

diorite, is referred to as Town quartz diorite. In between these quartz diorite bodies are volcanic rocks. Disseminated pyrite occurs mainly along the contact of the Town quartz diorite. Copper occurs as malachite and azurite in the cores of quartz diorite and feldspar andesite boulders within a boulder bed adjacent to a granodiorite contact. The pyrite and copper mineralisation is considered to be a hydrothermal deposition. At places, pseudo-gossanous iron-stained rocks occur in outcrop.

GEOCHEMISTRY - Stream sediment sampling in the area returned 15 to 115 ppm Cu. Soil samples were collected over the grid. Copper content in soil was erratic in both range and distribution, and corresponded to the erratic distribution of the copper mineralised boulders noted in different exposures. Follow-up work was confined to 7 broad areas of anomalous copper content in soil. Three of the anomalous areas were over granodiorite, one near a basic dyke and the remainder associated with the mineralised conglomerate sequence.

GEOPHYSICS - This area was covered by a ground magnetic, resistivity, self-potential (SP), and trans-EM surveys, but did not return any results of interest.

8) Champion area - 3 km ENE of the Mount Morgan open pit and includes the Champion, South Champion, Golden Cross, Welcome, Peuts and Retrieve mines which occur within a zone approximately 1300x700 m. Numerous other small pits and workings also occur within the zone.

GEOLOGY - The mines were exploiting auriferous quartz reefs. Total production was small with an estimated maximum of 500 oz. The largest mine, South Champion, has been described as an elongate pipe, and production was approximately 100 tons of ore at 19.2 g/t Au, 4.87% Cu, with significant quantities of molybdenite. Hydrothermal breccias occur on some dumps.

GEOCHEMISTRY - Rock chip samples were collected from the country rock.

9) Clanricarde area - 3.3 km NW of the Mount Morgan pit. The area includes the Clanricarde, Midas and Crows Nest Mine. Production to July 1949, was 2000 oz Au (grade approximately 1.4 oz/t), 5.5^t Cu (grade approximately 2.1%), and 146^t oz Ag (grade approximately 0.6 oz/t).

GEOLOGY - The Clanricarde and Midas mines worked a reef 2.5 to 15 cm wide. The reef occurs on a NE-SW striking fault. The reef dips SE at 60-70°. The Crows Nest workings occur to the W, on the Stoney Creek fault and apparently exploited small random reefs. The area was grided and mapped, but no large area of alteration or mineralisation was located.

10) Diggers Dive - These workings include several pits, adits, and shafts near the top of a small peak above Kangaroo Creek, 3.25 km SE of the Queen of Sheba workings.

GEOLOGY - Reconnaissance mapping confirmed a tuff (andesitic), sedimentary sequence, overlain by Pond Formation conglomerate. No significant areas of alteration were seen.

11) Divide area - investigating a low-order stream geochemical anomaly with an associated magnetic low anomaly near headwaters of the Calliope and Don Rivers.

GEOLOGY - The rocks consist of a sequence of andesite, andesitic tuff, and sediments of the (?) Upper Devonian - Lower Carboniferous Riverhead beds which are possibly equivalents of the Dee Volcanics - Pond Formation. The sequence is intruded by dioritic dykes and possibly a small stock.

GEOCHEMISTRY - Ridge and spur soil sampling was carried out, with the low-order copper anomaly apparently derived from a zone of quartz veining within a massive andesite in the Riverhead beds. Two anomalous values from the W appear to relate to a small diorite dyke or intrusion. The low geochemical values do not support the suggestion of mineralisation within the area.

GEOPHYSICS - Reconnaissance ground magnetics revealed a magnetic low in the S of the area. The profile suggests the presence of a granodiorite stock beneath the alluvium.

12) Drive area

GEOLOGY - Mapping revealed a small zone of pyritic and strongly altered rocks surrounded by a broad diffuse zone of weakly pyritic rocks with distinct spotted alteration and hornfelsing. Various weakly gossanous rocks occur within the central pyritic zone.

GEOCHEMISTRY - Soil sampling showed low-order Zn values associated with the gossanous zones. Copper, lead, silver and manganese returned only background values.

13) Eastern Part of Station Creek area (Archer area)

GEOCHEMISTRY - Stream sediment sampling was conducted in the area returning 30 to 80 ppm Zn and 2 to 87 ppm Cu.

GEOPHYSICS - Ground magnetics was carried out over the grid.

DRILLING - 9 shallow auger-diamond holes were drilled in the area.

14) Eulogie Park Gabbro

GEOLOGY - A 60 cm wide titaniferous and vanadiferous magnetite layer within the gabbro was located.

GEOPHYSICS - A ground magnetic traverse was made in parts of the area.

15) Eureka Mine - occurs NW of the Grillo Hill prospect.

GEOCHEMISTRY - Rock chip samples returned high values from weakly pyritic limestone dump material from the adit at Eureka, and from the adit entrance wall.

16) Fab area - approximately 20 km SE of Mount Morgan and occurs along strike from the Ajax Mine.

GEOLOGY - This area occurs within a sequence of rhyolitic tuffs, fragmentals, and associated Fe-Mn cherts. A zone of weakly gossanous, intensely altered rocks occurs over a strike length of 1200 m and a width of 250 to 650 m. Granodiorite outcrops along the N of the grid.

GEOCHEMISTRY - Soil sampling was carried out over the grid, returning 5 to 330 ppm Cu, 5 to 1400 ppm Pb, and 10 to 880 ppm Zn. The material from the percussion and diamond drilling returned best results of 2.05% Zn, 0.13% Cu, and 602 ppm Pb.

GEOPHYSICS - A ground radioactivity survey revealed several zones of potassic radiometric anomalies, all apparently correlating with sericitic alteration zones. Ground magnetics revealed an erratic magnetic pattern which was not any use in selecting drill targets. Several discrete but relatively low-order anomalies were detected by a SP survey. These are apparently related to zones of pyritisation in the rock. A Trans-EM survey was carried out over the area. A magneto-metric resistivity survey was carried out. The results indicate the presence of a conducting horizon from 60 to 150 m wide, running N-S through the prospect, parallel to strike, for a distance of 1700 m. Drilling revealed that the conductive horizon is caused by the pyrite-rich layers. SIROTEM traverses were conducted over the whole grid. A major anomaly which is in the appropriate position to reflect a massive sulphide body was discovered on the NE part of the grid. It is larger and broader than the SIROTEM anomalies in the other areas, and it has associated IP character. Drilling revealed the anomaly to be due to abundant pyrite mineralisation.

DRILLING - Auger drilling was carried out over the grid. Diamond, percussion and diamond/percussion drill holes were put down in the area.

17) Fern Hills area - on the Dee Range, just W of "Fern Hills" homestead, S of Mt Hopeful television tower.

GEOLOGY - In the SW corner of the grided area is a sequence of andesitic tuffs which probably represent the basal part of the Capella Creek beds. These may be unconformable on the predominantly acid volcanic rocks in the rest of the grid. The acid volcanic rocks are a series of ferruginous and cherty ash tuffs, usually siliceous but quite variable. In some places these are well-bedded and contain stratiform pyrite. Some of these bedded rocks contain jasper and manganese, and are considered to be the equivalent of the Bedded Formation of the Moongan Rhyolite sequence in the UNMC and Raspberry Creek area. Beneath these bedded rocks is a sequence of massive andesitic fragmental rocks. Thin section work suggests that the rock is in part a chloritised acid volcanic rock rather than an andesitic rock. The lower part of this unit is fine-grained (lapilli tuff) and contains apparent fragments of sulphides, mainly sphalerite. These sulphides are of the style which could occur in the peripheral environment of a major BMS deposit. Beneath the andesitic fragmental rocks is a sequence of ferruginous ash tuffs and some andesitic fragmentals which apparently represent the lowest part of the stratigraphy in the grid area. Further E, with a very irregular contact, is a variable but mainly massive hornblende andesite rock unit. The irregular nature of this unit is suggestive either of an intrusive rock or an unconformably overlying, E-dipping sequence. Within the hornblende andesite are several prominent occurrences of altered, sericitised, and pyritic intrusive rocks which were mapped as "ferruginous ash tuff". These units in places appear to be tuffaceous owing to an apparent fragmental texture, but in other places show characteristic dyke-like patterns. An apparent structural break, marked by changes of lithology along strike, crosses the grid in a NE trend. The break is complex, apparently consisting of several faults and an andesitic dyke. In the NW of the grid is a major unit of weakly foliated, siliceous chloritic fragmental rock. This unit has no clear correlative with the section S of the structural break, although it may be equivalent to the "cherty ash tuff" unit. Beneath this unit is a complex andesitic tuff-ferruginous ash tuff-fragmental rhyolite unit. The "ferruginous ash tuff" may represent an intrusive unit such as that enclosed within the hornblende andesite. This unit may be equivalent to the andesitic fragmental tuff in the S of the grid. Beneath this complex unit is a hornfelsed, highly silicified, cherty ash tuff which usually carries significant pyrite.

GEOCHEMISTRY - Soil samples, stream sediment samples, and ridge and spur soil samples were collected. The soil sampling defined a zone of poorly clustered low-order anomalous copper values in the area of the mineralised andesitic fragmental horizon in the S of the grid. A broader zone of low-order anomalous values occurs in the NE end of the grid, mostly associated with the pyritised siliceous rock, but some are in andesite, or the intrusive "ferruginous ash tuff". Lead values show two irregular closed clusters of low-order values centring on the mineralised andesitic tuff unit in the S of the grid. No anomalous lead values are associated with the copper zone in the N. Zinc values tend to repeat those of copper but show a more consistent pattern, with two significant anomalous zones corresponding to the mineralised tuff in the SW and the silicified zone in the NE.

18) Grillo Hill area - 16 km ESE of Mount Morgan.

GEOLOGY - The area consists of an extensive zone of pyritic sericite-clay alteration within a thinly bedded, nearly flat-lying sequence of acid lithic fragmental rocks and cherts. A pyrite-rich horizon from 50 to 100 m thick occurs in a sequence of andesitic to rhyolite tuffs and siltstones in a major anticlinorium along the front of the Dee Range. Two weakly gossanous altered zones occur within the horizon.

GEOCHEMISTRY - Soil sampling was carried out. Copper values show two highs associated with the exposed alteration zone. A low order lobe of copper values appears to be associated with a dolerite intrusive in the N of the grid. Lead values are not associated with the copper, but occur in a discrete zone in the SW part of the grid. Zinc values are spread widely, occurring both over the lead anomaly and the copper anomaly, excepting for a discrete "hole" in the centre of the NW anomaly, which is coincident with that copper high.

GEOPHYSICS - An IP survey was carried out returning a complex pattern of resistivity highs and lows over the alteration zone.

19) Gunpowder Creek area - near the headwaters of the Don River which returned weakly anomalous stream sediment values.

GEOLOGY - A small dioritic stock intrudes rocks of the Lower Carboniferous Pond Formation.

GEOCHEMISTRY - Ridge and spur soil sampling was carried out, but the only values of significance were copper values to 3500 ppm associated with gossanous quartz veins within the stock. The small size of the zone precludes any economic significance for the area.

20) Hamilton Creek area - 5 km S of Mount Morgan

GEOLOGY - A large, intensely altered and pyritic zone occurs in rocks of the (?) Capella Creek beds immediately S of a block of the Mine Corridor rocks. The (?) Capella Creek beds in the area consist predominantly of intermediate lithic tuff, feldspar porphyry, and minor limestone. The Corridor rocks in the area consist mainly of fine quartz-feldspar porphyry. The Capella Creek beds in the area are gently folded into a S-plunging anticline in the area of the alteration zone. The anticlinal structure is more or less concentric with the occurrence of the Corridor rocks, which appear to be a faulted-in block. The alteration zone consists mainly of a clay mineral with lesser amounts of calcite, sericite, and chlorite, with pyrite up to about 8% in places. The alteration crosses the stratigraphy. Several relatively minor faults cut across the area. The Dee Volcanics occurs on the W side of the grid.

GEOCHEMISTRY - Detailed stream sediment sampling was carried out, returning 35 to 255 ppm Cu, 10 to 150 ppm Pb, and 25 to 562 ppm Zn. Soil geochemistry was carried out over the area of interest on the grid, and returned 15 to 550 ppm Pb, 26 to 230 ppm Zn, 8 to 420 ppm Cu. Rock chip sampling was done over specific areas, returning 7 to 7150 ppm Zn, 25 to 1800 ppm Cu, and 0.02 to 0.19% W. Assays of the material from the drilling returned 5 to 9100 ppm Cu, 5 to 1100 ppm Zn, 0 to 70 ppm Pb (with one high of 300 ppm Pb), <20 to 20 ppm W, and traces to 2 ppm Ag. Most of these values are not significant with respect to mineralisation, tending to reflect variations in rock geochemical background.

GEOPHYSICS - Ground magnetics, trans-EM, and self-potential surveys were carried out over the area, but no significant results were returned.

DRILLING - One auger-diamond drill hole and 8 shallow diamond drill holes were drilled in the area. Later a percussion-diamond drill hole was put down more or less on the axis of the S-plunging anticline.

21) Head of Capella Creek area - approximately 19 km E of the confluence of the Dee River and Fletcher Creek in the central part of the ATP.

GEOLOGY - The area is underlain by sandstone, conglomerate, and lavas, intruded by micro-diorite dykes.

GEOCHEMISTRY - This area showed a geochemical anomaly in the regional stream sediment survey.

GEOPHYSICS - Ground magnetics and self-potential surveys were carried out over the grid.

22) Head of the Dee area - located on the main dividing range between the Dee River and Station Creek.

GEOCHEMISTRY - Detailed Stream sediment sampling was done over the grid area and the adjacent areas.

GEOPHYSICS - A magnetic and self-potential survey have been carried out over the area.

23) Horse Creek area

GEOCHEMISTRY - Initially, rock chip and soil samples were collected and indicated the presence of some highly anomalous Hg, and Se/Te values. Also three grids (A, B, & C) were surveyed over the three anomalous areas, and soil samples were collected from the grids. Results from grids showed weak to pronounced anomalies in Hg, Te, Se, Zn, and Cu. Analysis of the core from the drilling confirmed the presence of the anomalous elements located in the soil sampling, but values are generally somewhat lower. In one hole, the weathered part of the core showed enrichment in Hg, Zn and Cu,

while only low values were received from the fresh rock. This indicates possible remobilisation of values in the weathering profile.

GEOPHYSICS - Three lines of reconnaissance self-potential were carried out, but due to dry ground conditions the results are inconclusive. A detailed IP survey was conducted. Two anomalies were indicated, one near the Dee Bowling Club, and the other W of Grid A. Interpretation of the results indicate that the second IP anomaly is probably due to surface phenomena like percolating ground water in swampy terrain.

DRILLING - 2 diamond drill hole were completed to test the anomaly in Grid A. The alteration zone indicated on the surface was shown at depth to be similar to some parts of the alteration pipe in the Mt Morgan Mine, but is of lesser intensity.

24) Horse Creek South area

GEOLOGY - The area is a lobe of quartz-feldspar porphyry of the Mine Corridor surrounded by the Mount Morgan Tonalite. Within the lobe is a poorly define zone of silicified and ferruginised rock similar to the alteration zones at Horse Creek. At the S end of the lobe is a small (?) fault block of Dee Volcanics.

GEOCHEMISTRY - Geochemical results show a low-order anomaly of Zn and Cu but their significance is no yet known.

25) Kangaroo Creek area - SW part of the Prior Park grazing farm.

GEOLOGY - The rocks in the grid occupy a N-S elongate embayment of limestone, acid lithic and feldspathic tuff and acid feldspar porphyry of the Mid-Devonian Capella Creek beds, within the Stockyard Creek Granodiorite. The rocks have been hornfelsed into crystalline limestone, garnetiferous limestone, garnet (-epidote) skarn, calc-silicate hornfels, and hornfelsed limey tuff.

GEOCHEMISTRY - Analysis of the soil samples from the auger drilling returned 12 to 170 ppm Cu, 40 to 190 ppm (mostly 70 to 90 ppm) Zn, and 28 to 100 ppm Pb. Rock chip samples were also collected, returning 520 ppm to 0.09% Cu. However, further rock chip sampling did not repeat any anomalous results.

GEOPHYSICS - Detailed trans-electromagnetic and self-potential surveys were carried out over the area.

DRILLING - 43 auger holes were drilled and samples were collected from the soil profile for geochemistry and bed-rock chip for subsurface geological interpretation.

26) King Solomon - These workings are situated 37 km SE of the Mount Morgan pit, and the workings consist of several shafts, pits and an adit.

GEOLOGY - The country rocks are andesitic tuffs. No large zones of alteration or quartz veining were noted. A large (100 m diameter) diorite intrusive occurs to the E of the prospect.

27) Lancefield area - on Manton Creek, approximately 2 km upstream from Lancefield Homestead.

GEOLOGY - A complex of quartz diorite, granodiorite, and gabbro intrudes tuffaceous sandstone and conglomerate of the Permian Youlambie Conglomerate.

GEOCHEMISTRY - Ridge and spur soil samples were collected, but the only values of any significance were the copper values in the gabbro which were of the order of 100 to 200 ppm Cu.

28) Lennox area (Middle Creek) - 8 km SE of Mt Morgan

GEOCHEMISTRY - Soil samples were collected from the area.

29) Limestone Creek area - the area occurs near Walmount (about 2 km SW of the Struck Oil Porphyry Stock) and was located by a small magnetic anomaly.

GEOCHEMISTRY - Samples from the ?auger drilling were analysed. The results ranged from 15 to 190 ppm Cu. Soil sampling was carried out, returning 25 to 390 ppm Pb, 20 to 1500 ppm Hg, 25 to 2250 ppm Zn, and 5 to 900 ppm Cu. Follow-up ridge and spur soil sampling was carried out over several small areas of interest, returning 5 to 500 ppm Cu, 10 to 205 ppm Zn, 15 to 205 ppm Pb. Analysis of core from one of the diamond drill holes returned 20 to 4100 ppm Cu, 10 to 227 ppm Pb, 10 to 26,875 ppm Zn, and traces of gold.

GEOPHYSICS - Ground magnetic, self-potential and trans-EM surveys were conducted in the area.

DRILLING - A line of ?auger holes were drilled in the area. 2 auger-diamond drill holes, and 5 diamond drill holes, were drilled in the area. Irregular narrow zones of epidote alteration with associated pyrite, sphalerite, chalcopyrite and calcite are common at some levels in the drill holes.

30) Limestone Creek area 2 - approximately 2 km SW of the Struck Oil area.

GEOCHEMISTRY - The results from the ridge and spur soil samples and samples of stream sediments in the area are under study.

DRILLING - A small program of ridge and spur hand augering was carried out in this area.

31) Linda Gully area - 1 km N of Mount Morgan Mine. Several shafts and adits had been put down in the area in about 1900.

GEOLOGY - The rocks in the area consist of coarse quartz-feldspar porphyry of the Upper Mine Porphyries. These contain two poddy horizons of limestone which have been skarnified in places by contact with small latite intrusions in the area. The small magnetite skarn zone show high values of Se, Te, Cu, and Zn.

GEOCHEMISTRY - Samples of the skarn returned values of 1.5% Cu and 2.0 g/t Au. Analysis of core from the diamond drilling returned no anomalous results.

GEOPHYSICS - The area was read with a magnetometer. The drill core was also examined with the magnetometer and the latite bodies were found responsible for the magnetic anomaly.

DRILLING - 3 diamond drill holes were put down in the area.

32) Mannersley area - just SW of the Calliope River on the N edge of the Galloway Plains.

GEOLOGY - The prospect is underlain by a granodiorite porphyry stock which lies just to the N of the major Galloway Plains Tonalite. Mineralisation is mainly confined to a smaller biotite granodiorite stock within the granodiorite porphyry. The stock is bounded on the W by a sedimentary/volcanic sequence which is Carboniferous in age. Two narrow beds of magnetite have been located on the S position of the Mt Grim Ridge.

GEOCHEMISTRY - Soil samples were collected from over the whole grid by auger drilling. The highest copper value was 2120 ppm in the S of the grid, and molybdenum values ranged between detection limit to a peak of 32 ppm Mo. Ridge and spur soil sampling and detailed stream sediment sampling were used to indicate the extent of the Cu/Mo anomaly. C-zone soil sampling was then used to cover the anomaly. This sampling defined three anomalous areas of copper. The N and the central Cu-anomaly lie within the area of outcrop of the central biotite granodiorite stock. The S Cu-anomaly zone lies adjacent to, and trends roughly parallel to, the granodiorite - granodiorite porphyry contact.

Molybdenum values define an area similar to that of the central Cu-anomaly, and Zn values define a number of slightly anomalous areas. Samples of the core were analysed, returning 370 ppm to 0.37% Cu, and 2 to 520 ppm Mo.

GEOPHYSICS - An IP survey was carried out over the geochemically anomalous area and indicated a strong anomaly just S of the quartz diorite stock, associated with high Cu in the soil. A magnetic survey was also carried out, but no response of significance was recorded.

DRILLING - Auger drilling was undertaken to obtain soil samples. 3 diamond drill holes were completed over the area testing geochemical and geophysical anomalies.

33) Marble Mountain Grid - occurs in the SE corner of the ATP, immediately N of Marble Mountain.

GEOLOGY - This grid is a small area over gossanous material in sediments belonging to the Mount Holly beds adjacent to an intrusive granodiorite. The gossan which appears to be hematitic with usually poorly developed boxworks, is associated with limestones and other limey sediments where they occur in contact with a medium grained intrusive biotite granodiorite. Garnetiferous limestone, gossans and the occasional quartz veins are the most obvious of the contact effects produced by the granite.

GEOCHEMISTRY - Both stream sediment and soil sampling failed to detect any anomalous zinc and copper values. Chip samples of the gossan returned traces of gold, trace to 0.8 dwt/ton Ag, 70 to 130 ppm Pb, 225 to 305 ppm Zn, 230 to 750 ppm Cu, 0 to 12 ppm Mo, and 0.11 to 0.33% S.

GEOPHYSICS - A ground magnetic survey failed to produce conclusive results.

34) McKnight's area - this is the NW extension of the UNMC area

GEOLOGY - The geology is the same in the UNMC area.

GEOCHEMISTRY - Soil sampling was carried out over the new extension of the grid. The anomalous values of copper recorded in the UNMC grid in the banded cherty tuff die out at the edge of the grid. High background values of copper occur in andesitic rocks. Lead values show no trends. Zinc values show that the UNMC anomaly dies out rapidly along strike in the Footwall Sequence. However, the zones of high background in the dyke and the andesites to the S and N which were revealed in the copper values are also reproduced in the zinc values. Silver shows no significant trends, and manganese values show elevated background in andesitic rocks and dykes. These results suggest that the favourable geological environment within the UNMC grid loses its geochemical character to the W and is no longer of interest in this direction.

35) Mine Anticline area - this area is in the Mt Morgan mine leases S of the opencut mine.

GEOCHEMISTRY - Samples of core from the early drilling were assayed, returning trace to 0.30 gr/m tn Au of gold, and trace to 0.42% Cu. Assaying core from the "Upper Banded Mine Sequence" indicate anomalous base metals within the jaspers, with values increases with proximity to the Mt Morgan Mine.

DRILLING - 5 diamond drill holes were completed in this area. The holes reached indicated the presence of weak mineralisation, but grades were too low to be of significance. The holes generally confirmed the concept of a monoclinial fold plunging shallowly SE.

36) Mine Corridor North - this large area also includes the smaller Linda Gully area, Arnold's Ridge area, Upper Mundic area and Baree Area. These small areas will be dealt with separately.

GEOCHEMISTRY - Rock chip samples were collected from outcrops. Most of the values are low-order, with only rare values showing anomalous character, defining four zones of anomalous values.

GEOPHYSICS - A major Gradient Array IP survey was carried out over most of the grid area. The only feature of any significance was a very large anomaly extending N of the Horse Paddock Dump in a SE

direction to the Walterhall area. The anomaly is broad in the NW but sharp in the SE. The peak of the anomaly is within the Mount Morgan Tonalite. A bulldozer uncovered an old water pipe which was the source of the sharp peak of the IP anomaly. Drilling indicates that the broad part of anomaly was caused by anomalous amounts of fine pyrite.

DRILLING - 2 diamond drill holes were drilled in the area, but only low values of chalcopyrite and sphalerite were encountered. Percussion drilling was carried out to investigate the IP anomaly.

37) Mine Corridor South area - the area extending from the section where the Dee River crosses the Mine Corridor to Horse Creek.

GEOLOGY - The area is mainly underlain by coarse quartz-feldspar porphyry of the UMP. The sequence is thought to dip shallowly E. Minor zones of hematite-magnetite ?skarn occur in the N and S parts of the area. Two small zones of weak alteration were found, but these are too small to be economically significant. A zone of "fine acid" volcanic rocks (possibly fine quartz-feldspar porphyry) occurs on the S end of the area. Late Permian dykes cut across the area.

GEOCHEMISTRY - Rock chip samples were collected over the area, and assayed for Cu, Zn, Au, Hg, Se, and Te. The results show the presence of a few scattered, isolated anomalies. Material from the diamond drilling returned 30 to 995 ppm Cu, 5 to 180 ppm Pb, 70 to 1400 ppm Zn, and trace to 0.6 g/t Ag. A 20 cm thick skarn zone with about 20% pyrite yielded 2680 ppm Cu, 2.4 g/t Ag, and 396 ppm Zn. A second pyritic skarn zone, 1 m thick yielded 2.0 g/t Ag, 1180 ppm Cu, and 348 ppm Zn. No other significant values were recorded.

GEOPHYSICS - A trial gravimetric survey was carried out.

DRILLING - Two holes were put down by the Queensland Depart of Mines under 50% subsidy arrangement with Geopeko. The first hole was put down in the N part of the area, but no significant mineralisation was found. The second hole was located 500 m SE of the first hole. The equivalent of the BMS in a much diminished form was intersected in the second hole. As a host for a Mount Morgan-type orebody, its potential would appear to be considerably diminished. Two skarn zones with minor mineralisation occurred in the hole.

38) Moonmera Porphyry Copper Prospect - four areas were looked at in detail, these are the Moonmera Triangle, Moonmera Quarry Breccia zone, and No.2 Shaft area.

(A) Moonmera Triangle area (central part of the prospect) -

GEOLOGY - The Triangle area shows two zones of intense alteration associated with an irregular intrusion of quartz monzonite porphyry into a major batholith of quartz diorite-granodiorite (Bouldercombe Complex).

GEOCHEMISTRY - Soil sampling was carried out, returning anomalous values in copper and molybdenum over the alteration zone in the No.3 shaft area, and a weaker zone above the DDH MM 13, put down by North Broken Hill. Analysis of material from the drilling returned maximum values of 2.95% Cu with negligible Mo.

DRILLING - Three short diamond, and 6 percussion drill holes were put down in the area.

(B) Moonmera Quarry Breccia Zone

GEOLOGY - Brecciation and alteration occurs in a complex of biotite quartz diorite and quartz diorite porphyry which has been invaded by a mass of quartz monzonite porphyry in the S. Coarse blebs of chalcopyrite occur in the N of the brecciated and altered zone in the creek bed in an old quarry which was mined at about the turn of the century. Coarse boxworks occur in the altered rock on the slopes on the S of the area. The unusual coarse and sparse nature of the mineralisation makes the prospect very difficult to evaluate by any conventional means.

GEOCHEMISTRY - Soil sampling was carried out in the area. The zone of alteration yielded relatively uniform values between about 0.1% to 0.2% Cu, dropping off sharply in unaltered rocks to slightly high background values. Molybdenum soil values are generally very low except in the S part of the alteration zone, where they reached values of 60 ppm. Analysis of core from the drilling returned peak values of 0.7% and 0.8% Cu, but averaged for the length of the holes, the best results were 0.1% Cu. Three bulk samples were taken from an area of exposed fresh rock in the old quarry. Results of the three samples were 0.23%, 0.97% and 0.52% Cu.

DRILLING - 6 short diamond drill holes were completed.

(C) No.2 Shaft area

GEOLOGY - The mineralisation occurs in a wedge-shaped block of intensely altered quartz diorite porphyry ? breccia associated with an intrusive tuffsite (andesite breccia) pipe. After the results of the drilling, the zone is considered too small to warrant exploitation.

GEOCHEMISTRY - Material from the percussion drilling was assayed with a maximum value of 1.59% Cu. The diamond drill hole returned no mineralisation of significance.

DRILLING - The zone was tested with fifteen shallow percussion drill holes, one of the holes was continued by diamond drilling.

39) Moonmera - Lariat

GEOLOGY - A small breccia zone occurs on the approximate centre of a radial dyke swarm SE of the Moonmera porphyry copper prospect. It is probably part of the Moonmera mineralisation system.

GEOCHEMISTRY - Ridge and spur soil sampling was carried out over a small breccia zone to the SW of the Moonmera Prospect. Anomalous values were revealed over the breccia, but the small size of the zone did not warrant further work.

40) Morganite and Great North Lode areas - 2.5 and 3 km N of Mt Morgan mine respectively.

GEOLOGY - Both areas are windows of Corridor rocks emerging beneath the Jurassic Razorback beds. Both show zones of silicification and pyritisation in the acid volcanic rocks (fine quartz-feldspar porphyries) of the corridor. Small shafts, pits, and adits were put down in these alteration zones.

GEOCHEMISTRY - Rock chip samples were collected from the area. The copper values show discrete anomalous zones in both areas. The values for zinc, lead, and gold were only background values. Soil sampling was also carried out, returning 5 to 470 ppm Cu, 10 to 30 ppm Pb, 2 to 160 ppm Zn, and 9 to 90 ppb Au. The adit in the Great North Lode was chip-sampled along its length and analysed, returning 45 to 860 ppm Cu, 10 to 30 ppm Pb, 10 to 460 ppm Zn, and <0.1 ppm Au.

41) Mount Bennett area - 10 km W of Mount Larcom township and includes the old Mount Bennett Gold Mine.

GEOLOGY - The area has poor outcrop, and the geological interpretation is based on weathered surface rock fragments. The area includes retextured sediments and volcanic agglomerates. Feldspar porphyries are evident in the W. In the area of the old gold workings, fairly wide quartz reefs striking approximately E-W are found intruding the sediments.

GEOCHEMISTRY - Stream sediment samples were collected from the E part of the grid, but results were negative. Core samples from the drilling were analysed, returning 50 to 310 ppm Cu, 10 to 155 ppm Pb, 35 to 190 ppm Zn, <2 to 115 ppm Mo, <0.1 to 0.2 ppm Au, and <50 to 1900 ppb Te

GEOPHYSICS - Magnetometer and trans-EM surveys were conducted over the Mount Bennett grid. Part of the grid was also covered by an IP survey, but results were not conclusive.

DRILLING - A total of 5 short diamond drill holes were completed. They were mostly designed to test various geophysical anomalies. Minor pyrite was present in two of the holes.

42) Mount Cedric area - 1 km N of Mt Cedric on the Alma Range, investigating a low-order geochemical anomaly with an associated magnetic high.

GEOLOGY - A small stock of biotite quartz diorite intrudes interbedded tuffs and sediments of the (?) Middle Devonian Capella Creek beds.

GEOCHEMISTRY - Ridge and spur soil sampling was carried out over the area, but the results were generally low.

GEOPHYSICS - Reconnaissance magnetic traversing was carried out, and the magnetic anomaly was shown to be due to magnetic material within the tuffaceous rock.

43) Mount Dick area - extension of the grid between Raspberry Creek and UNMC.

GEOLOGY - The geology is an extrapolation of that of the UNMC area, and the zone of alteration and silicification within the Bedded Formation can be traced from the Springs Creek drilling area. At this point the zone is intensely silicified and contains abundant jasper, reminiscent of the "Siliceous Chimney" at the Mount Chalmers mine. The zone terminates abruptly and in its place is a manganiferous siltstone similar to the Manganese Marker horizon of UNMC but lower in the sequence, small gossans are also associated with this unit. The Bedded Formation in this area is thinner than UNMC or Raspberry Creek.

GEOCHEMISTRY - Rock chip sampling was carried out over the grid. Copper showed low anomalous values on the S flank of the silicified zone and the jasperous area. Slightly higher but only moderately anomalous values of copper occur along the manganiferous siltstone horizon. Lead values identify a discrete anomaly occurring on the manganiferous siltstone horizon. Anomalous zinc values occur both on the jasperous zone and on the manganiferous siltstone. Anomalous zinc also occurs in the footwall rocks on the N of the grid.

GEOPHYSICS - Two SIROTEM traverses were carried out in the area. Both traverses displayed a clearly developed anomaly which could indicate massive sulphide mineralisation.

44) Mount Grim area

GEOLOGY - A sequence of acid lithic tuffs with a fossiliferous limestone bed is intruded by the Mannersley Complex. The fossils have been identified as Lower Carboniferous. The area contains outcrops of magnetite-garnet-calcite skarn.

GEOCHEMISTRY - Ridge and spur soil sampling was carried out, but the only significant anomalous values received were in a zone within the main intrusive and a small zone on the margin. The low-order and small size of these anomalies does not warrant further work.

GEOPHYSICS - Reconnaissance ground magnetics was carried out over the area, and the results indicate that there is no potential for significant tonnages of ore.

45) Mount Hopeful area - Adjacent to the Upper Raspberry Creek area.

GEOLOGY - Mapping in this area shows that the Bedded Formation is continuous over the edge of the Dee Range and down the N side. Dips are shallow to the W. Hanging-wall quartz-feldspar crystal lithic tuffs with variations, and also Andesite Sequence (? unconformable) occur to the S.

GEOCHEMISTRY - Soil sampling was carried out. Copper defined a weak zone trending along the top of the range corresponding with a manganiferous siltstone horizon. Lead values shows the same zone

as copper, and zinc values further define the trend at the top of the range, and show that it extends down the E slope of the range as marginally anomalous values.

46) Mount Morgan Mine

GEOLOGY - The Mount Morgan Mine is hosted in a belt of siliceous and porphyritic rocks. They occur in a narrow belt bounded on either side by the Mount Morgan Tonalite, extending for several kilometres N and S of the Mine. For purposes of localised exploration, the Mine Corridor has been divided into the following areas; Mount Morgan Mine, Mine Corridor North, Mine Anticline, Mine Corridor South, Horse Creek, and Horse Creek South. Mapping of the mine area generally confirmed the classification of the Mt Morgan orebody as a "volcanogenic massive sulphide" deposit. The mine consists of a pipe-like massive pyritic copper-gold deposit underlain by a disseminated "stringer zone" of siliceous ore. The orebody occurs within a large siliceous alteration pipe which transgresses the acid volcanic rocks of the Middle Devonian (?) Capella Creek beds. Owing to faulting and tilting of the stratigraphic sequence, the lower "stringer zone" is now at the same level as the upper "massive zone". Relocation of the Slide Fault and tilting of the sequence from a NE dip to near horizontal returns the mine to its original position.

GEOCHEMISTRY - A geochemical orientation study has been carried out in the mine, with samples of unmineralised rocks of varying types, altered quartz-feldspar porphyries, quartz porphyry, quartz diorite, and associated alteration and various types of ore. Some massive sulphides were intersected in the diamond drilling, but analysis of most of the core returned no ore-grade mineralisation outside the orebody.

GEOPHYSICS - A ground magnetic survey was conducted over the mine. Trans-EM surveys were carried out over the mine area and corridor rocks to the N and S of the mine.

DRILLING - Exploration diamond drilling for stratigraphic and structural purposes was carried out over the mine area. About 30 holes were drilled. A program of percussion drilling was later carried out to test a small stratiform zone of Cu-Zn mineralisation in the NE corner of the open cut.

47) Mount Warner area - 19.3 km SE of Mount Morgan

GEOLOGY - The area includes a sequence of variously retextured sediments and quartz porphyries. Limestone lenses, jaspers and cherts are evident in the NW and are intruded by a large feldspar porphyry dyke, with intrusion breccias developed along the margins of the dyke. In a stream a small pyrite and chalcopyrite outcrop in a narrow band is apparently conformable with the sedimentary bedding. 60 m further W of this outcrop occurs a narrow elongated zone of gossan approximately 12 m x 150 m, also parallel to the bedding. The type of gossan indicates a probability of comparable mineralisation to that exposed in the creek.

GEOCHEMISTRY - Stream sediment sampling under ATP 403M revealed a spot high of copper and a pronounced zone of high zinc values which covers an area of approximately 2.6 km². Ridge and spur soil and rock geochemical sampling was carried out over the area. This work confirmed the broad zone of zinc highs with occasional associated copper highs. Assay of the core returned 20 to 2250 ppm Cu, 50 to 51,178 ppm Zn (most less than 1000 ppm Zn), 10 to 85 ppm Pb, and traces of gold and silver.

GEOPHYSICS - Magnetic, resistivity, electromagnetic, and self-potential surveys have been carried out.

DRILLING - Two diamond drill holes were completed in this area.

48) Mount Usher - 12 km ENE of the Mount Morgan open pit. Approximately 30,000 oz gold was produced from the workings which include the Mount Usher, Caledonian, Anglo Saxon, and Victor workings.

GEOLOGY - The workings exploited two narrow sub-parallel reefs. Mapping at Mt Usher revealed two steeply dipping reefs separated by 8 m of barren material (? carbonate). In the New Golden Cave workings, a thin (10 cm) quartz reef occurs. Minor quartz/sulphide filled joints/shears also occur. Pyritisation is commonly associated with many of the deposits and an intensely pyritised zone over 2 km in length has been mapped closely associated with the Victor mine along the inferred Mt Usher fault system.

GEOCHEMISTRY - Wall samples from Mt Usher and the New Golden Cave returned no significant gold values except in some of the thin reefs.

49) Omo Prospect

GEOLOGY - This prospect consists of a very small gossanous zone within a large intense alteration zone W of and contiguous with the Ajax alteration zone

GEOCHEMISTRY - The core from the diamond drilling was analysed, and the best results were 0.44% Zn, and 0.15% Cu.

DRILLING - A diamond drill hole was put down underneath the gossanous zone to test whether the zone had any depth extent. The hole reached intersected two zones of minor pyrite-sphalerite-chalcopyrite mineralisation.

50) Paddy's Gorge Creek area - 2 km W of Mt Morgan.

GEOCHEMISTRY - Stream sediment, rock chip, and ridge and spur soil sampling was carried out over the area.

51) Peacock Shaft area - High-grade mineralisation was reported from the old Peacock Shaft put down in about 1900. The shaft is presently covered by the Horse Paddock dump.

DRILLING - A diamond drill hole was put down to intersect the mineralisation recorded in the old shaft. The hole intersected mainly quartz-feldspar porphyry with some latite. No significant mineralisation was intersected. The reported ore may still be present, but is probably on either side of the latite intrusion.

52) Penumbra area - Just W of the Fern Hills prospect, at the other side of the Dee Range.

GEOLOGY - (The geology given here covers the Shadow area as well as the Penumbra area). The rock sequence belongs to the Lower to Middle Devonian Capella Creek beds. It consists of massive acid lithic tuffs, and fine acid volcanic rocks interbedded with fine grained intermediate volcanics and banded fine acid rocks. Lenses of recrystallised limestone 100 to 800 m long occur in the upper part of the sequence. In the Shadow area, these rocks are intruded by a quartz-feldspar porphyry unit and a massive hornblende andesite unit. The sequence has been folded into an asymmetrical anticline (Penumbra Anticline) which can be traced from Fern Hills to Penumbra.

GEOCHEMISTRY - Soil samples were collected from the area. The majority of copper values are less than 200 ppm Cu, and Zn values less than 300 ppm. Soil samples collected from the auger drilling returned no values of significance. The analysis of the core from the drilling returned values of less than 650 ppm Cu, and <130 ppm Zn.

GEOPHYSICS - Trans-electromagnetic and resistivity surveys were carried out over the area.

DRILLING - One diamond drill hole was drilled over the spot high of the best trans-EM anomaly. Subsequently three auger holes were drilled on the second trans-EM anomaly.

53) Pearce's Prospect - 8 km E of Mt Morgan at the head of Station Creek.

GEOLOGY - The area can readily be divided into 4 geologically distinct, structurally separated zones. (a) Calcareous intermediate lithic tuffs - This sequence outcrops in the NE corner of the grid. (b) The Shear Zone - This is a 100 m wide zone of limestone, quartz-feldspar porphyry, fine acid volcanic, chert, and feldspar porphyry. (c) Massive Acid Sequence correlated with the Moongan Rhyolite to the east of the Shear Zone. (d) A Banded Sequence to the west of the Shear Zone.

GEOCHEMISTRY - Soil sampling was carried out over the area, returning only very low anomalies, indicating that the area is of little interest economically.

GEOPHYSICS - Trans-electromagnetics and self-potential surveys were carried out over the area.

54) Poison Creek area - occurs 19 km NE of Mount Morgan

GEOLOGY - In all cases where bedrock samples were obtained, the rock chips were of biotite-granodiorite overlain in much of the area by thick river gravel.

GEOCHEMISTRY - The drill cuttings returned only low Cu and Fe values.

GEOPHYSICS - A ground magnetic survey was conducted over the area.

DRILLING - Rotary drilling was carried out in the area.

55) Quarry Creek area

GEOLOGY - A large part of the area is covered by a usually massive, intermediate to basic rock, though tuffaceous and fine banded varieties do occur. This unit appears to be flat lying or gently folded. Three other units also occur in the area; a foliated aphanitic andesite unit; a feldspar porphyry lithic tuff; and an intermediate lithic tuff/tuffaceous shale unit which constitutes the bulk of the sequence in the W part of the grid. Basic and acid dykes also occur in the area.

GEOCHEMISTRY - A soil survey was carried out, but no anomalous values were returned.

56) Queen of Sheba - These workings occur approximately 1.8 km S of the King Solomon workings.

GEOLOGY - Reconnaissance mapping confirms an anticlinal axis trending N-S through Grasstree Yards. The anticline is indicated by dips on massive andesitic tuffs, and ferruginous "jasper" beds near the axis. Two small (50 m diameter) diorite bodies occur near the axis. Quartz "reefs" occur in pits, shafts etc. along a zone about 600 m long. Outcrop and float on top of a hill indicated a larger zone of alteration and quartz veining, and this area was costeamed, revealing alteration, quartz veining and a deeply weathered basic dyke.

GEOCHEMISTRY - The costeams were sampled and revealed only low gold values except for some quartz veins in the southern costean.

57) Raspberry Creek area - This area is 14 km SE of Mount Morgan, and is the along-strike extension of the Upper Nine Mile Creek area.

GEOLOGY - A thick, strike extensive pyritic zone containing sub-gossanous rocks occurs stratigraphically above a sequence of quartz-chlorite fragmentals and below a manganiferous sedimentary horizon. A discrete zone of gossanous, leached, siliceous material occurs on the E end of the grid.

GEOCHEMISTRY - Soil sampling revealed a large, broad copper anomaly with values over 50 ppm occupying two distinct zones within a large area above 25 ppm Cu. The N zone sits just above the bottom contact of the pyritic acid volcanics with the underlying Mt Dick Fragmentals, but below the continuous, well bedded manganese siltstone horizon. The S anomaly overlies the manganese siltstone. Lead values, like copper, form a broad, long, irregular anomalous zone. There are two distinct lead highs over 40 ppm Pb. The N one is displaced relative to the copper high by 400 m to the E. The other

significant lead high is an elongate irregular zone, up to 400 m wide, and it is open ended. Zinc values are low throughout the grided area.

GEOPHYSICS - SIROTEM traverses were done over the area. A broad, high-order anomaly was detected, but no detailed work has been done owing to the lack of available time. A pronounced circular anomaly which is thought to represent 5×10^7 t of sulphide mineralisation was also detected.

DRILLING - The circular anomaly was investigated by percussion-diamond drilling. Virtually no sulphides are present compared to the altered and pyritised rocks on the surface in this area. The reason for the lack of sulphides in the drill hole compared to the surface is not known.

58) Riverhead area - Upper reaches of the Calliope River, W of Gladstone.

GEOLOGY - In the N part of the grid, the sequence consists of strongly outcropping acid volcanic rocks overlain by poorly outcropping sedimentary and pyroclastic rocks. To the S of the grid, siltstone, fine sandstone, and greywacke comprise the greater part of the sequence. This largely sedimentary unit is intruded by three small biotite-quartz diorite stocks. A variety of dykes exist in the area, most are later in age than the stocks and are of little interest.

GEOCHEMISTRY - Soil samples were collected from the area. The best results for copper were from the quartz-biotite diorite stocks (values mostly ranged from 1000 to 2000 ppm Cu, with a maximum of 8500 ppm). A granodiorite porphyry dyke to the N and NW of the W stock returned values of up to 7200 ppm Cu. Only 5 anomalous values of Mo were recorded, with the highest values of 100 and 200 ppm Mo associated with the zone of high copper values over the W stock. Analysis of core samples ranged from 95 ppm to 0.23% Cu, 5 to 40 ppm Mo, and <0.1 ppm Au.

GEOPHYSICS - Ground magnetic and trans-electromagnetic surveys were conducted over the area.

DRILLING - A trial was made to drill through the alluvials with 4 auger holes drilled. Three short holes were drilled through the alluvial boulder beds W of the grid to test the country rock for possible underlying porphyry-copper style mineralisation. A combination of auger, hammer, and diamond drilling was used. Six diamond drill holes were completed in the area. Some mineralisation was intersected.

59) Shadow area - 1.5 km S of the Penumbra prospect on the Dee Range.

GEOCHEMISTRY - Ridge and spur sampling was carried out, returning 5 to 300 ppm Cu, 15 to 80 ppm Pb, and 45 to 435 ppm Zn.

GEOPHYSICS - Reconnaissance trans-electromagnetic work was carried out.

60) Southern Part of the Plumtree area

GEOCHEMISTRY - Detailed sediment sampling has been done over the area.

GEOPHYSICS - A magnetic survey was carried out over this area.

61) St.Mary's Falls area - 10 km E of Mount Morgan

GEOCHEMISTRY - Detailed stream sediment, rock chip, and ridge and spur soil sampling was carried out in the area.

62) Stockyard Creek area - SE part of ATP 508M.

GEOCHEMISTRY - The C-zone samples from the auger drilling were assayed returning 4 to 118 ppm Zn, 0.75 to 7.6% Fe, and 14 to 311 ppm Cu.

GEOPHYSICS - Magnetic and self-potential surveys were carried out over the area

DRILLING - Auger drilling was carried out over the area.

63) Struck Oil area - 8 km E of Mount Morgan

GEOLOGY - The area generally lacks outcrop, and the geological information was based on interpretation of weathered fragments brought up during subsequent hand augering. Conglomerates and interbedded siltstones and sandstones persist in the E portion of the grid, whilst quartz porphyries and granodiorite porphyry are evident in the W and N portions. Dykes of microdiorite texture and composition frequently intrude these sediments and intrusives.

GEOCHEMISTRY - Initial drainage sediment geochemical sampling and follow-up ridge and spur soil sampling in the Struck Oil area was carried out under ATP 403M. Results from soil samples from the auger drilling revealed a broad zone of copper highs, frequently associated with molybdenum, corresponding closely to the geological contact between the sediments and intrusive determined from mapping of fragments. Rock chip samples were collected from gossans, skarns, dykes and alteration zones. The gossans and skarns returned anomalous Cu and W values; epidote alteration zones commonly were anomalous in Cu; while dykes failed to return any significant metal values. Hand augering soil sampling was conducted over skarn and alteration zones, but only one returned significantly anomalous values. Assay of core samples from the diamond drilling returned 0.009 to 1.240% Cu, 0 to 0.3 dwt Au, traces of Ag, and 0 to 2900 ppm Mo (most <300 ppm Mo).

GEOPHYSICS - Ground magnetic, electromagnetic, resistivity, gravity, trans electromagnetic, and self-potential surveys were conducted over the area. The magnetics confirmed the presence of a low in the area, but appears to be too wide and shallow to be of interest from an exploration point of view.

DRILLING - Auger drilling was carried out to collect soil samples. 13 diamond drill hole were drilled to test the geochemical anomaly.

64) Talban Hill Breccia Pipe - This area is 1.5 km S-SE of the Mt Morgan Mine, and is also known as the Light of Day Mine.

GEOLOGY - The Talban Hill Breccia Pipe is an intensely altered breccia zone occurring on the contact of the Mine Corridor rocks with the Mount Morgan Tonalite at the N end of the Mine Corridor South. Breccia fragments within the pipe consist of fine siliceous Mine Corridor rocks and tonalite, all of which are set in a fine altered matrix which is often highly pyritic. Some of the breccia fragments of rhyolitic rock are also pyritic.

GEOCHEMISTRY - Analysis of material from the drilling yielded 0 to 0.15 g/t Au, 24 to 184 ppm Cu, 24 to 66 ppm Pb, 18 to 132 ppm Zn, and 0 to 5 ppm Mo. These values are not significant suggesting that the earlier sampling of underground workings may have been false. On the other hand, the percussion holes were not very deep and most of the recorded values from the old workings were from lower down. Material from a diamond drill hole put down by North Broken Hill in 1969 was split and assayed. It returned no gold values of significance over the whole of the intersection.

DRILLING - 3 percussion holes were drilled.

65) Thomases Gossan area - 7 km N of the Mount Morgan Mine. Limited tonnages of high-grade ore were extracted from small workings in the area.

GEOLOGY - The area consists of Mine Corridor-type rocks, but occurring within the Moongan Corridor, which is similar in composition but is separated from it by a granodiorite body and may not be correlateable. The old workings occur mainly in fine acid and andesitic volcanic rocks in a greater sequence of acid volcanic rocks. These rocks are unconformably overlain by the Jurassic Razorback beds. The high-grade lode which was mined was obviously secondarily enriched beneath the Razorback beds.

GEOCHEMISTRY - Assays of soil sampling showed a zone of contamination below the old workings and an apparent zone of dispersion up into the Razorback beds. A slightly anomalous zone of copper appears to follow the unconformity. A spot high of copper in the Razorback beds may represent contamination. Zinc values show a concentration along the base of the Razorback beds similar to that shown for copper. A low-order anomaly occurs in the Razorback beds corresponding with a copper anomaly.

DRILLING - Hand augering to collect soil samples was carried out. 14 percussion drill holes were put down to see whether any small pods of high-grade ore could be recovered, but without success.

66) Trotters Creek area - 7 km S of Mount Morgan. Located from the airborne geophysical survey.

GEOCHEMISTRY - 6 rock chip samples were collected.

GEOPHYSICS - Reconnaissance Trans-electromagnetic work was carried out.

67) Upper Don area - at the head of the Don River.

GEOLOGY - The lowermost unit in the sequence is the quart-feldspar crystal-lithic tuff cropping out along the river. This is overlain immediately to the E by quartz porphyry lithic tuff which is similar but coarser grained. Both of these units contain localised ovoid alteration zones which are silicified and altered. Overlying these units to the E is a complex zone of interbedded fine acid volcanic rocks and acid lithic tuffs. These rocks vary in their proportion and appear to represent the equivalent horizon to the Banded Sequence at Mount Morgan. The entire sequence is dipping moderately to the NE. On the W side of the area is a complex sequence of andesite, andesitic tuff, sandstone, siltstone, and shale which is unconformable on the acid volcanic sequence. This is thought to be part of the Dee Volcanics. To the S this unconformable sequence is repeated across a major fault.

GEOCHEMISTRY - Ridge and spur soil samples were collected, and the results indicate a complex zone of anomalous values in the S part of the area. The grid was soil sampled by a hand auger. Copper shows a broad zone of high values on the S end of the grid which apparently reflects high background geochemistry in the basic to andesitic suite of volcanics. N of the fault, the acid volcanics have only low background copper values, and several discrete anomalous zones occur associated with gossanous zones. Lead generally shows very low background values. A broad zone of low-order anomaly occurs approximately coincident with the copper zone in the central part of the grid, but does not occur over the E copper zone. This anomaly is open to the N. Zinc shows a major broad anomaly associated with copper, and the anomaly is open to the N.

GEOPHYSICS - A reconnaissance SP survey indicated a broad zone, low-order anomaly roughly coincident with the geochemistry. A ground radiation survey was carried out over part of the grid. This showed a broad weak potassic radiometric anomaly stratigraphically above the gossanous zones. The uranium channel showed an unusual linear anomaly for which no explanation has been found. A SP survey was also carried out over part of the grid, and showed a broad low associated with the topographic high and also with the gossanous areas.

DRILLING - Hand augering was carried out to obtain soil samples.

68) Upper Manton Creek area - the headwaters of Manton Creek immediately N of the Upper Don River catchment area. Low order anomalous copper and zinc geochemical values were recorded from the early stream sediment survey.

GEOLOGY - The oldest rocks in the area are the acid volcanic rocks which extend from the Upper Don River area. On the divide between the Don River and Manton Creek catchment areas are variable acid lithic tuffs, and fine (?) dacite flows. These rocks extend W, under outliers of sandstone thought to be part of the Dee Volcanics, to the central part of the area around a horse-shoe bend in Manton Creek. The rocks in the central part of the area are mainly variations of the siliceous lithic tuff characterised by chloritic shards (? fiamme) and a fine ashy or siliceous matrix. On the W side of the horseshoe is a

prominent cherty very fine-grained ash tuff with rare feldspar phenocrysts and minor chloritic fragments. This rock has an unusual siliceous spotted alteration pattern. In the N part of the area is a zone of "acid lithic tuff" which is not as well indurated as the remaining acid volcanic rocks and weathers more deeply. On the SW side of the area a sequence of andesitic rocks and sediments lies unconformably above the acid sequence. These are thought to belong to the Dee Volcanics of Pond Formation. The rocks consist of a basal unit of medium to coarse-grained green volcanoclastic well-bedded sandstone, ranging up to lithic lapilli tuff. These are overlain by coarser lithic tuffs. Finer-grained sedimentary rocks including siltstone, chert, and fine sandstone also occur in this upper sequence. Fossils occur in some of these units but these have not yet been dated. Fossils from slightly higher in the sequence W of the Upper Don area yielded Early Carboniferous ages. A large area of alteration occurs in the N part of the area W of the horseshoe bend. It consists of highly silicified zones in the acid volcanic rocks which carry pyrite or gossan up to 15% but average somewhat less. Minor occurrences of secondary copper mineralisation were found in the rocks of the (?) Dee Volcanics, and one occurrence of native copper was found in a small dyke on the SE end of the area.

GEOCHEMISTRY - Ridge and spur soil sampling program was undertaken. Copper values were very low within the acid volcanic rocks, including the alteration zone. The only areas of anomalous copper were from within the (?) Dee Volcanics on the SW of the area. These are considered to reflect an erratic high copper background in these andesitic volcanic rocks, which is a characteristic feature of the Dee Volcanics. Lead values are all uniformly low.

DRILLING - hand augering was used to collect soil samples.

69) Upper Mundic area

GEOLOGY - This area occurs north of a small embayment of the Mt Morgan Tonalite into the Mine Corridor.

GEOCHEMISTRY - Low-order geochemical values have been returned from this area, but the significance has not yet been assessed. Analysis of cuttings from the percussion drilling, and core from the diamond drilling returned 10 to 780 ppm Cu, 4 to 60 ppm Pb, 36 to 1180 ppm Zn, traces of gold, and trace to 1.0 g/t Ag.

DRILLING - Two deep percussion holes were put down in an area of alteration, pyritisation and anomalous Se-Te. No significant sulphides were intersected except for the disseminated pyrite. One of the percussion holes was extended by diamond drilling.

70) Upper Nine Mile Creek area (UNMC) - 11 km ESE of Mount Morgan in the headwaters of Nine Mile Creek. The area was partly investigated as the Mount Warner area. Exploration is focused on a major copper-zinc geochemical anomaly found previously.

GEOLOGY - The rocks are the part of the Capella Creek beds that are locally known as the Moongan Rhyolite. The lowermost rock unit on the grid is the Footwall Tuffs, comprising coarse fragmental and agglomeratic rocks with no significant fine-grained sediments. These rocks occur along the Dee Range for a strike length of over 7 km. Overlying the Footwall Tuffs is the "Bedded Formation", which consists of an interbedded sequence of layered rhyolitic ash tuff, crystal tuff, jasper-chert-chloritic siltstone, and lithic lapilli tuffs. Some stratiform sulphides have been found in drill core. At the top of the Bedded Formation is a distinctive unit of manganiferous hematitic siltstone and jasper about 10 m thick. This unit is called the "Manganese Marker" and is traceable for over 10 km in the area. Overlying the Manganese Marker is a sequence of massive and banded fragmental and lithic tuffs of rhyodacite composition. A sill of magnetic andesitic feldspar porphyry intrudes the sequence. From the initial work done on the prospect, two areas of economic significance were located. The first is a lens of barite-rich (up to 22% BaSO₄) agglomerate within the Bedded Formation. The second, in Springs Creek, is an exposure of sheared fragmentals, cleaved chloritic siltstones, baritic gossan, and cryptocrystalline pyritic cherts sitting above the Footwall Tuffs. Old shallow diggings are concentrated on the sub-outcrops of the gossan.

GEOCHEMISTRY - Rock chip sampling of the units exposed revealed the presence of high levels of copper, lead, and zinc in the Manganese Marker, Bedded Formation, and altered Footwall Tuffs. The gossans from the northern area returned averages of 898 ppm Cu, 817 ppm Pb, 1827 ppm Zn, and 1369 ppm Mn. Analysis of the material from the hand augering has revealed 5 geochemical anomalies. Anomaly 1 is situated on the barite zone which overlies banded pyritic sediments. Anomalies 2 & 3 occur on the S part of the grid in the Springs Creek area, and are open to the S. Anomaly 4 is within the Bedded Formation, and Anomaly 5 is within altered Footwall Tuffs. Material from the drilling program returned intersections with values up to 20% Zn, 3.3% Cu, 0.5% Pb, 125.5 g/t Ag, and 0.51 g/t Au.

GEOPHYSICS - The area was covered by a ground magnetic survey. A SP survey identified an anomaly in the Footwall Tuffs. An IP survey revealed four narrow linear, strike conformable anomalies (Anomaly A, B, C, and D). Anomaly A is in Springs Creek, Anomaly B is in the Footwall Tuffs, Anomaly C is adjacent to the SP anomaly, and Anomaly D is located in the Hanging Wall Tuffs. A resistivity survey revealed highs on the Footwall and Hanging Wall Tuff units. A resistivity low forms a cross-cutting trend, and is adjacent to IP Anomaly A. A TURAM (EM) survey identified small anomalies forming a definite linear zone trending parallel to strike within the Bedded Formation. One SIROTEM traverse was completed in the area. Initial single loop traverses suggested a small anomaly, but later displaced loop traverse yielded no anomaly. The data for the UNMC area are not complete due to lack of time available for the survey.

DRILLING - Hand auger drilling was carried out to collect B-horizon soil samples. A large program of percussion and diamond drilling was carried out in the area investigating geochemical and geophysical anomalies. One diamond drill hole was also put down by the Queensland Department of Mines. Some holes intersected significant pyrite, sphalerite, chalcopyrite mineralisation, but most encountered only minor mineralisation.

71) Upper Raspberry Creek area - approximately 20 km SE of Mount Morgan. This area is the along-strike extension of the Upper Nine Mile Creek and Raspberry Creek areas.

GEOLOGY - Units outcropping are a strike continuation of the Bedded Formation. Stratigraphically, the lowermost unit of the grid is a pyritic rhyolite tuff which is overlain by a sub-gossanous sericitic and limonitic zone. Overlying the pyritic tuffs is a sequence of manganiferous horizons consisting of siltstone, jasper, chert and interbedded pyritic and non-pyritic tuff and breccia. The uppermost rhyolitic lithic tuff of this group is immediately overlain by a geochemically anomalous magnetic, sulphide-rich manganiferous chert-siltstone unit known locally as the Yarrowonga bed. Rhyolitic tuff, lava breccia and ignimbrite overlies the Yarrowonga bed, and are in turn overlain by a jasper horizon which marks the uppermost limit of the sequence of rocks considered equivalent to the Bedded Formation at UNMC. The Bedded Formation at Upper Raspberry Creek is overlain by chloritic, calcareous and fossiliferous fragmental tuff, agglomerate, and intermediate ash tuff. Dolerite and feldspar porphyry sills have intruded the sequence and some transcurrent faulting is evident.

GEOCHEMISTRY - B-horizon soil samples were collected and assayed. Copper defined two large anomalies. The W anomaly is open to the W and occurs near the stratigraphic top of the Bedded Formation. The E anomaly is open to the NE and overlies the Yarrowonga bed. Lead values define an irregular, broad zone of anomalous values which extends over much of the N part of the Upper Raspberry Creek grid. It contains two significant zones. The W zone is open to the E and lies above a manganiferous sedimentary horizon. The E zone is open to the N, and is coincident with the copper anomaly over the Yarrowonga bed. Zinc values defined a weak, elongate anomaly. Several small zinc anomalies correlate with the lead and copper anomalous zone over the Yarrowonga bed. High silver is noted to correlate with the anomalous Cu, Pb, and Zn over the Yarrowonga bed. A later soil sampling survey indicated that the altered Footwall Volcanics and manganiferous beds in the Bedded Formation return weakly anomalous values of copper, lead, and zinc, but no pronounced anomalies are present.

GEOPHYSICS - Two SIROTEM traverses were completed, but detected only low order anomalies.

72) West of Fernvale area - this area is about 56.5 km SE of Mount Morgan on the W flank of the Dee Range.

GEOLOGY - The area has poor outcrop, and the geological interpretation is based on weathered surface rock fragments. The area consists mainly of quartz and fine sediments cut by a set of feldspar porphyry dykes and by a later hornblende microdiorite dyke. In the SW is an outcrop of dacite.

GEOCHEMISTRY - A restricted zone of relatively high zinc values cover and area of approximately 2.6 km².

GEOPHYSICS - A magnetic survey was conducted over the area.

73) Youlambie - this area is following up a INPUT - EM anomaly in the Youlambie Conglomerate.

GEOCHEMISTRY - Ridge and spur soil sampling was carried out over the area, but the values returned are considered insignificant.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The ATP was relinquished in May 1984. Two areas of interest, the Upper Don and Fern Hills, have been retained under Lease Application by the Joint Venture partners. The ATP was surrendered conditionally on the granting of a new authority (ATP 3953) incorporating the required sub-blocks.

RECORDER: Paul Blake **DATE:** 29/04/1994.

COMPANY REPORT SUMMARY SHEET

CR: 2756 **STATUS:** Open

TITLE: Authority to Prospect 508M. Report to Queensland Mines Department for year ending 31st December, 1968.

AUTHOR(S): A.R. Hope & J.B. Seeley **DATE:** May 1969

ATP/EP No.: ATP 508M

COMPANY HOLDING TITLE: Geopeko Limited

COMPANY SUBMITTING REPORT: Geopeko Limited

DATE GRANTED: May 1968 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan, Bajool, Biloela, Calliope

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: The Mount Morgan, and Dee and Ulam Range area

MINING DISTRICT:

MINES/PROSPECTS: Bull Creek, Struck Oil and Mount Warner areas, and Eulogie Park Gabbro

EXPLORATION TARGETS/MODELS: All metals (but chiefly a Mount Morgan type copper/gold orebody)

SUMMARY:

GEOLOGY -

REGIONAL - In the SE corner of the ATP (Langmorn Creek area) the Lower to lower Middle Devonian Mt Holly beds (limestones, limey rocks, sandstones, greywackes and fragmentary rocks) are intruded by a granodiorite of unknown age. In general the granodiorite is strongly weathered and tends to form topographic depressions whereas the sediments usually form pronounced strike ridges. Contact effects are most pronounced where limestones and associated limey sediments lie in close proximity to the granodiorite. The effects range through evidence of re-crystallisation to development of calcareous silicate rocks which are sometimes garnetiferous. The predominantly sedimentary sequence in the area generally strikes NW to N with steep dips both to the E and W. Two small outcrops of flat lying, Tertiary, olivine basalt forming residual cappings were noted. Minor mineralisation has been noted in the area. Malachite was observed both in a narrow shear and associated with aplite intruding country rock between Stockyard and Oaky Creeks, whilst a gossan occurrence is reported under Marble Mountain Grid.

The Struck Oil area lies approximately 1.6 km E of the Mount Morgan Granite-trondhjemite mass within a sequence of quartz porphyry and Devonian conglomerate, sandstone, and siltstone. These sediments generally strike NNW-SSE and can be traced along strike to the Mount Warner area. Numerous limestone lenses containing corals and bryozoans occur in the sequence.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Walmul Copper Company (ATP 279M); and Morgan Mining & Industrial Co. P/L (ATP 302M, 352M, 402M, & 403M).

GEOLOGICAL MAPPING - Geological mapping was started in the SE portion of the ATP, and in the Struck Oil area E of Mount Morgan

GEOCHEMISTRY

- **stream sediment sampling** - A stream sediment survey was conducted to cover areas not previously sampled during investigations of previous Authorities to Prospect 302M, 352M, 402M, and 403M. Close interval sampling was employed in the Plumtree, Mount Hopeful and Langmorn areas. Results so far have disclosed a number of spot high copper values, occasionally with anomalous zinc content, and a large area in the Mount Hopeful area containing some 17 sample sites in which the zinc content exceeded 300 ppm, up to a maximum of 770 ppm. The Plumtree area is characterised by a background distribution of copper and zinc values.

GEOPHYSICS

- **airborne surveys** - An airborne magnetic survey was completed over the area by Geophysical Resources Development Company of Sydney. Magnetic anomalies of variable character have been outlined, some of which will require much follow-up work in order to relocate these anomalies on the ground and to study their associated geological environment.

LOCALISED EXPLORATION/PROSPECTS

1) Bull Creek Grid - This area was previously reported in the final report on ATP 279M.

GEOLOGY - Copper mineralisation has been found associated with granitic boulders within a boulder bed adjacent to a granodiorite contact.

GEOPHYSICS - This area was covered by a ground magnetic and a self-potential (SP) survey.

2) Eulogie Park Gabbro

GEOLOGY - A 60 cm wide titaniferous and vanadiferous magnetite layer within the gabbro was located.

GEOPHYSICS - A ground magnetic traverse was made along a line which had been chip sampled during an investigation of the area under ATP 352M. A second line was also traversed parallel to the first line.

3) Struck Oil area - The Struck Oil area lies approximately 1.6 km E of the Mount Morgan Granite-trondhjemite mass.

GEOLOGY - The area generally lacks outcrop, and the geological information was based on interpretation of weathered fragments brought up during subsequent hand augering. Conglomerates and interbedded siltstones and sandstones persist in the E portion of the grid, whilst quartz porphyries and granodiorite porphyry are evident in the W and N portions. Dykes of microdiorite texture and composition frequently intrude these sediments and intrusives.

GEOCHEMISTRY - Initial drainage sediment geochemical sampling and follow-up ridge and spur soil sampling in the Struck Oil area was carried out under ATP 403M. Results from soil samples from the auger drilling revealed a broad zone of copper highs, frequently associated with molybdenum highs, trending E-W across the central portions of the grid area and corresponds closely to the geological contact between the sediments and intrusive determined from mapping of fragments. Assays of samples from the diamond drilling returned 0.024 to 0.96% Cu, traces to 0.3 dwt Au, traces of Ag, and 8 to 360 ppm Mo.

GEOPHYSICS - Ground magnetic and self-potential surveys were conducted over the area.

DRILLING - Auger drilling was carried out, with the holes drilled to a maximum of 1.8 m where possible. A diamond drill hole was begun to test the geochemical anomaly but was abandoned due to

technical problems. A second hole was drilled approximately 8 m from the original, and reached a depth of 75 m.

4) Mount Warner area - 19.3 km SE of Mount Morgan

GEOLOGY - The area includes a sequence of variously retextured sediments and quartz porphyries dipping between 45° and 70° to the W. Limestone lenses, jaspers and cherts are evident in the NW and are intruded by a large feldspar porphyry dyke; intrusion breccias are developed along the margins of the dyke. A small stream pyrite and chalcopyrite outcrop in a narrow band apparently conformable with the sedimentary bedding. 60 m further W of this outcrop occurs a narrow elongated zone of gossan approximately 12 m x 150 m, also parallel to the bedding. The type of gossan indicates a probability of comparable mineralisation to that exposed in the creek.

GEOCHEMISTRY - Stream sediment sampling under ATP 403M revealed a spot high of copper (300 ppm) and a pronounced zone of high zinc values (up to 1770 ppm) which covers an area of approximately 2.6 km². Rock chip samples of the small pyrite and chalcopyrite outcrop returned 4.0% Cu, 2% Zn, 390 ppm Pb, trace gold. Follow-up ridge and spur soil and rock geochemical sampling was carried out over the Mt Warner area. This work confirmed the broad zone of zinc highs with occasional associated copper highs. At this stage these anomalous zinc and copper values have not been directly related to mineralisation as typified by the gossan.

5) Marble Mountain Grid - occurs in the SE corner of the ATP, immediately N of Marble Mountain.

GEOLOGY - This grid is a small area over gossanous material in sediments belonging to the Mount Holly beds adjacent to an intrusive granodiorite. The gossan which appears to be hematitic with usually poorly developed boxworks, is associated with limestones and other limey sediments where they occur in contact with a medium grained intrusive biotite granodiorite. Garnetiferous limestone, gossans and the occasional quartz veins are the most obvious of the contact effects produced by the granite.

GEOCHEMISTRY - Both stream sediment and soil sampling failed to detect any anomalous zinc and copper values. Chip samples of the gossan returned traces of gold, trace to 0.8 dwt/ton Ag, 0.11 to 0.33% S, 70 to 130 ppm Pb, 225 to 305 ppm Zn, 230 to 750 ppm Cu, and 0 to 12 ppm Mo.

GEOPHYSICS - A ground magnetic survey failed to produce conclusive results.

RECORDER: Paul Blake **DATE:** 03/03/1994.

COMPANY REPORT SUMMARY SHEET

CR: 3182 **STATUS:** Open

TITLE: Authority to Prospect 508M. Report to Queensland Mines Department for year ending 31st December 1969.

AUTHOR(S): S. Greive Brown **DATE:** May 1970

ATP/EP No.: ATP 508M

COMPANY HOLDING TITLE: Geopeko Limited

COMPANY SUBMITTING REPORT: Geopeko Limited

DATE GRANTED: May 1968 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan, Bajool, Biloela, Calliope

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: The Mount Morgan, and Dee and Ulam Range area

MINING DISTRICT:

MINES/PROSPECTS: Bull Creek, Struck Oil, Mount Warner, Poison Creek, Mount Bennett, and Limestone Creek areas, and Eulogie Park Gabbro

EXPLORATION TARGETS\MODELS: All metals (but chiefly a Mount Morgan type copper/gold orebody)

SUMMARY:

GEOLOGY -

REGIONAL - The Central Creek area is dominated by granite, conglomerate, and feldspar porphyry. The NE portion of the area is mainly volcanic conglomerate while the feldspar porphyry is dominant in the SW. The few obvious sedimentary outcrops in this area strike NNW with a dip of about 18° to the W.

REGIONAL EXPLORATION

GEOLOGICAL MAPPING - Regional geological mapping was continued in the E Calliungal area of the Struck Oil area (to the E of Mount Morgan), and in the Central Creek area.

GEOCHEMISTRY

- **stream sediment sampling** - Stream sediment geochemical sampling was continued in those areas not previously sampled either by previous company exploration or by previous work by Geopeko in ATP 508M. Close interval sampling was employed in the Langmorn, Gelobera, and Centre Creek areas of the ATP. Results have disclosed a number of spot high copper values occasionally with high zinc content. Both the Central Creek and Gelobera areas are characterised by a low uniform distribution of copper and zinc values.

LOCALISED EXPLORATION/PROSPECTS

1) Struck Oil area

GEOCHEMISTRY - Assays of the core returned 0.009 to 1.240% Cu, 0 to 2900 ppm Mo (most less than 300 ppm Mo), and absent to traces of gold.

DRILLING - A further 4 cored holes were completed.

2) Mount Warner area

GEOCHEMISTRY - Assay of the core returned 20 to 1180 ppm Cu, 50 to 51,178 ppm Zn (most less than 1000 ppm Zn), and traces of gold and silver.

DRILLING - One diamond drill hole was completed in this area.

3) Bell Top area - this area is 12.8 km SE of Mount Morgan near Nine Mile Creek.

GEOCHEMISTRY - A grid was set up over this area and geochemical sampling was carried out. The results returned were 8 to 4000 ppm Cu (most are less than 200 ppm Cu), and 0 to 4770 ppm Zn (most are less than 270 ppm Zn).

4) Poison Creek area - occurs 19 km NE of Mount Morgan

GEOLOGY - In all cases where bedrock samples were obtained the rock chips were of biotite-granodiorite overlain in much of the area by thick river gravel.

GEOCHEMISTRY - The drill cuttings returned only low Cu and Fe values.

GEOPHYSICS - A ground magnetic survey was conducted over the area, but the results have not yet been evaluated.

DRILLING - Rotary drilling was carried out in the area.

5) Mount Bennett area - 40 km SSW of Raglan and includes the old Mount Bennett Gold Mine.

GEOLOGY - The area has very poor outcrop, and the geological interpretation is based on weathered surface rock fragments. The area includes retextured sediments and volcanic agglomerates, dipping steeply to the E. Feldspar porphyries are evident in the W. In the area of the old gold workings, fairly wide quartz reefs striking approximately E-W are found intruding the sediments.

GEOPHYSICS - Magnetometer surveys were conducted over the Mount Bennett grid.

6) West of Fernvale area - this area is about 56.5 km SE of Mount Morgan on the W flank of the Dee Range.

GEOLOGY - The area has very poor outcrop, and the geological interpretation is based on weathered surface rock fragments. The area consists mainly of quartz and fine sediments cut by a set of feldspar porphyry dykes and by a later hornblende microdiorite dyke. In the SW is an outcrop of dacite.

GEOCHEMISTRY - A restricted zone of relatively high zinc values (up to 150 ppm) cover an area of approximately 2.6 km².

GEOPHYSICS - A magnetic survey was conducted over the area.

7) Limestone Creek area - the area was located by a small magnetic anomaly.

GEOCHEMISTRY - Samples from the drilling were analysed. The results ranged from 15 to 190 ppm Cu.

GEOPHYSICS - A ground magnetic survey was conducted in the area.

DRILLING - A line of holes were drilled in the area.

RECORDER: Paul Blake **DATE:** 04/03/1994.

COMPANY REPORT SUMMARY SHEET

CR: 3495 **STATUS:** Open

TITLE: Authority to Prospect 508M. Report to December 31, 1970.

AUTHOR(S): **DATE:**

ATP/EP No.: ATP 508M

COMPANY HOLDING TITLE: Geopeko Limited

COMPANY SUBMITTING REPORT: Geopeko Limited

DATE GRANTED: May 1968 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan, Bajool, Biloela, Calliope

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: The Mount Morgan, and Dee and Ulam Range area

MINING DISTRICT:

MINES/PROSPECTS: Bull Creek, Struck Oil, Mount Warner, Stockyard Creek, Bouldercombe, Poison Creek, Mount Bennett, and Limestone Creek areas, and Eulogie Park Gabbro

EXPLORATION TARGETS\MODELS: All metals (but chiefly a Mount Morgan type copper/gold orebody)

SUMMARY:

REASON FOR ACQUISITION OF TITLE -

GEOLOGY -

REGIONAL - In the Mount Morgan - Hamilton Creek area, the oldest rocks are banded siliceous rocks of the Mine Corridor Complex, which are intruded by quartz porphyry and quartz-feldspar porphyry. The Mine Corridor rocks are overlain by agglomeratic and tuffaceous bedded rocks with a trachy-andesitic composition, belonging to the Dee Volcanics. Both the Dee Volcanics and the Mine Corridor rocks are intruded by granodioritic rocks of the Mount Morgan Igneous Complex.

In rocks in the Raspberry Creek - Mount Warner area belong to a Middle Devonian sequence of volcanoclastic beds (fine crystal tuffs and slightly coarser agglomeratic beds) with a trachy-andesitic to andesitic composition. In places, limestone lenses and cherts are interbedded. The lower part of the sequence consists of rather massive quartz-feldspar porphyry, known regionally as the Moongan rhyolites. Strike and dip measurements indicate the presence of shallow, open folds with a NW-SE direction. The structures are cut off in the W by the E part of the "Town" granite-granodiorite.

In the Bouldercombe - Plumtree area, a gabbroic body is located on the S margin of the Gracemere Granodiorite. The latter intrudes the gabbro, and along the contact zone it has been contaminated to give a diorite. The gabbroic mass exhibits some layering due to differentiation. Two other gabbroic bodies occur, one to the E and one to the W of the main body. The main stock intrudes the axis of an anticline, but there are marked structural and lithological variations across the axis. To the E, well bedded tuff, agglomerate, conglomerate, chert and sandstone occur. These strike about 130° and dip to the E at about 40°. To the W a complexly folded sequence of massive fragmental and volcanic rocks with interbedded quartz-feldspar porphyry and chert occur. Adjacent to the granodiorite a zone of highly metamorphosed calcareous and pelitic sediments are found. This truncates the folding within the

stratified rocks of the Dee Volcanics. To the E of the Dee Volcanics are conformably overlain by the limy sediments of the Pond Argillite.

REGIONAL EXPLORATION

GEOLOGICAL MAPPING - Regional mapping was carried out in the area immediately S of Mount Morgan (Hamilton Creek), the area around Raspberry Creek, and Mount Warner.

GEOCHEMISTRY

- **stream sediment sampling** - The regional stream sediment survey was continued, with samples collected from the S section of Gelobera, parts of Langmorn area, and the N section of Manton.

LOCALISED EXPLORATION/PROSPECTS

1) Struck Oil area

GEOCHEMISTRY - Samples from the drilling returned 0.0310 to 1.1000% Cu, traces to 420 ppm Mo, 1.1 to 7.47% Fe, 0.11 to 4.16% S, and traces of gold.

GEOPHYSICS - A resistivity survey has been made over parts of the area.

DRILLING - Another diamond drill hole has been completed in the area, and reached a depth of 216 m.

2) Mount Warner area

GEOLOGY - The grid for the area has been extended, and the SW part of the new area has been mapped. The new area consists of a bedded sequence of volcano-clastic and tuffaceous sediments with a general NW-SE strike and a dip of 35° to the SW. This sequence is intruded by a 20 m wide feldspar porphyry dyke.

GEOPHYSICS - Magnetic and self-potential surveys have been begun.

DRILLING - A start was made on auger drilling but was temporarily discontinued due to heavy rainfall.

3) Head of Capella Creek area - approximately 19 km E of the confluence of the Dee River and Fletcher Creek in the central part of the ATP.

GEOLOGY - The area is underlain by sediments comprising sandstone and conglomerate, and lavas. This sequence is intruded by micro-diorite dykes.

GEOCHEMISTRY - This area showed a geochemical anomaly in the regional stream sediment survey.

GEOPHYSICS - Ground magnetics and self-potential surveys were carried out over the grid.

4) Limestone Creek area

DRILLING - 2 auger-diamond drill holes (SP-1 & SP-2), and two diamond drill holes (DDH-1 & DDH-2), were drilled in the area. DDH-1 reached 60 m, and DDH-2 reached 23.5 km depth. No assays are done on the core yet.

5) Stockyard Creek area - SE part of ATP 508M.

GEOCHEMISTRY - The C-zone samples from the auger drilling were assayed returning 4 to 118 ppm Zn, 0.75 to 7.6% Fe, and 14 to 311 ppm Cu.

GEOPHYSICS - Magnetic and self-potential surveys were carried out over the area

DRILLING - Auger drilling was carried out over the area.

6) Bouldercombe area - 12 km NNE of Mount Morgan.

GEOCHEMISTRY - C-zone samples from the auger drilling were analysed, returning 21 to 475 ppm Cu, 19 to 175 ppm Zn, and nil to 1500 ppm Cr (most are less than 100 ppm Cr).

GEOPHYSICS - A magnetic survey was carried out over the area.

DRILLING - Auger drilling was carried out over the area.

7) Station Creek area - 16 km E of Mount Morgan

GEOPHYSICS - A few reconnaissance magnetic line surveys were done over this area.

8) Head of the Dee area - located on the main dividing range between the Dee River and Station Creek.

GEOPHYSICS - A magnetic and self-potential survey have been carried out over the area.

9) Southern Part of the Plumtree area

GEOPHYSICS - A magnetic survey was carried out over this area.

10) Hamilton Creek area - 7 km S of Mount Morgan

GEOCHEMISTRY - Close spaced stream sediment sampling was carried out in this area returning 72 to 192 ppm Cu, and 25 to 95 ppm Zn. Rock chip sampling was done over specific areas, returning 7 to 7150 ppm Zn, 25 to 1800 ppm Cu, and 0.02 to 0.19% W. Assays of the material from the drilling returned 80 to 7400 ppm Cu, 16 to 228 ppm Zn, and 0 to 40 ppm Pb.

DRILLING - One auger-diamond drill hole was drilled in the area and reached a depth of 23.65 m.

RECORDER: Paul Blake **DATE:** 04/03/1994.

COMPANY REPORT SUMMARY SHEET

CR: 3881 **STATUS:** Open

TITLE: Authority to Prospect 508M. Report to Queensland Mine Department for year ending December 31, 1971.

AUTHOR(S): D.C. Frets **DATE:** February 1972

ATP/EP No.: ATP 508M

COMPANY HOLDING TITLE: Geopeko Limited

COMPANY SUBMITTING REPORT: Geopeko Limited

DATE GRANTED: May 1968 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan, Bajool, Biloela, Calliope

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: The Mount Morgan, and Dee and Ulam Range area

MINING DISTRICT:

MINES/PROSPECTS: Bull Creek, Struck Oil, Mount Warner, Mount Bennett, Bouldercombe, Stockyard Creek, Hamilton Creek, Poison Creek, and Limestone Creek areas, and Eulogie Park Gabbro

EXPLORATION TARGETS/MODELS: All metals (but chiefly a Mount Morgan type copper/gold orebody)

SUMMARY:

REGIONAL EXPLORATION

GEOLOGICAL MAPPING - Mapping of the Bouldercombe-Plumtree-Struck Oil area was finalised. Mapping was started in the SE corner of the ATP in the area drained by the head waters of the Calliope River. Further mapping was done in the SW part of the ATP. Mapping is being continued in the Centre Creek area, between Pomeygranate and Branch Creeks. Mapping was completed in the Head of Nine Mile Creek-Limestone Creek area, and the work was tied into that done in the Struck Oil region.

GEOCHEMISTRY

- **stream sediment sampling** - Detailed stream sediment sampling has been carried out in the Calliope River area. Further sampling is presently in progress in the Manton Creek area near the Don River. Further samples were collected in the Raspberry Creek area.

GEOPHYSICS

- **airborne surveys** - A E-W test strip was flown for airborne radiometrics and magnetics. The results are presently being studied.

LOCALISED EXPLORATION/PROSPECTS

1) Struck Oil area

GEOPHYSICS - A resistivity survey was carried out over a portion of the grid. Also part of the area was covered with ground electromagnetics.

DRILLING - Rock probe drilling is being carried out to obtain details of bedrock in areas with thick soil cover. Soil auger drilling was carried out in the S portion of the grid

2) Mount Warner area

GEOCHEMISTRY - A detailed stream sediment sampling program covering the grid area and the areas adjacent to the grid was done, with some results exceeding 200 ppm Cu, 100 ppm Pb, and 800 ppm Zn. Soil sampling was also carried out and returned 2 to 740 ppm Cu, and 14 to 2900 ppm Zn. Rock chip sampling was carried out in a selected part of the grid.

GEOPHYSICS - The ground magnetic surveys and self-potential surveys were completed. Resistivity surveys were carried out over part of the grid, and experiments were done with electromagnetics.

3) Limestone Creek area 2 - approximately 2 km SW of the Struck Oil area.

GEOCHEMISTRY - The results from the ridge and spur soil samples and samples of stream sediments in the area are under study.

DRILLING - A small program of ridge and spur hand augering was carried out in this area.

4) Bell Top area - just N of Bull Creek area.

GEOCHEMISTRY - Rock chip sampling was carried out in the area returning 0 to 4770 ppm Zn and 13 to 4000 ppm Cu.

5) Bouldercombe area

GEOCHEMISTRY - Stream sediment sampling was carried out in this area, and the results are 4 to 1240 ppm Cu, 11 to 6520 ppm Zn, and 10 to 120 ppm Cr.

6) Head of the Dee area

GEOCHEMISTRY - Further follow-up stream sediment drainage was done over the grid area and the adjacent areas.

GEOPHYSICS - The self-potential and ground magnetic surveys were completed.

7) Southern part of the Plumtree area

GEOCHEMISTRY - Detailed follow-up stream sediment sampling has been done over the area, and the results are presently being studied.

8) Hamilton Creek area

GEOCHEMISTRY - Further detailed follow-up stream sediment geochemistry is in progress in and around the anomalous area. Assay of the core from the drilling returned <100 to 9100 ppm Cu, <100 to 1100 ppm Zn, 10 ppm Pb, no gold, and <20 to 20 ppm W.

GEOPHYSICS - Ground magnetics and self-potential surveys were carried out over the area, but no significant results were returned.

DRILLING - Two shallow diamond drill holes were drilled. DDH32-1 reached 93.70 m and DDH32-2 reached 104.86 m.

9) Eastern Part of Station Creek area (Archer area)

GEOCHEMISTRY - Stream sediment sampling was conducted in the area returning 30 to 80 ppm Zn and 2 to 87 ppm Cu.

GEOPHYSICS - Ground magnetics was carried out over the grid.

DRILLING - 9 shallow auger-diamond holes were drilled in the area.

10) Head of Nine Mile Creek area - just W of Mt Warner.

GEOCHEMISTRY - A detailed follow-up stream sediment survey was conducted over the area.

GEOPHYSICS - The area was covered by a ground magnetic survey.

RECORDER: Paul Blake **DATE:** 08/03/1994.

COMPANY REPORT SUMMARY SHEET

CR: 4341 **STATUS:** Open

TITLE: Final Report on portions of Authority to Prospect 508M, as relinquished in May 1972.

AUTHOR(S): A. Taube **DATE:** August 1972

ATP/EP No.: ATP 508M

COMPANY HOLDING TITLE: Geopeko Limited

COMPANY SUBMITTING REPORT: Geopeko Limited

DATE GRANTED: May 1968 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan, Bajool, Biloela, Calliope

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: The Mount Morgan, and Dee and Ulam Range area

MINING DISTRICT:

MINES/PROSPECTS: Bull Creek, Struck Oil, Mount Warner, Mount Bennett, Bouldercombe, Stockyard Creek, Hamilton Creek, Poison Creek, and Limestone Creek areas, and Eulogie Park Gabbro

EXPLORATION TARGETS\MODELS: All metals (but chiefly a Mount Morgan type copper/gold orebody)

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Areas relinquished include mainly granitic to gabbroic igneous rocks and moderately disturbed volcanic and sedimentary sequences, ranging in age from Lower Devonian to Tertiary. Detailed work had previously been carried out in the Eulogie Park area and E of the Kyle Mohr complex.

RECORDER: Paul Blake **DATE:** 09/03/1994.

COMPANY REPORT SUMMARY SHEET

CR: 4433 **STATUS:** Open

TITLE: Authority to Prospect 508M. Report to Queensland Mines Department for year ending December 31, 1972.

AUTHOR(S): D.C. Frets **DATE:** March 1973

ATP/EP No.: ATP 508M

COMPANY HOLDING TITLE: Geopeko Limited

COMPANY SUBMITTING REPORT: Geopeko Limited

DATE GRANTED: May 1968 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan, Bajool, Biloela, Calliope

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: The Mount Morgan, and Dee and Ulam Range area

MINING DISTRICT:

MINES/PROSPECTS: Mount Morgan Mine, Bull Creek, Struck Oil, Mount Warner, Mount Bennett, Bouldercombe, Stockyard Creek, Hamilton Creek, Poison Creek, and Limestone Creek areas, and Eulogie Park Gabbro

EXPLORATION TARGETS/MODELS: All metals (but chiefly a Mount Morgan type copper/gold orebody)

SUMMARY:

REGIONAL EXPLORATION

GEOLOGICAL MAPPING - Mapping was done in the following areas; **(1)** The E escarpment area between Station Creek in the N, and Mount Helen in the S. **(2)** The Langmorn area including Mount Cedric and Mount Bennett. **(3)** The area around the headwaters of Manton Creek, Mount Alma, and Alma Coombs in the NE. **(4)** The Raspberry Creek-Capella Creek area. **(5)** The area S of the Gelobera Range down to Centre Creek.

GEOCHEMISTRY

- **stream sediment sampling** - Stream sediment sampling was carried out in the areas listed above in Geological Mapping, with a total of 5500 samples collected.

LOCALISED EXPLORATION/PROSPECTS

1) Mount Morgan Mine

GEOLOGY - Studies were carried out on lithology, structure, and alteration features.

GEOPHYSICS - A ground magnetic survey was conducted over the area.

DRILLING - Exploratory drilling commenced with a total of 20 holes drilled with a total of approximately 1650 m drilled.

2) Struck Oil area

GEOLOGY - The outcrops in the area were geologically mapped. In area covered by soil, basement geology was determined by drilling.

GEOCHEMISTRY - Soil and rock chip sampling was carried out over the area with the results ranging from 36 to 2750 ppm Cu.

GEOPHYSICS - Gravity and resistivity readings were taken over the Struck Oil Stock. Trans Electro-Magnetics were carried out over the whole grid area.

DRILLING - Short diamond drill holes were drilled in areas covered in soil to determine the basement rock.

3) Bull Creek Area

GEOPHYSICS - The grid of the area was extended. Geophysical work carried out over the area consisted of ground magnetics, resistivity probes, self-potential probes, and trans-EM probes.

4) Mount Warner area

GEOCHEMISTRY - Analysis of the core from the drilling returned 20 to 2250 ppm Cu, 10 to 85 ppm Pb, and 35 to 460 ppm Zn. 84 rock chip samples were collected returning 0 to 3900 ppm S, 1.6 to 21.6% Fe, 15 to 1250 ppm Zn, 15 to 400 ppm Pb, and 8 to 1950 ppm Cu.

DRILLING - Diamond drill hole DDH 9/2 was completed, reaching a depth of 242 m.

5) Limestone Creek area (near Walmount) - approximately 2 km SW of the Struck Oil Porphyry stock.

GEOCHEMISTRY - A grid was established over the area and detailed soil sampling was carried out, returning 25 to 390 ppm Pb, 20 to 1500 ppm Hg, 25 to 2250 ppm Zn, and 5 to 900 ppm Cu. Follow-up ridge and spur soil sampling was carried out over several small areas of interest, west (5 to 500 ppm Cu, 10 to 140 ppm Zn, 15 to 75 ppm Pb), north, and southeast (25 to 245 ppm Cu, 20 to 205 ppm Pb, and 30 to 205 ppm Zn) of the grid.

GEOPHYSICS - Ground magnetics, self-potential and trans-EM were carried out over the grid.

DRILLING - Diamond drill hole 37/1 was started in November, and at the close of the year had reached 226 m.

6) Hamilton Creek area

GEOCHEMISTRY - Detailed stream sediment sampling was carried out over a selected part of the area, returning 37 to 562 ppm Zn, 35 to 255 ppm Cu, and 10 to 150 ppm Pb. Detailed soil geochemistry was carried out over the area of interest on the grid, and returned 15 to 550 ppm Pb, 26 to 230 ppm Zn, 8 to 420 ppm Cu.

GEOPHYSICS - The whole grid was surveyed with trans-EM, but no significant results were returned.

7) East of Mount Morgan Golf Club

GEOCHEMISTRY - Follow-up ridge and spur soil sampling was carried out over a small area of interest E of the Mount Morgan Golf Club.

RECORDER: Paul Blake

DATE: 10/03/1994.

COMPANY REPORT SUMMARY SHEET

CR: 5052 **STATUS:** Open

TITLE: Authority to Prospect 508M. Report to Queensland Mines Department for year ending December 31, 1973.

AUTHOR(S): D.C. Frets **DATE:** March 1974

ATP/EP No.: ATP 508M

COMPANY HOLDING TITLE: Geopeko Limited

COMPANY SUBMITTING REPORT: Geopeko Limited

DATE GRANTED: May 1968 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan, Bajool, Biloela, Calliope

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: The Mount Morgan, and Dee and Ulam Range area

MINING DISTRICT:

MINES/PROSPECTS: Mount Morgan Mine, and Ajax Mine; and Bull Creek, Struck Oil, Mount Warner, Mount Bennett, Bouldercombe, Stockyard Creek, Hamilton Creek, Poison Creek, Kangaroo Creek, Riverhead, Mannersley, Penumbra, and Limestone Creek areas; and Eulogie Park Gabbro

EXPLORATION TARGETS/MODELS: All metals (but chiefly a Mount Morgan type copper/gold orebody)

SUMMARY:

REGIONAL EXPLORATION

GEOCHEMISTRY

- **stream sediment sampling** - A further 35 stream sediment samples were collected in the S part of the ATP.

GEOPHYSICS

- **airborne surveys** - An airborne electromagnetic, magnetic and radiometric survey was carried out by Geoterrex Ltd. over the major part of the ATP.

LOCALISED EXPLORATION/PROSPECTS

1) Mount Morgan Mine

GEOCHEMISTRY - Analysis of core from hole 8-60 returned 0 to 0.6 g/mtr Au, and trace to 1.7% Cu. No ore-grade mineralisation was encountered outside the orebody.

GEOPHYSICS - Trans-EM ground survey was carried out over the mine area and corridor rocks to the N and S of the Mine.

DRILLING - 5 diamond drill holes were completed with a total of approximately 1000 m (4-42, 43, 7-36, 7-37, and 8-60), and drilling is continuing. Exploration drilling for stratigraphic and structural

purposes continued over the Mine Lease south of the open cut. Three holes were drilled for this with a total of 1207 m.

2) Struck Oil area - 8 km E of Mount Morgan

GEOCHEMISTRY - Core from DDH2/11 returned 0.02 to 0.15 ppm Cu, and 0 to 70 ppm Mo. Core from DDH2/12 returned 200 to 9700 ppm Cu (most <1500 ppm Cu), and 0 to 500 ppm Mo (most <200 ppm Mo).

DRILLING - Two diamond drill holes (DDH2/11 and DDH2/12) were drilled to a depth of 348 m and 462.68 m. DDH2/11 was centred over a trans-EM anomaly, and the anomaly was explained by generally high pyrite content in the core. DDH2/12 was drilled to test a geochemical anomaly and the geochemical anomaly was shown to be associated with a skarn horizon.

3) Hamilton Creek area - 5 km S of Mount Morgan

GEOCHEMISTRY - The core from the drilling was split and analysed, but the results are still being analysed.

DRILLING - Six short diamond drill holes with a total of 296.56 m were drilled over the area.

4) Trotters Creek area - 7 km S of Mount Morgan. Located from the airborne geophysical survey.

GEOCHEMISTRY - 6 rock chip samples were collected.

GEOPHYSICS - Reconnaissance Trans-electromagnetic work was carried out.

5) Paddy's Gorge Creek area - 2 km W of Mt Morgan.

GEOCHEMISTRY - Initially, 5 stream sediment samples and 4 rock chip samples were collected. Later, follow-up ridge and spur soil sampling was carried out with 44 samples collected. Results are under study.

6) Limestone Creek (near Walmount) area

GEOCHEMISTRY - Analysis of core from DDH37/1 returned 20 to 4100 ppm Cu, 10 to 227 ppm Pb, 10 to 26,875 ppm Zn, and traces of gold.

DRILLING - DDH37/1 was completed, reaching a depth of 494.13 m; it was designed to test for mineralisation in the axial area of the Walmount Syncline below a Cu/Pb/Zn soil anomaly. The core was logged with the following descriptions; **0-19 m** Mineralised sediments - This is a fine-grained, green, highly fractured rock, with the fractures being filled with iron oxides; **19-379.40 m** Intermediate Tuffs - Lithic fragments were all andesitic in composition being either felsite (fine grained plagioclase-rich rock) or feldspar porphyry. All grain size variations were present, from <1 mm in ash tuff units, to up to 30 cm in some of the coarser volcanic breccias. Bedding was common within the finer grained ash tuff units, but rare in coarser grained beds; **123.30-141.00 m** Quartz-feldspar Porphyry - Diorite porphyry consisting of subhedral quartz and plagioclase phenocrysts up to 2 mm, set in a fine-grained (<0.10 mm), holocrystalline, quartzo-feldspathic matrix with variable chlorite and epidote. This unit is identical in hand specimen to the rhyodacite unit mapped on the surface; **379.40-479.40 m** Andesites and Andesitic Tuffs - This is a magnetite-rich sequence of alternating lithic lapilli tuffs and massive andesites. There is little difference between the fragments and the matrix in the tuffs, except that the fragments contain more magnetite; **479.40-494.13 m** Tonalite Porphyry - This rock type consists of subhedral quartz and plagioclase phenocrysts up to 4 mm in diameter set in a matrix of micrographic intergrowths between quartz and plagioclase. Chlorite after hornblende (?) and minor epidote are also present. Compositionally this tonalite porphyry relates to the "Town Granite Complex".

Irregular narrow zones of epidote alteration with associated pyrite, sphalerite, chalcopyrite and calcite are common within the intermediate lithic tuff unit. Chloritisation is the common form of alteration within the andesitic lithic tuff unit.

7) Lennox area (Middle Creek) - 8 km SE of Mt Morgan

GEOCHEMISTRY - 124 soil samples were collected from the area.

8) St. Mary's Falls area - 10 km E of Mount Morgan

GEOCHEMISTRY - Detailed stream sediment sampling was carried out in the area. 63 ridge and spur soil samples were collected from the area. 12 rock chip samples were also collected from the area.

9) Pearce's Prospect - 8 km E of Mt Morgan at the head of Station Creek.

GEOLOGY - The area can readily be divided into 4 geologically distinct, structurally separated zones. (a) Calcareous intermediate lithic tuffs - This sequence outcrops in the NE corner of the grid. It is part of the middle or early Upper Devonian sequence which stretches from the Dee River in the N to Friday Creek in the S. The contact between this sequence and the massive acid sequence to the SW is sharp and steep. (b) East of the Shear Zone - Massive Acid Sequence - This sequence consists of quartz-feldspar porphyry, feldspar porphyry, chert, and limestone. The cherts are poorly banded in part but usually massive white, grey, and green coloured. This sequence correlates with the Moongan Rhyolites, and is not identical to the Moongan Corridor which terminates at the Station Creek Fault. (c) West of the Shear Zone - Banded Sequence - This area consists of banded cherts, feldspar porphyry, acid lithic tuff, and minor quartz-feldspar porphyry, and appears to be correlatable with the area W of the Mt. Warner Shear Zone, and N of the Little Raspberry Linear. To the N the sequence is in faulted contact with quartz-feldspar porphyry, acid tuff and feldspar porphyry of the Moongan Corridor. There is considerable drag folding adjacent to the shear zone, and the movement sense is SW block downwards. (d) The Shear Zone - This zone of limestone, quartz-feldspar porphyry, fine acid volcanic, chert, and feldspar porphyry, is approximately 100 m wide. Outcrop and float are lacking, and the rock types are known from bedrock chips collected during the auger drilling.

GEOCHEMISTRY - Soil sampling was carried out over the area, returning 0 to 85 ppm Cu, and 0 to 190 ppm Zn. These are very low anomalies and the area is of little interest economically.

GEOPHYSICS - Trans-electromagnetics and self-potential surveys were carried out over the area.

10) Ajax Mine Prospect - 4 km SE of Mt Hopeful television tower.

GEOPHYSICS - Trans-electromagnetics and self-potential surveys were carried out over the area.

11) Fern Hills area - on the Dee Range, just W of "Fern Hills" homestead, S of Mt Hopeful television tower.

GEOLOGY - (The geology given here covers the Shadow and Penumbra areas, as well as the Fern Hills area). The rock sequence belongs to the Lower to Middle Devonian Capella Creek beds. It consists of massive acid lithic tuffs and fine acid volcanic rocks interbedded with fine grained intermediate volcanics and banded fine acid rocks. Lenses of recrystallised limestone 100 to 800 m long occur in the upper part of the sequence while major limestone beds can be traced on the E margin of the area. In the Fern Hills and Shadow area, these rocks are intruded by a quartz-feldspar porphyry unit and a massive, usually very coarse-grained hornblende andesite unit. The hornblende andesite encloses a very strongly sheared, sericitised and ferruginous siliceous rock, and to the E, is faulted against strongly sheared acid lithic tuff by the Fern Hills fault. Small and large andesite and feldspar porphyry dykes and less commonly microdiorite dykes are found throughout the area. The regional strike is approximately NW. The sequence has been folded into an asymmetrical anticline (Penumbra Anticline) which can be traced from Fern Hills to Penumbra. The E limb of the anticline is terminated by the NW trending Fern Hills

fault. This has produced a broad shear zone at least 1 km wide in the N. The contact between this zone and the Stockyard Creek Granodiorite is obscured by alluvium.

GEOCHEMISTRY - 15 stream sediment samples were collected. 153 ridge and spur soil samples were collected, returning 35 to 1160 ppm Zn, 20 to 350 ppm Cu, and 20 to 230 ppm Pb.

12) Penumbra area - Just W of the Fern Hills prospect, at the other side of the Dee Range.

GEOCHEMISTRY - 9 soil samples were collected. 31 soil samples were taken from the auger drilling. The majority of copper values are less than 200 ppm Cu, and Zn values less than 300 ppm. The analysis of the core from DDH48/1 returned values of less than 650 ppm Cu, and <130 ppm Zn. All assays for lead resulted in background values ranging between 14 and 50 ppm, and no gold was recorded.

GEOPHYSICS - Trans-electromagnetic and resistivity surveys were carried out over the area.

DRILLING - Diamond drill hole DDH48/1 was drilled to a depth of 101.58 m. This hole was drilled over the spot high of the best trans-EM anomaly. Subsequently three auger holes were drilled to depths of 20, 16, and 22 m on the second trans-EM anomaly.

13) Shadow area - 1.5 km S of the Penumbra prospect on the Dee Range.

GEOCHEMISTRY - Ridge and spur sampling was carried out, returning 5 to 300 ppm Cu, 15 to 80 ppm Pb, and 45 to 435 ppm Zn.

GEOPHYSICS - Reconnaissance trans-electromagnetic work was carried out.

14) Kangaroo Creek area - SW part of the Prior Park grazing farm.

GEOLOGY - The rocks in the grid occupy a N-S elongate embayment, open to the SW, within the Stockyard Creek Granodiorite. The rocks form part of a sequence of NW-SE striking limestones, acid lithic and feldspathic tuffs and acid feldspar porphyries of Mid-Devonian Capella Creek beds. To the E is a further, larger embayment within the Stockyard Creek Granodiorite, occupied by rocks of the same sequence; the Marble Mountain grid is located in this area. The rocks of the Kangaroo Creek Grid dip at approximately 45° to the NE and lie on the W limb of the Marble Mountain Syncline. The rocks in the area have been hornfelsed into crystalline limestone, garnetiferous limestone, garnet (-epidote) skarn, calc-silicate hornfels, and hornfelsed limey tuff. Acid feldspar porphyry forms a small outcrop in the W of the grid. The Stockyard Creek granodiorite forms the major part of the outcrop immediately W of the grid. To the NW is a prominent outcrop of finely banded acid aphanitic quartz porphyry and feldspar-quartz porphyry. It is most likely either a large xenolith of an intrusion. Extending S from the grid is a fairly continuous outcrop, principally of garnet skarn with lesser, sometimes weakly bedded, coarsely crystalline limestone and garnetiferous crystalline limestone. This is intruded to the W by a large acid feldspar porphyry dyke which trends approximately parallel to the strike of the limestones, but appears to dip to the SW.

GEOCHEMISTRY - Analysis of the soil samples from the auger drilling returned 12 to 170 ppm Cu, 40 to 190 ppm (mostly 70 to 90 ppm) Zn, 28 to 100 ppm Pb, and all values of Mo were below the limits of detection. 20 rock chip samples were also collected, returning 520 ppm to 0.09% Cu

GEOPHYSICS - Detailed trans-electromagnetic and self-potential surveys were carried out over the area.

DRILLING - 43 auger holes were drilled and samples were collected from the soil profile for geochemistry and bed-rock chip for subsurface geological interpretation.

15) Mount Bennett area - 10 km W of Mount Larcom township.

GEOPHYSICS - Detailed trans-electromagnetics was carried out over the area.

16) Riverhead area - Upper reaches of the Calliope River, W of Gladstone.

GEOLOGY - In the N part of the grid, the sequence dips to the S at 15-25°, over the E part of the grid a gentle swing in strike to NW-SE occurs and the dip steepens to 25-45°. The sequence consists of strongly outcropping acid volcanic rocks in the N of the grid area overlain by poorly outcropping sedimentary and pyroclastic rocks consisting largely of tuffaceous siltstone breccia-conglomerate, with horizons of acid lithic tuff, intermediate crystal lithic tuff and skarn. To the S of the grid, siltstone, fine sandstone, and greywacke comprise the greater part of the sequence. This largely sedimentary unit is intruded by three small biotite-quartz diorite stocks. No major faulting occurs in the grid area, except to the NW where a NE-SW trending fault brings in a sequence of acid feldspar porphyries with fragmental varieties, andesite, and minor greywacke and siltstone. A variety of dykes exist in the area, most are later in age than the stocks and are of little interest.

GEOCHEMISTRY - 585 soil samples were collected from the area. Over the W quartz-biotite diorite stock, copper values ranged up to 8500 ppm, with most values in the 1500 to 2000 ppm range. Values over the E stock are lower with most values in the 1000 to 1500 ppm range, with a high value of 5500 ppm. Copper values over the metasediments were 200 to 1000 ppm within 150 m of the stock and then decrease rapidly away to a local background of approximately 100 ppm. Copper values over the rhyolite and acid tuff in the N part of the grid are all less than 100 ppm. A granodiorite porphyry dyke to the N and NW of the W stock returned values of up to 7200 ppm Cu. Zinc values are generally less than 100 ppm over the stocks, as compared to 100 to 150 ppm over the sediments and pyroclastics. A rough correlation exists between anomalous zinc values of >200 ppm and outcrops of garnet-quartz-epidote skarn and epidote-quartz skarn. Only 5 anomalous values of Mo were recorded, with the highest values of 100 and 200 ppm Mo associated with the zone of high copper values over the W stock. All lead values lie in the range of 20 to 110 ppm, and none of these are considered anomalous. 9 rock chip samples were assayed

GEOPHYSICS - Ground magnetic and trans-electromagnetic surveys were conducted over the area.

DRILLING - A trial was made to drill through the alluvials with 4 auger holes drilled.

17) Upper Don area - at the head of the Don River.

GEOLOGY - The 1:250,000 geology map groups all the rocks in the area in the Middle Devonian Capella Creek beds. However, four distinct units were mapped in the area. They are as follows; (1) Dee Volcanics - This unit is presumed to be unconformable in the mapping area. Bedding in tuffaceous sandstones and conglomerates near the base of the unit gives a strike of 120-140° with dips of 15-30° to the SW. The oldest part of the sequence consists of poorly sorted, fine to medium grained, tuffaceous sandstones, intermediated feldspar crystal tuffs, chert, conglomerate, and acid lithic tuff. Overlying this is a unit composed largely of massive andesite with lesser intermediate tuff. Traces of malachite and sericite alteration are noted in these rocks in the SW of the area. The uppermost unit mapped of the Dee Volcanics comprises predominantly of lapilli tuff, and lesser bedded fine to medium sandstone. (2) Ulam beds - The rocks of this unit form the outcrop along the crest of the Calliope Range and form the major part of the outcrop in the streams draining down to the Don in the central part of the area. They are determined by a fault in the S bringing in rocks of the Riverhead Andesite. The sequence consists of acid to intermediate lithic tuffs, weakly banded pyrite-rich cherts, acid feldspar and quartz-feldspar porphyries, chert, conglomerate and breccia, greywacke, and siltstone. (3) Moongan Rhyolites - The relationship of these beds to the Ulam beds is uncertain as the contact is not visible and no structural information indicating the relationship can be obtained within the unit. In this area, the Moongan Rhyolite are a sequence of highly siliceous volcanic rocks, usually quartz and feldspar porphyritic, sometimes distinctly fragmental of containing a few percent of lithic fragments. In the S of the area, outcrops are largely of a quartz and quartz feldspar porphyry unit. Field evidence indicates this unit is flat lying and possibly intrusive. These outcrops contain more pyrite but less sphalerite than the Moongan Rhyolite rock further N. To the N, the above unit passes into crystal and lithic, fragmental acid rocks, almost all with the characteristic siliceous ovoids. (4) Riverhead Andesite - The 1:250,000

geology map shows these as Capella Creek beds, but Taube (1972) indicated a regional correlation with the Upper Devonian Dee Volcanics. These rocks were only mapped in the SE of the area, but are presumed to extend to the W to the Little Don fault. They consist of predominantly andesite, andesitic lithic crystal tuffs, conglomerate, sandstone, siltstone, greywacke, chlorite and hematitic intermediate lithic tuffs and minor fine acid rocks and chert.

GEOCHEMISTRY - 34 rock chip sample were collected.

18) Mannersley area - just SW of the Calliope River on the N edge of the Galloway Plains.

GEOCHEMISTRY - Soil samples were collected from over the whole grid by auger drilling. A total of 92 samples were collected. The highest copper value was 2120 ppm in the S of the grid, and molybdenum values ranged between detection limit to a peak of 32 ppm Mo.

DRILLING - Auger drilling was undertaken to obtain soil samples.

RECORDER: Paul Blake **DATE:** 14/03/1994.

COMPANY REPORT SUMMARY SHEET

CR: 5157 **STATUS:** Open

TITLE: Authority to Prospect 508M. Report to Queensland Mines Department for year ending December 31, 1974.

AUTHOR(S): D.C. Frets **DATE:** March 1975

ATP/EP No.: ATP 508M

COMPANY HOLDING TITLE: Geopeko Limited

COMPANY SUBMITTING REPORT: Geopeko Limited

DATE GRANTED: May 1968 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan, Bajool, Biloela, Calliope

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: The Mount Morgan, and Dee and Ulam Range area

MINING DISTRICT:

MINES/PROSPECTS: Mount Morgan Mine, and Ajax Mine; and Mine Anticline, Bull Creek, Struck Oil, Mount Warner, Mount Bennett, Bouldercombe, Stockyard Creek, Hamilton Creek, Horse Creek, Poison Creek, Kangaroo Creek, Fern Hills, Riverhead, Mannersley, Penumbra, and Limestone Creek areas; and Eulogie Park Gabbro

EXPLORATION TARGETS/MODELS: All metals (but chiefly a Mount Morgan type copper/gold orebody)

SUMMARY:

LOCALISED EXPLORATION/PROSPECTS

1) Mount Morgan Mine

GEOCHEMISTRY - A total of 1186 core samples were collected and geochemically analysed. DDH 8-73 returned trace to 2.55 gr/m tn Au, and trace to 0.88% Cu. DDH 7-39 returned trace to 5.85 gr/m tn Au, and trace to 3.3% Cu.

DRILLING - 5 diamond drill holes (DDH 5-28 WRO/2, DDH 7-39, DDH 7-42, DDH 8-73, DDH 3-35) were completed in the area. The holes were drilled to test different aspects of the geology and potentially associated mineralisation in the open cut area. DDH 7-39 was designed to test the quartz porphyry pipe under the Sugarloaf orebody. No ore grade mineralisation was encountered and the hole was abandoned at 409 m. DDH 7-42 was designed to test underneath the Slide Fault, N of the diorite porphyry dyke and S of the known mineralisation. The hole was terminated at 120 m, and no mineralisation was encountered. DDH 8-73 was designed to test the quartz porphyry pipe from a locality at the bottom of the pit. The hole reached 967.15 m, and indicated the presence of alteration at depth, but failed to indicate mineralisation of any significance. DDH 3-35 was drilled on the S edge of the open cut to test the S extension of the quartz porphyry pipe, and drilling is continuing.

2) Mine Anticline area - this area is in the Mt Morgan mine leases S of the open cut mine.

GEOCHEMISTRY - 79 core samples were assayed from DDH 38-12, returning trace to 0.30 gr/m tn Au of gold, and trace to 0.42% Cu.

DRILLING - 4 diamond drill holes (DDH 38-12, 38-13, 38-14, and 38-15) were completed in this area. DDH 38-12 was designed to follow-up massive sulphide mineralisation encountered in DDH5-20 towards the W. The hole reached a depth of 883.5 m and indicated the presence of weak mineralisation, but grades were too low to be of significance. DDH 38-13 was drilled in the S of the area, and was designed to test the "Lower Mine porphyries" for mineralisation at depth and to test the possible presence of a hydrothermal channel-way below the "magnetite blow" exposed at the other side of the Dee River. The hole was terminated at 520 m, and failed to indicate either a channel-way or mineralisation of any significance. DDH 38-14 was drilled to test for mineralisation in the "Lower Mine porphyries". The hole reached 514 m, but no mineralisation of significance were encountered. DDH 38-15 was designed to test the "Lower Mine porphyries" at depth for possible mineralisation. It failed to indicate mineralisation of significance and was terminated at 420 m.

3) Horse Creek area

GEOCHEMISTRY - Initially 56 rock chip samples were collected and indicated the presence of some highly anomalous Hg, and Se/Te values. Subsequently soil testing was carried out around three of the outcrops showing highest Hg values with 25 samples collected. This survey indicated that the anomalous rock values were reflected in the surrounding soils. After initial testing for Hg had proved successful, further rock-chip sampling was carried out over all outcrops in the area, with a total of 286 samples. The results will be available in next years report. Also three grids were surveyed over the three anomalous areas, and 663 soil samples were collected from the grids. Results from Grid A showed a pronounced anomaly in Hg, Te, Se, Zn, and Cu. The results from Grid B indicated the presence of a weak anomaly in Zn, Hg, and Cu over Au ironstone outcrop. Results from Grid C are not yet available. 97 core samples from DDH 31-1 were assayed, but the results are not yet available.

GEOPHYSICS - Three lines of reconnaissance self-potential were carried out, but due to dry ground conditions the results are inconclusive. A detailed IP survey was conducted. Two anomalies were indicated, one near the Dee Bowling Club, and the other W of Grid A. Interpretation of the results indicate that the second IP anomaly is probably due to surface phenomena like percolating ground water in swampy terrain.

DRILLING - A short diamond drill hole (DDH 31-1) was drilled to test the anomaly in Grid A. The hole penetrated soil to a depth of 15 m, then entered quartz-feldspar porphyries and was terminated at a depth of 103.02 m in quartz diorite. No mineralisation of significance was encountered.

4) Mine Corridor South area

GEOCHEMISTRY - A total of 130 rock chip samples were collected over the area and assayed for Cu, Zn, Au, Hg, Se, and Te. The results show the presence of a few scattered, isolated anomalies.

GEOPHYSICS - A trial gravimetric survey was carried out but results are presently still under study.

5) Mount Battery area - located as a INPUT EM anomaly.

GEOCHEMISTRY - 44 soil samples were collected from the area and analysed for Cu, Pb, and Zn, but results failed to indicate anything of significance.

6) Bouldercombe area - A small part of the old Bouldercombe grid was re-established in order to follow-up a pronounced stream sediment anomaly.

GEOLOGY - The stream under investigation is apparently located at the contact between the Bouldercombe diorite and surrounding metamorphosed intermediate volcanic rocks.

GEOCHEMISTRY - 65 soil samples were collected from different levels in the auger holes and assayed, but no values of significance were encountered. The anomalous stream was re-sampled during different periods of the year, and the sampling extended to the area to the N across the highway. A total of 59 stream sediment samples were collected and assayed, as were 4 rock chip samples. Results

positively indicated the presence of a strong zinc anomaly with, in certain areas, anomalous copper values. Follow-up work is being planned.

DRILLING - 14 Auger drills were completed in order to investigate subsurface geology. However, the presence of a thick fossil boulder bed prevented the successful completion of this program.

7) Struck Oil area

GEOLOGY - The sequence investigated this year consists of an andesite/andesitic tuff unit overlain by a tuffaceous sedimentary unit, folded into a syncline and anticline with fold axes striking N-S and passing to the E of the Struck Oil stock.

GEOCHEMISTRY - A short orientation biogeochemical (vegetation) survey was conducted over the known mineralisation to determine the suitability of this sample medium as a substitute for soil sampling. 363 samples were analysed for Cu and Mo. Results showed very poor reproducibility and failed to show a significant anomaly contrasts. Another trial orientation survey was carried out by using the magnetic fraction of stream sediments and assayed. A total of 173 samples were collected, and in general, values from the magnetic fraction compared well with those from whole stream sediment samples. 30 rock chip samples were collected from gossans, skarns, dykes and alteration zones. The gossans and skarns returned anomalous Cu and W values, epidote alteration zones commonly were anomalous in Cu; while dykes failed to return any significant metal values. Hand augering soil sampling was conducted over skarn and alteration zones with a total of 43 samples collected. No samples returned significantly anomalous values. C-zone auger drill sampling was done on a systematic basis with 356 samples collected. Of the four gossan areas covered, only one returned significantly anomalous values and follow-up work is planned. 30 core samples from DDH's 2-13 and 2-14 were assayed. The assay results from DDH 2-13 indicate 30 m at 0.27% Cu, and 200 ppm Mo. The assay results from DDH 2-14 have not yet been received.

GEOPHYSICS - A ground magnetic and gravimetric survey were conducted over the area to test the area for possible buried stocks. The magnetics confirmed the presence of a low in the area, but appears to be too wide and shallow to be of interest from an exploration point of view. There has been problems with terrain corrections with the gravimetric survey. A short IP survey was done over the area indicated by the trans-EM survey, and the results confirmed the results of the trans-EM Survey.

DRILLING - Auger drilling was carried out over the grid to recover soil samples. Two more diamond drill holes (DDH 2-13 & 2-14) were completed in the area. DDH 2-13 & 2-14 were designed to test for near-surface economic mineralisation, and reached 44.53 m and 98.52 m respectively.

8) Mount Bennett area

GEOCHEMISTRY - 6 biogeochemical (vegetation) samples were collected to compare with grid soil values. 22 stream sediment samples were collected from the E part of the grid, but results were negative. Core samples from the drilling were analysed; DDH 14-1 returned 50 to 220 ppm Cu, 35 to 155 ppm Pb, 95 to 190 ppm Zn, 10 to 115 ppm Mo, <0.1 ppm Au, and <50 ppb Te; DDH 14-2 returned 5 to 60 ppm Cu, 10 to 20 ppm Pb, 35 to 65 ppm Zn, <2 to 2 ppm Mo, <0.1 to 0.2 ppm Au, and <50 to 1900 ppb Te; DDH 14-3 returned 50 to 210 ppm Cu, 10 to 20 ppm Pb, 40 to 80 ppm Zn, <2 to 30 ppm Mo, <0.1 ppm Au, and <50 ppb Te; DDH 14-4 returned 120 to 310 ppm Cu, 10 to 25 ppm Pb, 40 to 165 ppm Zn, <2 to 65 ppm Mo, <0.1 to 0.1 ppm Au, and 50 to 100 ppb Te; DDH 14-5 returned 50 to 150 ppm Cu, 10 to 100 ppm Pb, 35 to 105 ppm Zn, <2 to 50 ppm Mo, <0.1 ppm Au, and 16 to 750 ppb Te.

GEOPHYSICS - Part of the grid was covered by an IP survey, but results were not conclusive.

DRILLING - A total of 5 short diamond drill holes (DDH 14-1, 14-2, 14-3, 14-4, & 14-5) were drilled. DDH 14-1 & 14-4 (24.28 & 30.48 m respectively) were designed to test trans-EM anomaly peaks; DDH 14-2 (34.50 m) was designed to test a magnetic low; DDH 14-3 (17.78 m) was designed to test a magnetic high; and DDH 14-5 (33.17 m) was designed to try to determine the N extent of the granite

encountered in DDH 14-2. DDH 14-3, 14-4, & 14-5 intersected fine-grained feldspar porphyry, and DDH 14-2 intersected granite. Minor pyrite was present in DDH 14-2 & 14-3.

9) Mannersley area

GEOLOGY - The prospect is underlain by a granodiorite porphyry stock which lies just to the N of the major Galloway Plains Tonalite. Mineralisation is mainly confined to a smaller biotite granodiorite stock within the granodiorite porphyry. The stock is bounded on the W by interbedded fine acid sediments, tuff, feldspar porphyry and andesite. The sedimentary/volcanic sequence has been assigned to the Lower Middle Devonian Mt Holly beds. Two narrow beds of magnetite have been located on the S position of the Mt Grim Ridge.

GEOCHEMISTRY - Initially ridge and spur soil sampling (79 samples) and detailed stream sediment sampling (162 samples) were used to indicate the extent of the Cu/Mo anomaly located in 1973. The grid was enlarged to cover this area. C-zone soil sampling was conducted over the grid with 724 samples collected. This sampling defined three anomalous areas of copper. The N Cu-anomaly covers a broad area trending approximately NE-SW. The central Cu-anomaly is the largest with peak values of 6800 ppm supported by several 1500 ppm Cu values. Both the N and central anomalies lie within the area of outcrop of the central biotite granodiorite stock. The S Cu-anomaly zone lies adjacent to, and trends roughly parallel to, the granodiorite - granodiorite porphyry contact. Molybdenum values define an area similar to that of the central Cu-anomaly, and has a peak value of 65 ppm Mo. Zn values define a number of slightly anomalous areas with a peak value of 760 ppm. No association appears to exist between soil geochemistry and rock types. Background values of lead were recorded over most of the grid. 500 core samples were assayed, but the results have not yet returned.

GEOPHYSICS - An IP survey was carried out over the geochemically anomalous area and indicated a strong anomaly just S of the quartz diorite stock, associated with high Cu in the soil. A magnetic survey was also carried out, but no response of significance was recorded.

DRILLING - 3 diamond drill holes were completed over the area. DDH 43-1 was drilled to 201.40 m to test an IP anomaly. DDH 43-2 was drilled to 141.72 m to test the peak of the geochemical anomaly over the central part of the grid. DDH 43-3 was drilled to a depth of 149.33 m, and was drilled at the contact between the granodiorite porphyry and the biotite granodiorite.

10) Riverhead area

GEOLOGY - Mapping was carried out to the W of the Riverhead Grid where low order stream sediment values were recorded. An interbedded sequence of feldspar porphyry and siltstone, striking NW and dipping 20° to 30° to the SW, contains a number of narrow shears and breccias with associated quartz-epidote-chlorite alteration and minor pyrite. Granitic linear intrusions crop out in a number of places and carry pyrite but no copper mineralisation was observed.

GEOCHEMISTRY - 30 stream sediment samples and 8 rock chip samples were collected and analysed, confirming the presence of erratic, small Cu/Zn anomalies. 283 core samples were analysed. Assays from DDH 36-1 ranged from 330 to 1300 ppm Cu. DDH 36-2 returned 160 to 320 ppm Cu, 5 to 40 ppm Mo, and <0.1 ppm Au. Assays from DDH 36-3 ranged from 95 to 1500 ppm Cu. DDH 36-4 averaged 0.23% Cu. A 90 cm thick magnetite skarn intersected in DDH 36-5 returned 0.2% Cu.

DRILLING - Three short holes were drilled through the alluvial boulder beds W of the grid to test the country rock for possible underlying porphyry-copper style mineralisation. A combination of auger, hammer, and diamond drilling was used. DDH 36-1 was drilled to 24.02 m, and penetrated 10.37 m of boulder alluvial and then entered volcanic tuffs with quartz-pyrite veins. DDH 36-2 was positioned over a weak trans-EM anomaly and reached 21.59 m. The hole penetrated 16 m of boulder alluvium and then entered spotted and brecciated hornfels cut by narrow quartz/pyrite veins. DDH 36-3 was drilled to 19.95 m, and passed through fine-grained dacite and acid lithic tuff cut by numerous quartz/pyrite veins. Later in the year, two deep diamond drill holes were drilled in the N part of the grid. DDH 36-4 was drilled to 270.97 m and was positioned on top of a geochemical copper anomaly. Initially the hole penetrated intermediate volcanics and sediments but then entered the biotite

granodiorite stock. Sulphides were distributed throughout the core. DDH 36-5 reached 106.98 m and was designed to test a sequence of volcanics and limey sediments for the presence of possible skarn occurrences. Mineralisation in this hole was less evident than in DDH 36-4.

11) Kangaroo Creek area - this area was a follow-up of an INPUT anomaly.

GEOCHEMISTRY - A total of 73 rock chip samples were collected from this area, including re-sampling of some areas that returned anomalous results previously. The anomalous values were not repeated and no further work is warranted in the area.

12) Fern Hills area

GEOCHEMISTRY - 85 soil samples were collected from the area. The results indicated the presence of a very small, but strong Zn anomaly.

13) Penumbra area

GEOCHEMISTRY - 67 soil sampling was collected from the hand augering, but no anomalous values of significance were returned. No further work is intended in this area.

DRILLING - Hand auger soil sampling was carried out over the trans-EM anomaly.

14) Ajax mine area

GEOLOGY - Rock types in the area are acid volcanics (aphanitic, porphyritic and fragmental varieties) of the Devonian Moongan Rhyolite sequence, mafic dykes, and a limited development of garnet-epidote skarns. The area lies near the junction of the Fern Hills Fault and an un-named linear lying to the W of it. Mineralisation is confined to a shear zone, coincident with an area of sericitic and siliceous alteration localised within a quartz-feldspar porphyry. Along strike to the NW the lode passes into unaltered, pyritic quartz-feldspar porphyry and to the S is covered by alluvium.

GEOCHEMISTRY - Two rock samples were taken from old workings and analysed.

GEOPHYSICS - One traverse of IP was carried out over the main peak of the trans-EM anomaly N of the old workings. No response of significance was recorded.

RECORDER: Paul Blake **DATE:** 16/03/1994.

COMPANY REPORT SUMMARY SHEET

CR: 5413 **STATUS:** Open

TITLE: Final report on portions of Authority to Prospect 508M, as relinquished in May 1975.

AUTHOR(S): A. Taube **DATE:** October 1975

ATP/EP No.: ATP 508M

COMPANY HOLDING TITLE: Geopeko Limited

COMPANY SUBMITTING REPORT: Geopeko Limited

DATE GRANTED: May 1968 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan, Bajool, Biloela, Calliope

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: The Mount Morgan, and Dee and Ulam Range area

MINING DISTRICT:

MINES/PROSPECTS: Mount Morgan Mine, and Ajax Mine; and Mine Anticline, Mine Corridor North, Linda Gully, Bull Creek, Struck Oil, Mount Warner, Mount Bennett, Fab, Bouldercombe, Stockyard Creek, Hamilton Creek, Horse Creek, Poison Creek, Kangaroo Creek, Archer, Fern Hills, Riverhead, Mannersley, Penumbra, and Limestone Creek areas; and Eulogie Park Gabbro

EXPLORATION TARGETS\MODELS: All metals (but chiefly a Mount Morgan type copper/gold orebody)

SUMMARY:

GEOLOGY -

REGIONAL - Northern Part of the ATP: The oldest rocks exposed in the N part of the ATP are the Middle Devonian Capella Creek beds. These comprise a lower intermediate sequence, a middle acid sequence, and an upper intermediate sequence. The Lower Capella Creek beds consist mainly of intermediate tuffs and calcareous tuffs with minor interbedded limestone, quartz-feldspar porphyry, feldspar porphyry, and acid lithic tuff. Most of the tuffs are well bedded. The middle acid sequence, the Moongan Rhyolite member, consists of mainly quartz-feldspar porphyry, feldspar porphyry, banded rhyolite and some acid tuff. The upper intermediate sequence, the Walmount beds, consists of intermediate tuffs and calcareous tuffs with some impure limestone. N of the Struck Oil Fault is a large mass of undifferentiated intermediate volcanic rocks (mainly intermediate to basic agglomerates and tuffs) whose stratigraphic position is uncertain; they were previously thought to resemble the Dee Volcanics in lithology, but are now considered part of the Lower Capella Creek beds. Further E is a sequence of similar rocks which appear conformable with the overlying Lower Carboniferous sequence and the underlying Moongan Rhyolites; these are thought to be the Upper Capella Creek beds (Walmount beds). Unconformably overlying these three rock units is a small residual of the Upper Devonian Dee Volcanics, which here consists of sandstone.

Central part of the ATP: There are large gaps in the mapping of this area, notably S of Mt Warner along the Ulam Range, and much of the regional geology remains interpretative. A generalised sequence is inferred from the compilation. The oldest rocks in this area are the Moongan Rhyolites (Quartz-feldspar porphyry (many of which are fragmental) with minor interbedded acid tuff, rhyolite, and fine acid rocks), which extend along the front of the range from Mt Warner almost to Fern Hills. Their broad area of exposure on the map is probably due to their occurrence in the nose of a broad anticline.

Overlying the Moongan Rhyolite along the range from Mt Warner to Fern Hills is a predominantly acid fragmental sequence. The rocks here are inferred from mapping on the margins of the unmapped areas. The lithologies include, as far as is known, the Mt Warner sequence of chlorite clot fragmental rocks, acid and intermediate tuffs, quartz-feldspar porphyries, banded cherts, and limestone. Similar rocks, mainly acid fragmental rocks, occur along the range to the SE. These are here referred to as the Ulam beds. Overlying the Ulam beds is a broad synclinal area correlated with the Upper Capella Creek beds. These are predominantly intermediate tuffaceous rocks, with minor interbedded limestone, fine acid rock, acid tuff, feldspar porphyry, and sandstone; a central core in the syncline consists of quartz-feldspar porphyry and acid tuff. In the Emu Creek area the Capella Creek beds are unconformably overlain by the Dee Volcanics (abundant sandstone), as well as the more characteristic lithic tuff and andesite. A sequence of rocks (interbedded feldspar porphyry, fine acid rocks, and tuff) whose stratigraphic position is unknown occurs in the Upper Raspberry Creek area. These are here defined as the Upper Raspberry beds.

Southern part of the ATP: 1) Fern Hills to Mt Cedric Fault Zone - The oldest rocks in the S of the ATP are the Moongan Rhyolites, which crop out only in the Upper Don River area in what is thought to be the axial part of the major regional anticline. These are bounded on the W by a major fault, the Little Don Fault, which brings the Lower Carboniferous Pond Formation downwards into contact with these rocks. The Moongan Rhyolite is overlain by the Ulam beds (acid lithic and feldspathic tuff, chlorite clot fragmental rocks, and minor interbedded chert and rhyolite). Limestones occur here in the Ulam beds, and are abundant in the Mt Cedric-Stockyard Creek area. These have been referred to in a previous report as Mt Holly beds, but completion of regional mapping indicates that they belong to the Capella Creek beds. Overlying the Ulam beds is a sequence of rocks (mainly intermediate tuff with minor sandstone and limestone) referred to here as the Mt Cedric beds as they are best exposed on the N slopes of Mt Cedric. Overlying the Mt Cedric beds (possibly unconformably) is a sequence of interbedded intermediate tuff and argillite here defined as the Mt Alma Beds. The proportions of each rock type in the sequence vary. A predominantly argillaceous sequence occurs on the W slope of Mt Alma and has been traced S to Mannersley and N to Mt Bennett. Other predominantly argillaceous units occur, but the sequence as a whole is mainly intermediate tuff. This sequence continues eastward to the axis of the Almacoombe Syncline and is presumably repeated in descending order on the other side of the syncline. A massive andesitic to basic hornblende feldspar porphyry unit, the Ayrdrrie Andesite, occurs within the Mt Alma beds and extends from Stockyard Creek to the Galloway Plains Tonalite. This unit is thought to be extrusive because of; **(a)** the presence of amygdules filled with calcite; **(b)** its interbedded nature with tuffs in its upper contact area SE of Mt Bennett; and **(c)** N of the Bullock Creek Fault an argillaceous member occurs within the unit. It is possible, however, that this unit is intrusive, as suggested by the position of similar rocks in other parts of the stratigraphy. Two residuals of an unconformable sequence occur on the W side of the Little Don Fault. The N one (SW of Kangaroo Creek) consists of 30 m of conglomerate overlain by an interbedded sequence of fine sandstone and quartz-lithic tuff. This could represent the basal member of the Dee Volcanics, but the presence of the relatively acid quartz-lithic tuff suggests a similarity to rocks of the Pond Formation on the other side of the Little Don Fault. For the present it is suggested to be part of the Dee Volcanics. The S residual occurs on the W side of the Upper Don area. It consists of sandstone, argillite and intermediate tuff, and it probably correlates with the N residual, although the lithologies are slightly different. About 2 km E of Mt Bennett, steeply-dipping tuffaceous and argillaceous units within the Mt Alma beds are overlain by a nearly flat lying conglomerate with granitic boulders and by more tuffaceous and argillaceous beds. Similar conglomerates occur on the S flank of Mt Alma and also along the range between Mt Alma and Mt Bennett. 2) South of Mt Cedric Fault Zone - The oldest rocks in the area are exposed in the core of the Ayrdrrie Anticline along Alma Creek. They are thought to be equivalent to the Mt Cedric beds, and consist of intermediate tuffs with interbedded argillaceous sediments and limestone. They are overlain on the E flank of the anticline by the Ayrdrrie Andesite and the Mt Alma beds, as discussed above. A major unconformity, possibly equating to that at the base of the Dee Volcanics, exists somewhere between this and the Ayrdrrie Andesite to the E. On the W flank of the anticline there is further evidence for an unconformity. Along the W branch of Alma Creek the interbedded sediments and tuffs of the Mt Cedric beds show evidence of crumpling in the base of the creek; above these on the W side of the creek are nearly flat-lying fossiliferous sandstones. These sandstones are similar to the unconformable residue at the top of Mt Cedric and to others in the area. It is possible that they are all part of the basal member of the Dee Volcanics. Overlying the sandstone is the Riverhead Sequence, and is best defined in the Riverhead Area. It consists of a lower rhyolitic

feldspar porphyry unit, a middle intermediate tuff unit, and an upper tuffaceous sandstone unit with a distinctive limestone horizon. The rhyolitic feldspar porphyry unit may be a local acid unit at the base of the more basic hornblende feldspar porphyry unit which occurs to the W. This unit appear to correlate with the Ayrdrrie Andesite. The gross compositional change is difficult to explain, but the rocks are in fact spatially related and texturally similar in places. The Riverhead sequence is truncated stratigraphically above the tuff unit by the Galloway Plains Tonalite. 3) West of the Little Don Fault - Two unconformity surfaces have been demonstrated in this area. The rocks beneath these surfaces are undifferentiated but represent the oldest rocks in this part of the ATP. The northernmost unconformity surface, about 3 km E of the Pomegranate Granodiorite, is at the base of an interbedded sandstone-tuff unit considered to be part of the Dee Volcanics. Although faulting has complicated the picture in the area, the underlying rocks are andesitic and apparently belong to the Capella Creek beds. The southernmost unconformity surface appears to lie at the base of the Pond Formation. The Dee Volcanics appear to have thinned considerably or disappeared at this point. A small window of older rocks, possibly part of the Capella Creek beds, occurs adjacent to the S extremity of the Little Don Fault. The Pond Formation in this area consists of lithic tuff with characteristic coarse rounded boulders, quartz-lithic tuff (quartz-feldspar porphyry tuff), sandstone, and purple rhyolitic feldspar porphyry. The latter grades through fragmental and conglomeratic feldspar porphyry to purple lithic-crystal tuff. Disconformably overlying the Pond Formation at the S end of the ATP is the Youlambie Conglomerate. This comprises a lower sequence of mainly conglomerate and an upper sequence of mainly sandstone. It occurs as a basin-shaped unit on the S portion of the ATP and a residual adjacent to the Eulogie Gabbro.

Two major faulting directions are prominent in the ATP. A large amount of vertical block faulting occurs, and there are abundant minor faults of relatively small displacement. (1) East-Northeast. Faults belonging to this series tend to show considerable apparent horizontal displacement. In many cases such apparent displacement may be exaggerated due to relatively small vertical displacement of shallow-dipping beds, but in some cases, horizontal movement can be demonstrated by displacement of fold axes. Such displacement is demonstrable along the Struck Oil Fault, and the Mt Cedric Fault System. The Stony Creek, Mt Battery, and Centre Creek faults also belong to this system. (2) North-Northwest. Faults belonging to his series are often difficult to recognise because they are parallel to the regional strike of the rocks. One of the most important of these is the Mt Warner Shear. The Riverhead Fault appears to have a contradictory time relationship to that of the Mt Warner Shear Zone. This fault displaces the E-NE Mt Cedric Fault System, rather than being displaced by an E trending fault. Several faults appear to occur along major fold axes. The Ayrdrrie Anticline is faulted along its axis, as indicated by the truncation of the limestone horizon in the Riverhead beds. The Fern Hill Fault is a major linear along which shallow-dipping beds W of the linear appear to be truncated and become steeply dipping E of the linear. The Almacoombe Syncline also appears to be faulted. Several traverses across this synclinal axis confirmed a major asymmetrical structure as depicted on the regional map but intermediate traverses showed only consistently flat-lying dips. This anomaly could be explained by invoking an unconformity at the conglomerate units in the Mt Alma beds, then invoking minor E-W vertical block-faulting to alternatively expose (horst) and cover (graben) the steeply-dipping beds on the other side of the syncline.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The areas relinquished include mainly granitic to gabbroic igneous rocks and moderately disturbed volcanic and sedimentary sequences, ranging in age from Lower Devonian to Tertiary. The area relinquished included the Poison Creek area, Youlambie area, Big Oaky grid, NE portion of the Eulogie Park Gabbro, Archer area, and Mount Bennett area.

RECORDER: Paul Blake

DATE: 17/03/1994.

COMPANY REPORT SUMMARY SHEET

CR: 5684 **STATUS:** Open

TITLE: Authority to Prospect 508M. Report to Queensland Mines Department for year ending 31 December, 1975.

AUTHOR(S): A. Taube **DATE:** June 1976

ATP/EP No.: ATP 508M

COMPANY HOLDING TITLE: Geopeko Limited

COMPANY SUBMITTING REPORT: Geopeko Limited

DATE GRANTED: May 1968 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan, Bajool, Biloela, Calliope

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: The Mount Morgan, and Dee and Ulam Range area

MINING DISTRICT:

MINES/PROSPECTS: Mount Morgan Mine, and Ajax Mine; and Mine Anticline, Mine Corridor North, Linda Gully, Bull Creek, Struck Oil, Mount Warner, Mount Bennett, Mount Grim, Fab, Bouldercombe, Stockyard Creek, Hamilton Creek, Horse Creek, Poison Creek, Kangaroo Creek, Archer, Fern Hills, Riverhead, Mannersley, Penumbra, and Limestone Creek areas; and Eulogie Park Gabbro

EXPLORATION TARGETS/MODELS: All metals (but chiefly a Mount Morgan type copper/gold orebody)

SUMMARY:

REGIONAL EXPLORATION

GEOCHEMISTRY

- **stream sediment sampling** - The data from the regional stream sediment sampling program was compiled and compared to the geological plan. The copper plan shows the obvious area of smelter contamination SW of the Mt Morgan mine; the Bouldercombe contamination; the Dee Range anomalous zone comprising Moongan-Struck Oil-Mt Warner trend; the Fern Hills anomalous area; a broad zone of apparent high background in andesitic rocks of the Dee Volcanics and Pond Formation; the Riverhead-Divide anomalous area which is the most pronounced copper zone in the ATP; small anomalous zones associated with the contact zones in the Galloway Plains Tonalite; high back ground values in the Ayrdrrie Andesite; and a discreet anomaly associated with the Mannersley Porphyry copper prospect. The zinc plan shows a similar area of smelter contamination to the copper plan; a trend of anomalous zinc roughly follows the Moongan Rhyolite, and is contiguous across the Station Creek Granodiorite with the Dee Range which is the largest zinc anomaly in the ATP, including the Mt Warner, Mt Alexander, and Fab areas; the Fern Hills anomalous zone occurring as a discrete area; a broad area of anomalous values on the W side of the Eulogie Gabbro, thought to represent high background in the Dee Volcanics; an anomaly in the Upper Don area thought to be associated with the Moongan Rhyolites; and a trend reflecting high background values in mainly sedimentary rocks overlying the Ayrdrrie Andesite.

- **soil sampling** - A major program of ridge and spur soil sampling was carried out along the Dee Range from Mt Alexander to the Ajax Mine. Four zones of anomalous geochemistry were delineated within the acid volcanic rocks of the Moongan Rhyolite, and one anomalous zone apparently relates to intermediate

volcanics of the Upper Capella Creek beds. The five zones have been named the Omo, Ajax, Fab, Drive, and Grillo Hill.

LOCALISED EXPLORATION/PROSPECTS

1) Mt Cedric area - 1 km N of Mt Cedric on the Alma Range, investigating a low-order geochemical anomaly with an associated magnetic high.

GEOLOGY - A small stock of biotite quartz diorite intrudes interbedded tuffs and sediments of the (?) Middle Devonian Capella Creek beds. The sediments dip to the E at 30 to 50° and are moderately faulted.

GEOCHEMISTRY - Ridge and spur soil sampling was carried out over the area, but the results were generally low and the area is of no further interest.

GEOPHYSICS - Reconnaissance magnetic traversing was carried out, and the magnetic anomaly was shown to be due to magnetic material within the tuffaceous rock.

2) Divide area - investigating a low-order stream geochemical anomaly with an associated magnetic low anomaly near headwaters of the Calliope and Don Rivers.

GEOLOGY - The rocks consist of a sequence of andesite, andesitic tuff, and sediments of the (?) Upper Devonian - Lower Carboniferous Riverhead beds which are possibly equivalents of the Dee Volcanics - Pond Formation. The sequence dips SW at about 30° and is intruded by dioritic dykes and possibly a small stock.

GEOCHEMISTRY - Ridge and spur soil sampling was carried out, with the low-order copper anomaly apparently derived from a zone of quartz veining within a massive andesite in the Riverhead beds. Two anomalous values from the W appear to relate to a small diorite dyke or intrusion. The low geochemical values do not support the suggestion of mineralisation within the area.

GEOPHYSICS - Reconnaissance ground magnetics revealed a magnetic low in the S of the area. The profile suggests the presence of a granodiorite stock beneath the alluvium.

3) Gunpowder Creek area - near the headwaters of the Don River which returned weakly anomalous stream sediment values.

GEOLOGY - A small dioritic stock intrudes rocks of the Lower Carboniferous Pond Formation.

GEOCHEMISTRY - Ridge and spur soil sampling was carried out, but the only values of significance were copper values to 3500 ppm associated with gossanous quartz veins within the stock. The small size of the zone precludes any economic significance for the area.

4) Lancefield area - on Manton Creek, approximately 2 km upstream from Lancefield Homestead.

GEOLOGY - A complex of quartz diorite, granodiorite, and gabbro intrudes tuffaceous sandstone and conglomerate of the Permian Youlambie Conglomerate.

GEOCHEMISTRY - Ridge and spur soil samples were collected, but the only values of any significance were the copper values in the gabbro which were of the order of 100 to 200 ppm Cu.

5) Upper Don area - headwaters of the Don River.

GEOLOGY - A window of possible Middle Devonian Rhyolites occur in this area beneath tuffs and sediments of the (?) Upper Devonian Dee Volcanics. The Moongan Rhyolite in this area consists of acid lithic tuff and quartz-feldspar porphyry. These rocks, and particularly a zone of ovoid silicification within them, contain high background values of zinc.

GEOCHEMISTRY - Ridge and spur soil samples were collected, and the results indicate a complex zone of anomalous values in the S part of the area.

GEOPHYSICS - A reconnaissance SP survey indicated a broad zone, low-order anomaly roughly coincident with the geochemistry.

6) Belgamba area - occurs in the ranges immediately S of Bouldercombe

GEOLOGY - Pyritic cherty horizons and jaspers occur within acid volcanics.

GEOCHEMISTRY - Chip samples of the pyritic cherts and jaspers did not return any anomalous base metal values.

7) Mount Morgan Mine

GEOLOGY - The Mount Morgan Mine is hosted in a belt of siliceous and porphyritic rocks. They occur in a narrow belt bounded on either side by the Mount Morgan Tonalite, extending for several kilometres N and S of the Mine. For purposes of localised exploration, the Mine Corridor has been divided into the following areas; Mount Morgan Mine, Mine Corridor North, Mine Anticline, Mine Corridor South, Horse Creek, and Horse Creek South.

GEOCHEMISTRY - A geochemical orientation study has been carried out in the mine, with samples of unmineralised rocks of varying types, altered quartz-feldspar porphyries, quartz porphyry, quartz diorite, and associated alteration and various types of ore. It is hoped that these will yield data on primary dispersion haloes around the mine which may be useable in evaluating other prospects in the area. The details are being analysed. Core from the drilling program was assayed. The two bands of massive sulphides from DDH 3-37 were analysed and returned the following results; 252-254.4 m of 2.85 g/t Au and 11.16% Cu, and 272.4-279.6 m of 0.57 g/t and 2.18% Cu.

DRILLING - Deep exploration drilling continued. DDH 3-35 was designed to test whether massive sulphides at a depth of 600 to 750 m, intersected in DDH 5-28 and 8-73 were part of a continuous body. The hole reached 914 m, and only penetrated quartz porphyry with minor low grade disseminated pyrite, and a number of latite intrusions. DDH 6-55 & DDH 3-37 were designed to test the area beneath old mine workings in the Mt Morgan Extended area where high-grade copper had been recorded in 1923. DDH 3-37 intersected two narrow zones of massive sulphide mineralisation, and DDH 6-55 did not intersect any significant mineralisation.

8) Mine Corridor North - this large area also includes the smaller Linda Gully area, Arnold's Ridge area, Upper Mundic area and Baree Area. These small areas will be dealt with separately.

GEOCHEMISTRY - 177 rock chip samples were collected from outcrops, returning values of 5 ppm to 0.9% Cu, 5 to 780 ppm Zn, and 0 to 0.9 ppm Au. Most of the values are low-order, with only rare values showing anomalous character, defining four zones of anomalous values.

DRILLING - One of the four geochemical anomalous zones was diamond drilled.

9) Linda Gully area

GEOLOGY - This area contains a small magnetite skarn zone showing high Se, Te, Cu, and Zn.

GEOPHYSICS - The area was read with a magnetometer. The drill core was also examined with the magnetometer and the latite bodies were found responsible for the magnetic anomaly.

DRILLING - Diamond drill hole DDH 63/1 was put down to test the magnetic anomaly. The hole penetrated a sequence of quartz-feldspar porphyries which was cut by several latite intrusions.

10) Arnold's Ridge area

GEOLOGY - The area comprises Mine Corridor rocks with a zone of silicification and ferruginisation.

GEOCHEMISTRY - A low-order, broad zone of anomalous Se and Te has been shown by preliminary reconnaissance to be associated with the zone of silicification and ferruginisation.

11) Upper Mundic area

GEOLOGY - This area occurs north of a small embayment of the Mt Morgan Tonalite into the Mine Corridor. No alteration effects have been noted.

GEOCHEMISTRY - Low-order geochemical values have been returned from this area, but the significance has not yet been assessed.

12) Baree area

GEOCHEMISTRY - A discrete zone of copper-zinc anomalism was confirmed in this area; it had been previously reported by C.R.A. This area will be examined in detail in the coming year.

13) Mine Anticline area

GEOCHEMISTRY - 80 samples were collected of drill core from the "Upper Banded Mine Sequence" to determine whether the jaspers within the unit contain anomalous values of base metals. The results indicate anomalous base metals within the jaspers, with values increases with proximity to the Mt Morgan Mine. No further work is planned for this part of the Mine Corridor.

DRILLING - Diamond drill hole DDH 38/16 was drilled to 432.3 m, completing the drill-hole investigation of this area S of the Mt Morgan Mine. The hole penetrated the "Lower Banded Mine Sequence" to about 210 m, and the "Lower Mine Porphyries" from 210 m to its total depth of 432.3 m. Abundant intrusive latite was intersected in the drill hole. The hole generally confirmed the concept of a monoclinical fold plunging shallowly SE. No mineralisation of any significance was intersected.

14) Mine Corridor South area - the area extending from the section where the Dee River crosses the Mine Corridor to Horse Creek.

GEOLOGY - Detailed mapping was begun in the area using a grid and airphotos.

15) Horse Creek area

GEOCHEMISTRY - The geochemical results from DDH 31/1 (from within Grid A) were received with core from the weathered part of the core showing enrichment in Hg, Zn and Cu, while only low values were received from the fresh rock. This indicates possible remobilisation of values in the weathering profile from a source just uphill or adjacent to the peak of the surface anomaly. Grid A which covered the S end of the Horse creek alteration zone was extended to cover the whole zone and was soil sampled. Assay of the soil samples returned 10 to 250 ppm Pb, 10 to 370 ppm Cu, 25 to 2900 ppm Zn, <3 to 140 ppb Au, <50 to 350 ppb Hg, 150 to 1650 ppb Se, and <50 to 550 ppb Te. An anomaly in Cu, Zn, Te, and Se was revealed over the widest part of the alteration zone. Geochemical analysis of core samples from DDH 31/2 confirm the presence of the anomalous elements located in soil sampling, but values are generally somewhat lower.

DRILLING - Diamond drill hole DDH 31/2 was drilled in the soil anomaly identified in the extended Grid A. The alteration zone indicated on the surface was shown at depth to be similar to some parts of the alteration pipe in the Mt Morgan Mine, but is of lesser intensity, comprising mainly sericite alteration rather than the intense silica-sericite alteration in the Mine.

16) Horse Creek South area

GEOLOGY - The area is a lobe of quartz-feldspar porphyry of the Mine Corridor surrounded by the Mount Morgan Tonalite. Within the lobe is a poorly define zone of silicified and ferruginised rock

similar to the alteration zones at Horse Creek. At the S end of the lobe is a small (?) fault block of Decease Volcanics.

GEOCHEMISTRY - Geochemical results show a low-order anomaly of Zn and Cu (10 to 480 ppm Zn & 2 to 270 ppm Cu), but their significance is not yet known.

17) Hamilton Creek area - this area was investigated to cover a large magnetic feature S of Horse Creek. This magnetic feature is suggested to have some similarities to the magnetic character of the Mt Morgan Mine.

GEOLOGY - Mapping of the area is presently being compiled.

GEOPHYSICS - A ground magnetic survey was begun but not completed.

18) Struck Oil area - This is one of the major porphyry-copper style occurrences in E Australia, but work was halted due to lack of encouraging results. A major compilation of all data is presently underway.

GEOLOGY - A major anticline and syncline pair occur just E of the Struck Oil Stock in Middle Devonian andesite and andesitic tuff. Several faults occur in the area, the two most important ones being the Mt Warner Shear trending NNW to the W of the stock, and the Struck Oil fault system. W of the Mt Warner Shear, the acid volcanics of the Moongan Corridor are abutted against this feature. North of the stock, the Struck Oil fault system separates a complex sequence of acid and intermediate volcanics.

GEOCHEMISTRY - The assays of core from DDH 2-14 were received and returned 80.7 m of andesitic feldspar porphyry averaging 0.11% Cu and 99 ppm Mo. Assays of core from DDH 2-15 averaged 0.16% Cu, and 180 ppm Mo over the length of the hole. DDH 2-16 averaged 0.15% Cu and 113.5 ppm Mo over a length of 134.1 m. Several relatively minor soil and rock chip surveys were carried out but plans for these have not yet been finalised.

DRILLING - 3 diamond drill holes were completed. DDH 2-15 reached 46.3 m and was designed to test for near-surface economic mineralisation. It followed a granodiorite porphyry dyke for its entire length and was abandoned for that reason. DDH 2-16 was drilled 15 m S of DDH 2-15 and was also designed to test for near-surface economic mineralisation. The hole reached 137.5 m, intersecting 118.4 m of tuff and tuffaceous sediments before bottoming in massive andesite. DDH 2-17 was designed to investigate a SP and magnetic anomaly. The hole reached 146.8 m without intersecting any ironstone, having passed through andesite for its total length. Magnetic material in the andesite accounted for the magnetic anomaly.

19) Mannersley area

GEOLOGY - A small complex stock has intruded a sequence of Carboniferous tuffaceous rocks, sandstone, limestone and siltstone about 1 km E of Mt Grim and N of the contact of the Permian Galloway Plains Tonalite. Copper is present as low-grade porphyry-style mineralisation in a late stage coarse grained quartz diorite intrusive within the complex intrusion.

GEOCHEMISTRY - The results from the core samples were received. For DDH 43/1, the average copper assay was 370 ppm Cu (highest value 0.2% Cu), and molybdenum ranged from 2 to 35 ppm Mo. For DDH 43/2, the average copper value was 0.12% Cu (peak value of 0.37% Cu), and molybdenum averaged 29 ppm Mo (peak of 520 ppm Mo). For DDH43/3, copper averaged 325 ppm Cu (peak of 0.28% Cu), and molybdenum averaged 19 ppm Mo (peak of 155 ppm Mo). In the light of these sub-economic results, no further work is planned.

20) Mt Grim area

GEOLOGY - A sequence of acid lithic tuffs with a fossiliferous limestone bed dips about 20° E and is intruded by the Mannersley Complex. The fossils have been identified as Lower Carboniferous. The area contains outcrops of magnetite-garnet-calcite skarn.

GEOCHEMISTRY - Ridge and spur soil sampling was carried out, but the only significant anomalous values received were in a zone within the main intrusive and a small zone on the margin. The low-order (10 to 270 ppm Pb, and 5 to 360 ppm Cu) and small size of these anomalies does not warrant further work.

GEOPHYSICS - Reconnaissance ground magnetics was carried out over the area, and the results indicate that there is no potential for significant tonnages of ore.

21) Ajax Mine area - the grid in this area was extended.

GEOLOGY - The mine occurs in a SW dipping sequence of rhyolite to dacitic rocks which are intensely altered in the mineralised area. Small pods of high-grade copper and zinc mineralisation occur in a concordant alteration zone up to 100 m thick.

GEOCHEMISTRY - Soil samples were collected from the auger drilling. The results are <2 to 880 ppm Cu, 5 to 1600 ppm Pb, and 15 to 8200 ppm Zn.

GEOPHYSICS - A ground radioactivity survey was conducted over the area, indicating a distinct potassic radiometric anomaly around the ore-bearing horizon, apparently reflecting sericitic alteration around this zone. A broad zone of anomalous potassic radiation also occurs in the SW part of the grid, also apparently reflecting sericitic alteration.

DRILLING - Auger drilling was conducted over the grid.

22) Fab area - occurs along strike from the Ajax Mine.

GEOLOGY - This area occurs within a sequence of rhyolitic tuffs, fragmentals, and associated Fe-Mn cherts. A zone of weakly gossanous, intensely altered rocks occurs over a strike length of 1200 m and a width of 250 to 650 m. Granodiorite outcrops along the N of the grid.

GEOCHEMISTRY - Soil sampling was carried out over the grid, returning 5 to 330 ppm Cu, 5 to 1400 ppm Pb, and 10 to 880 ppm Zn. Analysis of core returned a best intersection of 5 m averaging 2.05% Zn.

GEOPHYSICS - A ground radioactivity survey revealed several zones of potassic radiometric anomalies, all apparently correlating with sericitic alteration zones. Ground magnetics revealed an erratic magnetic pattern which was not any use in selecting drill targets. Several discrete but relatively low-order anomalies were detected by a SP survey. These are apparently related to zones of pyritisation in the rock. A Trans-EM survey was carried out over the area.

DRILLING - Auger drilling was carried out over the grid. One diamond drill hole was put down on an SP anomaly near the centre of the largest gossanous outcrop. The hole reached 165 m and intersected disseminated zinc-pyrite mineralisation in altered pyritic tuffaceous rocks. Pyrite occurred throughout the hole, varying from 5% to 25%. Hornfelsing in the form of biotite-cordierite was abundant throughout the hole.

23) Youlambie - this area is following up a INPUT - EM anomaly in the Youlambie Conglomerate.

GEOCHEMISTRY - Ridge and spur soil sampling was carried out over the area returning 5 to 170 ppm Cu, 15 to 125 ppm Zn, 10 to 30 ppm Pb, and 50 to 150 ppb Hg. These values are considered insignificant and no further work is warranted.

24) Moonmera - Lariat

GEOLOGY - A small breccia zone occurs on the approximate centre of a radial dyke swarm SE of the Moonmera porphyry copper prospect. It is probably part of the Moonmera mineralisation system.

GEOCHEMISTRY - Ridge and spur soil sampling was carried out over a small breccia zone to the SW of the Moonmera Prospect. Anomalous values were revealed over the breccia, but the small size of the zone did not warrant further work.

RECORDER: Paul Blake **DATE:** 18/03/1994.

COMPANY REPORT SUMMARY SHEET

CR: 5840 **STATUS:** Open

TITLE: Final report on portions of Authority to Prospect 508M, as relinquished in May, 1976.

AUTHOR(S): A. Taube **DATE:** November 1976

ATP/EP No.: ATP 508M

COMPANY HOLDING TITLE: Geopeko Limited

COMPANY SUBMITTING REPORT: Geopeko Limited

DATE GRANTED: May 1968 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan, Bajool, Biloela, Calliope

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: The Mount Morgan, and Dee and Ulam Range area

MINING DISTRICT:

MINES/PROSPECTS: Mount Morgan Mine, and Ajax Mine; and Mine Anticline, Mine Corridor North, Linda Gully, Bull Creek, Struck Oil, Mount Warner, Mount Bennett, Mount Grim, Fab, Bouldercombe, Stockyard Creek, Hamilton Creek, Horse Creek, Poison Creek, Kangaroo Creek, Archer, Fern Hills, Riverhead, Mannersley, Penumbra, and Limestone Creek areas; and Eulogie Park Gabbro

EXPLORATION TARGETS/MODELS: All metals (but chiefly a Mount Morgan type copper/gold orebody)

SUMMARY:

LOCALISED EXPLORATION/PROSPECTS

1) Bull Creek area

GEOLOGY - Two quartz diorite batholiths occur in the area. The small one in the W referred to as the Bull Creek quartz diorite, while the one in the E, being an extension of the Mine and Town quartz diorite, is referred to as Town quartz diorite. In between these quartz diorite bodies volcanic rocks are found with general strike between 290° and 330°, and a general dip of 20° towards the S. Disseminated pyrite occurs mainly along the contact of the Town quartz diorite. The pyrite is present both in the quartz diorite and in the homogenous, fine grained andesite near the contact. It is considered to be a hydrothermal deposition related to a late stage of the quartz diorite intrusion. The copper mineralisation is also considered to have a hydrothermal epigenetic origin. Copper occurs as malachite and azurite in the cores of quartz diorite and feldspar andesite boulders. At places, pseudo-gossanous iron-stained rocks occur in outcrop.

GEOCHEMISTRY - Stream sediment sampling in the area returned 15 to 115 ppm Cu. 1375 soil samples were collected over the grid by hand augering. Copper content in soil was erratic in both range and distribution, and corresponded to the erratic distribution of the copper mineralised boulders noted in different exposures. Copper in soil ranged from 75 to 245 ppm Cu. Follow-up work was confined to 7 broad areas of anomalous copper content in soil. Three of the anomalous areas were over granodiorite, one near a basic dyke and the remainder associated with the mineralised conglomerate sequence. The anomalies were costeamed.

GEOPHYSICS - The ground magnetic and SP surveys did not return any results of interest. No further work was considered warranted.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The areas relinquished include mainly granitic to gabbroic igneous rocks and moderately disturbed volcanic and sedimentary sequences, ranging in age from Lower Devonian to Tertiary. The area relinquished included the Lancefield, Bull Creek, Archer, Mount Bennett, Stockyard Creek, Gunpowder Creek, Mannersley Porphyry Copper Prospect, and Craiglands area.

RECORDER: Paul Blake **DATE:** 21/03/1994.

COMPANY REPORT SUMMARY SHEET

CR: 6167 **STATUS:** Open

TITLE: Authority to Prospect 508M. Report to Queensland Mine Department for year ending 31 December, 1976.

AUTHOR(S): A. Taube **DATE:** August 1977

ATP/EP No.: ATP 508M

COMPANY HOLDING TITLE: Geopeko Limited

COMPANY SUBMITTING REPORT: Geopeko Limited

DATE GRANTED: May 1968 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan, Bajool, Biloela, Calliope

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: The Mount Morgan, and Dee and Ulam Range area

MINING DISTRICT:

MINES/PROSPECTS: Mount Morgan Mine, Morganite, Great Northern Lode, and Ajax Mine; and Mine Anticline, Mine Corridor North, Mine Corridor South, Talban Hill Breccia Pipe (Light of Day mine), Linda Gully, Peacock Shaft, Struck Oil, Mount Warner, Mount Bennett, Mount Grim, Fab, Omo, Upper Don, Bouldercombe, Bull Creek, Stockyard Creek, Hamilton Creek, Horse Creek, Poison Creek, Kangaroo Creek, Quarry Creek, Archer, Fern Hills, Riverhead, Mannersley, Penumbra, and Limestone Creek areas; Moonmera Porphyry Copper Prospect; and Eulogie Park Gabbro

EXPLORATION TARGETS/MODELS: All metals (but chiefly a Mount Morgan type copper/gold orebody)

SUMMARY:

REGIONAL EXPLORATION

GEOLOGICAL MAPPING - Mine Corridor - The belt of siliceous rocks that host the Mount Morgan Mine and other prospects that have been investigated in the past. A major program of semi-regional work was done on this area during the year. The stratigraphic sequence in the Mine Corridor is known from geological mapping and diamond drilling, mainly in the area of the Mine. Its top and bottom has not been defined, but the sequence as a whole is correlated with the Moongan Rhyolite sequence. The known sequence in the Mine Corridor is defined as follows, in order of decreasing age; **(A) Lower Mine Porphyry (LMP)** - The LMP together with the Banded Mine Sequence are the host rocks for the Mt Morgan orebody. The LMP are known only from exposures within the Mt Morgan open cut and from diamond drill holes within and around the pit. The total known thickness is about 850 m. Away from the mine, the LMP consists predominantly of massive quartz-feldspar porphyry with rare fragments and relatively sparse phenocrysts. The sequence also includes highly fragmental varieties with quartz-feldspar porphyry matrix. The fragmental types show a wide variety of fragmentals including dark chloritic rocks, porphyritic rocks, light-coloured cherty rocks, limestones, and rare to occasional sulphide fragments. **(B) Banded Mine Sequence (BMS)** - The BMS is considered to represent the approximate time equivalent sequence to the Mt Morgan orebody (i.e. probably deposited on the sea floor at or just before the time the orebody was formed sub-surface). It is best defined in and around the open cut and in diamond drill cores in the Mine Anticline area. The characteristic feature of this sequence is the presence of thin (2-10 cm) jasper beds in the upper part of the unit. These are

interbedded with acid to intermediate crystal tuffs (averaging 10-20 cm thick), some larger massive chert beds, and massive and fragmental quartz-feldspar porphyry as in the LMP. Pyritic beds within the sequence carry anomalous amounts of iron, manganese and zinc which increases in value with proximity to the mine. The base of the sequence is defined as the limestone layer which is exposed on the N side of the open cut. Where this limestone is not present, the definition of the boundary of the BMS becomes more difficult to determine, and is suggested as the change from banded rocks to homogeneous quartz-feldspar porphyry. The total thickness of the unit is about 200 m in the mine area, but is greater in some area. (C) Upper Mine Porphyries (UMP) - The UMP are exposed E of the open cut, in the North and South Corridors, and are known from diamond drill holes E of the open cut. They consist of massive fragmental quartz-feldspar porphyry, with rare minor cherty and limestone interbeds. Coarse quartz phenocrysts (5 mm) are characteristic of the unit. The fragments consist mainly of chert, jasper, quartz-feldspar porphyry, and relatively minor limestone fragments. Rare pyrite and magnetite fragments have been observed, mainly in core from diamond drill holes S and E of the open cut. The UMP is relatively homogenous for most of its thickness of 850 m. (D) Arnold's Ridge Felsite - This is a massive fine acid unit with minor fine quartz and feldspar phenocrysts. It overlies the Upper Mine Porphyries in the Arnold's Ridge area. The lower contact is interbedded with coarse quartz-feldspar porphyry of the UMP. The upper contact grades into coarse quartz-feldspar porphyry similar to the UMP but with fewer phenocrysts. (E) Baree Felsite - Most of the N lobe of corridor rocks consists of light-coloured fine grained to aphanitic siliceous rocks, with minor areas of quartz porphyry, quartz-feldspar porphyry, and lithic tuff. These areas are probably the highest part of the stratigraphic sequence in the mine corridor, but their stratigraphic position is uncertain because of a major intrusion of granodiorite between these and the Arnold's Ridge Felsite. (F) Undifferentiated - A sequence of fine-grained quartz-feldspar porphyry occurs in the Upper Mundic area but its stratigraphic position is uncertain. Its contact with the UMP is thought to be faulted. Similar fine-grained acid rocks occur in the Horse Creek and Hamilton Creek areas. (G) Intrusive Rocks - Quartz latite, previously referred to as "Old basics" or "Andesites" occurs abundantly as irregular dyke and stock-like bodies within, and especially in an annular zone around, the mine. They post-date the mineralisation, but in places are themselves mineralised, sometimes reaching economic grades. The Mount Morgan Tonalite intrudes the Mine Corridor sequence and the quartz latites. Late dilation dykes of Permian age occur in anomalous abundance in the mine area. They show a wide variety of textures but are mainly andesitic in composition. The main trends of these dykes are NW and NE. The boot-shaped Mount Morgan orebody occurs within the Lower Mine Porphyries in the central part of the domal structure defined by the BMS. The heel part of the boot, known as the Main Ore Pipe, consists of massive sulphide mineralisation with greater than 50% sulphides. The toe part of the boot, known as the Sugarloaf orebody, consists of disseminated and stockwork mineralisation with less than 20% sulphides. Mineralisation in the orebody consists mainly of pyrite with lesser chalcopyrite, pyrrhotite, magnetite, and sphalerite. Economic amounts of gold and gold telluride are also present. Alteration, consisting mainly of silicification and pyritisation of the host rocks, occurs in an envelope around the orebody.

LOCALISED EXPLORATION/PROSPECTS

1) Mount Morgan Mine

GEOLOGY - The Mount Morgan open-cut mine was re-mapped in preparation for the visit of the International Geological Congress. The mapping generally confirmed the classification of the Mt Morgan orebody as a "volcanogenic massive sulphide" deposit. The mine consists of a pipe-like massive pyritic copper-gold deposit underlain by a disseminated "stringer zone" of siliceous ore. The orebody occurs within a large siliceous alteration pipe which transgresses the acid volcanic rocks of the Middle Devonian (?) Capella Creek beds. Owing to faulting and tilting of the stratigraphic sequence, the lower "stringer zone" is now at the same level as the upper "massive zone". Relocation of the Slide Fault and tilting of the sequence from a NE dip to near horizontal returns the mine to its original position.

GEOCHEMISTRY - Values from the core of DDH 3-38 were very low, reaching maximum values of 1.5 g/t Au, and 0.35% Cu.

DRILLING - One diamond drill hole, DDH 3-38, was put down in the Sugarloaf area to test for mineralisation beneath the "false gossan" under the Mundic Creek tailings dam. The drill hole reached 245.55 m, intersecting gossanous and highly pyritic quartz porphyry for most of its length.

2) Peacock Shaft area - High-grade mineralisation was reported from the old Peacock Shaft put down in about 1900. The shaft is presently covered by the Horse Paddock dump.

DRILLING - A diamond drill hole was put down to intersect the mineralisation recorded in the old shaft. The hole reached 110.36 m and intersected mainly quartz-feldspar porphyry with some latite to a depth of 85.46 m, after which it passed into massive latite. No significant mineralisation was intersected. The reported ore may still be present, but is probably on either side of the latite intrusion.

3) Mine Corridor South area

GEOLOGY - The area is mainly underlain by coarse quartz-feldspar porphyry of the UMP. The sequence is thought to dip shallowly E. Minor zones of hematite-magnetite ?skarn occur in the N and S parts of the area. Two small zones of weak alteration were found, but these are too small to be economically significant. A zone of "fine acid" volcanic rocks (possibly fine quartz-feldspar porphyry) occurs on the S end of the area. Late Permian dykes cut across the area.

GEOCHEMISTRY - Rock chip samples were taken from the area, returning 140 to 195 ppm Cu and 150 to 490 ppm Zn.

4) Talban Hill Breccia Pipe - This area is 1.5 km S-SE of the Mt Morgan Mine, and is also known as the Light of Day Mine.

GEOLOGY - The Talban Hill Breccia Pipe is an intensely altered breccia zone occurring on the contact of the Mine Corridor rocks with the Mount Morgan Tonalite at the N end of the Mine Corridor South. The pipe is boomerang-shaped on the surface and appears to extend conically outwards at depth. Breccia fragments within the pipe consist of fine siliceous Mine Corridor rocks and tonalite, all of which are set in a fine altered matrix which is often highly pyritic. Some of the breccia fragments of rhyolitic rock are also pyritic.

GEOCHEMISTRY - Analysis of material from the drilling yielded 0 to 0.15 g/t Au, 24 to 184 ppm Cu, 24 to 66 ppm Pb, 18 to 132 ppm Zn, and 0 to 5 ppm Mo. These values are not significant suggesting that the earlier sampling of underground workings may have been false. On the other hand, the percussion holes were not very deep and most of the recorded values from the old workings were from lower down. The drilling material did return highly anomalous values for selenium and tellurium (3500 ppb and 1250 ppb respectively). Material from a diamond drill hole (DDH MC1) put down by North Broken Hill in 1969 was split and assayed. It returned no gold values of significance over the whole of the intersection.

DRILLING - 3 percussion holes were drilled.

5) Baree area - 1 to 2 km N and E of the Mt Morgan Mine, in the NW part of the Mine Corridor.

GEOLOGY - The area is underlain by coarse quartz-feldspar porphyry of the UMP, the Arnold's Ridge Felsite, and the Baree Felsite. Aplite granite bounds the acid volcanics of the Corridor Rocks on the NE. The Corridor rocks are apparently dipping to the NE but their attitude is unknown. They are intruded by (early) latites and (late) Permian dykes of andesitic composition.

GEOCHEMISTRY - Soil sampling was carried out over the area. Copper and zinc values show broad, nearly coincident anomalies which tend to be associated with latite intrusions and also occur within the granite. Copper reaches a peak of 1000 ppm Cu, and zinc reaches 1250 ppm Zn. Se and Te were only sampled in the lower part of the grid. Peak values of 1300 and 150 ppb, respectively, were reproduced over an area of alteration (silicification and ferruginisation) in the Arnold's Ridge Felsite. These results were disappointingly low compared to the rock chip values in the area, which reached peaks of 7000 and 1250 ppb, respectively, in previous years.

6) Morganite and Great North Lode areas - 2.5 and 3 km N of Mt Morgan mine respectively.

GEOLOGY - Both areas are windows of Corridor rocks emerging beneath the Jurassic Razorback beds. Both show zones of silicification and pyritisation in the acid volcanic rocks (fine quartz-feldspar porphyries) of the corridor. Small shafts, pits, and adits were put down in these alteration zones.

GEOCHEMISTRY - Rock chip samples were collected from the area returning 10 to 290 ppm Cu, <5 to 15 ppm Pb, 5 to 230 ppm Zn, and <3 to 15 ppb Au. The copper values show discrete anomalous zones in both areas. The values for zinc, lead, and gold were only back ground values. Soil sampling was also carried out, returning 5 to 470 ppm Cu, 10 to 30 ppm Pb, 2 to 160 ppm Zn, and 9 to 90 ppb Au. The adit in the Great North Lode was chip-sampled along its length and analysed, returning 45 to 860 ppm Cu, 10 to 30 ppm Pb, 10 to 460 ppm Zn, and <0.1 ppm Au.

7) Fab area

GEOCHEMISTRY - A soil survey was carried out, returning 5 to 420 ppm Cu, 10 to 4000 ppm Pb, 20 to 3400 ppm Zn, <1 to 7 ppm Ag, and 10 to 8400 ppm Mn. Mineralisation in the core from DDH 69/2 is weak, with maximum values of 0.52% Zn, and 0.13% Cu.

DRILLING - Detailed hand auger sampling was carried out over the area. Two diamond drill holes were put down. DDH 69/2 was put down to test an SP anomaly, reaching 126.6 m and intersected semi-massive pyrite (20 to 50% pyrite) zone within acid volcanics from 98.7 to 109.8 m. The rocks are strongly foliated throughout the length of the hole. DDH 69/3 was designed to show the stratigraphic sequence through the mineralised zone and the iron-manganese cherts. Two major pyritic zones within a sequence of silicic cherts, tuffs and fragmentals were intersected. The lower zone contains weak and sporadic disseminated sphalerite.

8) Ajax-Omo area - the Ajax grid was extended to cover the Omo alteration zone. A tribute arrangement was made with a local miner to work the Ajax Mine. The small shaft was deepened from 12 m to 20.5 m and encountered a small rich pod of massive chalcocite associated with a banded pyritic zinc lode. Production from the mine for the period 1.7.75 to 30.6.76 was 17.8 g Au, 2661.6 g Ag, and 3.82 t Cu from 49.8 t of ore.

GEOLOGY - A zone of surface mineralisation and alteration was defined in a gentle anticlinal structure parallel to, and in the same horizon as, the Ajax structure. Re-mapping of the area, with information from the drilling, seems to indicate that the mine is a stratiform massive sulphide emplaced in a (?) sheared anticlinal fold nose, associated with jaspers and manganiferous sediments.

GEOCHEMISTRY - Soil sampling was carried out over the area, returning 2 to 800 ppm Cu, 0 to 1600 ppm Pb, 15 to 8200 ppm Zn, 15 ppm to 0.14% Mn. The core from the drilling was assayed, and the results from DDH 47/3 returned maximum values of 0.6% Cu, 360 g/t Ag, 10% Zn, 1.1% Pb, and 6.0 g/t Au, but the values were too patchy to be considered as ore. DDH 47/4 returned 0.96 to 10.8% Zn, 6 to 800 ppm Ag, and 0.2 to 4.1 g/t Au (one value of 19.2 g/t Au). All the mineralisation occurs within strongly altered and pyritic lithic tuffs with patchy and disseminated sphalerite. DDH 47/5 intersected a zone of strong biotite-chlorite-dolomite alteration, between 92.5 and 102.7 m, but contained no significant values. The material from the percussion drilling was assayed and returned 5 to 1760 ppm Cu, <5 to 1900 ppm Pb, and 45 to 11000 ppm Zn.

GEOPHYSICS - The area was covered by ground radioactivity

DRILLING - Three more diamond drill holes (DDH 47/3, 4, and 5) were put down in the Ajax area. DDH 47/3 was put down to test for further shallow secondary Cu mineralisation in the area. DDH 47/4 was drilled to test the extension of the Ajax mineralisation zone to the SE beneath the eastern river gravels. DDH 47/5 was drilled to test a coincident geochemical and trans-EM anomaly. The hole passed through a sequence of grey siliceous fine acid rocks cut by numerous andesitic dykes. A

program of percussion drilling was carried out in the alluvial areas S of the mine to test whether the geochemical anomaly extended beneath the alluvium.

9) Drive area

GEOLOGY - Mapping revealed a small zone of pyritic and strongly altered rocks surrounded by a broad diffuse zone of weakly pyritic rocks with distinct spotted alteration and hornfelsing. Various weakly gossanous rocks occur within the central pyritic zone.

GEOCHEMISTRY - Soil sampling showed low-order Zn values associated with the gossanous zones, reaching a maximum value of 1000 ppm Zn. Copper, lead, silver and manganese returned only background values.

10) Grillo Hill area

GEOLOGY - A pyrite rich horizon from 50 to 100 m thick occurs in a sequence of andesitic to rhyolite tuffs and siltstones in a major anticlinorium along the front of the Dee Range. Two weakly gossanous altered zones occur within the horizon.

GEOCHEMISTRY - Soil sampling was carried out, returning 10 to 660 ppm Cu, 10 to 1200 ppm Zn, and 75 to 14500 ppm Mn.

11) Upper Don area

GEOLOGY - Geological mapping outlined a (pyritic) mineralised zone approximately 800 m in strike length and 25-125 m wide.

GEOCHEMISTRY - The grid was soil sampled by a hand auger. Copper shows a broad zone of high background values on the S end of the grid which apparently reflects high background geochemistry in the basic to andesitic suite of volcanics. N of the fault, the acid volcanics have only low background copper values, and several discrete anomalous zones occur associated with the gossanous zones. The maximum copper value is 740 ppm. Lead generally shows very low background values. A broad zone of low-order anomaly occurs approximately coincident with the copper zone in the central part of the grid, but does not occur over the E copper zone. This anomaly is open to the N. Zinc shows a major broad anomaly associated with copper. The maximum value reached was 0.23% Zn, and the anomaly is open to the N.

GEOPHYSICS - A ground radiation survey was carried out over part of the grid. This showed a broad weak potassic radiometric anomaly stratigraphically above the gossanous zones. The uranium channel showed an unusual linear anomaly for which no explanation has been found. A SP survey was also carried out over part of the grid, and showed a broad low associated with the topographic high and also with the gossanous areas.

DRILLING - Hand augering was carried out to obtain soil samples.

12) Quarry Creek area

GEOLOGY - A large part of the area is covered by a usually massive, intermediate to basic rock, tuffaceous and fine banded varieties do occur. This unit appears to be flat lying or gently folded. Three other units also occur in the area; a foliated aphanitic andesite unit; a feldspar porphyry lithic tuff; and an intermediate lithic tuff/tuffaceous shale unit which constitutes the bulk of the sequence in the W part of the grid. Basic and acid dykes also occur in the area.

GEOCHEMISTRY - A soil survey was carried out, returning 15 to 175 ppm Zn, 5 to 35 ppm Pb, and up to 350 ppm Cu. None of these values are anomalous, and no further exploration is warranted in the area.

13) Moonmera Porphyry Copper Prospect - Two areas were looked at in detail, these are the Moonmera Triangle area and the Moonmera Quarry Breccia zone.

(A) Moonmera Triangle area (central part of the prospect) -

GEOLOGY - The Triangle area shows two zones of intense alteration associated with an irregular intrusion of quartz monzonite porphyry into a major batholith of quartz diorite-granodiorite (Bouldercombe Complex).

GEOCHEMISTRY - Soil sampling was carried out, returning 180 to 5000 ppm Cu, and 2 to 112 ppm Mo. The values are anomalous over the alteration zone in the No.3 shaft area, and a weaker zone above the DDH MM 13, put down by North Broken Hill. Core from DDH 61/1 (between 9 and 17 m) was assayed, returning an average of 1.14% Cu with negligible Mo. Core from the hole in the No. 3 shaft area yielded an average of 1.05% Cu between 11.0 and 18.0 m.

DRILLING - Two short diamond drill holes were put down in the alteration zone around DDH MM 13, to test the possibility of a small tonnage ore zone. DDH 61/1 reached 30.5 m, drilling through a shallow-dipping quartz monzonite porphyry dyke into intensely altered (?) granodiorite with coarse breccia-style mineralisation. The second drill hole was 30 m to the W of DDH 61/1. It intersected altered (?) brecciated granodiorite for the entire length, except for a 10.5 m thick dyke. The alteration zone was unfortunately only very weakly mineralised. A third diamond drill hole was put down on the geochemical anomaly of the No. 3 shaft alteration zone. The hole intersected weakly mineralised altered rock to a depth of 28.97 m.

(B) Moonmera Quarry Breccia Zone

GEOLOGY - Brecciation and alteration occurs in a complex of biotite quartz diorite and quartz diorite porphyry which has been invaded by a mass of quartz monzonite porphyry in the S. Coarse blebs of chalcopyrite occur in the N of the brecciated and altered zone in the creek bed in an old quarry which was mined at about the turn of the century. Coarse boxworks occur in the altered rock on the slopes on the S of the area. The unusual coarse and sparse nature of the mineralisation makes the prospect very difficult to evaluate by any conventional means.

GEOCHEMISTRY - Soil sampling was carried out in the area. The zone of alteration yielded relatively uniform values between about 0.1% to 0.2% Cu, dropping off sharply in unaltered rocks to slightly high background values. Molybdenum soil values are generally very low except in the S part of the alteration zone, where they reached values of 60 ppm. Analysis of core from the drilling returned peak values of 0.7% and 0.8% Cu, but averaged for the length of the holes, the best results were 0.1% Cu. Three bulk samples were taken from an area of exposed fresh rock in the old quarry. Results of the three samples were 0.23%, 0.97% and 0.52% Cu.

DRILLING - 6 short diamond drill holes (DDH 61/4 to 61/9) were completed in the area.

RECORDER: Paul Blake **DATE:** 23/03/1994.

COMPANY REPORT SUMMARY SHEET

CR: 6502 **STATUS:** Open

TITLE: Authority to Prospect 508M. Report to Queensland Department of Mines for year ending 31 December, 1977.

AUTHOR(S): A. Taube **DATE:** June 1978

ATP/EP No.: ATP 508M

COMPANY HOLDING TITLE: Geopeko Limited

COMPANY SUBMITTING REPORT: Geopeko Limited

DATE GRANTED: May 1968 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan, Bajool, Biloela, Calliope

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: The Mount Morgan, and Dee and Ulam Range area

MINING DISTRICT:

MINES/PROSPECTS: Mount Morgan Mine, Morganite, Great Northern Lode, and Ajax Mine; and Mine Anticline, Mine Corridor North, Mine Corridor South, Talban Hill Breccia Pipe (Light of Day mine), Arnold's Ridge, Linda Gully, Peacock Shaft, Thomases Gossan, Struck Oil, Mount Warner, Mount Bennett, Mount Grim, Fab, Omo, Upper Don, Bouldercombe, Bull Creek, Stockyard Creek, Hamilton Creek, Horse Creek, Poison Creek, Kangaroo Creek, Quarry Creek, Archer, Fern Hills, Riverhead, Mannersley, Penumbra, and Limestone Creek areas; Moonmera Porphyry Copper Prospect; and Eulogie Park Gabbro

EXPLORATION TARGETS/MODELS: All metals (but chiefly a Mount Morgan type copper/gold orebody)

SUMMARY:

LOCALISED EXPLORATION/PROSPECTS

1) Mount Morgan Mine

GEOCHEMISTRY - Material from the drilling was assayed. Several of the drill holes, notably PDH. No.1 (3 bench) and No.C. (4a bench) yielded 3 m lengths assaying 8000 ppm Zn. One intersection (No.1-4a bench) yielded 1.58% Cu and 1.2 g/t Au in one 3 m intersection.

DRILLING - A program of percussion drilling was carried out to test a small stratiform zone of Cu-Zn mineralisation in the NE corner of the open cut. Diamond drill hole DDH 3-39 was put down to follow-up, at depth, the anomalous values recorded in percussion hole No.1-4a bench. Logging of the core showed that the Banded Mine Sequence of interbedded jaspers, cherts, and tuffaceous quartz-feldspar porphyries contained the values. The holes demonstrated that the stratiform Cu-Zn mineralisation occurs within the top part of the BMS. One other percussion drill hole was put down further N to test the top of the BMS. No significant values were intersected.

2) Mine Corridor North

GEOPHYSICS - A major Gradient Array IP survey was carried out over most of the grid area. The only feature of any significance was a very large anomaly extending N of the Horse Paddock Dump in a SE direction to the Waltherhall area. The anomaly is broad in the NW but sharp in the SE. The peak of the anomaly is within the Mount Morgan Tonalite. A bulldozer uncovered an old water pipe which appeared to be the source of the sharp peak of the IP anomaly.

DRILLING - Percussion drilling was carried out to investigate the IP anomaly. The drilling, together with the bulldozing which uncovered the water pipe, showed conclusively that the peak of the IP anomaly was caused by the water pipe but the broad zone extending to the NW was caused by anomalous amounts of fine pyrite within the alteration zone. A diamond drill hole (DDH 63/3) was put down adjacent to Bond's Shaft (about 0.7 km N of Mt Morgan mine). The hole intersected banded mine sequence from 164 m to 360.5 m, with pyritic skarn zone from 357 to 360.5 m. The skarn contained low values of chalcopyrite and sphalerite.

3) Arnold's Ridge area

DRILLING - A diamond drill hole was put down on the Arnold's Ridge alteration zone to test the IP anomaly and the alteration zone. Geochemical basemetal background values, amount of pyrite, and intensity of alteration showed an increase with depth to 96 m, then decreased from 96 to 293.2 m.

4) Linda Gully area - 1 km N of Mount Morgan Mine. Several shafts and adits had been put down in the area in about 1900.

GEOLOGY - The rocks in the area consist of coarse quartz-feldspar porphyry of the Upper Mine Porphyries. These contain two poddy horizons of limestone which have been skarnified in places by contact with small latite intrusions in the area.

GEOCHEMISTRY - Samples of the skarn returned values of 1.5% Cu and 2.0 g/t Au. Results of assays from core have not been received yet.

DRILLING - Two diamond drill holes were put down to test the stratigraphy beneath the limestone-magnetite skarn. DDH 63/5 intersected a major porphyritic diorite dyke at 100 m, and was abandoned. DDH 63/6 was moved 50 m back from DDH 63/5. It collared within the porphyritic diorite dyke and drilled out of it into UMP at 90.6 m. The hole was drilled to 980.0 m and penetrated the BMS at 640 m.

5) Thomases Gossan area - 7 km N of the Mount Morgan Mine. Limited tonnages of high-grade ore were extracted from small workings in the area.

GEOLOGY - The area consists of Mine Corridor-type rocks, but occurring within the Moongan Corridor, which is similar in composition but is separated from it by a granodiorite body and may not be correlateable. The old workings occur mainly in fine acid and andesitic volcanic rocks in a greater sequence of acid volcanic rocks. Quartz-feldspar porphyry occurs in the E part of the grid. These rocks are unconformably overlain by the Jurassic Razorback beds. The high-grade lode which was mined was obviously secondarily enriched beneath the Razorback beds. The lode may have been a small vein associated with the Moonmera porphyry copper system 1 km NE, or could possibly be a stratiform bed within the Moongan Rhyolite.

GEOCHEMISTRY - Assays of soil sampling showed a zone of contamination below the old workings and an apparent zone of dispersion up into the Razorback beds. A slightly anomalous zone of copper (to 260 ppm) appears to follow the unconformity. A spot high of 320 ppm Cu in the Razorback beds may represent contamination. Lead values range from 5 to 30 ppm and are not considered anomalous. Zinc values show a concentration along the base of the Razorback beds similar to that shown for copper. A low-order anomaly (150 ppm Zn) occurs higher in the Razorback beds, also corresponding with a copper anomaly. Its cause is unknown.

DRILLING - Hand augering to collect soil samples was carried out. 14 percussion drill holes were put down to see whether any small pods of high-grade ore could be recovered with no success.

6) Moonmera Porphyry Copper Prospect - The No.2 and No.3 shaft areas were investigated during this year.

(A) No.2 Shaft area

GEOLOGY - The mineralisation occurs in a wedge-shaped block of intensely altered quartz diorite porphyry ? breccia associated with an intrusive tuffsite (andesite breccia) pipe. After the results of the drilling, the zone is considered too small to warrant exploitation.

GEOCHEMISTRY - Material from the percussion drilling was assayed. The best intersections were from PDH 43 with 8.1 m averaged at 1.59% Cu; PHD44 with 18 m averaged at 0.62% Cu; and PDH45 with 21 m averaged at 0.73% Cu. The diamond drill hole returned no mineralisation of significance.

DRILLING - The zone was tested with fifteen shallow percussion drill holes, one of the holes was continued by diamond drilling.

(B) No.3 Shaft area

GEOLOGY - The shaft in this area was sunk on an intensely altered malachite-stained knob of quartz-sericite porphyry about 50 x 50 m. Geopeko in 1976 put down a short diamond drill hole (30 m deep) adjacent to the shaft, returning 7 m of 1.05% Cu, and negligible Mo.

GEOCHEMISTRY - Geochemical values from the percussion drilling material did not reproduce the values intersected in diamond drill hole. Most copper values were less than 0.1% Cu. The highest value intersected was 2.95% Cu in one unsupported 3 m sample. The zone is considered to be of no further interest.

DRILLING - 6 percussion drill holes were put down to follow up Geopeko's diamond drill hole.

7) Ajax Mine area

GEOCHEMISTRY - The best values from the percussion drilling in the N zinc anomaly were 2.25% Zn and 349 ppm Cu over 4 m in PD 21. The best intersection from the drilling in the E geochemical anomaly was 0.17% Pb, 12.6 g/t Ag and 0.25 g/t Au over 6 m. The significant results from DDH 47/7 were 97 to 103 m returning 0.19% Cu, 0.1 g/t Au, 0.1 g/t Ag, and 2.5% Zn; 103 to 109 m returning 0.71% Cu, 0.1 g/t Au, 5.8 g/t Ag, and 4.84% Zn; and 109 to 114 m returning 0.13% Cu, 0.4 g/t Au, 10.95 g/t Ag, and 2.18% Zn.

DRILLING - A program of percussion drilling was carried out for shallow testing beneath alluvial flats for geochemical purposes, and deeper testing beneath previously defined geochemical anomalies. 23 holes were drilled for a total of 547 m. Holes drilled on the N zinc anomaly intersected weakly mineralised and altered tuffs interbedded with cherts and jaspers. Holes in the E geochemical anomaly intersected only weakly mineralised tuffs which suggests that this zone has little ore potential. One hole drilled on the trans-EM anomaly intersected a body of magnetic dolerite with no mineralisation. A diamond drill hole was designed to test the strike extension of the mineralised zone which was worked underground. The hole reached 118.6 m when it was realised that it was drilling over the plunge of the anticline to the E, and would not intersect the favourable horizon, and was so stopped. A second hole, DDH 47/7 was designed to drill down the fold axis. Patchy copper and zinc mineralisation was intersected between 97 and 125 m depth.

8) Fab Prospect

DRILLING - 4 percussion drill holes were drill on various SP, geochemical and trans-EM anomalies. Holes 1 and 2 intersected pyritic zones in fresh rock, but no base metal sulphides are visible. Hole 3 passed into gneissic rock close to the granodiorite contact and was terminated short of target. Hole 4 intersected an andesite dyke with no pyrite.

9) Omo Prospect

GEOLOGY - This prospect consists of a very small gossanous zone within a large intense alteration zone W of and contiguous with the Ajax alteration zone

GEOCHEMISTRY - The core from DDH 70/1 was analysed, and the significant values are 147 to 155 m at 0.187% Zn; 150 to 151 m at 0.15% Cu, and 188 to 192 m at 0.44% Zn.

DRILLING - A diamond drill hole (DDH 70/1) was put down underneath the gossanous zone to test whether the zone had any depth extent. The hole reached 269.5 m and intersected two zones of minor pyrite-sphalerite-chalcopyrite mineralisation, between 147-156 m and 165-187 m.

RECORDER: Paul Blake **DATE:** 25/03/1994.

COMPANY REPORT SUMMARY SHEET

CR: 6742 **STATUS:** Open

TITLE: Final report on portions of Authority to Prospect 508M, as relinquished in May, 1978.

AUTHOR(S): A. Taube **DATE:** November 1978

ATP/EP No.: ATP 508M

COMPANY HOLDING TITLE: Geopeko Limited

COMPANY SUBMITTING REPORT: Geopeko Limited

DATE GRANTED: May 1968 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan, Bajool, Biloela, Calliope

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: The Mount Morgan, and Dee and Ulam Range area

MINING DISTRICT:

MINES/PROSPECTS: Mount Morgan Mine, Morganite, Great Northern Lode, and Ajax Mine; and Mine Anticline, Mine Corridor North, Mine Corridor South, Talban Hill Breccia Pipe (Light of Day mine), Arnold's Ridge, Linda Gully, Peacock Shaft, Thomases Gossan, Struck Oil, Mount Warner, Mount Bennett, Mount Grim, Fab, Omo, Upper Don, Bouldercombe, Bull Creek, Stockyard Creek, Hamilton Creek, Horse Creek, Poison Creek, Kangaroo Creek, Quarry Creek, Archer, Fern Hills, Riverhead, Mannersley, Penumbra, and Limestone Creek areas; Moonmera Porphyry Copper Prospect; and Eulogie Park Gabbro

EXPLORATION TARGETS/MODELS: All metals (but chiefly a Mount Morgan type copper/gold orebody)

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The areas relinquished include mainly granitic to gabbroic igneous rocks and moderately disturbed volcanic and sedimentary sequences, ranging in age from Middle Devonian to Tertiary. The relinquished areas include the Quarry Creek area, and part of the Bull Creek grid.

RECORDER: Paul Blake **DATE:** 25/03/1994.

COMPANY REPORT SUMMARY SHEET

CR: 7230 **STATUS:** Open

TITLE: Authority to Prospect 508M. Report to Queensland Department of Mines for year ending 31 December, 1978.

AUTHOR(S): A. Taube **DATE:** June 1979

ATP/EP No.: ATP 508M

COMPANY HOLDING TITLE: Geopeko Limited

COMPANY SUBMITTING REPORT: Geopeko Limited

DATE GRANTED: May 1968 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan, Bajool, Biloela, Calliope

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: The Mount Morgan, and Dee and Ulam Range area

MINING DISTRICT:

MINES/PROSPECTS: Mount Morgan Mine, Morganite, Great Northern Lode, and Ajax Mine; and Mine Anticline, Mine Corridor North, Mine Corridor South, Talban Hill Breccia Pipe (Light of Day mine), Arnold's Ridge, Linda Gully, Peacock Shaft, Thomases Gossan, Struck Oil, Mount Warner, Mount Bennett, Mount Grim, Fab, Omo, Upper Don, Upper Mundic, Bouldercombe, Bull Creek, Stockyard Creek, Hamilton Creek, Horse Creek, Poison Creek, Kangaroo Creek, Quarry Creek, Raspberry Creek, Upper Nine Mile Creek, Archer, Fern Hills, Riverhead, Mannersley, Penumbra, and Limestone Creek areas; Moonmera Porphyry Copper Prospect; and Eulogie Park Gabbro

EXPLORATION TARGETS/MODELS: All metals (but chiefly a Mount Morgan type copper/gold orebody)

SUMMARY:

LOCALISED EXPLORATION/PROSPECTS

1) Linda Gully area

GEOCHEMISTRY - Analysis of core from DDH 63/6 returned 5 to 660 ppm Cu, <5 to 430 ppm Pb, and 65 to 270 ppm Zn. None of these results area considered anomalous.

2) Upper Mundic area

GEOCHEMISTRY - Analysis of cuttings from PDH 7 and core from DDH 63/7 returned 10 to 780 ppm Cu, 5 to 60 ppm Pb, 50 to 1180 ppm Zn, and traces of gold. PDH 8 returned 12 to 160 ppm Cu, 4 to 52 ppm Pb, 36 to 640 ppm Zn, traces of gold, and trace to 1.0 g/t Ag.

DRILLING - Two deep percussion holes were put down in an area of alteration, pyritisation and anomalous Se-Te. The first hole (PDH 7) was put down to test for the presence of BMS, and intersected 40 m of pyritic "fine acid" volcanic rock before passing into coarse quartz-feldspar porphyry of the UMP. The hole was extended by diamond drilling as DDH 63/7 from 248 to 420 m. It penetrated coarse quartz-feldspar porphyry of the UMP for its entire length. The lack of intersection of

the BMS suggests that in this area the BMS may be dipping more steeply than anticipated. No significant sulphides were intersected except for the disseminated pyrite in the upper part of the percussion drill hole. The second percussion hole (PDH 8) intersected 56 m of pyritic "fine acid" volcanic rock before passing into coarse quartz-feldspar porphyry of the UMP. No significant sulphides were intersected apart from the disseminated pyrite in the "fine acid" volcanic rock.

3) Mine Corridor South

GEOCHEMISTRY - Material from DDH 59/1 returned 30 to 995 ppm Cu, 5 to 180 ppm Pb, 70 to 1400 ppm Zn, and trace to 0.6 g/t Ag. Material from DDH 59/2 was assayed. A skarn zone with about 20% pyrite from 160.8 m to 161.0 m yielded 2680 ppm Cu, 2.4 g/t Ag, and 396 ppm Zn. A second pyritic skarn zone from 327.24 m to 328.24 m yielded 2.0 g/t Ag, 1180 ppm Cu, and 348 ppm Zn. No other significant values were recorded.

DRILLING - Two holes were put down by the Queensland Department of Mines under 50% subsidy arrangement with Geopeko. The first hole (DDH 59/1) was put down in the N part of the area. The hole penetrated UMP to 217.65 m, at which point it intersected the Mount Morgan Tonalite. No significant mineralisation was found. The second hole (DDH 59/2) was located 500 m SE of the first hole. The hole penetrated UMP with a large proportion of intrusive rocks (latites & andesite dykes) to a depth of 304.0 m, at which depth an interbedded sequence of chert, weak jasper, minor skarn beds, and tuffaceous rocks was intersected. The interbedded sequence would appear to be the equivalent of the BMS in a much diminished form. As a host for a Mount Morgan-type orebody, its potential would appear to be considerably diminished, as suggested by its lesser thickness and the almost complete absence of jaspers. This sequence terminated with a major skarn zone from 438.6 to 445.2 m. The hole continued in coarse fragmental and tuffaceous rocks (the LMP) to its final depth of 546.68 m. Two zones of minor mineralisation occurred in the hole.

4) Upper Nine Mile Creek area (UNMC) - 11 km ESE of Mount Morgan in the headwaters of Nine Mile Creek. The area was partly investigated as the Mount Warner area. Exploration is focused on a major copper-zinc geochemical anomaly found previously.

GEOLOGY - The rocks are the part of the Capella Creek beds that are locally known as the Moongan Rhyolite. The volcanoclastic sequence is characterised by a continuous sedimentary horizon comprising jasper, manganeseiferous siltstone, banded chert and minor intraformationally folded crystal tuffs called the Manganese Marker. Above this marker are massive, flow banded fragmental and lithic tuffs of rhyo-dacitic composition, ash tuffs, crystal tuffs, and fine acids. To the S appears a rhythmically bedded chert-siltstone-ash tuff unit 200 m above the Manganese Marker. Underlying the Manganese Marker is the sequence of rocks termed the Bedded Formation which includes a substantial fine acid unit and a chemical sediment zone of fossiliferous limestone and chert. This formation contains the bulk of the mineralisation known in the area. The Bedded Formation consists of layered rhyolitic ash tuff, crystal tuff, and jasper-chert-chloritic siltstone lenses and beds. Below this predominantly sedimentary zone are lithic-lapilli and rounded fragmental tuffs which pass downwards into banded pyritic chlorite-rich argillaceous rocks with minor pyritic quartz lithic tuffs, commonly with a jaspery matrix. A gradational change marked by decrease in Fe and Mn staining, increasing clastic fragment size and scarcity of bedded fine grained sediments, signals the appearance of the lower most unit named the Footwall Tuffs. These massive fragmentals and agglomeritic quartz-chlorite-rich rocks form rugged outcrops and extensive scree deposits. Correlating to the S with the Mt Dick Fragmentals, these rocks form a basal volcanic pile over 500 m thick, extending over a strike length of at least 7 km. Intruded into the UNMC sequence is a narrow, transgressive sill of medium grained feldspar porphyry which has a magnetic character. Numerous narrow basic dykes occur but are seldom seen on the surface. From the initial work done on the prospect, two areas of economic significance were located. The first is a lens of barite rich (up to 22% BaSO₄) agglomerate stratigraphically above a hematitic-pyritic siltstone horizon in the bedded formation. The second, in Springs Creek, is an exposure of sheared fragmentals, cleaved chloritic siltstones, baritic gossan, and cryptocrystalline pyritic cherts sitting above the Footwall Tuffs which are in this area strongly chloritic and Fe and Mn stained. Old shallow diggings are concentrated on the sub-outcrops of the gossan.

GEOCHEMISTRY - A grab sample from the second area of interest returned 3% Pb and 6.5% Barite. Rock chip sampling of the units exposed revealed the presence of high levels of copper, lead, and zinc in the Manganese Marker (averages of 334 ppm Cu, 157 ppm Pb, 502 ppm Zn, 4.3% Mn, 51 ppm Ba, and 1 ppm Ag), Bedded Formation (averages of 1468 ppm Cu, 150 ppm Pb, 184 ppm Zn, 615 ppm Mn, 203 ppm Ba, 4 ppm Ag), and altered Footwall Tuffs (averages of 106 ppm Cu, 54 ppm Pb, 549 ppm Zn, and 2063 ppm Mn). The gossans from the northern area returned averages of 898 ppm Cu, 817 ppm Pb, 1827 ppm Zn, and 1369 ppm Mn.

Analysis of the material from the hand augering has revealed 3 main centres of metal concentration. Five soil geochemical anomalies are related to the Bedded Formation, both at its lower contact with the Footwall Tuffs and along the top contact with the Manganese Marker. Anomaly 1 is situated on the barite zone which overlies banded pyritic sediments. The results reach 1600 ppm Pb and 400 ppm Cu; zinc forms a diffuse high over the Bedded Formation and silver occurs as a distinct anomaly above 4 ppm associated with the barite zone. The second major zone of high soil geochemistry (Anomalies 2 & 3) occurs on the S part of the grid in the Springs Creek area, and is open to the S. The results reach 1100 ppm Cu and 450 ppm Pb; zinc forms a broad high zone with values above 240 ppm. The barium soil geochemistry correlates with the base metal anomalies. Anomaly 4 is within the Bedded Formation and contains maximums of 185 ppm Cu, 160 ppm Pb, 3100 ppm Zn, 4 ppm Ag, and 3812 ppm Ba. Anomaly 5 is within altered Footwall Tuffs and returned maximums of 860 ppm Cu, 480 ppm Pb, 3500 ppm Zn, 2 ppm Ag, and 1000 ppm Ba.

Material from the drilling of PDH 1 returned an intersection of 6-18 m with 0.45% Zn and 2 g/t Ag. PDH 2 returned no significant results except for 3000 ppm Zn in chert-jasper. PDH 3 returned 6 m with 12 g/t Ag. PDH 4 returned no significant results. PDH 5 returned values up to 1% Zn, 0.5% Cu, 6 g/t Ag, and 1.4% Ba. PDH 6 recorded no values of interest. Analysis of core from DDH 77/1 returned 62-70 m with 0.83% Zn; 94-98 m with 1.4% Zn; and 56-74 m with 0.31% Ba. Analysis of material from DDH 77/2 returned best results of 97-108 m with 4.35% Zn, 16.5 g/t Ag, and 0.3 g/t Au; 102-107 m with 1.0% Cu; and 119-120 m with 2.24% Cu, 10 g/t Ag, and 0.45 g/t Au.

GEOPHYSICS - A SP survey identified an anomaly in the Footwall Tuffs. An IP survey was initiated in order to focus on zones of concentrated sulphide mineralisation. The results show four narrow linear, strike conformable anomalies and are designated Anomaly A, B, C, and D. Anomaly A is in Springs Creek, Anomaly B is in the Footwall Tuffs, Anomaly C is adjacent to the SP anomaly, and Anomaly D is located in the Hanging Wall Tuffs. A resistivity survey revealed highs on the Footwall and Hanging Wall Tuff units. A resistivity low forms a cross-cutting trend, and is adjacent to IP Anomaly A. A TURAM (EM) survey identified small anomalies forming a definite linear zone trending parallel to strike within the Bedded Formation.

DRILLING - Hand auger drilling was carried out to collect B-horizon soil samples. Percussion drill holes PDH 1, 2, and 3 were drilled to test geochemical anomaly 2, and reached depths of 58, 50, and 80 m respectively. PDH 1 was extended with diamond drilling (DDH 77/1). DDH 77/1 intersected the down dip extension of the outcropping barite zone and the banded chloritic pyrite zone containing zinc mineralisation before passing into chloritic fragmental tuffs containing disseminated sphalerite and pyrite. PDH 4, 5, and 6 were drilled to test the Springs Creek area, and reached 49, 45, and 21 m respectively. The Queensland Department of Mines drilled a deep stratigraphic hole (DDH 77/2) in IP Anomaly A. The hole reached 278.74 m and intersected zones of significant mineralisation. The mineralisation consists of sheared bands of fine grained pyrite and sphalerite (white) in foliated chloritic-quartz lithic tuff, massive banded pyrite with blebs of chalcopyrite in a siliceous gangue. The lower intersection occurs as contorted pyrite-chalcopyrite bands up to 10 cm thick and quartz-chalcopyrite veins in a foliated black chlorite rock.

5) Ajax Mine area - 23 km SE of Mount Morgan

GEOPHYSICS - The result from the EM survey were received. The results revealed a small discrete anomaly associated with the known mineralisation and a number of larger anomalies. Some of the other anomalies are associated with observations of alteration and pyritisation.

DRILLING - Diamond drill hole, DDH 47/8, was designed to test beneath the old mine workings at a depth of 250 m. The hole cored altered rhyolitic fragmentals, pyritic chert, and metavolcanics for its total length of 326.8 m. The zone of alteration in this hole was much larger than in the previous holes put down, although zinc values were very much lower.

6) Fab Prospect - 20 km SE of Mount Morgan

GEOCHEMISTRY - The interval 98 to 116 m from PDH 5 returned 602 ppm Pb, 1320 ppm Zn, and 1640 ppm Mn. Core from PDH 6 returned maximums of 204 ppm Cu and 3760 ppm Zn.

GEOPHYSICS - A magneto-metric resistivity survey was carried out. The results indicate the presence of a conducting horizon from 60 to 150 m wide, running N-S through the prospect, parallel to strike, for a distance of 1700 m. Three discrete anomalies with a strike length of about 300 m each occur within the conducting horizon. The S anomaly is adjacent to a narrow SP anomaly and associated with a weak zinc-copper soil anomaly. The central anomaly associated with some spot high soil geochemistry (up to 2200 ppm Zn and 330 ppm Cu) but occurs partially below a cover of river gravels. The N anomaly is the largest of the three, and occurs completely below thick cover (3-10 m) of river gravels. Drilling revealed that the conductive horizon is caused by the pyrite-rich layers.

DRILLING - 3 percussion drill holes were put down, two of which were designed as precollar holes for diamond drilling. The first hole, PDH 5, reached 148 m and penetrated a sequence of quartz-biotite-cordierite-amphibole hornfels with minor intervals of pyrite-biotite schist. Trace amounts of chalcopyrite were observed from 44 to 54 m, and the interval from 98 to 116 m carried 8% pyrite. PDH 6 reached 51.8 m, was drilled on the central MMR anomaly and was used as a precollar hole for diamond drilling which reached 232.0 m. The diamond drilling cored highly pyritic siliceous hornfelsed rock. Apart from its higher grade of metamorphism, the rock is virtually identical with the pyritic quartz-feldspar porphyry occurring adjacent to the Sugarloaf orebody. PDH 7 was designed as a precollar hole for diamond drilling, but the diamond drilling was not started. Up to 15% pyrite was logged in the chip cuttings.

7) Grillo Hill Prospect - 16 km ESE of Mount Morgan.

GEOLOGY - The area consists of an extensive zone of pyritic sericite-clay alteration within a thinly bedded, nearly flat-lying sequence of acid lithic fragmental rocks and cherts.

GEOCHEMISTRY - Soil sampling was completed. Copper values show two highs associated with the exposed alteration zone. A low order lobe of copper values appears to be associated with a dolerite intrusive in the N of the grid. Lead values are not associated with the copper, but occur in a discrete zone in the SW part of the grid. Maximum value for lead was 240 ppm. Zinc values are spread widely, occurring both over the lead anomaly and the copper anomaly, excepting for a discrete "hole" in the centre of the NW anomaly, which is coincident with that copper high.

GEOPHYSICS - An IP survey was carried, out returning a complex pattern of resistivity highs and lows over the alteration zone.

8) Raspberry Creek area - This area is 14 km SE of Mount Morgan, and is the along-strike extension of the Upper Nine Mile Creek area.

GEOLOGY - A thick, strike extensive pyritic zone containing sub-gossanous rocks occurs stratigraphically above a sequence of quartz-chlorite fragmentals and below a manganeseiferous sedimentary horizon. A discrete zone of gossanous, leached, siliceous material occurs on the E end of the grid.

GEOCHEMISTRY - Soil sampling revealed a large, broad copper anomaly with values over 50 ppm occupying two distinct zones within a large area above 25 ppm Cu. The N zone is a linear anomaly with a strike length of 1 km and width up to 200 m, and contains a core with up to 200 ppm Cu. This anomaly sits just above the bottom contact of the pyritic acid volcanics with the underlying Mt Dick Fragmentals, but below the continuous, well bedded manganese siltstone horizon. The S anomaly has a

diffuse, irregular pattern and overlies the manganese siltstone. This anomaly is like the footwall zone to the N, open ended to the E. Lead values, like copper, form a broad, long, irregular anomalous zone. There is good correlation between zones of >20 ppm Pb, and outcrops of pyritic rocks. The footwall fragmentals, hanging wall tuffs, and fine acids contain value all below 20 ppm. There are two distinct lead highs over 40 ppm Pb. The N one has the highest value of 500 ppm Pb. This lead high is displaced relative to the copper high by 400 m to the E. The other significant lead high has a maximum of 310 ppm Pb, is an elongate irregular zone, up to 400 m wide, and it is open ended. Zinc values are low throughout the grided area with the highest value being 600 ppm Zn.

RECORDER: Paul Blake

DATE: 28/03/1994.

COMPANY REPORT SUMMARY SHEET

CR: 7337 **STATUS:** Open

TITLE: Authority to prospect 508M. Results of Stratigraphic Drilling carried out in the Mount Morgan Mine Corridor by the Queensland Department of Mines during 1978-79.

AUTHOR(S): A. Taube **DATE:** October 1979

ATP/EP No.: ATP 508M

COMPANY HOLDING TITLE: Geopeko Limited

COMPANY SUBMITTING REPORT: Geopeko Limited

DATE GRANTED: May 1968 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan, Bajool, Biloela, Calliope

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: The Mount Morgan, and Dee and Ulam Range area

MINING DISTRICT:

MINES/PROSPECTS: Mount Morgan Mine, Morganite, Great Northern Lode, and Ajax Mine; and Mine Anticline, Mine Corridor North, Mine Corridor South, Talban Hill Breccia Pipe (Light of Day mine), Arnold's Ridge, Linda Gully, Peacock Shaft, Thomases Gossan, Struck Oil, Mount Warner, Mount Bennett, Mount Grim, Fab, Omo, Upper Don, Upper Mundic, Bouldercombe, Bull Creek, Stockyard Creek, Hamilton Creek, Horse Creek, Poison Creek, Kangaroo Creek, Quarry Creek, Raspberry Creek, Upper Nine Mile Creek, Archer, Fern Hills, Riverhead, Mannersley, Penumbra, and Limestone Creek areas; Moonmera Porphyry Copper Prospect; and Eulogie Park Gabbro

EXPLORATION TARGETS/MODELS: All metals (but chiefly a Mount Morgan type copper/gold orebody)

SUMMARY:

LOCALISED EXPLORATION/PROSPECTS

1) Upper Nine Mile Creek area

GEOLOGY - The sequence within the grid is dipping moderately SW. The lowermost rock unit on the grid is the Footwall Tuffs, comprising coarse fragmental and agglomeratic quart-chlorite-rich rocks. These rocks occur along the Dee Range for a strike length of over 7 km. The rocks are characterised by very coarse fragments of varying lithologies, including chert, quartz-feldspar porphyry, and chloritic rocks, all in a chloritic tuffaceous andesitic matrix. No significant fine-grained sediments occur within this unit. Overlying the Footwall Tuffs is the "Bedded Formation", which consists of an interbedded sequence of layered rhyolitic ash tuff, crystal tuff, jasper-chert-chloritic siltstone, and lithic lapilli tuffs. Jasper or hematitic siltstone occurs sporadically within the unit, and some stratiform sulphides have been found in drill core. Certain chloritic schist beds occur which are usually highly cleaved. In the N part of the area a "fine acid" volcanic rock occurs (probably an ash tuff or fine quartz-feldspar porphyry) together with a zone of limestone and chert. The Bedded Formation is about 200 m thick. At the top of the Bedded Formation is a distinctive unit of manganiferous hematitic siltstone and jasper about 10 m thick. This unit is called the "Manganese Marker" and is traceable for over 10 km in the area. Overlying the Manganese Marker is a sequence of massive and banded fragmental and lithic tuffs of rhyodacite composition. A sill of magnetic andesitic feldspar porphyry intrudes the sequence.

DRILLING - DDH 77/2 was originally described in CR 7230, but more detail was given in this report. The hole was collared in the Manganese Marker. It passed into banded rhyolitic tuffs of the Bedded Formation at 22 m. The Feldspar Porphyry sill was intersected from 73-83.6 m. From 83.6 to 88.3 m, the characteristic banded cherty-tuffs continued. At 88.3 m, pyrite began to appear both in cherty rocks and as disseminations in the matrix of fragmental rocks. Small stratiform pyrite layers began to appear in the rock, particularly in cherty units, e.g. at 92-93 m. At one point several 1 cm beds of banded jasper were associated with banded pyrite in cherts within a few centimetres of each other in the core. At 97.0 m, zinc mineralisation in the form of very light-coloured white-grey sphalerite (iron-poor) appeared in sub-ore grade amounts. The sphalerite is variable, occurring as discrete zoned crystals in tuffaceous or chloritic rock and also as thin massive zones, or banded pyrite-sphalerite with blebs and veinlets of chalcopyrite in a siliceous gangue. From 108 m, sphalerite gradually decreases in the hole but chalcopyrite continued at a low level, usually less than 0.5% Cu, but reaching a value of 2.24% in a sheared chloritic zone from 118.7 to 119.7 m. The host rocks continued to be banded quartz-feldspar crystal-lithic tuffs and chloritic zones. Mineralisation generally decreases gradually, and dropped considerably after 134 m, though still carrying anomalous geochemical values. A zone of massive hematite-chlorite rock with minor sulphides forms a marker unit near the base of the Bedded Formation, which is considered to be at 172 m in the hole. From 172 m to the end of the hole at 278.74 m, the rocks consist of barren dacitic footwall tuffs. These rocks are distinct from the Bedded Formation and represent the unmineralised basal part of the sequence.

2) Hamilton Creek area

GEOLOGY - A large, intensely altered and pyritic zone occurs in rocks of the (?) Capella Creek beds immediately S of a block of the Mine Corridor rocks. The (?) Capella Creek beds in the area consist predominantly of intermediate lithic tuff, feldspar porphyry, and minor limestone. The Corridor rocks in the area consist mainly of fine quartz-feldspar porphyry. A limestone bed occurs within the Corridor rocks. The Capella Creek beds in the area are gently folded into a S-plunging anticline in the area of the alteration zone. The anticlinal structure is more or less concentric with the occurrence of the Corridor rocks, which appear to be a faulted-in block. This block is suggestive of a domal structure, although no dome can be defined on present information. The alteration zone consists mainly of a clay mineral with lesser amounts of calcite, sericite, and chlorite, with pyrite up to about 8% in places. The alteration crosses the stratigraphy. Several relatively minor faults cut across the area. The Dee Volcanics occurs on the W side of the grid, but its contact with the underlying Capella Creek beds is uncertain owing to similarity of lithological types and lack of fossil evidence.

GEOCHEMISTRY - Material from the percussion-drilled part of DDH 32/11 returned 12 to 136 ppm Cu, 8 to 70 ppm (with one high of 300 ppm) Pb, 36 to 220 ppm Zn, and traces to 1.2 ppm Ag. The results from the cored part of the hole were 5 to 230 ppm Cu, 10 to 30 ppm Pb, 5 to 380 ppm Zn, and <1 to 2 ppm Ag. Skarn and granitised rocks where present showed slightly higher values than intrusive rocks. None of these values are significant with respect to mineralisation, tending to reflect variations in rock geochemical background.

DRILLING - Drilling in the area showed that the alteration zone is intense and extensive, but has only low base-metal geochemical values. Diamond drill hole DDH 32/11 was sited on the westernmost of two intense centres within the zone, more or less on the axis of the poorly defined S-plunging anticline. The hole was precollared to a depth of 198 m, intersecting intensely altered siliceous rock (possibly silicified rather than originally siliceous) for the entire length. The rock contained of the order of 10% pyrite throughout. The diamond drill core began to show some lithological variation. The rock became more fragmental and although still intensely altered, could be recognised as similar to the quartz-feldspar porphyry tuffs of the UMP. Small dykes of pyritic microgranite intrusions began to appear after 205 m. These microgranite intrusions became larger with depth in the hole, and showed a clear relationship with alteration. The host rock is gradually granitised with depth, showing a clear gradation between ungranitised quartz-feldspar porphyry tuff, through epidotised and partially granitised tuffs, to granitised rocks with relict fragmental textures (238.5 to 322.67 m). The alteration assemblage associated with the microdiorite intrusive is clearly superimposed upon the granitisation assemblage. Lower in the hole all granitisation textures disappear and a "cleaner" intrusive granodiorite phase apparently intrudes the granitised (syenitic) host rock, e.g. 403.7-404.2 m. From about 381.8 m onwards, the entire assemblage of rocks shows a complex pattern of brecciation which is thought to be

a "roof-breccia" assemblage typical of the margins of some porphyry coppers. This assemblage consists of large fragments (>10 cm) of both altered syenitic host rock and less altered microgranite intrusive, both of which appear to have been further altered. From about 512 m to the end of the hole at 550.6 m the rock consists of relatively homogeneous hornblende syenite, which appears to be the last intrusive phase in the area apart from some minor late dykes.

3) Mine Corridor South - This drilling was already covered in CR 7230.

RECORDER: Paul Blake

DATE: 30/03/1994.

COMPANY REPORT SUMMARY SHEET

CR: 7919 **STATUS:** Open

TITLE: Authority to Prospect 508M. Report to Queensland Department of Mines for year ending 31 December, 1979.

AUTHOR(S): A. Taube **DATE:** June 1980

ATP/EP No.: ATP 508M

COMPANY HOLDING TITLE: Geopeko Limited

COMPANY SUBMITTING REPORT: Geopeko Limited

DATE GRANTED: May 1968 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan, Bajool, Biloela, Calliope

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: The Mount Morgan, and Dee and Ulam Range area

MINING DISTRICT:

MINES/PROSPECTS: Mount Morgan Mine, Morganite, Great Northern Lode, and Ajax Mine; and Mine Anticline, Mine Corridor North, Mine Corridor South, Talban Hill Breccia Pipe (Light of Day mine), Arnold's Ridge, Linda Gully, Peacock Shaft, Thomases Gossan, Struck Oil, Mount Warner, Mount Bennett, Mount Grim, Fab, Omo, Upper Don, Upper Mundic, Bouldercombe, Bull Creek, Stockyard Creek, Hamilton Creek, Horse Creek, Poison Creek, Kangaroo Creek, Quarry Creek, Raspberry Creek, Upper Nine Mile Creek, Archer, Fern Hills, Riverhead, Mannersley, Penumbra, and Limestone Creek areas; Moonmera Porphyry Copper Prospect; and Eulogie Park Gabbro

EXPLORATION TARGETS/MODELS: All metals (but chiefly a Mount Morgan type copper/gold orebody)

SUMMARY:

LOCALISED EXPLORATION/PROSPECTS

1) Upper Nine Mile Creek area

GEOCHEMISTRY - Analysis of material from PDH 9-DDH 77/3 returned only one significant interval, 204.5-205.0 m, which yielded 1.57% Zn. Analysis of material from PDH 10-DDH 77/4 yielded 0.21% Cu and 0.39% Zn from 66 to 70 m. The interval of 48 to 52 m from PDH 11 returned 0.27% Zn. Analysis of material from PDH 12-DDH 77/5 returned 1.17% Zn from 130 to 133 m, and <0.5% Cu from 133 to 142 m. Assay of material from PDH 13-DDH 77/6 returned 0.78% Cu from 241 to 242 m. Analysis of material from PDH 14-DDH 77/7 returned 23.4 g/t Ag from 111 to 132 m, and 125.5 g/t Ag, 0.51 g/t Au, 1.8% Zn, 0.5% Pb, and 0.15% Cu from 152.9-163.6 m.

DRILLING - Two percussion drill holes were put down prior to the major diamond drilling program. PDH 7 was drilled to 105 m as a precollar hole for future diamond drilling. No mineralisation was intersected in the hole. PDH 8 was designed to test a sharp IP anomaly within the Manganese Marker horizon. The hole was drilled to a depth of 103 m without intersecting mineralisation. The hole was cased for diamond drilling at a later stage. The major program of drilling which followed this was a pattern of holes around the intersection made previously in the Mines Department drill hole DDH 77/2.

The first hole, PDH 9-DDH 77/3, was designed to intersect the mineralisation horizon at 120 m down dip from the previous intersection. The percussion part of the hole was collared in the Manganese Marker (to 113.0 m), then intersected a jasperous horizon (to 122 m), the Bedded Formation (to 130 m), and passed into coarse porphyritic magnetic dyke. The hole was cased and diamond drilling commenced. The hole passed out of the dyke at 143.7 m, and penetrated the Bedded Formation to 264.3 m. Fine grained sphalerite and pyrite are present as thin bands in a crystal lithic tuff in the interval 204.5-205.0 m. After this, PDH 10-DDH 77/4 was designed to test the strike extension of the mineralised horizon to the S at a depth of 70 m. The hole was collared in the Manganese Marker and passed into the Bedded Formation at a depth of 8 m. At 40 m, the hole intersected a magnetic hornblende feldspar porphyry intrusive and then passed back into the Bedded Formation at 56 m. The hole was diamond drilled from 76 m and was stopped in Bedded Formation at 147 m. The final 8 m of core is characterised by quartz-hematite zones. Minor mineralisation was intersected over a 4 m interval from 66 to 70 m. The strike extension of the mineralisation to the N was tested by PDH 11 which was collared in the Bedded Formation and expected to intersect the mineralisation at 80 m. The hole passed into the footwall at 97 m and stopped at a depth of 130 m. Minor sphalerite was noted from 48 to 52 m. PDH 12-DDH 77/5 was designed to test the extension of the mineralised horizon down dip from PDH 11. It was collared in the Manganese Marker and penetrated 26 m before entering the Bedded Formation. Diamond drilling began at 53.2 m. At 61.4 m, the hole entered a feldspar hornblende porphyry intrusive and then passed back into the Bedded Formation at 80.2 m. The hole passed into the Footwall Tuffs at 191 m, and the hole was ended at 207.1 m. Disseminated sphalerite and fine grained pyrite were noted from 130 to 133 m and sporadic disseminated chalcopyrite occurred from 133 to 142 m. PDH 13-DDH 77/6 was designed to test the mineralised horizon down dip from DDH 77/4. The hole was collared in the Hanging-Wall sequence, passed into the Manganese Marker at 64 m, and entered the Bedded Formation at 124 m. Diamond drilling commenced at 201.5 m, and penetrated the Footwall Sequence at 287.85 m. Disseminated chalcopyrite was noted from 241 to 242 m, and the lowermost 10 m of the Bedded Formation is characterised by quartz-hematite zones. PDH 14-DDH 77/7 was designed to test down dip from 77/1. The hole was collared in the Hanging-Wall sequence, entered the Manganese Marker at 20 m, passed into the Bedded Formation at 31 m, and entered a zone with significant pyrite at 106 m. Diamond drilling commenced at 108 m and finished at 253 m without leaving the Bedded Formation. Sub-massive pyrite was intersected from 111 to 132 m, and massive to semi-massive pyrite and sphalerite bands from 152.9 to 163.6 m. The down dip extension of the mineralisation in PDH 14-DDH 77/7 was tested by PDH 15-DDH 77/8. The hole was collared in the Hanging-Wall sequence, and diamond drilling commenced at 81 m. The hole entered the Manganese Marker at (?)91 m, passed into the Bedded Formation at (?)101 m, and entered the Footwall sequence at 446.5 m. The hole was stopped at 545.1 m. Disseminated pyrite and pale yellow sphalerite occur in tuffs from 384 to 430 m.

2) Upper Raspberry Creek area - approximately 20 km SE of Mount Morgan. This area is the along-strike extension of the Upper Nine Mile Creek and Raspberry Creek areas.

GEOLOGY - Units outcropping are a strike continuation of the Bedded Formation. Units strike between 110 and 120° and dips vary from horizontal to about 60° to the SW. Stratigraphically, the lowermost unit of the grid is a pyritic rhyolite tuff which is overlain by a sub-gossanous sericitic and limonitic zone. Overlying the pyritic tuffs is a sequence of manganiferous horizons consisting of siltstone, jasper, chert and interbedded pyritic and non-pyritic, rhyolitic lithic and crystal-lithic tuff and breccia. The uppermost rhyolitic lithic tuff of this group is immediately overlain by a geochemically anomalous magnetic, sulphide-rich manganiferous chert-siltstone unit known locally as the Yarrawonga bed. This horizon is open to the E, and thickens towards the Dee Range. Rhyolitic tuff, lava breccia and ignimbrite overlies the Yarrawonga bed, and are in turn overlain by a jasper horizon which marks the uppermost limit of the sequence of rocks considered equivalent to the Bedded Formation at UNMC. The Bedded Formation at Upper Raspberry Creek is overlain by chloritic, calcareous and fossiliferous fragmental tuff, agglomerate, and intermediate ash tuff. Dolerite and feldspar porphyry sills have intruded the sequence and some transcurrent faulting is evident.

GEOCHEMISTRY - B-horizon soil samples were collected and assayed. Copper defined two large anomalies with core values in excess of 200 ppm, and a number of smaller anomalies have values exceeding 100 ppm Cu. These anomalies occur within a large area of above background copper values. The W anomaly is open to the W, has a maximum value of 295 ppm Cu, and occurs near the

stratigraphic top of the Bedded Formation. The E anomaly is open to the NE, has a maximum value of 320 ppm Cu, and overlies the Yarrowonga bed. Lead values define an irregular, broad zone of anomalous values over 40 ppm Pb which extends over much of the N part of the Upper Raspberry Creek grid. It contains a number of discrete highs above 80 ppm and two significant zones with values in excess of 160 ppm. The W anomaly is open to the E, has a maximum value of 250 ppm Pb, and lies above a manganiferous sedimentary horizon. The E anomaly is open to the N, has a maximum value of 290 ppm Pb, and is coincident with the copper anomaly over the Yarrowonga bed. Zinc values were low throughout the area. An elongate anomaly with a maximum value of 230 ppm Zn was defined. Several small zinc anomalies correlate with the lead and copper anomalous zone over the Yarrowonga bed. The highest zinc value on the grid is a spot high of 340 ppm Zn which lies over a manganiferous siltstone horizon. Silver values are uniformly low over the grid. High silver (3 ppm Ag) is noted to correlate with the anomalous Cu, Pb, and Zn over the Yarrowonga bed. Manganese values clearly differentiate the Hanging Wall tuffs on the S side of the grid. Values above 1000 ppm are usually coincident with manganiferous rocks, e.g. the Yarrowonga bed or any of the manganiferous jasperous siltstone horizons. The intrusive dolerite horizon also yielded manganese values over 1000 ppm, as did any of the areas of observed pyritisation.

RECORDER: Paul Blake

DATE: 06/04/1994.

COMPANY REPORT SUMMARY SHEET

CR: 9037 **STATUS:** Open

TITLE: Authority to Prospect 508M. Report to Queensland Department of Mines for year ending 31 December 1980.

AUTHOR(S): A. Taube **DATE:** June 1981

ATP/EP No.: ATP 508M

COMPANY HOLDING TITLE: Geopeko Limited

COMPANY SUBMITTING REPORT: Geopeko Limited

DATE GRANTED: May 1968 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan, Bajool, Biloela, Calliope

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: The Mount Morgan, and Dee and Ulam Range area

MINING DISTRICT:

MINES/PROSPECTS: Mount Morgan Mine, Morganite, Great Northern Lode, and Ajax Mine; and Mine Anticline, Mine Corridor North, Mine Corridor South, Talban Hill Breccia Pipe (Light of Day mine), Arnold's Ridge, Linda Gully, Peacock Shaft, Thomases Gossan, Struck Oil, Mount Warner, Mount Bennett, Mount Grim, Fab, Omo, Upper Don, Upper Mundic, Bouldercombe, Bull Creek, Stockyard Creek, Hamilton Creek, Horse Creek, Poison Creek, Kangaroo Creek, Quarry Creek, Raspberry Creek, Upper Nine Mile Creek, Archer, Fern Hills, Riverhead, Mannersley, Penumbra, and Limestone Creek areas; Moonmera Porphyry Copper Prospect; and Eulogie Park Gabbro

EXPLORATION TARGETS/MODELS: All metals (but chiefly a Mount Morgan type copper/gold orebody)

SUMMARY:

LOCALISED EXPLORATION/PROSPECTS

1) Upper Nine Mile Creek area (UNMC)

GEOCHEMISTRY - Material from drill hole PDH16/DDH77/9 returned 130 ppm Cu and 360 ppm Zn between 141 and 150 m. The "crenulated cherty tuff" sequence from PDH17/DDH77/10, PDH18/DDH77/11, and PDH19/DDH77/12 was assayed. DDH77/10 intersected 10 m of 1.4% Zn associated with a limestone unit. DDH77/11 intersected 16 m of 0.8% Cu beneath a limestone unit and associated with the hematite marker bed which is usually near the base of the "crenulated cherty tuff". DDH77/12 intersected 11 m at 7.3% Zn beneath the limestone bed, with some 1 m intervals reaching values over 20% Zn. Analysis of material from the "crenulated cherty tuff" sequence in PDH20/DDH77/13 and PDH21/77/14 returned maximum values of 2.5% Cu over 1 m, and 7.6% Zn over 2 m. The mineralised horizon in DDH77/15 yielded 6.2 m of 7.1% Zn and 6.4 g/t Ag, with 2 m averaging 3.3% Cu.

DRILLING - The hole PDH16/DDH77/9 was put down to test the extension of the Springs Creek geochemical anomaly. The hole collared in Manganese Marker, and drilled through the Bedded Formation to 150 m. From 150 to 190.8 m the hole intersected the crenulated cherty tuff unit, then

entered the Footwall Sequence and was terminated at 209.6 m. The only mineralisation was pyritic material between 141 and 150 m. Small highly pyritic chloritic beds were intersected lower in the hole but contained no significant values. Three holes (PDH17/DDH77/10; PDH18/DDH77/11; and PDH19/DDH77/12) were put down adjacent to PDH 14-DDH 77/7. All holes collared within or above the Manganese Marker horizon (about 10 m thick). They then drilled through an approximately 90 m thick sequence of variable ash tuffs (usually andesitic and granular), with minor chert, jasper interbeds, and limestone. The holes then intersected a 50 m thick, homogenous, quartz-feldspar crystal-lithic tuff. This was followed by approximately 10 m of fine banded chert and minor sulphides, usually fine stratiform, but sometimes semi-massive. Beneath this is a characteristic laminated crenulated cherty tuff unit which has a contorted slumped appearance with a variable thickness. All three holes bottomed in the Footwall Sequence. Each hole intersected mineralisation in the "crenulated cherty tuff". A further two holes (PDH20/DDH77/13 and PDH21/77/14) were put down adjacent to PDH 14-DDH 77/7. The holes collared in or above the Manganese Marker and penetrated a 75 m section of variable ash tuffs with minor jasper and limestone. A pyritic tuff zone, 3 to 5 m thick, marks the top of the massive quartz-feldspar crystal-lithic tuff zone (pyritised in DDH14, but barren in DDH 13). A pyritic bed with high silver occurs near the base of this tuff and is underlain by Zn-Ba rich zones lower in the holes. The massive quartz-feldspar crystal-lithic tuff is 55 m thick. The "crenulated cherty tuff" unit is approximately 95 m thick in these two holes, and both holes intersected narrow beds of mineralisation associated with limestone. The holes were terminated before the footwall rocks were reached. Two holes (PDH23/DDH77/15 and PDH24/DDH77/6) were put down to follow the mineralisation intersected in DDH77/12. DDH77/15 intersected an approximately 90 m thick "crenulate cherty tuff" unit containing the mineralised horizon, but DDH77/16 intersected almost no mineralisation at all. Three percussion holes (PDH 22, 25 and 26) were put down in the Springs Creek area to test an IP anomaly. PDH 22 was placed too far to the E and reached only 30 m depth before entering the Footwall Sequence. PDH 25 tested the modified target and intersected the mineralised horizon which carried sufficient sulphides to account for the IP anomaly. PDH 26 was put down to test the E extension of the IP anomaly but did not intersect any mineralisation.

2) Mount Dick area - extension of the grid between Raspberry Creek and UNMC.

GEOLOGY - The geology is an extrapolation of that of the UNMC area, and the zone of alteration and silicification within the Bedded Formation can be traced from the Springs Creek drilling area. At this point the zone is intensely silicified and contains abundant jasper, reminiscent of the "Siliceous Chimney" at the Mount Chalmers mine. The zone terminates abruptly and in its place is a manganiferous siltstone similar to the Manganese Marker horizon of UNMC but lower in the sequence, small gossans are also associated with this unit. The Bedded Formation in this area is thinner than UNMC or Raspberry Creek.

GEOCHEMISTRY - Rock chip sampling was carried out over the grid. Copper showed low anomalous values on the S flank of the silicified zone and the jasperous area. Slightly higher but only moderately anomalous values of copper occur along the manganiferous siltstone horizon. Lead values identify a discrete anomaly occurring on the manganiferous siltstone horizon. Anomalous zinc values occur both on the jasperous zone and on the manganiferous siltstone, reaching values of 580 and 680 ppm Zn respectively. Anomalous trends up to 700 ppm Zn also occur in the footwall rocks on the N of the grid. Manganese showed a pronounced high in the manganiferous siltstone, reaching values of over 1%. Silver returned no significant results, and barium showed no obvious trends.

3) Raspberry Creek/Upper Raspberry Creek area

GEOCHEMISTRY - Soil sampling was begun, but the results are not yet available.

4) Ajax Mine area

GEOCHEMISTRY - Of the first three percussion drill holes (PDH 25, 26 & 27), PDH 27 returned the best intersection, yielding 14 m averaging 7.98% Zn, 0.87% Pb, 0.23% Cu, 40.4 g/t Ag, and 0.36 g/t Au. The mineralisation in PDH 43 returned 1.22% Zn, and the mineralisation in PDH 31 returned 1.69% Zn with some Cu, Pb, and Ag. The mineralised zone in PDH 38 returned 2.5% Zn, and the mineralised zone in PDH 36 returned 6.45% Zn. PDH 42 returned 22.7 g/t Ag, and 0.4 g/t Au.

DRILLING - A program of percussion drilling was carried out. The holes PDH 25, 26, and 27 were the first to be put down, and were designed to test for trends in the mineralisation intersected in DDH4. The results indicate a shallower dip to the W for the mineralisation, and confirm that the nature of the mineralisation is patches of zinc with minor values of copper and gold. The mineralisation remains open at depth. PDH 28, 29, 31, and 43 were put down to test the mineralised zone on either side of Ford's shaft. PDH 28 apparently did not reach the mineralised horizon; PDH 29 & 43 drilled into old workings, presumably connected with a small shaft W of Ford's shaft; PDH 43 intersected 9 m of mineralisation; and 31 intersected 17 m of mineralisation. PDH 30, 32, 33, and 35 were put down to test the area either side of where DDH 3 had been drilled. PDH 38 and 36 intersected 3 m and 20 m of mineralisation respectively. PDH 42 was put down on the peak Cu-Pb anomaly and yielded 9 m of mineralisation.

RECORDER: Paul Blake

DATE: 08/04/1994.

COMPANY REPORT SUMMARY SHEET

CR: 10687 **STATUS:** Open

TITLE: Authority to Prospect 508M. Report to Queensland Department of Mines for year ending 31 December 1981.

AUTHOR(S): A. Taube **DATE:** June 1982

ATP/EP No.: ATP 508M

COMPANY HOLDING TITLE: Geopeko Limited

COMPANY SUBMITTING REPORT: Geopeko Limited

DATE GRANTED: May 1968 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan, Bajool, Biloela, Calliope

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: The Mount Morgan, and Dee and Ulam Range area

MINING DISTRICT:

MINES/PROSPECTS: Mount Morgan Mine, Morganite, Great Northern Lode, and Ajax Mine; and Mine Anticline, Mine Corridor North, Mine Corridor South, Talban Hill Breccia Pipe (Light of Day mine), Arnold's Ridge, Linda Gully, Peacock Shaft, Thomases Gossan, Struck Oil, Mount Warner, Mount Bennett, Mount Grim, Fab, Omo, Upper Don, Upper Mundic, Bouldercombe, Bull Creek, Stockyard Creek, Hamilton Creek, Horse Creek, Poison Creek, Kangaroo Creek, Quarry Creek, Raspberry Creek, Upper Nine Mile Creek, Archer, Fern Hills, Riverhead, Mannersley, Penumbra, and Limestone Creek areas; Moonmera Porphyry Copper Prospect; and Eulogie Park Gabbro

EXPLORATION TARGETS/MODELS: All metals (but chiefly a Mount Morgan type copper/gold orebody)

SUMMARY:

LOCALISED EXPLORATION/PROSPECTS

1) Upper Raspberry Creek area

GEOLOGY - The sequence is the same for the UNMC area, with the Footwall Volcanics (sugary ash tuffs which are variably fragmental and are characterised by fine chloritic shards of fiamme), Bedded Formation (interbedded quartz-feldspar crystal-lithic tuffs and cherty rocks, some of which are jasperous and manganiferous), Hanging-wall Sequence (quartz-feldspar crystal-lithic tuff which has gradational variations down to sandstone and siltstone, and the Andesite Sequence (fine feldspar porphyritic andesite lava, but often contains thinly bedded cherts and andesitic to dacitic lithic lapilli tuffs.

GEOCHEMISTRY - The results of the soil sampling from the previous year were received. The altered Footwall Volcanics display low-order anomalous values of copper, lead, and zinc (maximums of 345 ppm Cu, 500 ppm Pb, and 535 ppm Zn). The Bedded Formation shows weakly anomalous trends in copper (60 to 295 ppm Cu), lead, and zinc (maximum of 250 ppm Zn) coincident with manganiferous beds, but no pronounced anomalies are present.

2) Mount Hopeful area - Adjacent to the Upper Raspberry Creek area.

GEOLOGY - Mapping in this area shows that the Bedded Formation is continuous over the edge of the Dee Range and down the N side. Dips are shallow to the W. Hanging-wall quartz-feldspar crystal lithic tuffs with variations, and also Andesite Sequence (? unconformable) occur to the S.

GEOCHEMISTRY - Soil sampling was carried out. Copper defined a weak zone trending along the top of the range (peak of 290 ppm Cu), corresponding with a manganiferous siltstone horizon. Lead values shows the same zone as copper, and peaks at 290 ppm Pb. Zinc values further define the trend at the top of the range, and show that it extends down the E slope of the range as marginally anomalous values between 100 and 200 ppm.

3) Fern Hills area

GEOLOGY - In the SW corner of the grided area is a sequence of andesitic tuffs which probably represent the basal part of the Capella Creek beds. These may be unconformable on the predominantly acid volcanic rocks in the rest of the grid. The acid volcanic rocks are a series of ferruginous and cherty ash tuffs, usually siliceous but quite variable. In some places these are well-bedded and contain stratiform pyrite. Some of these bedded rocks contain jasper and manganese, and are considered to be the equivalent of the Bedded Formation of the Moongan Rhyolite sequence in the UNMC and Raspberry Creek area. Beneath these bedded rocks is a sequence of massive andesitic fragmental rocks. Thin section work suggests that the rock is in part a chloritised acid volcanic rock rather than an andesitic rock. The lower part of this unit is fine-grained (lapilli tuff) and contains apparent fragments of sulphides, mainly sphalerite. Although sub-ore grade, these sulphides is of the style which could occur in the peripheral environment of a major BMS deposit. Beneath the andesitic fragmental rocks is a sequence of ferruginous ash tuffs and some andesitic fragmentals which apparently represent the lowest part of the stratigraphy in the grid area. Further E, with a very irregular contact, is a variable but mainly massive hornblende andesite rock unit. The irregular nature of this unit is suggestive either of an intrusive rock or an unconformably overlying, E-dipping sequence. Within the hornblende andesite are several prominent occurrences of ferruginised, silicified rock mapped as "ferruginous ash tuff". These localised units in places appear to be tuffaceous owing to an apparent fragmental texture, but in other places show characteristic dyke-like patterns. An apparent structural break, marked by changes of lithology along strike, crosses the grid in a NE trend. The break is complex, apparently consisting of several faults and an andesitic dyke. In the NW of the grid is a major unit of weakly foliated, siliceous chloritic fragmental rock. This unit has no clear correlative with the section S of the structural break, although it may be equivalent to the "cherty ash tuff" unit. Beneath this unit is a complex andesitic tuff-ferruginous ash tuff-fragmental rhyolite unit. The "ferruginous ash tuff" may represent an intrusive unit such as that enclosed within the hornblende andesite. This unit may be equivalent to the andesitic fragmental tuff in the S of the grid. Beneath this complex unit is a hornfelsed, highly silicified, cherty ash tuff which usually carries significant pyrite.

GEOCHEMISTRY - Soil sampling was carried out. Copper values defined a zone of poorly clustered low-order anomalous values (peak of 410 ppm) in the area of the mineralised andesitic fragmental horizon in the S of the grid. A broader zone of low-order anomalous values (up to 260 ppm Cu) occurs in the NE end of the grid, mostly associated with the pyritised siliceous rock, but some are in andesite, or the intrusive "ferruginous ash tuff". Sporadic low anomalous zones occur on the E margin of the grid and on the S margin of the grid, mostly associated with the "ferruginous ash tuff". Lead values show two irregular closed clusters of low-order values centring on the mineralised andesitic tuff unit in the S of the grid. No anomalous lead values are associated with the copper zone in the N. The highest lead value was 490 ppm Pb. Zinc values tend to repeat those of copper but show a more consistent pattern, with two significant anomalous zones corresponding to the mineralised tuff in the SW and the silicified zone in the NE. Zinc peaks at 0.25% and 0.21% Zn in the two zones respectively. Manganese values are uniformly high over most of the grid (i.e. above 500 ppm). A definable zone of over 2000 ppm with a low in its centre occurs over the mineralised tuff zone.

4) Belgamba area - 8 km ENE of Mount Morgan

GEOLOGY - This area was investigated as the apparent source area for the Dee River alluvial gold deposits. A grid was surveyed to cover a lobe of acid volcanic rocks containing jasper adjacent to the Struck Oil fault in the area just SW of Bouldercombe. S of the Dee River the rocks are all andesitic (Capella Creek beds) which are apparently nearly flat lying. A series of sub-parallel strong linear features mark the boundaries of the lobes of acid volcanic rocks within the grid. These features have been identified as faults. The westernmost lobe consists of fine quartz-feldspar crystal tuff, which contains rare thin jasper beds and is weakly altered, bleached, and silicified. The central lobe is similar but is less altered with no jasper. The southernmost area of acid volcanic rocks consist of quartz-feldspar crystal ash tuff which is more chloritic and somewhat coarser. N of the acid volcanic lobes the rocks are all andesite, andesitic tuff, apparently equivalent to the andesitic tuff S of the Dee River.

GEOCHEMISTRY - The area was soil sampled. Copper values are low over the grid, with values in the andesitic rocks in the W slightly higher than values in the acid rocks on the E of the grid. Lead values are uniformly low. Zinc values are slightly higher in the W of the grid but could not be considered anomalous. The area is low in gold, returning a peak value of 15 ppb against a background of 5 ppb or less. This indicates that the acid volcanics are not the provenance of the alluvial gold. Silver values are uniformly low. Magnesium values showed no distinct trends, but the acid volcanic rocks tended to have a lower background for manganese.

GEOPHYSICS - A magnetic and IP survey were carried out. The magnetics revealed no discrete contourable anomalies. The local highs and sharp contrasts appear to relate to the fault zones. The andesitic rocks tend to have a higher and more erratic magnetic character than acid rocks. The only conclusive trend in the IP survey was low resistivity in alluvium. The centre of the grid shows a comparatively high chargeability, reaching a broad peak of 4%. The implications of this response are uncertain.

5) Upper Don area - 50 km SE of Mount Morgan. The grid in the area was extended to the N and SW.

GEOLOGY - The lowermost unit in the sequence is the quartz-feldspar crystal-lithic tuff cropping out along the river. This is overlain immediately to the E by quartz porphyry lithic tuff which is similar but coarser grained. Both of these units contain localised ovoid alteration zones which are silicified and altered. Overlying these units to the E is a complex zone of interbedded fine acid volcanic rocks and acid lithic tuffs. These rocks vary in their proportion and appear to represent the equivalent horizon to the Banded Sequence at Mount Morgan. The entire sequence is dipping moderately to the NE. On the W side of the area is a complex sequence of andesite, andesitic tuff, sandstone, siltstone, and shale which is unconformable on the acid volcanic sequence. This is thought to be part of the Dee Volcanics. To the S this unconformable sequence is repeated across a major fault.

GEOCHEMISTRY - Soil sampling in the S extension of the grid showed broad zones of low-order anomalous copper (50 to 200 ppm) occurring within andesite and represents background for that rock. Lead shows no significant values. Zinc shows low values reflecting the main anomalous zinc zone in the adjacent original grid on the E. Gold returned low-level values with only one spot high associated with old gold workings, and a local zone of high background in the NW corner of the grid. Silver values were uniformly low, and manganese showed a broad irregular zone corresponding very roughly with the area of andesite. Soil sampling in the N grid showed a low-order copper anomaly trending in a NW direction, with a maximum value of 330 ppm Cu in the S part of the grid. The trend correlates approximately with local zones of pyritisation and ovoid alteration within the acid volcanic rocks. Low-order lead values appear to be fringing the copper trend, but have an almost antipathic relationship in detail. The maximum lead value is 300 ppm on the E central part of the grid. Zinc values show a very broad anomalous zone peaking at 0.17% Zn and trending diagonally NW across the grid. The trend is open to the S and decreases but does not close to the N. The zinc overlaps both the lead and copper trends. Manganese values show two trends of moderate anomaly. The W trend follows the course of the river but is too broad to be a secondary anomaly. The E trend is very broad and appears to reflect the mineralisation in zinc, lead, and copper

6) Upper Nine Mile Creek area

GEOCHEMISTRY - An orientation geochemical survey was carried out using core and drill cutting material from the earlier drilling.

RECORDER: Paul Blake **DATE:** 19/04/1994.

COMPANY REPORT SUMMARY SHEET

CR: 11361 **STATUS:** Open

TITLE: Final report on portions of Authority to Prospect 508M. As relinquished in May, 1982.

AUTHOR(S): A. Taube **DATE:** October 1982

ATP/EP No.: ATP 508M

COMPANY HOLDING TITLE: Geopeko Limited

COMPANY SUBMITTING REPORT: Geopeko Limited

DATE GRANTED: May 1968 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan, Bajool, Biloela, Calliope

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: The Mount Morgan, and Dee and Ulam Range area

MINING DISTRICT:

MINES/PROSPECTS: Mount Morgan Mine, Morganite, Great Northern Lode, and Ajax Mine; and Mine Anticline, Mine Corridor North, Mine Corridor South, Talban Hill Breccia Pipe (Light of Day mine), Arnold's Ridge, Linda Gully, Peacock Shaft, Thomases Gossan, Struck Oil, Mount Warner, Mount Bennett, Mount Grim, Fab, Omo, Upper Don, Upper Mundic, Bouldercombe, Bull Creek, Stockyard Creek, Hamilton Creek, Horse Creek, Poison Creek, Kangaroo Creek, Quarry Creek, Raspberry Creek, Upper Nine Mile Creek, Archer, Fern Hills, Riverhead, Mannersley, Penumbra, and Limestone Creek areas; Moonmera Porphyry Copper Prospect; and Eulogie Park Gabbro

EXPLORATION TARGETS/MODELS: All metals (but chiefly a Mount Morgan type copper/gold orebody)

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The areas relinquished include mainly granitic to gabbroic igneous rocks and moderately disturbed volcanic and sedimentary sequences, ranging in age from Middle Devonian to Tertiary. The areas relinquished included the Bouldercombe, Horse Creek, Horse Creek South, Hamilton Creek, Shadow, Penumbra, Marble Mountain, Mount Cedric, & Divide areas, and Moonmera Porphyry Copper Prospect & Riverhead (Briggs) Porphyry Copper Prospect

RECORDER: Paul Blake **DATE:** 19/04/1994.

COMPANY REPORT SUMMARY SHEET

CR: 11751 **STATUS:** Open

TITLE: Authority to Prospect 508M. Report to Queensland Department of Mines for year ending 31 December 1982.

AUTHOR(S): A. Taube **DATE:** March 1983

ATP/EP No.: ATP 508M

COMPANY HOLDING TITLE: Geopeko Limited

COMPANY SUBMITTING REPORT: Geopeko Limited

DATE GRANTED: May 1968 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan, Bajool, Biloela, Calliope

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: The Mount Morgan, and Dee and Ulam Range area

MINING DISTRICT:

MINES/PROSPECTS: Mount Morgan Mine, Morganite, Great Northern Lode, and Ajax Mine; and Mine Anticline, Mine Corridor North, Mine Corridor South, Talban Hill Breccia Pipe (Light of Day mine), Arnold's Ridge, Linda Gully, Peacock Shaft, Thomases Gossan, Struck Oil, Mount Warner, Mount Bennett, Mount Grim, Fab, Omo, Upper Don, Upper Mundic, Upper Manton Creek, Bouldercombe, Bull Creek, Stockyard Creek, Hamilton Creek, Horse Creek, Poison Creek, Kangaroo Creek, Quarry Creek, Raspberry Creek, Upper Nine Mile Creek, Archer, Fern Hills, Riverhead, Mannersley, Penumbra, and Limestone Creek areas; Moonmera Porphyry Copper Prospect; and Eulogie Park Gabbro

EXPLORATION TARGETS/MODELS: All metals (but chiefly a Mount Morgan type copper/gold orebody)

SUMMARY:

LOCALISED EXPLORATION/PROSPECTS

1) Upper Nine Mile Creek area

GEOPHYSICS - One SIROTEM traverse was completed in the area. Initial single loop traverses suggested a small anomaly, but later displaced loop traverse yielded no anomaly. The data for the UNMC area are not complete due to lack of time available for the survey.

2) Mount Dick area

GEOPHYSICS - Two SIROTEM traverses were carried out in the area. Both traverses displayed a clearly developed anomaly which could indicate massive sulphide mineralisation.

3) Raspberry Creek area

GEOPHYSICS - SIROTEM traverses were done over the area. A broad, high-order anomaly was detected, but no detailed work has been done owing to the lack of available time. A pronounced circular anomaly which is thought to represent 5×10^7 t of sulphide mineralisation was also detected.

DRILLING - The circular anomaly was investigated by percussion-diamond drilling. Drill hole 62/2 penetrated a thick section of interbedded variable tuffaceous rocks with manganiferous jasper beds, as inferred from surface mapping. The remainder of the hole consisted of interbedded variable tuffaceous rocks including mainly "crenulated cherty tuff" with minor finely bedded chert units. Jasperous colouring appeared in the lower part of this unit and a few small jasper beds also occurred. A thin zone of andesite lava occurred near the bottom of the hole with the rocks adjacent being magnetite-rich quartz-feldspar crystal-lithic tuff. The lower part of the hole correlates well with the geology found up dip on the surface, but virtually no sulphides are present compared to the altered and pyritised rocks on the surface in this area. The reason for the lack of sulphides in the drill hole compared to the surface is not known. It is possible that a penecontemporaneous fault may occur between the drill hole and the surface, giving rise to a possible concentration of sulphides such as occurred associated with the penecontemporaneous fault at UNMC.

4) Upper Raspberry Creek area

GEOPHYSICS - Two SIROTEM traverses were completed, but detected only low order anomalies.

5) Fab area

GEOPHYSICS - SIROTEM traverses were conducted over the whole grid. A major anomaly which is in the appropriate position to reflect a massive sulphide body was discovered on the NE part of the grid. It is larger and broader than the anomalies in the other areas, and it has associated IP character.

DRILLING - Drill hole PDH9 - DDH69/6 was drilled to test the SIROTEM anomaly. It was collared in manganiferous siltstone which are probably equivalent to the lowermost jasper horizons from the Raspberry Creek area. It cored high-grade hornfelsed acid volcanic rocks, essentially biotite gneiss, for its total length. The top 290 m was finely bedded with beds generally moderately dipping. Lower in the hole the dips became steeper. A fine-grained skarn horizon occurred from 225-239 m. Sulphides in abundance, averaging about 10% but reaching 20%, occurred in the lower part of the hole from 290 m to the bottom of the hole at 452 m. Sphalerite appeared at 390 m but values did not exceed 1% Zn. The amount of sulphides, particularly around 290-350 m, was probably sufficient to account for both the SIROTEM and the IP character of the grid.

6) Mount Hopeful area - the grid was extended over the E side of the range to tie in with the Fab grid.

GEOLOGY - The newly covered area consists essentially of the same acid volcanic sequence, consisting mainly of cherty quartz-feldspar crystal-lithic tuffs with minor interbedded jasperous units, dipping shallowly to the SW. The andesite unit was also mapped.

GEOCHEMISTRY - The grid was soil sampled. A small copper anomalous zone, peaking at 320 ppm Cu, was confirmed near the top of the ridge. Other than this, andesitic rocks tend to have a higher background than the acid rocks. Lead values were mostly uniformly low (<50 ppm Pb), with spot highs peaking at 100 ppm Pb. Also the previously defined lead anomaly was confirmed. Zinc values were below 200 ppm and are not considered anomalous. Manganese showed a pronounced trend at the approximate level of the manganiferous and jasperous siltstone, reaching values above 1% Mn. These results show no obvious or significant geochemical trends, but the area remains of interest because of its proximity to the Fab pyritic alteration zone.

7) McKnight's area - this is the NW extension of the UNMC area

GEOLOGY - The geology is the same in the UNMC area.

GEOCHEMISTRY - Soil sampling was carried out over the new extension of the grid. The anomalous values of copper recorded in the UNMC grid in the banded cherty tuff die out at the edge of the grid. High background values of copper occur in andesitic rocks. Lead values show no trends. Zinc values show that the UNMC anomaly dies out rapidly along strike in the Footwall Sequence. However, the zones of high background in the dyke and the andesites to the S and N which were revealed in the

copper values are also reproduced in the zinc values. Silver shows no significant trends, and manganese values show elevated background in andesitic rocks and dykes. These results suggest that the favourable geological environment within the UNMC grid loses its geochemical character to the W and is no longer of interest in this direction.

8) Fern Hills area

GEOLOGY - The units previously designated as "ferruginous ash tuff" appear on subsequent examination to be altered, sericitised, pyritic intrusive rocks.

GEOCHEMISTRY - The grid was extended and soil sampled to try and close off the open ended anomalous zone. The zones of copper with values above 100 ppm Cu remain open ended and appear to occur over the ferruginous (?) intrusive rocks, although some occur over the andesitic rocks as well. Lead values show no significant variations over the extended lines except for a spot high of 320 ppm Pb. Zinc values show pronounced anomalous values peaking at 0.11% Zn in the southernmost part of the area. This coincides with an area of the ferruginous (?) intrusive rock.

9) Upper Don River area - infill gridding was done in areas where previously major grid extension had been put in.

GEOCHEMISTRY - Soil sampling was carried out over the new grid. Copper values from the new sampling show a weak trend continuing S across the grid from the previously defined anomaly in the N grid. Lead values are low in the N but show a pronounced anomaly of 800 ppm on the southernmost line of the grid. Zinc values show a continuing trend across the whole grid in a N-NW direction, peaking at 0.18%. Manganese values show a continuing trend of over 0.2% Mn all along the E side of the grid. The investigations in the Upper Don River area showed that the geochemical anomaly is continuous over a length of 2.5 km in this favourable acid volcanic sequence.

10) Upper Manton Creek area - the headwaters of Manton Creek immediately N of the Upper Don River catchment area. Low order anomalous copper and zinc geochemical values were recorded from the early stream sediment survey.

GEOLOGY - The oldest rocks in the area are the acid volcanic rocks which extend from the Upper Don River area. On the divide between the Don River and Manton Creek catchment areas are variable acid lithic tuffs including quartz-feldspar crystal-lithic tuff, siliceous green lithic tuffs, and fine (?) dacite flows. These rocks extend W, under outliers of sandstone thought to be part of the Dee Volcanics, to the central part of the area around a horse-shoe bend in Manton Creek. The rocks in the central part of the area are mainly variations of the siliceous lithic tuff characterised by chloritic shards (? fiamme) and a fine ashy or siliceous matrix. On the W side of the horseshoe is a prominent cherty very fine-grained ash tuff with rare feldspar phenocrysts and minor chloritic fragments. This rock has an unusual siliceous spotted alteration pattern. In the N part of the area is a zone of "acid lithic tuff" which is not as well indurated as the remaining acid volcanic rocks and weathers more deeply. On the surface it has a bumpy texture suggestive of fragments. On the SW side of the area a sequence of andesitic rocks and sediments lies unconformably above the acid sequence. These are thought to belong to the Dee Volcanics of Pond Formation. The rocks consist of a basal unit of medium to coarse-grained green volcanoclastic well-bedded sandstone, ranging up to lithic lapilli tuff. These are overlain by coarser lithic tuffs. Finer-grained sedimentary rocks including siltstone, chert, and fine sandstone also occur in this upper sequence. Fossils occur in some of these units but these have not yet been dated. Fossils from slightly higher in the sequence W of the Upper Don area yielded Early Carboniferous ages. A large area of alteration occurs in the N part of the area W of the horseshoe bend. It consists of highly silicified zones in the acid volcanic rocks which carry pyrite or gossan up to 15% but average somewhat less. Minor occurrences of secondary copper mineralisation were found in the rocks of the (?) Dee Volcanics, and one occurrence of native copper was found in a small dyke on the SE end of the area.

GEOCHEMISTRY - Ridge and spur soil sampling program was undertaken. Copper values were very low within the acid volcanic rocks, including the alteration zone. The only areas of anomalous copper (over 60 ppm Cu) were from within the (?) Dee Volcanics on the SW of the area. These are considered to reflect an erratic high copper background in these andesitic volcanic rocks, which is a characteristic

feature of the Dee Volcanics. Lead values are all uniformly low. Manganese values display several zones of over 1000 ppm Mn within mainly the acid volcanic sequence. These do not correlate with any mineralisation and are considered to reflect the geological environment as in the Upper Don area.

DRILLING - hand augering was used to collect soil samples.

RECORDER: Paul Blake **DATE:** 21/04/1994.

COMPANY REPORT SUMMARY SHEET

CR: 13443 **STATUS:** Open

TITLE: Authority to Prospect 508M. Report to Queensland Department of Mines for year ending 31st December, 1983.

AUTHOR(S): M.J. Hunter **DATE:** January 1984

ATP/EP No.: ATP 508M

COMPANY HOLDING TITLE: Geopeko Limited

COMPANY SUBMITTING REPORT: Gold Fields Exploration Pty Limited

DATE GRANTED: May 1968 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan, Bajool, Biloela, Calliope

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: The Mount Morgan, and Dee and Ulam Range area

MINING DISTRICT:

MINES/PROSPECTS: Mount Morgan Mine, Morganite, Great Northern Lode, Ajax Mine, Eureka Mine, Queen of Sheba Mine, King Solomon Mine, Diggers Dive Mine, Champion Area (Champion, South Champion, Golden Cross, Welcome, Peuts and Retrieve mines), Mount Usher (Caledonian, Anglo Saxon, Victor, and New Golden Cave workings), and Clanricarde area (Clanricarde, Midas, and Crows Nest Mines); and Mine Anticline, Mine Corridor North, Mine Corridor South, Talban Hill Breccia Pipe (Light of Day mine), Arnold's Ridge, Linda Gully, Peacock Shaft, Thomases Gossan, Struck Oil, Mount Warner, Mount Bennett, Mount Grim, Fab, Omo, Upper Don, Upper Mundic, Upper Manton Creek, Bouldercombe, Bull Creek, Stockyard Creek, Hamilton Creek, Horse Creek, Poison Creek, Kangaroo Creek, Quarry Creek, Raspberry Creek, Upper Nine Mile Creek, Archer, Fern Hills, Riverhead, Mannersley, Penumbra, and Limestone Creek areas; Moonmera Porphyry Copper Prospect; and Eulogie Park Gabbro

EXPLORATION TARGETS\MODELS: All metals (but chiefly a Mount Morgan type copper/gold orebody)

SUMMARY:

GEOLOGY -

REGIONAL - Goldfields Research Group-Canberra reinterpreted mapping and drill-log data and postulated a caldera margin, defined by the axis of an asymmetric anticline in the Capella Creek beds. The caldera is postulated to have dimensions of about 12x26 km. The earliest rocks in this sequence belong to the footwall sequence. It is generally a quartz-feldspar crystal-lithic tuff containing some fiamme but generally without a well defined pumice lenticle foliation. The caldera formation is a direct result of the evacuation of the magma chamber by the large volume of magma which formed the pyroclastic flow. Eruption duration would have likely been 2-3 days. Following caldera collapse a caldera lake formed within which the Banded Mine Sequence of the mine corridor and the Banded Sequence of the Dee Range area were deposited. Following the banded sequence a second caldera forming event must have occurred. The Upper Mine Porphyries of the Mine Corridor and the

Hangingwall sequence of the Dee Range again exhibit features of large pyroclastic flow deposits. The location of this second caldera is not known. At least two vents have been tentatively located for the basal eruptions of the hangingwall sequence. The two main centres of "massive sulphide" mineralisation, the Mount Morgan and UNMC, occur close to vents on the postulated southern caldera margin. Mount Morgan and Mount Usher are considered to occur where the caldera margin is cut by the extremities of a ring fault system. Anomalies at Fab, Grillo Hill etc. are interpreted as minor leakages along fractures on the caldera floor. Vein mineralisation in the Mt Usher area hangingwall sequence may be related to underlying volcanogenic mineralisation in the Banded sequence.

REGIONAL EXPLORATION

GEOCHEMISTRY

- **stream sediment sampling** - Previous stream sediment geochemical data from various sources was re-assessed and 18 areas anomalous for Cu and/or Zn were selected for follow-up stream sediment sampling and analysis for gold. Eleven of the areas were sampled during 1983, and results are awaited.

LOCALISED EXPLORATION/PROSPECTS

1) Mount Usher - 12 km ENE of the Mount Morgan open pit. Approximately 30,000 oz gold was produced from the workings which include the Mount Usher, Caledonian, Anglo Saxon, and Victor workings.

GEOLOGY - The workings exploited two narrow sub-parallel reefs. Three levels at Mt Usher and two levels at the New Golden Cave (80 m S) were geologically mapped and sampled. Mapping at Mt Usher indicates two steeply dipping reefs separated by 8 m of barren material (? carbonate). In the New Golden Cave workings, a thin (10 cm) quartz reef occurs. Minor quartz/sulphide filled joints/shears also occur. Pyritisation is commonly associated with many of the deposits and an intensely pyritised zone over 2 km in length has been mapped closely associated with the Victor mine along the inferred Mt Usher fault system.

GEOCHEMISTRY - Wall samples from Mt Usher and the New Golden Cave returned no significant gold values except in some of the thin reefs.

2) North Mine Corridor

GEOCHEMISTRY - Rock chip sampling was carried out but the results are not yet available.

3) Champion area - 3 km ENE of the Mount Morgan open pit and includes the Champion, South Champion, Golden Cross, Welcome, Peuts and Retrieve mines which occur within a zone approximately 1300x700 m. Numerous other small pits and workings also occur within the zone.

GEOLOGY - The mines were exploiting auriferous quartz reefs. Total production was small with an estimated maximum of 500 oz. The largest mine, South Champion, has been described as an elongate pipe, and production was approximately 100 tons of ore at 19.2 g/t Au, 4.87% Cu, with significant quantities of molybdenite. Hydrothermal breccias occur on some dumps.

GEOCHEMISTRY - Rock chip samples were collected from the country rock and results are awaited.

4) Belgamba

GEOPHYSICS - The geophysical data on Belgamba was re-appraised. Further ground magnetics and EM are recommended over an area of coincident IP and magnetic anomalism.

5) Clanricarde area - 3.3 km NW of the Mount Morgan pit. The area includes the Clanricarde, Midas and Crows Nest Mine. Production to July 1949, was 2000 oz Au (grade approximately 1.4 oz/t), 5.5^t Cu (grade approximately 2.1%), and 146^t oz Ag (grade approximately 0.6 oz/t).

GEOLOGY - The Clanricarde and Midas mines worked a reef 2.5 to 15 cm wide. The reef occurs on a NE-SW striking fault. The reef dips SE at 60-70°. The Crows Nest workings occur to the W, on the Stoney Creek fault and apparently exploited small random reefs. The area was grided and mapped, but no large area of alteration or mineralisation was located.

6) Grillo Hill area - including the area to the NW, towards the Eureka mine.

GEOLOGY - Reconnaissance mapping was carried out in this area to locate possible skarn type, low grade gold, near the edge of the Station Creek Granodiorite.

GEOCHEMISTRY - Rock chip samples returned high values from weakly pyritic limestone dump material from the adit at Eureka, and from the adit entrance wall.

7) Fab area

GEOLOGY - Seven samples from drill hole DDH 69-6 were sent for a petrological/mineralogical study and comparison with Ajax mineralisation. Results are awaited.

8) Fern Hills area

GEOCHEMISTRY - Rock chip samples were collected from pyritic rocks at the E edge of the grid. Results indicate very low gold values. One line of soil geochemistry was re-assayed, and results indicate no Au values greater than 0.05 ppm.

9) Mount Dick area

GEOCHEMISTRY - Gossanous-ferruginous rocks were re-sampled and analysed for gold. Results indicate a maximum value of 0.60 ppm Au in the N gossan. Samples from two previous lines of soil geochemistry were sieved and analysed for gold. Results indicate no values greater than 0.05 ppm Au.

10) King Solomon - These workings are situated 37 km SE of the Mount Morgan pit, and the workings consist of several shafts, pits and an adit.

GEOLOGY - The country rocks are andesitic tuffs. No large zones of alteration or quartz veining were noted. A large (100 m diameter) diorite intrusive occurs to the E of the prospect.

11) Queen of Sheba - These workings occur approximately 1.8 km S of the King Solomon workings.

GEOLOGY - Reconnaissance mapping confirms an anticlinal axis trending N-S through Grasstree Yards. The anticline is indicated by dips on massive andesitic tuffs, and ferruginous "jasper" beds near the axis. Two small (50 m diameter) diorite bodies occur near the axis. Quartz "reefs" occur in pits, shafts etc. along a zone about 600 m long. Outcrop and float on top of a hill indicated a larger zone of alteration and quartz veining, and this area was costeamed, revealing alteration, quartz veining and a deeply weathered basic dyke.

GEOCHEMISTRY - The costeams were sampled and revealed low gold values except for some quartz veins in the southern costean.

12) Diggers Dive - These workings include several pits, adits, and shafts near the top of a small peak above Kangaroo Creek, 3.25 km SE of the Queen of Sheba workings.

GEOLOGY - Reconnaissance mapping confirmed a tuff (andesitic), sedimentary sequence, overlain by Pond Formation conglomerate. No significant areas of alteration were seen.

13) Upper Manton

GEOCHEMISTRY - Previous soil sampling was re-assayed for gold. Maximum value recorded was 0.05 ppm Au.

14) Upper Don

GEOCHEMISTRY - Several rock samples were collected and assayed, and one line of soil samples were re-assayed. The results indicate a maximum value of 0.05 ppm Au.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Gold Fields Exploration Pty Limited assumed management for the ATP in June 1983.

RECORDER: Paul Blake **DATE:** 22/04/1994.

COMPANY REPORT SUMMARY SHEET

CR: 13444 **STATUS:** Open

TITLE: Final report, Authority to Prospect 508M.

AUTHOR(S): A. Taube, W. Delaney, and M. Hunter **DATE:** May 1984

ATP/EP No.: ATP 508M

COMPANY HOLDING TITLE: Geopeko Limited

COMPANY SUBMITTING REPORT: Gold Fields Exploration Pty Limited

DATE GRANTED: May 1968 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan, Bajool, Biloela, Calliope

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: The Mount Morgan, and Dee and Ulam Range area

MINING DISTRICT:

MINES/PROSPECTS: Mount Morgan Mine, Morganite, Great Northern Lode, Ajax Mine, Eureka Mine, Queen of Sheba Mine, King Solomon Mine, Diggers Dive Mine, Champion Area (Champion, South Champion, Golden Cross, Welcome, Peuts and Retrieve mines), Mount Usher (Caledonian, Anglo Saxon, Victor, and New Golden Cave workings), and Clanricarde area (Clanricarde, Midas, and Crows Nest Mines); and Mine Anticline, Mine Corridor North, Mine Corridor South, Talban Hill Breccia Pipe (Light of Day mine), Arnold's Ridge, Linda Gully, Peacock Shaft, Thomases Gossan, Struck Oil, Mount Warner, Mount Bennett, Mount Grim, Fab, Omo, Upper Don, Upper Mundic, Upper Manton Creek, Bouldercombe, Bull Creek, Stockyard Creek, Hamilton Creek, Horse Creek, Poison Creek, Kangaroo Creek, Quarry Creek, Raspberry Creek, Upper Nine Mile Creek, Archer, Fern Hills, Riverhead, Mannersley, Penumbra, and Limestone Creek areas; Moonmera Porphyry Copper Prospect; and Eulogie Park Gabbro

EXPLORATION TARGETS\MODELS: All metals (but chiefly a Mount Morgan type copper/gold orebody)

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - ATP 508M was relinquished in May 1984. See CR 14089 for more details on the relinquishment.

RECORDER: Paul Blake **DATE:** 22/04/1994.

COMPANY REPORT SUMMARY SHEET

CR: 14089 **STATUS:** Open

TITLE: Final report on portions of Authority to Prospect 508 M relinquished in May 1984.

AUTHOR(S): W. Delaney **DATE:**

ATP/EP No.: ATP 508M

COMPANY HOLDING TITLE: Geopeko Limited

COMPANY SUBMITTING REPORT: Gold Fields Exploration Pty Limited

DATE GRANTED: May 1968 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan, Bajool, Biloela, Calliope

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: The Mount Morgan, and Dee and Ulam Range area

MINING DISTRICT:

MINES/PROSPECTS: Mount Morgan Mine, Morganite, Great Northern Lode, Ajax Mine, Eureka Mine, Queen of Sheba Mine, King Solomon Mine, Diggers Dive Mine, Champion Area (Champion, South Champion, Golden Cross, Welcome, Peuts and Retrieve mines), Mount Usher (Caledonian, Anglo Saxon, Victor, and New Golden Cave workings), and Clanricarde area (Clanricarde, Midas, and Crows Nest Mines); and Mine Anticline, Mine Corridor North, Mine Corridor South, Talban Hill Breccia Pipe (Light of Day mine), Arnold's Ridge, Linda Gully, Peacock Shaft, Thomases Gossan, Struck Oil, Mount Warner, Mount Bennett, Mount Grim, Fab, Omo, Upper Don, Upper Mundic, Upper Manton Creek, Bouldercombe, Bull Creek, Stockyard Creek, Hamilton Creek, Horse Creek, Poison Creek, Kangaroo Creek, Quarry Creek, Raspberry Creek, Upper Nine Mile Creek, Archer, Fern Hills, Riverhead, Mannersley, Penumbra, and Limestone Creek areas; Moonmera Porphyry Copper Prospect; and Eulogie Park Gabbro

EXPLORATION TARGETS\MODELS: All metals (but chiefly a Mount Morgan type copper/gold orebody)

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - 26 sub-blocks were relinquished during May 1984. The area dropped comprised primarily exposures of Ulam beds with subordinate occurrences of Moongan Rhyolite, Capella Creek beds and Dee Volcanics. Two areas of interest, the Upper Don and Fern Hills, have been retained under Lease Application by the Joint Venture partners. The area relinquished included the King Solomon, Queen of Sheba and Diggers Dive workings, and the Upper Manton area. The retained section of ATP 508M was surrendered conditionally on the granting of a new authority (ATP 3953) incorporating the required sub-blocks.

RECORDER: Paul Blake **DATE:** 22/04/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 667M

COMPANY HOLDING TITLE: Kennecott Explorations (Australia) Pty Ltd

COMPANY SUBMITTING REPORT: Kennecott Explorations (Australia) Pty Ltd

DATE GRANTED: 01/09/1969 **PERIOD:**

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Bajool-Raglan area

MINING DISTRICT:

MINES/PROSPECTS: Limonite Hill

EXPLORATION TARGETS/MODELS: Porphyry Copper Deposits

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File- 3338, 3512*

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To explore a leached capping (Limonite Hill) discovered in a granitic stock 5 km S of Bajool.

GEOLOGY -

LOCAL - The oldest rocks mapped in this area are believed to be a hornblende granodiorite (trondhjemite?) exposed in an elliptical shaped inlier. A much larger and better exposed inlier of hornblende granodiorite occurs along the road on the upper reaches of Poison Creek, approximately 4 km NW of the small inlier. The main unit cropping out in the ATP is the Mount Holly beds. Within the Mt Holly beds are abundant rhyolite intrusions. Permian augite gabbros and biotite-albite granites also intrude the area. A NW set of vertical felsitic dykes, with widths ranging from 0.5 to 3 m, cuts the granitic plutons. Two vertical, circular, quartz pipes form topographic highs above the surrounding granitic terrane. A thin crust of Recent arkose has developed over the biotite-albite granite.

MINERALISATION/ALTERATION - The westernmost granite outcrop, 5 km S of Bajool, possessed a capping that represents the oxidised equivalent of a disseminated sulphide system. The area is called Limonite Hill, and chemical analyses show anomalous concentrations of Cu and Mo in soil and leached rocks. Sulphide voids in the capping show that metallisation is pervasive, accounting for about 5 weight % of the former granite. To the E, similar but weaker cappings surround the two quartz pipes. The limonite in the cappings is a mixture of goethite, hematite, and jarosite. The quartz pipes are composed of >99.0% SiO₂, and gold is almost absent. Rare flakes of molybdenite can be megascopically recognised. Other sulphides are absent.

LOCALISED EXPLORATION/PROSPECTS

1) San Jose and Little San Jose Quartz Pipes

GEOLOGY - These pipes have been emplaced in a medium-grained biotite-quartz monzonite that probably contains hornblende. There are only a few areas in the outcrops surrounding the San Jose and Little San Jose Quartz Pipes that contain prominent voids formerly occupied by sulfides. Boxworks are rare with transported limonite being distributed on surfaces quite like the distribution of indigenous limonite filling the voids of the mineralised rocks exposed on Limonite Hill.

GEOCHEMISTRY - A soil survey was carried out over the leached cappings surrounding the San Jose Quartz Pipe. Molybdenum values are interesting with notable concentrations occurring in the granitic host rocks, however, the masses of quartz rocks are essentially barren. The copper anomalies are virtually coincident with those of molybdenum.

2) One Rock Plain

GEOLOGY - In view of its distance (nearly 3.5 km) from the leached rocks exposed on Limonite Hill, the discovery of a boulder of float ore, containing 1500 ppm Cu and 920 ppm Mo, justified follow-up geochemical work.

GEOCHEMISTRY - A soil survey was carried out over the area. The samples returned up to 270 ppm Cu, but the Mo content was low, returning 10 ppm Mo or less. However, less than 0.5 km N of the soil grid, caliche is exposed. If this evaporite rock is widespread and extends into the area of the geochemical grid, the bulk of the geochemical data is likely to be spurious in evaluating the economic potential of the underlying rocks.

3) Limonite Hill

GEOLOGY - The outcrop of Limonite Hill comprises biotite-albite granite of Permian age. To the immediate N and E of Limonite hill, further such outcrops are found in association with minor hornblende diorite, quartz and alaskite outcrops.

GEOCHEMISTRY - Soil sampling was carried out over the leached capping of Limonite Hill. The results show Limonite Hill to be anomalous in Cu and Mo, and the anomaly is asymmetrical to the N and E of Limonite Hill. Some soil and surface rock samples exceeded 0.1% Mo. The best estimate of primary grade is 0.7% Cu and 0.1% Mo. Material from the drilling returned interesting copper values, but there is a near absence of molybdenum.

GEOPHYSICS - An IP and limited magnetic survey were carried out. The IP results show that Limonite Hill is weakly to moderately anomalous, and the amplitude of the IP anomaly decreases generally with distance from the hill. The magnetic results show a minor anomaly broadly associated with the hill. This anomaly is broadly comparable with those to be expected from a porphyry copper deposit.

DRILLING - A rotary post-hole digger was used to get samples from 65 to 165 m beyond the outcrop perimeter of Limonite Hill.

RECORDER: Paul Blake **DATE:** 24/11/1994.

COMPANY REPORT SUMMARY SHEET

CR: 3338 **STATUS:** Open

TITLE: Final report, Authority to Prospect 667M.

AUTHOR(S): K.D. Cornelius **DATE:** 1970

ATP/EP No.: ATP 667M

COMPANY HOLDING TITLE: Kennecott Explorations (Australia) Pty Ltd

COMPANY SUBMITTING REPORT: Kennecott Explorations (Australia) Pty Ltd

DATE GRANTED: 01/09/1969 **PERIOD:**

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Bajool-Raglan area

MINING DISTRICT:

MINES/PROSPECTS: Limonite Hill

EXPLORATION TARGETS\MODELS: Porphyry Copper Deposits

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To explore a leached capping (Limonite Hill) discovered in a granitic stock 5 km S of Bajool.

GEOLOGY -

LOCAL - The oldest rocks mapped in this area are believed to be a hornblende granodiorite (trondhjemite?) exposed in an elliptical shaped inlier. A much larger and better exposed inlier of hornblende granodiorite occurs along the road on the upper reaches of Poison Creek, approximately 4 km NW of the small inlier. The main unit cropping out in the ATP is the Mount Holly beds. The sequence comprises tuffs, rhyolite flows, siltstones, claystones, graywackes, limestones, and chert. Within the Mt Holly beds are abundant rhyolite intrusions. Augite gabbro plutons intrude the area, are believed to be Permian, and form slightly higher topographic expression than the granitic intrusion. The granites in the area contain biotite and albite, with little or no K-feldspar. A NW set of vertical felsitic dykes, with widths ranging from 0.5 to 3 m, cuts the granitic plutons. Two vertical, circular, quartz pipes of 75 and 80 m diameters form topographic highs above the surrounding granitic terrane. They are composed of milky quartz and virtually free of vugs. A thin crust of Recent arkose has developed over the biotite-albite granite. Commonly the arkose is <0.5 m, but in places the thickness is greater than 1 m. The distribution of this sedimentary accumulation is unknown, but it often forms in topographic depressions. Two small exposures of caliche along creek channels occur about 2.5 km S of Bajool.

MINERALISATION/ALTERATION - The westernmost granite outcrop, 5 km S of Bajool, possessed a capping that represents the oxidised equivalent of a disseminated sulphide system. The area is called Limonite Hill, and chemical analyses show anomalous concentrations of Cu and Mo in soil and leached rocks. The capping is laced with quartz veinlets, moreover the host granite has been extensively silicified and sericitised. Sulphide voids in the capping show that metallisation is pervasive, accounting for about 5 weight % of the former granite. To the E, similar but weaker cappings surround the two quartz pipes. The limonite in the cappings is a mixture of goethite, hematite, and jarosite. The quartz pipes are composed of >99.0% SiO₂, and gold is almost absent. Rare flakes of molybdenite can be megascopically recognised. Other sulphides are absent.

RECORDER: Paul Blake

DATE: 22/11/1994.

COMPANY REPORT SUMMARY SHEET

CR: 3512 **STATUS:** Open

TITLE: Addendum to final report, Authority to Prospect 667M (incorporating Annual Report 1969).

AUTHOR(S): **DATE:**

ATP/EP No.: ATP 667M

COMPANY HOLDING TITLE: Kennecott Explorations (Australia) Pty Ltd

COMPANY SUBMITTING REPORT: Kennecott Explorations (Australia) Pty Ltd

DATE GRANTED: 01/09/1969 **PERIOD:**

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Bajool-Raglan area

MINING DISTRICT:

MINES/PROSPECTS: Limonite Hill

EXPLORATION TARGETS\MODELS: Porphyry Copper Deposits

SUMMARY:

LOCALISED EXPLORATION/PROSPECTS

1) San Jose and Little San Jose Quartz Pipes

GEOLOGY - These pipes have been emplaced in a medium-grained biotite-quartz monzonite pluton that probably contains hornblende. There are only a few areas in the outcrops surrounding the San Jose and Little San Jose Quartz Pipes that contain prominent voids formerly occupied by sulfides. Boxworks are rare with transported limonite being distributed on surfaces quite like the distribution of indigenous limonite filling the voids of the mineralised rocks exposed on Limonite Hill.

GEOCHEMISTRY - A soil survey was carried out over the leached cappings surrounding the San Jose Quartz Pipe. Molybdenum values are interesting with notable concentrations occurring in the granitic host rocks, however, the masses of quartz rocks are essentially barren. The copper anomalies are virtually coincident with those of molybdenum.

2) One Rock Plain

GEOLOGY - In view of its distance (nearly 3.5 km) from the leached rocks exposed on Limonite Hill, the discovery of a boulder of float ore, containing 1500 ppm Cu and 920 ppm Mo, justified follow-up geochemical work.

GEOCHEMISTRY - A soil survey was carried out over the area. The samples returned up to 270 ppm Cu, but the Mo content was low, returning 10 ppm Mo or less. However, less than 0.5 km N of the soil grid, caliche is exposed. If this evaporite rock is widespread and extends into the area of the geochemical grid, the bulk of the geochemical data is apt to be spurious in terms of evaluating the economic potential of the underlying rocks.

3) Limonite Hill

GEOLOGY - The outcrop of Limonite Hill comprises biotite-albite granite of Permian age. To the Immediate N and E of Limonite hill, further such outcrops are found in association with minor hornblende diorite, quartz and alaskite outcrops, also of Permian age.

GEOCHEMISTRY - Soil sampling was carried out over the leached capping of Limonite Hill. The results show Limonite Hill to be anomalous in Cu and Mo, and the anomaly is asymmetrical to the N and E of Limonite Hill. Some soil and surface rock samples exceeded 0.1% Mo. The best estimate of primary grade is 0.7% Cu and 0.1% Mo. Material from the drilling returned interesting copper values, but there is a near absence of molybdenum.

GEOPHYSICS - An IP and limited magnetic survey were carried out. The IP results show that Limonite Hill is weakly to moderately anomalous, and the amplitude of the IP anomaly decreases generally with distance from the hill. The magnetic results show a minor anomaly broadly associated with the hill. This anomaly is broadly comparable with those to be expected from a porphyry copper deposit.

DRILLING - A rotary post-hole digger was used to get samples from 65 to 165 m beyond the outcrop perimeter of Limonite Hill.

RECORDER: Paul Blake **DATE:** 24/11/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 683M

COMPANY HOLDING TITLE: Darra Exploration Pty. Ltd.

COMPANY SUBMITTING REPORT: Darra Exploration Pty. Ltd.

DATE GRANTED: 01/10/69 **PERIOD:**

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Nine kilometres south of Ambrose. The eastern boundary of ATP 683 is 29 km west of Gladstone. Mine area is 20-30 km W of Gladstone (150°53' - 150°58'E and 23°52' - 23°55'S) and covers an area of approximately 65 km².

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: Limestone

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File-* 3031, 5210, 5510, 6898, 6899

Confidential- C

SUMMARY:

Company report 3031 has tabulated data of limestone samples taken from drill holes in the Mount Larcom area.

REASON FOR ACQUISITION OF TITLE - To locate and indicate the presence of limestone sufficient to justify the establishment of a large scale manufacturing plant at Gladstone.

GEOLOGY -

REGIONAL - The Mount Holly Beds are a Lower Devonian formation preserved in the Mount Holly Fault Block. To the E is the Coastal Block, and to the W the Eungella-Cracow Mobile Belt. The beds

of the Mount Holly Formation consist of a sequence of alternating volcanic and sedimentary rocks approximately 5000 m in thickness, the volcanics comprising of andesites and tuff and the sediments comprising mudstones, lithic and felspathic sandstones, silt and mudstone, conglomerates and crinoidal and coralline limestones. There is slight regional metamorphism of the formation. There are two major anticlines - the Mount Bennet and the Eastend anticlines, and an intervening syncline. There are tighter folds within the limbs of the major folds. Intrusive volcanic rocks are also present, as are Cainozoic sediments.

LOCAL - The Mount Holly Formation forms a NNW belt from just W of Bajool S 40 km to Mount Alma Range. The belt is up to 30 km wide. The sequence includes andesites, tuffs, greywackes and conglomerates, cherts, mudstones and limestones. The limestones are lenticular (from a few metres to several kilometres in length).

Three broad NNW trending limestone belts are in the fault block and can be defined by deposits. In the N, from E to W - 1) Raglan/Ambrose; 2) the eastern flank of Mount Holly to Raglan Creek; and 3) the Marmor Horrigan Creek area. A fourth may be represented by marble at Ulam marble quarry near Prior Park. In the S, the limestones are more recrystallised, and are represented in areas 1, 2, 3 and 4 of this survey.

The limestones are all dipping to vertical lenticular masses. The lenticular nature in the N seems to be due to their original deposition shape. From a brief study they seem to be bar or bank accumulations of sand-sized carbonate material. The limestone exists as large lenticular bodies ranging from cream to black in colour. The dip of the limestone is steep to vertical. The rock at the surface is weathered, brecciated and cemented with overburden. The limestone appears stratigraphically identical in all areas.

The overburden consists of marly-clayey material with a high amount of chert, granite, diorite and tuff fragments. Andesite dykes are present.

LOCALISED EXPLORATION/PROSPECTS

Four leases were granted to the Company on August 1, 1976 - East End (ML 700), Bracewell No.1 (ML 699), Bracewell No.2 (ML 701), and Bracewell No.3 (ML 698).

GEOLOGY - A summary of indicated limestone reserves is shown with an explanation as to how they arrived at the values.

- 1) Eastend Nos. 1 and 1A areas - 72 million tonnes.
- 2) Bracewell No.1 area - 163 million tonnes.
- 3) Bracewell No.2 area - 143 million tonnes.
- 4) Bracewell No.3 area - 11 million tonnes.

A total reserve of 389 million tonnes.

The report explains the process by which it arrives at the overburden reserve values.

Indicated Reserves -

- 1) Eastend Area (grid reserves) - 4.8 million tonnes.

Inferred Reserves -

- 1) Eastend Area 1 and 1A - 1.8 million tonnes (Sth area).
 - 10.1 million tonnes (Est area).
 - 4.4 million tonnes (Nth area).
 - Total 16.3 million tonnes.
- 2) Bracewell No.1 - 24.9 million tonnes (Nth area).

0.6 million tonnes (Centr area).
0.8 million tonnes (Sth area).
Total 26.3 million tonnes.

3) Bracewell No.2 - 12.2 million tonnes.

4) Bracewell No.3 - 1.2 million tonnes.

Total tonnage based on drilling is 60.8 million tonnes.

Projected overburden tonnage in undrilled areas is as follows -

1) Eastend Area - 33.0 million tonnes.
2) Bracewell No.1 - 56.0 million tonnes.
3) Bracewell No.2 - 14.0 million tonnes.
4) Bracewell No.3 - 22.0 million tonnes.
Total 125.0 million tonnes.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE -

The report CR 6899 defines a life estimate of reserves -:

Period 1978 - 2009 - Clinker production (cumulative) 62.7 million tonnes

Raw mix quantity required 100.4 million tonnes

80% limestone 80.3 million tonnes
15% overburden 15.1 million tonnes
5% sand 5.0 million tonnes

The report also stated acquisition and exploitation of the Boyne Island sand deposits.

The report describes in detail raw material characteristics including physical appearance; moisture content; chemical composition of the limestone, overburden, siliceous materials and coal ash; and mineral composition. It also discusses the variability of the limestone and overburden composition and details the analysis procedures.

Coal is discussed as a fuel, the ratio of natural and synthetic gypsum to be used, and two sources of water from Awoonga Dam and/or Wilmot Lagoon.

The report also details the variety of raw mixes, both past and recent, which can be produced. It is considered the mix will need additional sand when taking into account coal ash. Other properties considered include burnability and grindability. The recommended mix was 81% limestone, 12% overburden, and 6% sand. Contrary to the investigated raw mix, the proposed raw mix will consist of approximately 80% limestone, 15% overburden and 5% sand.

Potential slurry properties was tested for in combinations of limestone and Yarwun siliceous material, limestone and overburden, and limestone and overburden (and sand). In addition the filtration of the raw material was tested - the slurry (67.5% limestone, 32.1% overburden) in this test measured as very good.

The results of pumpability are considered in a publication by William Bros./CMPS Engineers (Appendix III).

A dry, semi-wet, or wet process can be used depending on the overall economics of the whole production and transport facility.

The report also gives a detailed analysis of quarry design. Initial and future development is stated along with a detailed drilling program.

The report also emphasises use of iron oxide when necessary due to the high fluctuations in alumina ratio of the overburden.

RECORDER: Simon Crouch **DATE:** 28/04/1994.

COMPANY REPORT SUMMARY SHEET

CR: 3031 **STATUS:** Open

TITLE:

AUTHOR(S): **DATE:**

ATP/EP No.: ATP 683M

COMPANY HOLDING TITLE:

COMPANY SUBMITTING REPORT:

DATE GRANTED: **PERIOD:**

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Mount Larcom

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: Limestone

SUMMARY:

Tabulated data of limestone samples taken from drill holes in the Mount Larcom area.

RECORDER: Simon Crouch **DATE:** 20/04/1994.

COMPANY REPORT SUMMARY SHEET

CR: 5210 **STATUS:** Open

TITLE: Report on drilling in Authority to Prospect 683M.

AUTHOR(S): T.J. Madden **DATE:** June 1975

ATP/EP No.: ATP 683M

COMPANY HOLDING TITLE: Queensland Cement and Lime Co. Ltd. (Darra Exploration Pty. Ltd.)

COMPANY SUBMITTING REPORT: T.J. Madden & Associates Pty. Ltd.

DATE GRANTED: 01/10/1969 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Nine kilometres south of Ambrose. The eastern boundary of ATP 683 is 29 km west of Gladstone.

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: Limestone

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To locate and indicate the presence of limestone sufficient to justify the establishment of a large scale manufacturing plant at Gladstone.

GEOLOGY -

REGIONAL - The limestone is part of the Mount Holly Beds, a Lower Devonian formation preserved in the Mount Holly Fault Block. The beds consist of a sequence of alternating volcanic and sedimentary rocks approximately 5000 m in thickness, the volcanics comprising of andesites and tuff and the sediments comprising mudstones, lithic and felspathic sandstones, conglomerates and limestones. There is slight regional metamorphism of the formation. There are two major anticlines - the Mount Bennet and the Eastend anticlines, with evidence of smaller folds present in the limbs.

LOCAL - The Authority to Prospect is composed entirely of Mount Holly Beds, with Cainozoic alluvium deposited along the creeks. Limestones are generally recrystallised to marble, and outcrop in three distinct parallel belts trending NNW (relationship between the belts is unknown). The remaining outcrop in the Authority comprises andesites and indurated greywackes, with minor tuff and thin beds of mudstone. The limestone exists as large lenticular bodies ranging from cream to black in colour. The dip of the limestone is steep to vertical. Andesite dykes are present.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - First investigated in 1970 with nine holes (379 m) drilled in the Eastern area. The results have been used in tonnage calculations for the report.

LOCALISED EXPLORATION/PROSPECTS

GEOLOGY - A summary of indicated limestone reserves is shown with an explanation as to how they arrived at the values.

- 1) Eastend Nos. 1 and 1A areas - 72 million tonnes.
- 2) Bracewell No.1 area - 163 million tonnes.
- 3) Bracewell No.2 area - 143 million tonnes.
- 4) Bracewell No.3 area - 11 million tonnes.

A total reserve of 389 million tonnes.

The overburden material provides an adequate source of argillaceous material generally suitable for use in the cement manufacturing process. Based on the quantity of limestone reserves it is stated that 1 part overburden to 3 parts limestone is needed for the process, ie, 130 million tonnes of overburden.

The report explains the process by which it arrives at the overburden reserve values.

Indicated Reserves -

- 1) Eastend Area (grid reserves) - 4.8 million tonnes.

Inferred Reserves -

- 1) Eastend Area 1 and 1A - 1.8 million tonnes (Sth area).
10.1 million tonnes (Est area).
4.4 million tonnes (Nth area).
Total 16.3 million tonnes.

- 2) Bracewell No.1 - 24.9 million tonnes (Nth area).
0.6 million tonnes (Centr area).
0.8 million tonnes (Sth area).
Total 26.3 million tonnes.

- 3) Bracewell No.2 - 12.2 million tonnes.

- 4) Bracewell No.3 - 1.2 million tonnes.

Total tonnage based on drilling is 60.8 million tonnes.

Projected overburden tonnage in undrilled areas is as follows -

- 1) Eastend Area - 33.0 million tonnes.
- 2) Bracewell No.1 - 56.0 million tonnes.
- 3) Bracewell No.2 - 14.0 million tonnes.
- 4) Bracewell No.3 - 22.0 million tonnes.
Total 125.0 million tonnes.

DRILLING - The Authority was covered by four separate Mineral Lease Applications - (from east to west) Eastend Nos.1 and 1A, Bracewell No.1, Bracewell No.2, and Bracewell No.3.

Drilling was done in all four areas to assess the thickness of overburden and to establish the presence of limestone below the soil cover. The work was carried out by Rockdrill Pty. Ltd.. The drilling was on a 800 m grid with most holes at 45° to the horizontal. Three vertical holes were drilled at Bracewell No.3 area.

Forty-six diamond drill holes were drilled at a total length of 4675 m. A further 58 percussion holes were drilled to determine the sub-soil extent of the limestone as well as assessing the thickness of overburden. The cores have shown beds of volcanic rock (andesites or tuffs) between the limestone as well as calcareous greywackes. The beds vary in thickness from one metre to 21 m. To check overburden 79 random samples (scout holes) were taken, the surface samples of the diamond drill holes were taken, and a further 58 holes were drilled on a grid in the Eastend area.

RECORDER: Simon Crouch

DATE: 21/04/1994.

COMPANY REPORT SUMMARY SHEET

CR: 5510 **STATUS:** Open

TITLE: Authority to Prospect - 683M report for twelve months ending 31st December, 1975. (Letter)

AUTHOR(S):G.A. Walker **DATE:** January 1976

ATP/EP No.: ATP 683M

COMPANY HOLDING TITLE: Darra Exploration Pty. Ltd.

COMPANY SUBMITTING REPORT: Darra Exploration Pty. Ltd

DATE GRANTED: **PERIOD:**

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Nine kilometres S of Ambrose

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: Limestone

SUMMARY:

LOCALISED EXPLORATION/PROSPECTS

DRILLING - The results of the 59 drill holes taken to assess the chemical composition of the overburden showed material generally high in silica and containing a quantity of lime. Magnesia was low, all less than 2%. This material is suitable to make cement. The drilling also showed the overburden depth varied from nil to 15.25 m.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The remainder of the report deals with the local geology and the projected tonnages of limestone and overburden. This information can be found on the previous company report CR 5210.

RECORDER: Simon Crouch **DATE:** 21/04/1994.

COMPANY REPORT SUMMARY SHEET

CR: 6898 **STATUS:** Open

TITLE: Report on an area relinquished from the Authority to Prospect 683M.

AUTHOR(S): **DATE:**

ATP/EP No.: ATP 683M

COMPANY HOLDING TITLE: Darra Exploration Pty. Ltd.

COMPANY SUBMITTING REPORT: Darra Exploration Pty. Ltd.

DATE GRANTED: **PERIOD:**

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Nine kilometres S of Ambrose

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: Limestone

SUMMARY:

REASON FOR ACQUISITION OF TITLE - Initially it was to obtaining supplies of limestone and clay material, the latter stage to find additional quantities of silica and iron oxide for the clay.

GEOLOGY -

LOCAL - Rocks in the area were dioritic in character and the overburden was similar in composition to that present over a wide area.

LOCALISED EXPLORATION/PROSPECTS

DRILLING - Geochemistry was completed on the holes drilled. Six examples are given, one from the rock, five from the overburden. An analysis of the limestone present in the boreholes is presented on three holes.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The report details sub-blocks drilled in an attempt to locate limestone, silica and ironstone. The blocks and sub-blocks -

1) Block 3323, Rockhampton : sub-blocks n, o, p, s, t, u, x, y, z.

2) Block 3324, Rockhampton : sub-blocks l, m, n, o, q, r, s, t, v, w, x, y.

Sub-blocks 3323 : n, o, s, t; and 3324 : r, t, v, w, x, y, were deleted.

RECORDER: Simon Crouch **DATE:** 26/04/1994.

COMPANY REPORT SUMMARY SHEET

CR: 6899 **STATUS:** Open

TITLE: Raw material investigations. (Authority to Prospect 683M. Report for twelve months ending 31st December, 1978)

AUTHOR(S): G.A. Walker **DATE:** January 1979

ATP/EP No.: ATP 683M

COMPANY HOLDING TITLE: Darra Exploration Pty. Ltd.

COMPANY SUBMITTING REPORT: Darra Exploration Pty. Ltd.

DATE GRANTED: **PERIOD:**

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Mine area is 20-30 km W of Gladstone (150°53' - 150°58'E and 23°52' - 23°55'S) and covers an area of approximately 65 km².

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: Limestone

SUMMARY:

GEOLOGY -

REGIONAL - Presence of quartz greywacke, chert, conglomerates, mudstone, flows and tuffs. The Mount Holly formation comprises tuffs and flows, conglomerates, silt and mudstone and crinoidal and coralline limestone. the limestone of this unit forms NW belts. Intrusive volcanic rocks are also present, as are Cainozoic sediments.

LOCAL - Three parallel belts of steeply dipping or vertical limestone were observed and drilled. The belts were 3-4 km apart and were up to 6 km long and 2 km wide. The limestone probably extends S to the Calliope River and N to Mount Etna. Igneous rocks occur between the limestone belts.

The limestone is characterised as a marble with colour ranges from white-pink-blue, the rock at the surface weathered, brecciated and cemented with overburden. The limestone appears stratigraphically identical in all areas. The overburden consists of marly-clayey material with a high amount of chert, granite, diorite and tuff fragments. Siliceous material is not available in the Authority to Prospect.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The report defines a life estimate of reserves -:

Period 1978 - 2009 - Clinker production (cumulative) 62.7 million tonnes

Raw mix quantity required 100.4 million tonnes

80% limestone 80.3 million tonnes

15% overburden 15.1 million tonnes

5% sand 5.0 million tonnes

Comparing the tabulated results of material requirements against potential reserves it is clear that available reserves are far in excess of future cement requirements.

The report also stated acquisition and exploitation of the Boyne Island sand deposits.

The report describes in detail raw material characteristics including physical appearance; moisture content; chemical composition of the limestone, overburden, siliceous materials and coal ash; and mineral composition. It also discusses the variability of the limestone and overburden composition and details the analysis procedures.

Coal is discussed as a fuel, the ratio of natural and synthetic gypsum to be used, and two sources of water from Awoonga Dam and/or Wilmot Lagoon.

The report also details the variety of raw mixes, both past and recent, which can be produced - tabulating the average analyses from these average mixes. It is considered the mix will need additional sand when taking into account coal ash. Other properties are accounted for like burnability (results suggest moderate temperatures and poorer burning in higher silica mixes), and grindability (moderate to good, better for limestone and overburden than limestone and silica). The recommended mix was 81% limestone, 12% overburden, and 6% sand. Contrary to the investigated raw mix, the proposed raw mix will consist of approximately 80% limestone, 15% overburden and 5% sand.

Potential slurry properties was tested for in combinations of limestone and Yarwun siliceous material, limestone and overburden, and limestone and overburden (and sand). In addition the filtration of the raw material was tested - the slurry (67.5% limestone, 32.1% overburden) in this test measured as very good. The slurry had normal flow characteristics at 32% water (with molasses being an effective thinner in this case). Although changes to the mix proportions was made the results can be considered and extrapolated. Also, the proposed raw mix is expected to reduce filtration times; the addition of sand may influence behaviour; cake thickness of 75-85 mm should be realised; the requirement of 12 atmospheres pressure; Ca(OH)₂ as a filter aid should be added in amounts of 0.1%.; and finally no thinning agent is required. The filtrate will have to be neutralised (too alkaline). Filterability of slurry is very good and slurry moisture is expected to be readily reduced to 18% by use of the filter processes.

The results of pumpability are considered in a publication by William Bros./CMPS Engineers (Appendix III).

A dry, semi-wet, or wet process can be used depending on the overall economics of the whole production and transport facility.

The report also gives a detailed analysis of quarry design. These include location (Area 1A), face length (500 m NE-SW and unlimited NW-SE), blasting and drilling (as required), effects of weather (slope of 1:200), and ecology (no restriction). Initial and future development is stated along with a detailed drilling program.

The report also emphasises use of iron oxide when necessary due to the high fluctuations in alumina ratio of the overburden.

RECORDER: Simon Crouch **DATE:** 26/04/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 994M

COMPANY HOLDING TITLE: International Nickel Australia Limited

COMPANY SUBMITTING REPORT: International Nickel Australia Limited

DATE GRANTED: 30/09/1971 **PERIOD:**

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 15 km SSW of Mount Larcom

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS/MODELS: Base and Precious metals

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File- 4187*

Confidential-

SUMMARY:

GEOLOGY -

LOCAL - The ATP is underlain by Lower to Middle Devonian volcanics and sediments assigned to the Mount Holly beds. The volcanics are mostly andesite/dacite flows, and ash flow and ash fall tuffs. Sediments consist of greywacke and associated siltstones and shales. The area appears to be part of a volcanic trench accumulation with violent explosive activity coupled with rapid down slope slumping and turbidite movement. The lava flows are well fractured resulting in a blocky appearance.

REGIONAL EXPLORATION

GEOCHEMISTRY

- **stream sediment sampling** - 200 stream sediment samples were collected and the -80 mesh fraction was assayed for Cu, Pb, and Zn. Cumulative Percent Frequency graphs were compiled but nothing of interest was located.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Unfavourable geochemical stream sediment and rock chip sampling results and lack of evidence of mineralisation indicate that further exploration on such a small area is not warranted.

RECORDER: Paul Blake

DATE: 31/10/1994.

COMPANY REPORT SUMMARY SHEET

CR: 4187 **STATUS:** Open

TITLE: Authority to Prospect No. 994M, Mt. Larcom area, Queensland.

AUTHOR(S): **DATE:** July 1972

ATP/EP No.: ATP 994M

COMPANY HOLDING TITLE: International Nickel Australia Limited

COMPANY SUBMITTING REPORT: International Nickel Australia Limited

DATE GRANTED: 30/09/1971 **PERIOD:**

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 15 km SSW of Mount Larcom

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: Base and Precious metals

SUMMARY:

GEOLOGY -

LOCAL - The ATP is underlain by Lower to Middle Devonian volcanics and sediments assigned to the Mount Holly beds. The volcanics are mostly andesite/dacite flows, and ash flow and ash fall tuffs. Sediments consist of greywacke and associated siltstones and shales. The area appears to be part of a volcanic trench accumulation with violent explosive activity coupled with rapid down slope slumping and turbidite movement. The lava flows are well fractured resulting in a blocky appearance.

REGIONAL EXPLORATION

GEOCHEMISTRY

- **stream sediment sampling** - 200 stream sediment samples were collected and the -80 mesh fraction was assayed for Cu, Pb, and Zn. Cumulative Percent Frequency graphs were compiled but nothing of interest was located.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Unfavourable geochemical stream sediment and rock chip sampling results and lack of evidence of mineralisation indicate that further exploration on such a small area is not warranted.

RECORDER: Paul Blake **DATE:** 31/10/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 999M

COMPANY HOLDING TITLE: Serem (Australia) Pty Ltd

COMPANY SUBMITTING REPORT: Serem (Australia) Pty Ltd

DATE GRANTED: 23/11/1971 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan & Banana

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: Rannes area

MINING DISTRICT:

MINES/PROSPECTS: Western, Southeastern, and Eastern Occurrence

EXPLORATION TARGETS\MODELS: Base metals

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File- 4219*

SUMMARY:

GEOLOGY -

LOCAL - The main part of the ATP is comprised of the Camboon Andesite. This unit comprises andesite, basalt, agglomerate, intermediate and acidic tuff, rhyolite, trachyte, as well as sedimentary intercalations. The Camboon Andesite crops out in a series of anticlinal cores. The Rannes beds consist of a great variety of rocks, including shales, siltstones, argillites, conglomerates, and tuffaceous sediments and limestone. The Rannes beds are intensely deformed. They consist mainly of tightly folded argillaceous sediments with slaty or fracture cleavage. The Rookwood Volcanics appear in the field as massive, fine-grained, grey-green lavas. Tertiary sediments occur in the NE and SW corners of the ATP.

MINERALISATION/ALTERATION - Three copper occurrences were discovered in the ATP. At the **Western Occurrence**, malachite and azurite were found in a fault in basic lava. At the **Southeastern Occurrence**, various small workings occur in an area of 200 m radius. Malachite, azurite, and native copper are associated with quartz veinlets in a basic flow. The **Eastern Occurrence** is located on the E flank of Mount Rannes. It consisted of specks of native copper with malachite and azurite disseminated in a dark microlithic rock. This mineralisation has no lateral extent.

REGIONAL EXPLORATION

GEOCHEMISTRY

- **stream sediment sampling** - A systematic sampling of the drainage was performed. None of the samples were anomalous in lead. Zones of anomalous copper were located to the SE of Rannes, at the NW of Muruguran Siding, and a weak, widespread zinc anomaly in the N part of the ATP. The origin of the Zn anomaly is not known exactly, but it is more likely to correspond to a geochemical anomalous grade in the rocks themselves (Rannes beds) rather than to a specific localised concentrated mineralisation.

- **soil sampling** - Soil sampling was carried out over two areas where copper occurrences were found. The **Southeastern Occurrence** returned no anomalies for zinc or lead, but three anomalous zones were detected for copper. Correlation between anomalous zones and geology is not conspicuous. Copper mineralisation is found in quartz veins cutting through andesitic lavas, but the anomalous areas could be correlated with basic tuffs and sedimentary intercalations. The **Western Occurrence** also returned no anomalous values for zinc and lead. Anomalous Cu values are scattered and no significant anomaly was found correlated with the fault.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Some copper mineralisation was located, but none were of a promising type. They are either shear zone in andesitic or more basic flows, or specks of native copper with some copper carbonates in andesitic tuffs. These types of mineralisation usually do not lead to economic deposits. Therefore the ATP was surrendered.

RECORDER: Paul Blake

DATE: 31/10/1994.

COMPANY REPORT SUMMARY SHEET

CR: 4219 **STATUS:** Open

TITLE: Final Report on A. to P. 999M

AUTHOR(S): **DATE:**

ATP/EP No.: ATP 999M

COMPANY HOLDING TITLE: Serem (Australia) Pty Ltd

COMPANY SUBMITTING REPORT: Serem (Australia) Pty Ltd

DATE GRANTED: 23/11/1971 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan & Banana

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: Rannes area

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: Base metals

SUMMARY:

GEOLOGY -

REGIONAL - The area covered by the ATP is part of the Gogango Range. To the NW of the ATP is a narrow strip of outcrop consisting of recrystallised limestone associated with volcanic rocks and argillaceous sediments. These rocks are mapped as Siluro-devonian. In the Lower Permian, three units have been defined; **(1) Camboon Andesite-** This unit is well developed on the E flank and in the SE part of the Gogango Range. Its contact with the overlying Rannes beds is well marked to the W, but to the E the contact is not clear due to faulting and interfingering of the two formations. **(2) Rannes beds-** This unit comprises terrigenous fine grained sediments with some carbonate intercalations. Crinoids are said to have been found in this unit. Due to intense deformation, the Rannes beds have a slaty aspect. **(3) Rookwood Volcanics-** This unit crops out only in the E flank of the Gogango Range. This unit is essentially composed of spillitic lavas, and appears very conspicuously on air photos. Two unit are defined in the Upper Permian; **(A) Oxtrack Formation-** This unit crops out on very restricted areas along the W margin of the Gogango Range. It comprises fossiliferous calcareous siltstone, and partly recrystallised calcarenite. **(B) Undifferentiated Back Creek Group-** This crops out largely along the N and NW margin of the Gogango Range. It is a thick sequence of subgreywackes and shales with some conglomerate. Tertiary sediments and basalts occur both E and W of the Gogango Range in steep sided mesas and tablelands. The sediments consist mainly of silty and sandy claystone, and white, yellow, and buff sandstone which locally are pebbly or conglomeratic. Most of the rocks have been lateritised. Wide belts of Cainozoic alluvium occur along the main river. To the W of Wowan, the Camboon Andesite is intruded by a series of irregular shaped diorite masses which trend NNW. The ATP encloses the S extent of this intrusive body. At Mount Cooper, outside the ATP, the Back Creek Group is intruded by a mass of coarse-grained syenite.

LOCAL - The main part of the ATP is comprised of the Camboon Andesite. Various types of rocks include andesite, basalt, agglomerate, intermediate and acidic tuff, rhyolite, trachyte, as well as sedimentary intercalations. The Camboon Andesite crops out in a series of anticlinal cores. This type of structure is well exposed in the N part of the ATP. The Rannes beds consist of a great variety of rocks, including shales, siltstones, argillites, conglomerates, and tuffaceous sediments and limestone. The limestone beds are better developed near the contact with Camboon Andesite. The Rannes beds

are intensely deformed. They consist mainly of tightly folded argillaceous sediments with slaty or fracture cleavage. The Rookwood Volcanics appear in the field as massive, fine-grained, grey-green lavas. Tertiary sediments occur in the NE and SW corners of the ATP. It is a succession of clay and sandy clay layers, with some beds of sandstone and conglomerate. These sediments are largely lateritised.

MINERALISATION/ALTERATION - Three copper occurrences were discovered in the ATP. At the **Western Occurrence**, Malachite and azurite were found in a fault in basic lava. The fault is visible over 2 km, and is marked in the topography by a line of creeks. At the **Southeastern Occurrence**, various small workings are scattered in an area of 200 m radius. Malachite, azurite, and native copper are associated with quartz veinlets in a basic flow. The **Eastern Occurrence** is located on the E flank of Mount Rannes. It consisted of specks of native copper with malachite and azurite disseminated in a dark microlithic rock. Thin section revealed this rock to be a basic tuff. This mineralisation has no lateral extent and the host rock constitutes only one single bed thinning out rapidly laterally.

REGIONAL EXPLORATION

GEOCHEMISTRY

- **stream sediment sampling** - A systematic sampling of the drainage was performed. Altogether, 1015 samples were collected and analysed for Cu, Pb, and Zn. None of the samples were anomalous in lead. A zone anomalous in copper was located to the SE of Rannes. Another anomalous copper zone appears also at the NW of Muruguran Siding, this second zone appears to correspond with the Rookwood Volcanics. A widespread zinc anomalous area occurs in the N part of the ATP. The values are usually rather low. The origin of this low and widespread anomaly is not known exactly, but this type of anomaly seems more likely to correspond to a geochemical anomalous grade in the rocks themselves (Rannes beds) rather than to a specific localised concentrated mineralisation.

- **soil sampling** - Soil sampling was carried out over two areas where copper occurrences were found. The **Southeastern Occurrence** returned no anomalies for zinc or lead, but three anomalous zones were detected for copper. Correlation between anomalous zones and geology is not conspicuous. Copper mineralisation is found in quartz veins cutting through andesitic lavas, but the anomalous areas could be correlated with basic tuffs and sedimentary intercalations. The **Western Occurrence** also returned no anomalous values for zinc and lead. Anomalous Cu values are scattered and no significant anomaly was found correlated with the fault.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Some copper mineralisation was located, but none were of a promising type. They are either shear zone in andesitic or more basic flows, or specks of native copper with some copper carbonates in andesitic tuffs. These types of mineralisation usually do not lead to economic deposits. Therefore the ATP was surrendered.

RECORDER: Paul Blake **DATE:** 31/10/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 1199M

COMPANY HOLDING TITLE: Electrolytic Zinc Company of Australia Ltd.

COMPANY SUBMITTING REPORT: Electrolytic Zinc Company of Australia Ltd.

DATE GRANTED: 19/04/1973 **PERIOD:**

1:100 000 SHEET NAME(S): Rockhampton and Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Between Rockhampton-Emu Park Road and the Fitzroy River

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: precious and base metals

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File- 4873*

SUMMARY:

REASON FOR ACQUISITION OF TITLE - precious and base metal exploration

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Area mapped by Consolidated Zinc Pty. Ltd. in the early sixties. Between 1967 and 1972 Broken Hill Pty. Ltd. held part of the area (reports unavailable at the time).

GEOLOGICAL MAPPING - Work on literature research and field studies on known mineral deposits with the Berserker Beds. Photo-interpretation was done and reconnaissance mapping on a scale of 1:25 000 was completed. The mapping found the Berserker Beds could be divided into four major units:-

Unit 1 - intermediate lavas, coarse pyroclastics and tuffs

Unit 2 - predominantly acid tuffs and lavas

Unit 3 - intermediate lavas, coarse pyroclastics and tuffs

Unit 4 - fine-grained sediments and lateral acid crystal tuff equivalents

Unit 1 found on upper slopes and ridges of Flat Top Range and Broadmount. Units 2, 3 and 4 found on lower slopes.

Rock samples from the Berserker Beds were submitted for microscopic studies, results attached to Appendix of the third quarter 1973 report.

Eight specimens submitted from mineralised horizons were submitted for scan analyses for 18 elements. Results concluded that in addition to Pb, Zn, Cu, and Au the mineral assemblage is characterised by high Ba and Hg values. Sr and Mo may also be useful discriminators.

GEOCHEMISTRY

- **stream sediment sampling** - Two stages of stream sediment samples were taken in the Mount Chalmers district - 1) orientation program (no stats. done); 2) major survey (results pending)

RECORDER: Simon Crouch **DATE:** 25/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 4873 **STATUS:** Open

TITLE: Authority to Prospect 1199M. Exploration report for 1973.

AUTHOR(S): L.W. Davis **DATE:** June 1974

ATP/EP No.: ATP 1199M

COMPANY HOLDING TITLE: Electrolytic Zinc Company of Australia Ltd.

COMPANY SUBMITTING REPORT: Electrolytic Zinc Company of Australia Ltd.

DATE GRANTED: 19/04/1973 **PERIOD:**

1:100 000 SHEET NAME(S): Rockhampton and Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Between Rockhampton-Emu Park Road and the Fitzroy River

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: precious and base metals

SUMMARY:

REASON FOR ACQUISITION OF TITLE - precious and base metal exploration

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Area mapped by Consolidated Zinc Pty. Ltd. in the early sixties. Between 1967 and 1972 Broken Hill Pty. Ltd. held part of the area (reports unavailable at the time).

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GEOCHEMISTRY

- **stream sediment sampling** - Two stages of stream sediment samples were taken in the Mount Chalmers district - 1) orientation program (no stats. done); 2) major survey (results pending)

RECORDER: Simon Crouch **DATE:** 25/02/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 1542M

COMPANY HOLDING TITLE: Geopeko Limited

COMPANY SUBMITTING REPORT: Geopeko Limited

DATE GRANTED: **PERIOD:**

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 23 km SE of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS/MODELS: precious and base metals

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File- 5481, 5566*

SUMMARY:

REASON FOR ACQUISITION OF TITLE - Seeking areas of potential mineralisation outside the gridded area of ATP 508M.

GEOLOGY -

LOCAL - Felsic pyroclastics and ashes of the Moongan Rhyolite Sequence outcrop over the south western half of the Authority, and have been intruded by the Station Creek Granodiorite(?) to the NE. Up to 500 m away the country rock has been metamorphosed to biotite schists and calc-silicate hornfels (garnet-pyroxene-calcite). Further out there are quartz-sericite-biotite and quartz-sericite-chlorite assemblages.

MINERALISATION/ALTERATION - Secondary copper and primary zinc mineralisation at the Ajax Mine occurs within altered rhyolitic pyroclastics and ashes of the Moongan Rhyolite Sequence, approximately 800 m from the granodiorite contact. No evidence of metasomatism or mineralisation. No sulphide mineralisation was discovered in the ATP outside lease 960.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - High grade copper was originally mined in 1921 in the 'number 1 shaft' (Ball, 1921). The 'number 2 shaft' was sunk by the Mount Morgan Gold Mining Co. in 1923. Reid (1937) reports on underground development in the area of 'number 1 shaft' up to 1937. In the period of 1959-60 Mount Morgan Limited drilled two diamond drill holes under the old workings. Hawkins and Whitcher (1961), and Innes and Kerr (1974) reported mineralisation was confined to a shear zone from 25 to 100 m thick.

Lease 960 was applied for on 18/07/1975, overlapping ATP's 1542M and 508M, and covering the grid over ATP 1542M. Only geological mapping was done outside lease 960 on ATP 1542M.

GEOCHEMISTRY - Samples of gossan collected along pyrite-sericite alteration and analysed for Cu, Pb, Zn, Ag, Au, and Se.

- **soil sampling** - C-horizon soil sampling was conducted over the entire 1600 x 800 m grid. Cu, Pb, and Zn gave significantly anomalous values immediately around the old workings and extending along strike for 200 m. Zn was generally low elsewhere except for the SW corner where a weak anomaly was gridded and B-horizon sampled. Ten metre spaced C-horizon samples were taken in the vicinity of the workings to define the shape of the mineralised zone. A gamma ray spectrometer survey was conducted in October 1975 revealed an area of potassium enrichment to the W along strike from the known mineralisation. A broad area of anomalous potassium was recorded over the SW section of the grid.

GEOPHYSICS

- **ground surveys** - In 1973 a weak EM anomaly was discovered close to the mine area by Geotrex Aerial INPUT Survey. Subsequently, transient EM and self potential surveys were conducted on the 800 x 800 m grid centres on the mine. Results were low and erratic although a weak EW trend was located. In September-October 1975 a horizontal loop multifrequency EM survey was carried out over the extended 800 x 2000 m grid (results to be plotted and assessed).

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Area of ATP 1542M outside lease No. 960 holds little potential for economic mineralisation.

RECORDER: Simon Crouch **DATE:** 01/03/1994.

COMPANY REPORT SUMMARY SHEET

CR: 5566 **STATUS:** Open

TITLE: Open file report on Authority to Prospect 1542M

AUTHOR(S): Ross R. Large **DATE:** March 1976

ATP/EP No.: ATP 1542M

COMPANY HOLDING TITLE: Geopeko Limited

COMPANY SUBMITTING REPORT: Geopeko Limited

DATE GRANTED: **PERIOD:**

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 23 km SE of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: precious and base metals

SUMMARY:

REASON FOR ACQUISITION OF TITLE - Seeking areas of potential mineralisation outside the gridded area of ATP 508M.

GEOLOGY -

REGIONAL - Felsic pyroclastics, tuffs and ashes of the Moongan Rhyolite Sequence occur over the south western half of ATP 1542M and have been intruded by the Station Creek Granodiorite to the north east. Within a distance of 500 m from the granodiorite contact the felsic volcanics have been metamorphosed to quartz sericite schists, biotite schists, and amphibolites. A narrow horizon of calc-silicate hornfels from 10-20 m thick outcrops in places adjacent to the granodiorite contact. This unit has a garnet-pyroxene-calcite mineralogy. No evidence of metasomatism or mineralisation. No sulphide mineralisation was discovered in the ATP outside lease 960. Lease 960 was applied for on 18/07/1975, overlapping ATP's 1542M and 508M, and covering the grid over ATP 1542M. Only geological mapping was done outside lease 960 on ATP 1542M.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Area of ATP 1542M outside lease No. 960 holds little potential for economic mineralisation.

RECORDER: Simon Crouch **DATE:** 01/03/1994.

COMPANY REPORT SUMMARY SHEET

CR: 5481 **STATUS:** Open

TITLE: East Queensland, Mount Morgan. Final report on Authority to Prospect 1542M.

AUTHOR(S): Ross R. Large **DATE:** January 1976

ATP/EP No.: ATP 1542

COMPANY HOLDING TITLE: Geopeko Limited

COMPANY SUBMITTING REPORT: Geopeko Limited

DATE GRANTED: **PERIOD:**

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Covering the portions of Ajax Mine and its northern extension at the foot of the Dee Range, 23 km southeast of Mount Morgan.

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: Base metals

SUMMARY:

GEOLOGY -

LOCAL - Felsic pyroclastics and ashes of the Moongan Rhyolite Sequence outcrop over the south western half of the Authority, and have been intruded by the Station Creek Granodiorite(?) to the NE. Up to 500 m away the country rock has been metamorphosed to biotite schists and calc-silicate hornfels. Further out there are quartz-sericite-biotite and quartz-sericite-chlorite assemblages.

MINERALISATION/ALTERATION - Secondary copper and primary zinc mineralisation at the Ajax Mine occurs within altered rhyolitic pyroclastics and ashes of the Moongan Rhyolite Sequence, approximately 800 m from the granodiorite contact. Pyritic and sericitic alteration was mapped to a distance of 300 m NW from the workings. Unable to trace mineralisation to the S due to andesitic cover. Geological mapping over an area extending 10 km NW along strike from the Ajax Mine indicates mineralisation is stratiform in nature and confined to a particular cherty fragmental tuff unit.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - High grade copper was originally mined from the 'number 1 shaft' in 1921 (Ball, 1921). The 'number 2 shaft' was sunk by the Mount Morgan Gold Mining Co. in 1923. Reid (1937) reports on underground development in the area of 'number 1 shaft' up to 1937. In the period of 1959-60 Mount Morgan Limited drilled two diamond drill holes under the old workings. DDH1 - schists and phyllites from 36 to 112 m carrying disseminated pyrite and minor sphalerite (1.6% Zn and 0.1% Cu at interval 53.7 m to 72.5 m). DDH2 - oxidised mineralisation from 31.1 to 47.5 m averaging 0.9% Cu and 2.8% Zn, and primary pyrite with weak sphalerite from 47.5 to 197 m. Hawkins and Whitcher (1961), and Innes and Kerr (1974) reported mineralisation was confined to a shear zone from 25 to 100 m thick.

GEOCHEMISTRY - Samples of gossan collected along pyrite-sericite alteration and analysed for Cu, Pb, Zn, Ag, Au, and Se.

- **soil sampling** - C-horizon soil sampling was conducted over the entire 1600 x 800 m grid. Cu, Pb, and Zn gave significantly anomalous values immediately around the old workings and extending along strike for 200 m. Zn was generally low elsewhere except for the SW corner where a weak anomaly was gridded and B-horizon sampled. Ten metre spaced C-horizon samples were taken in the vicinity of the workings to define the shape of the mineralised zone. A gamma ray spectrometer survey was conducted in October 1975 revealed an area of potassium enrichment to the W along strike from the known mineralisation. A broad area of anomalous potassium was recorded over the SW section of the grid.

GEOPHYSICS

- **ground surveys** - In 1973 a weak EM anomaly was discovered close to the mine area by Geotrex Aerial INPUT Survey. Subsequently, transient EM and self potential surveys were conducted on the 800 x 800 m grid centres on the mine. Results were low and erratic although a weak EW trend was located. In September-October 1975 a horizontal loop multifrequency EM survey was carried out over the extended 800 x 2000 m grid (results to be plotted and assessed).

RECORDER: Simon Crouch **DATE:** 03/05/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 1585M

COMPANY HOLDING TITLE: Mineral Deposits Limited

COMPANY SUBMITTING REPORT: Mineral Deposits Limited

DATE GRANTED: 29/10/1975 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan, Ridglands

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Stanwell area

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: Base and Precious Metals

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File-6189*

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To try and detect Palaeozoic mineralisation preserved under younger capping rock in the area.

GEOLOGY -

LOCAL - The oldest units outcropping in the tenement are small areas of Carboniferous and Permian sediments belonging to the Neerkol Formation and the Youlambie and Dinner Creek Conglomerate. Permian intrusives of the Bouldercombe Complex also outcrop in the S of the ATP and at the W end of the Stanwell Valley. The main structural feature in the area is the E-W trending Stanwell Fault which forms the Stanwell Valley in the N section of the ATP. North of this fault, the Native Cat Andesite crops out and forms a ridge; the Native Cat Range. In the Stanwell Valley, the Native Cat Andesite is overlain by the Stanwell Coal Measures. Some Upper Cretaceous basalt outcrops also occur in the central and W portion of the tenement. The Permian intrusives in the S are unconformably overlain by the Jurassic Razorback beds, which are in turn overlain by the Stanwell Coal Measures.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Consolidated Zinc Pty Ltd, Broken Hill Proprietary Co. Ltd, Geopeko Pty Ltd, Mines Exploration Pty Ltd, and Enterprising Exploration Co. Pty Ltd.

GEOCHEMISTRY

- **stream sediment sampling** - A sampling program was carried out around the contact of Mesozoic outcrop by sampling the present drainage patterns from this higher outcrop. The results showed a broad anomalous zone of copper values along the N edge of the Stanwell Valley and an outcrop of Permian granodiorite in the W section of the valley.

- **rock chip sampling** - Rock chip samples were collected from within the anomalous areas. These samples were analysed for gold, copper, lead, and zinc, with selected samples from the intrusive being assayed for molybdenum. All molybdenum assays were below 6 ppm Mo. The results of the survey suggested an anomalous zone associated with the contact zone of the Native Cat Andesite and the sediments of the Stanwell Valley.

GEOPHYSICS

- **ground surveys** - A pole-dipole technique was run along the E end of the Stanwell Valley to follow up the geochemical results. Two zones of anomalous results were delineated. The larger of the anomalous zones was tested by drilling, but the hole intersected only minor pyrite.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - No economic mineralisation was encountered, and the Authority was relinquished.

RECORDER: Paul Blake

DATE: 31/10/1994.

COMPANY REPORT SUMMARY SHEET

CR: 6189 **STATUS:** Open

TITLE: Final report on A-P 1585M, Stanwell - Central Qld.

AUTHOR(S): R.G. Wynn **DATE:** September 1977

ATP/EP No.: ATP 1585M

COMPANY HOLDING TITLE: Mineral Deposits Limited

COMPANY SUBMITTING REPORT: Mineral Deposits Limited

DATE GRANTED: 29/10/1975 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan, Ridglands

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Stanwell area

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: Base and Precious Metals

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To try and detect Palaeozoic mineralisation preserved under younger capping rock in the area.

GEOLOGY -

LOCAL - The oldest units outcropping in the tenement are small areas of Carboniferous and Permian sediments belonging to the Neerkol Formation and the Youlambie and Dinner Creek Conglomerate. Permian intrusives of the Bouldercombe Complex also outcrop in the S of the Authority and at the W end of the Stanwell Valley. The main structural feature in the area is the E-W trending Stanwell Fault which forms the Stanwell Valley in the N section of the ATP. North of this fault, the Native Cat Andesite crops out and forms a ridge; the Native Cat Range. In the Stanwell Valley, the Native Cat Andesite is overlain by the Stanwell Coal Measures. Some Upper Cretaceous basalt outcrops also occur in the central and W portion of the tenement. The Permian intrusives in the S are unconformably overlain by the Jurassic Razorback beds, which are in turn overlain by the sediments of the Stanwell Coal Measures.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Consolidated Zinc Pty Ltd, Broken Hill Proprietary Co. Ltd, Geopeko Pty Ltd, Mines Exploration Pty Ltd, and Enterprising Exploration Co. Pty Ltd.

GEOCHEMISTRY

- **stream sediment sampling** - A sampling program was carried out around the contact of Mesozoic outcrop by sampling the present drainage patterns from this higher outcrop. The results showed a broad anomalous zone of copper values along the N edge of the Stanwell Valley and an outcrop of Permian granodiorite in the W section of the valley.

- **rock chip sampling** - Rock chip samples were collected from within the anomalous areas. These samples were analysed for gold, copper, lead, and zinc, with selected samples from the intrusive being

assayed for molybdenum. All molybdenum assays were below 6 ppm Mo. The results of the survey suggested an anomalous zone associated with the contact zone of the Native Cat Andesite and the sediments of the Stanwell Valley.

GEOPHYSICS

- **ground surveys** - A pole-dipole technique was run along the E end of the Stanwell Valley to follow up the geochemical results. Two zones of anomalous results were delineated. The larger of the anomalous zones was tested by drilling, but the hole intersected only minor pyrite.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - No economic mineralisation was encountered, and the Authority was relinquished.

RECORDER: Paul Blake **DATE:** 31/10/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 1833M

COMPANY HOLDING TITLE: North Broken Hill Limited

COMPANY SUBMITTING REPORT: North Broken Hill Limited

DATE GRANTED: 30/09/1977 **PERIOD:**

1:100 000 SHEET NAME(S): Bajool & Rockhampton

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 20 km NW of Bajool

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS/MODELS:

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File- 6631*

SUMMARY: Work in this ATP is done in conjuncture with ATP 1721M.

GEOPHYSICS

- **ground surveys** - 24.5 line km of ground magnetics and 3.25 line km of gravity were measured in the ATP. The ground surveys followed up aerial magnetic anomalies called the Roope's Bridge, Bates', Edinda, Gavial North, and Gavial South (centred within ATP 1721M, but overlaps onto ATP 1833M). The Roope's Bridge anomaly is confused, and is thought to be due to a magnetite-bearing rock type, such as the outcrops in the hills S of Bouldercombe, and as such, it is not considered to be a drilling target. The Bates' anomaly is a very extensive mild magnetic effect, and almost certainly a rock type rather than an orebody. The Edinda and Gavial North anomalies were considered to be discrete bodies and were initially planned to be diamond drilled. However, further unfavourable information on the geological environment caused this plan to be abandoned. The Gavial South anomaly was drilled and the results are reported under ATP 1721M.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Results of the drilling of the Gavial South anomaly in ATP 1721 were discouraging. Since the geological environments in both ATP 1721M & ATP 1833M are considered similar, it was decided to relinquish both areas.

RECORDER: Paul Blake **DATE:** 31/10/1994.

COMPANY REPORT SUMMARY SHEET

CR: 6631 **STATUS:** Open

TITLE: A-P 1833M, Rockhampton. Final report.

AUTHOR(S): **DATE:**

ATP/EP No.: ATP 1833M

COMPANY HOLDING TITLE: North Broken Hill Limited

COMPANY SUBMITTING REPORT: North Broken Hill Limited

DATE GRANTED: 30/09/1977 **PERIOD:**

1:100 000 SHEET NAME(S): Bajool & Rockhampton

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 20 km NW of Bajool

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS:

SUMMARY: Work in this ATP is done in conjuncture with ATP 1721M.

GEOPHYSICS

- **ground surveys** - 24.5 line km of ground magnetics and 3.25 line km of gravity were measured in the ATP. The ground surveys followed up aerial magnetic survey anomalies called the Roope's Bridge, Bates', Edinda, Gavial North, and Gavial South (centred within ATP 1721M, but overlaps onto ATP 1833M). The Roope's Bridge anomaly is confused, and is thought to be due to a magnetite-bearing rock type, such as the outcrops in the hills S of Bouldercombe, and as such, it is not considered to be a drilling target. The Bates' anomaly is a very extensive mild magnetic effect, and almost certainly a rock type rather than an orebody. The Edinda and Gavial North anomalies were considered to be discrete bodies and were initially planned to be diamond drilled. However, further unfavourable information on the geological environment caused this plan to be abandoned. The Gavial South anomaly was drilled and the results are reported under ATP 1721M.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Results of the drilling of the Gavial South anomaly in ATP 1721 were discouraging. Since the geological environments in both ATP 1721M & ATP 1833M are considered similar, it was decided to relinquish both areas.

RECORDER: Paul Blake **DATE:** 31/10/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 1950M

COMPANY HOLDING TITLE: Australian Anglo American Limited

COMPANY SUBMITTING REPORT: Australian Anglo American Limited

DATE GRANTED: 20/06/1978 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 20 km W of Mt Larcom

MINING DISTRICT:**MINES/PROSPECTS:** Austerity and Mount Bennett Mines**EXPLORATION TARGETS/MODELS:** base metals of volcanogenic origin**TRANSFERS, JOINT VENTURES, etc:****LEASES TAKEN OUT:****COMPANY REPORT Nos:** *Open File- 6949, 7328, 7329, 7527***SUMMARY:**

REASON FOR ACQUISITION OF TITLE - To determine the potential of the Mt Holly beds as a host to base metal sulphide deposits of volcanogenic origin. The Capella Creek beds have been extensively prospected for volcanogenic sulphides, but the Mount Holly beds and Barmundoo beds appear to have been largely ignored.

GEOLOGY -

REGIONAL - The Mt Holly beds and the Barmundoo beds, together with their lateral equivalents, the Capella Creek beds, represents a sequence of Lower to Middle Devonian volcanic and volcanic derived sedimentary units which form the basement to the Yarrol Basin.

LOCAL - The published geological units of the Capella Creek beds and Mt Holly beds have been disregarded in favour of three distinct mappable units. Unit 1 comprises a sequence of volcanic agglomerate, tuffaceous sandstone, shale, mudstone, and minor chert. The tuffaceous sandstone varies from coarse to fine grained and small pebble bands have been observed. Limestone occurs in this unit at Ulam where it has been altered to marble by the adjacent Permian granite. Unit 2 consists largely of a sequence of green basaltic agglomerate to tuff with minor green trachyte tuff in the S. Isolated ignimbrite has also been observed. These pyroclastic rocks are interbedded with volcanic derived mudstone, siltstone, and minor sandstone. Lenticular bodies of fine grained pure crystalline limestone are located towards the top of the sequence. Unit 3 comprises a sequence of fine grained dacitic tuff with interbedded tuffaceous siltstone and mudstone. Unit 1 is regarded as the oldest of the units mapped but it is probably at least in part contemporaneous with Unit 2. Unit 1 is undoubtedly part of the Capella Creek beds, probably the lateral equivalents of the Lower Capella Creek beds. This unit is everywhere in fault contact with Unit 2, the fault being marked by a line of abandoned gold workings and quartz blows. The lower predominantly pyroclastic part of Unit 2 becomes finer in grain size to the SE with an increasing marine influence. The marine influence extended northwards in late Unit 2 time when coralline limestone accumulated around the flanks of the volcanic centres. The association of coralline limestone with the closing stage of basic to intermediate pyroclastic activity is also noted in the Calliope beds to the E of the Boyne Rift and it is considered that Unit 2 and the Calliope beds are lateral equivalents. A hiatus separated Unit 2 from Unit 3 with a change from basic to acid volcanic activity and a probable reduction in the marine influence witnessed by the ignimbritic nature of the volcanic debris. If the correlation between Units 1 and 2 and the Lower Capella Creek beds is found to be valid, Unit 3 would represent the middle acid sequence of the Capella Creek beds.

The dominant structural feature of the ATP is a series of tightly folded NNW trending folds. Typically the anticlines have steeply dipping E limbs and more gently dipping W limbs. Overfolding has not been observed. Associated with this folding is a well developed slaty cleavage in the fine grained members and fracture cleavage in the more competent beds. Superimposed on the NNW fold axis is a secondary axis of open folding trending NE. A series of prominent NE trending linear features cross the area parallel to the major discordant granites at Diglum and Glassford.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - The review of previous prospecting activity indicates that this area was largely confined to the search for disseminated copper deposits associated with the intrusive rocks and the search for limestone deposits within the sedimentary units. In both cases, the exploration methods used were incompatible with a search for massive sulphide deposits.

GEOLOGICAL MAPPING - The ATP was mapped at 1:100,000 scale, with the mapping largely confined to roadcut exposures and was accomplished in 4 days.

GEOCHEMISTRY

- **stream sediment sampling** - A stream sediment survey was conducted over the area with 740 samples collected. The copper pattern reflects the shearing with associated gold mineralisation between Unit 1 and Unit 2. The zinc pattern is more diffuse but the same line of shearing can also be discerned. Lead values are uniformly low except for isolated anomalies attributed to roadside contamination. Statistical treatment of the results indicates that >65 ppm Cu, >35 ppm Pb, and >90 ppm Zn can be regarded as anomalous. 12 anomalous areas have been identified. (1) A zinc anomaly evident in one sample overlying Unit 2. (2) A lead anomaly evident in two samples overlying Permian granite intrusive into Unit 2. (3) A lead anomaly evident in two samples overlying Unit 2. (4) A low order zinc anomaly evident in one sample overlying Unit 2. (5) A copper anomaly evident in 6 samples (peaking at 110 ppm Cu) overlying shear zone between Units 1 & 2. Abandoned Mining Leases are known in the area. (6) A copper anomaly evident in one sample overlying Unit 1. (7) A copper anomaly evident in two samples overlying Unit 1, and is almost certainly related to the known mineralisation at Austerity Mine. (8) A zinc anomaly evident in one sample overlying Unit 1. (9) A copper anomaly evident in two samples overlying Unit 2. (10) A copper anomaly evident in one sample overlying Unit 1, and is probably related to gold mineralisation adjacent to the Mt Bennett Mine. (11) A copper/zinc anomaly evident in two samples overlying Unit 1 adjacent to Mt Bennett Mine. The anomaly is attributed to gold bearing quartz veins. (12) A large complex Cu/Zn anomaly mainly underlain by Unit 2 and associated limestone with some Unit 1 in the SW. Part of the anomaly can be attributed to gold-bearing quartz veins and perhaps some of the copper response is due to the increase in pH of the streams by the presence of limestone. Much of the anomaly is unexplained. All of the anomalies were investigated except for 2 & 3.

- **rock chip sampling** - A rock chip sample of ferruginous chert from Unit 1 returned an analysis of 10 ppm Cu, 10 ppm Pb, and 30 ppm Zn.

LOCALISED EXPLORATION/PROSPECTS

1) Area 1

GEOLOGY - The area is underlain by tuffaceous mudstone cut by gold-bearing quartz veins. Float of a coarse grained felsic rock was also found. The quartz veins are exposed in several small abandoned diggings.

GEOCHEMISTRY - Follow-up stream sediment sampling indicated a high order zinc anomaly with associated copper and lead in a small drainage basin. This high order response is attributed to scrap metal debris in the creek, but the original low order zinc anomaly was substantiated. The zinc response is attributed to gold-bearing quartz veins. Soil sampling across the abandoned diggings indicate a slight enhancement in copper and zinc values.

2) Area 4

GEOLOGY - The area is underlain by basaltic tuffs of Unit 2.

GEOCHEMISTRY - Follow-up stream sediment sampling failed to repeat the original anomalous zinc result.

3) Area 5

GEOLOGY - The area is underlain by basaltic tuff, tuffaceous sediments and limestone of Unit 2, and tuffaceous sediments of Unit 1. A major shear following the course of Diggers Creek separates the two units. Minor abandoned gold diggings in limestone are associated with this shear.

GEOCHEMISTRY - Follow-up stream sediment sampling failed to repeat the copper anomalies. A rock chip sample from the diggings, and rock chip samples from tuffaceous sediments W of the shear, showed no enhancement in copper, lead, or zinc.

4) Area 6

GEOLOGY - The area is underlain by tuffaceous sediments of Unit 1.

GEOCHEMISTRY - The follow-up stream sediment sampling failed to repeat the anomalous copper result.

5) Area 7 & Area 8

GEOLOGY - Both areas are underlain by basic extrusive rocks of Unit 1, locally cut by quartz and epidote stringers. The quartz stringers commonly exhibit epidote selvage.

GEOCHEMISTRY - Follow-up stream sediment sampling confirmed the low order copper anomaly in Area 7, but transposed Area 8 from a low order zinc anomaly into a low order copper anomaly. Rock chip samples of the basic rocks show high background copper values which adequately explain the stream sediment geochemical anomalies.

6) Area 9

GEOLOGY - The area is underlain by basaltic agglomerate and tuff of Unit 2, cut by NW-trending quartz veins up to 0.4 m across. The quartz veins are exposed in abandoned gold diggings. Chalcopyrite is present in the quartz veins.

GEOCHEMISTRY - Follow-up stream sediment sampling confirmed the low order copper anomaly (peak values of 140 ppm). Rock chip samples of the quartz veins returned assays of 24 ppm Au and 4 ppm Au. The country rock adjacent to the veins returned no values for gold, but did return high background values for copper. Soil samples taken across the strike of the quartz veins confirm the high background copper values associated with the quartz veins (peak values of 140 ppm). The quartz veins with their high associated copper mineralisation adequately explains the stream sediment geochemical anomaly in this area.

7) Area 10

GEOLOGY - The area is underlain by basic extrusive rocks of Unit 1 showing extensive epidote and chlorite alteration. The alteration is believed to be caused by the hydrothermal effects of the adjacent Permian granite, probably acting on an originally lime rich basic rock to produce incipient skarns.

GEOCHEMISTRY - Follow-up stream sediment sampling confirmed the low order copper anomaly in this area (peaking at 75 ppm). Rock chip samples of the basic extrusives returned 40 to 95 ppm Copper. Soil sampling returned a peak of 100 ppm Cu, which is consistent with the rock chip values and adequately explains the stream sediment anomaly.

8) Area 11 - This area was identified as a separate copper and zinc anomaly by the original stream sediment survey.

GEOLOGY - The area is underlain by greenish-grey tuffaceous shale and basic extrusive rocks of Unit 1. No evidence of mineralisation was found in the anomalous drainage basin.

GEOCHEMISTRY - Follow-up stream sediment sampling was unable to confirm the original zinc anomaly and the original copper anomaly was transposed. The anomaly is attributed to high background copper in the basic extrusive rocks.

9) Anomaly 12

GEOCHEMISTRY - There was poor correlation between the original stream sediment survey and the follow-up stream sediment survey. This attributed to contamination from agricultural buildings which may have given rise to all the copper anomalies and one of the zinc anomalies. Soil sampling at the other zinc anomaly showed that it too is attributable to abandoned agricultural buildings.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Conventional geochemical techniques have failed to show any indication of massive sulphide deposits of volcanogenic origin within the ATP. No further work was recommended, and the ATP was relinquished.

RECORDER: Paul Blake

DATE: 02/03/1994.

COMPANY REPORT SUMMARY SHEET

CR: 6949 **STATUS:** Open

TITLE: A to P 1950M. Report for the Mines Department, Queensland, for the six month period ending 20 December 1978.

AUTHOR(S): J. Newton-Smith **DATE:** March 1979

ATP/EP No.: ATP 1950M

COMPANY HOLDING TITLE: Australian Anglo American Limited

COMPANY SUBMITTING REPORT: Australian Anglo American Limited

DATE GRANTED: 20/06/1978 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 20 km W of Mt Larcom

MINING DISTRICT:

MINES/PROSPECTS: Austerity and Mount Bennett Mines

EXPLORATION TARGETS\MODELS: base metals of volcanogenic origin

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To determine the potential of the Mt Holly beds as a host to base metal sulphide deposits of volcanogenic origin. The Capella Creek beds have been extensively prospected for volcanogenic sulphides, but the Mount Holly beds and Barmundoo beds appear to have been largely ignored.

GEOLOGY -

REGIONAL - The Mt Holly beds and the Barmundoo beds, together with their lateral equivalents, the Capella Creek beds, represents a sequence of Lower to Middle Devonian volcanic and volcanic derived sedimentary units which form the basement to the Yarrol Basin.

LOCAL - The published geological units of the Capella Creek beds and Mt Holly beds have been disregarded in favour of three distinct mappable units. Unit 1 comprises a sequence of volcanic agglomerate, tuffaceous sandstone, shale, mudstone, and minor chert. The tuffaceous sandstone varies from coarse to fine grained and small pebble bands have been observed. Limestone occurs in this unit at Ulam where it has been altered to marble by the adjacent Permian granite. Unit 2 consists largely of a sequence of green basaltic agglomerate to tuff with minor green trachyte tuff in the S. Isolated ignimbrite has also been observed. These pyroclastic rocks are interbedded with volcanic derived mudstone, siltstone, and minor sandstone. Lenticular bodies of fine grained pure crystalline limestone are located towards the top of the sequence. Unit 3 comprises a sequence of fine grained dacitic tuff with interbedded tuffaceous siltstone and mudstone. Unit 1 is regarded as the oldest of the units mapped but it is probably at least in part contemporaneous with Unit 2. Unit 1 is undoubtedly part of the Capella Creek beds, probably the lateral equivalents of the Lower Capella Creek beds. This unit is everywhere in fault contact with Unit 2, the fault being marked by a line of abandoned gold workings and quartz blows. The lower predominantly pyroclastic part of Unit 2 becomes finer in grain size to the SE with an increasing marine influence. The marine influence extended northwards in late Unit 2 time when coralline limestone accumulated around the flanks of the volcanic centres. The association of coralline limestone with the closing stage of basic to intermediate pyroclastic activity is also noted in the Calliope beds to the E of the Boyne Rift and it is considered that Unit 2 and the Calliope beds are lateral equivalents. A hiatus

separated Unit 2 from Unit 3 with a change from basic to acid volcanic activity and a probable reduction in the marine influence witnessed by the ignimbritic nature of the volcanic debris. If the correlation between Units 1 and 2 and the Lower Capella Creek beds is found to be valid, Unit 3 would represent the middle acid sequence of the Capella Creek beds.

The dominant structural feature of the ATP is a series of tightly folded NNW trending folds. Typically the anticlines have steeply dipping E limbs and more gently dipping W limbs. Overfolding has not been observed. Associated with this folding is a well developed slaty cleavage in the fine grained members and fracture cleavage in the more competent beds. Superimposed on the NNW fold axis is a secondary axis of open folding trending NE. A series of prominent NE trending linear features cross the area parallel to the major discordant granites at Diglum and Glassford.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - The review of previous prospecting activity indicates that this area was largely confined to the search for disseminated copper deposits associated with the intrusive rocks and the search for limestone deposits within the sedimentary units. In both cases, the exploration methods used were incompatible with a search for massive sulphide deposits.

GEOLOGICAL MAPPING - The ATP was mapped at 1:100,000 scale, with the mapping largely confined to roadcut exposures and was accomplished in 4 days.

GEOCHEMISTRY

- **stream sediment sampling** - A stream sediment survey was conducted over the area with 740 samples collected. The copper pattern reflects the shearing with associated gold mineralisation between Unit 1 and Unit 2. The zinc pattern is more diffuse but the same line of shearing can also be discerned. Lead values are uniformly low except for isolated anomalies attributed to roadside contamination. Statistical treatment of the results indicates that >65 ppm Cu, >35 ppm Pb, and >90 ppm Zn can be regarded as anomalous. 12 anomalous areas have been identified. (1) A zinc anomaly evident in one sample overlying Unit 2. (2) A lead anomaly evident in two samples overlying Permian granite intrusive into Unit 2. (3) A lead anomaly evident in two samples overlying Unit 2. (4) A low order zinc anomaly evident in one sample overlying Unit 2. (5) A copper anomaly evident in 6 samples (peaking at 110 ppm Cu) overlying shear zone between Units 1 & 2. Abandoned Mining Leases are known in the area. (6) A copper anomaly evident in one sample overlying Unit 1. (7) A copper anomaly evident in two samples overlying Unit 1, and is almost certainly related to the known mineralisation at Austerity Mine. (8) A zinc anomaly evident in one sample overlying Unit 1. (9) A copper anomaly evident in two samples overlying Unit 2. (10) A copper anomaly evident in one sample overlying Unit 1, and is probably related to gold mineralisation adjacent to the Mt Bennett Mine. (11) A copper/zinc anomaly evident in two samples overlying Unit 1 adjacent to Mt Bennett Mine. The anomaly is attributed to gold-bearing quartz veins. (12) A large complex Cu/Zn anomaly mainly underlain by Unit 2 and associated limestone with some Unit 1 in the SW. Part of the anomaly can be attributed to gold-bearing quartz veins and perhaps some of the copper response is due to the increase in pH of the streams by the presence of limestone. Much of the anomaly is unexplained. All of the anomalies will be investigated except for 2 & 3.

- **rock chip sampling** - A rock chip sample of ferruginous chert from Unit 1 returned an analysis of 10 ppm Cu, 10 ppm Pb, and 30 ppm Zn.

RECORDER: Paul Blake **DATE:** 02/03/1994.

COMPANY REPORT SUMMARY SHEET

CR: 7328 **STATUS:** Open

TITLE: A to P 1950M. Final report to the Mines Department for that part relinquished on June 20, 1979.

AUTHOR(S): J. Newton-Smith **DATE:** August 1979

ATP/EP No.: ATP 1950M

COMPANY HOLDING TITLE: Australian Anglo American Limited

COMPANY SUBMITTING REPORT: Australian Anglo American Limited

DATE GRANTED: 20/06/1978 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 20 km W of Mt Larcom

MINING DISTRICT:

MINES/PROSPECTS: Austerity and Mount Bennett Mines

EXPLORATION TARGETS/MODELS: base metals of volcanogenic origin

SUMMARY:

LOCALISED EXPLORATION/PROSPECTS

1) Area 1

GEOLOGY - The area is underlain by tuffaceous mudstone cut by gold-bearing quartz veins. Float of a coarse grained felsic rock was also found. The quartz veins are exposed in several small abandoned diggings.

GEOCHEMISTRY - Follow-up stream sediment sampling indicated a high order zinc anomaly with associated copper and lead in a small drainage basin. This high order response is attributed to scrap metal debris in the creek, but the original low order zinc anomaly was substantiated. The zinc response is attributed to gold-bearing quartz veins. Soil sampling across the abandoned diggings indicate a slight enhancement in copper and zinc values.

2) Area 4

GEOLOGY - The area is underlain by basaltic tuffs of Unit 2.

GEOCHEMISTRY - Follow-up stream sediment sampling failed to repeat the original anomalous zinc result.

3) Area 5

GEOLOGY - The area is underlain by basaltic tuff, tuffaceous sediments and limestone of Unit 2, and tuffaceous sediments of Unit 1. A major shear following the course of Diggers Creek separates the two units. Minor abandoned gold diggings in limestone are associated with this shear.

GEOCHEMISTRY - Follow-up stream sediment sampling failed to repeat the copper anomalies. A rock chip sample from the diggings, and rock chip samples from tuffaceous sediments W of the shear, showed no enhancement in copper, lead, or zinc.

4) Area 6

GEOLOGY - The area is underlain by tuffaceous sediments of Unit 1.

GEOCHEMISTRY - The follow-up stream sediment sampling failed to repeat the anomalous copper result.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The general low order of geochemical values is discouraging and the lack of correlation, particularly between copper and zinc, is indicative of high background situations and not reflective of volcanogenic massive sulphide mineralisation. Therefore the N part of the ATP was relinquished.

RECORDER: Paul Blake **DATE:** 02/03/1994.

COMPANY REPORT SUMMARY SHEET

CR: 7329 **STATUS:** Open

TITLE: A to P 1950M. Six monthly report to the Mines Department for that part retained on 20th June, 1979.

AUTHOR(S): J. Newton-Smith **DATE:** August 1979

ATP/EP No.: ATP 1950M

COMPANY HOLDING TITLE: Australian Anglo American Limited

COMPANY SUBMITTING REPORT: Australian Anglo American Limited

DATE GRANTED: 20/06/1978 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 20 km W of Mt Larcom

MINING DISTRICT:

MINES/PROSPECTS: Austerity and Mount Bennett Mines

EXPLORATION TARGETS/MODELS: base metals of volcanogenic origin

SUMMARY:

LOCALISED EXPLORATION/PROSPECTS

1) Area 7 & Area 8

GEOLOGY - Both areas are underlain by basic extrusive rocks of Unit 1, locally cut by quartz and epidote stringers. The quartz stringers commonly exhibit epidote selvage.

GEOCHEMISTRY - Follow-up stream sediment sampling confirmed the low order copper anomaly in Area 7, but transposed Area 8 from a low order zinc anomaly into a low order copper anomaly. Rock chip samples of the basic rocks show high background copper values which adequately explain the stream sediment geochemical anomalies.

2) Area 9

GEOLOGY - The area is underlain by basaltic agglomerate and tuff of Unit 2, cut by NW trending quartz veins up to 0.4 m across. The quartz veins are exposed in abandoned gold diggings. Chalcopyrite is present in the quartz veins.

GEOCHEMISTRY - Follow-up stream sediment sampling confirmed the low order copper anomaly (peak values of 140 ppm). Rock chip samples of the quartz veins returned assays of 24 ppm Au and 4 ppm Au. The country rock adjacent to the veins returned no values for gold, but did return high background values for copper. Soil samples taken across the strike of the quartz veins confirm the high background copper values associated with the quartz veins (peak values of 140 ppm). The quartz veins with their high associated copper mineralisation adequately explains the stream sediment geochemical anomaly in this area.

3) Area 10

GEOLOGY - The area is underlain by basic extrusive rocks of Unit 1 showing extensive epidote and chlorite alteration. The alteration is believed to be caused by the hydrothermal effects of the adjacent Permian granite, probably acting on an originally lime rich basic rock to produce incipient skarns.

GEOCHEMISTRY - Follow-up stream sediment sampling confirmed the low order copper anomaly in this area (peaking at 75 ppm). Rock chip samples of the basic extrusives returned 40 to 95 ppm Copper. Soil sampling returned a peak of 100 ppm Cu, which is consistent with the rock chip values and adequately explains the stream sediment anomaly.

4) Area 11 - This area was identified as a separate copper and zinc anomaly by the stream sediment survey in CR 6949.

GEOLOGY - The area is underlain by greenish-grey tuffaceous shale and basic extrusive rocks of Unit 1. No evidence of mineralisation was found in the anomalous drainage basin.

GEOCHEMISTRY - Follow-up stream sediment sampling was unable to confirm the original zinc anomaly and the original copper anomaly was transposed. The anomaly is attributed to high background copper in the basic extrusive rocks.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The anomalies in Areas 7, 8, 10, and 11 are attributed to high background copper values in basic extrusives. The anomaly in Area 9 is attributed to copper mineralisation associated with gold-bearing quartz veins. This leaves Area 12 to be covered by follow-up work.

RECORDER: Paul Blake

DATE: 02/03/1994.

COMPANY REPORT SUMMARY SHEET

CR: 7527 **STATUS:** Open

TITLE: A to P 1950M. Final report to the Mines Department.

AUTHOR(S): J. Newton-Smith **DATE:** November 1979

ATP/EP No.: ATP 1950M

COMPANY HOLDING TITLE: Australian Anglo American Limited

COMPANY SUBMITTING REPORT: Australian Anglo American Limited

DATE GRANTED: 20/06/1978 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 20 km W of Mt Larcom

MINING DISTRICT:

MINES/PROSPECTS: Austerity and Mount Bennett Mines

EXPLORATION TARGETS/MODELS: base metals of volcanogenic origin

SUMMARY:

LOCALISED EXPLORATION/PROSPECTS

1) Anomaly 12

GEOCHEMISTRY - There was poor correlation between the original stream sediment survey (CR 6949) and the follow-up stream sediment survey. This attributed to contamination from agricultural buildings which may have given rise to all the copper anomalies and one of the zinc anomalies. Soil sampling at the other zinc anomaly showed that it too is attributable to abandoned agricultural buildings.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Conventional geochemical techniques have failed to show any indication of massive sulphide deposits of volcanogenic origin within the ATP. No further work was recommended, and the ATP was relinquished.

RECORDER: Paul Blake **DATE:** 02/03/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 1951M

COMPANY HOLDING TITLE: Australian Anglo American Limited

COMPANY SUBMITTING REPORT: Australian Anglo American Limited

DATE GRANTED: 20/06/1978 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 40 km SW of Bajool

MINING DISTRICT:

MINES/PROSPECTS: Mt Raglan, Mt Turret, Spring Hill, & Cedar Vale Mines, and Area 1.

EXPLORATION TARGETS\MODELS: Copper, lead, & zinc

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File- 7071, 7309, 7310, 7568*

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To determine the potential of the Mt Holly beds as a host to base metal sulphide deposits of volcanogenic origin. The Capella Creek beds have been extensively prospected for volcanogenic sulphides, but the Mount Holly beds and Barmundoo beds appear to have been largely ignored.

GEOLOGY -

REGIONAL -The Mt Holly beds and the Barmundoo beds, together with their lateral equivalents, the Capella Creek beds, represents a sequence of Lower to Middle Devonian volcanic and volcanic derived sedimentary units which form the basement to the Yarrol Basin.

LOCAL - The published geological units of the Capella Creek beds and Mt Holly beds have been disregarded in favour of three distinct mappable units. Unit 1 comprises a sequence of volcanic agglomerate, tuffaceous sandstone, shale, mudstone, and minor chert. The tuffaceous sandstone varies from coarse to fine grained and small pebble bands have been observed. Unit 2 consists largely of a sequence of green basaltic agglomerate to tuff with minor green trachyte tuff in the S. Isolated ignimbrite has also been observed. These pyroclastic rocks are interbedded with volcanic derived mudstone, siltstone, and minor sandstone. Lenticular bodies of fine grained pure crystalline limestone are located towards the top of the sequence. Unit 3 comprises a sequence of fine grained dacitic tuff with interbedded tuffaceous siltstone and mudstone. Unit 1 is regarded as the oldest of the units mapped but it is probably at least in part contemporaneous with Unit 2. Unit 1 is undoubtedly part of the Capella Creek beds, probably the lateral equivalents of the Lower Capella Creek beds. This unit is everywhere in fault contact with Unit 2, the fault being marked by a line of abandoned gold workings and quartz blows. The lower predominantly pyroclastic part of Unit 2 becomes finer in grain size to the SE with an increasing marine influence. The marine influence extended northwards in late Unit 2 time when coralline limestone accumulated around the flanks of the volcanic centres. A hiatus separated Unit 2 from Unit 3 with a change from basic to acid volcanic activity and a probable reduction in the marine influence witnessed by the ignimbritic nature of the volcanic debris. If the correlation between Units 1 and 2 and the Lower Capella Creek beds is found to be valid, Unit 3 would represent the middle acid sequence of the Capella Creek beds.

The dominant structural feature of the ATP is a series of tightly folded NNW trending folds. Typically the anticlines have steeply dipping E limbs and more gently dipping W limbs. Overfolding has not been observed. Associated with this folding is a well developed slaty cleavage in the fine grained members and fracture cleavage in the more competent beds. Superimposed on the NNW fold axis is a secondary axis of open folding trending NE. A series of prominent NE trending linear features cross the area parallel to the major discordant granites at Diglum and Glassford.

MINERALISATION/ALTERATION - The principal mineral occurrences are shear controlled quartz veins containing minor gold. This mineralisation is confined to Units 1 and 2.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - International Nickel (ATP 994M).

GEOLOGICAL MAPPING - The ATP was covered by reconnaissance geological mapping at 1:100,000 scale. Mapping was largely confined to road cut exposures and was accomplished in two days

GEOCHEMISTRY

- **stream sediment sampling** - A stream sediment survey was carried out with 202 samples collected. The copper pattern reflects the shearing with associated gold mineralisation between Unit 1 and Unit 2 with the highest values present over Unit 2 in the NE part of the ATP. High zinc values complement the high copper values in the NE area. Lead values are uniformly low. The following 2 anomalies were defined; (**Area 1**) A large complex Cu/Zn anomaly mainly underlain by Unit 2 and associated limestone with some Unit 1 in the SW. Part of the anomaly can be attributed to gold-bearing quartz veins and perhaps some of the Cu response is due to the increase in pH of the streams by the presence of limestone. Much of the anomaly is unexplained. (**Area 2**) A copper anomaly evident in two samples underlain by Unit 1 and the anomaly is probably related to gold-bearing quartz veins. This area was also found to be anomalous by International Nickel (ATP 994M)

LOCALISED EXPLORATION/PROSPECTS

1) Area 1

GEOLOGY - Geological traversing of the area was completed. The area is largely underlain by basaltic agglomerate, tuff, and tuffaceous shale of Unit 2, with a large limestone outcrop to the N. Tuffaceous sandstone and shale of Unit 1 outcrop in the W, separated from Unit 2 by a prominent NW trending shear zone. Several minor shears parallel this major shear and contain minor gold-bearing quartz veins which are exposed in a series of shallow diggings.

GEOCHEMISTRY - Further stream sediment sampling was undertaken to validate the original anomaly. Three areas of coincident copper and zinc response are evident and received geological traversing. The copper/zinc anomaly in the S of the area is attributed to scrap metal debris in the creek and no further work is warranted. The copper/zinc anomaly in the NW of the area is attributed to abandoned gold diggings and no further work is warranted. The cause of the copper/zinc anomaly on the extreme N edge of the area has not been established. The several areas of monoelemental response are regarded as high background and were not investigated. Rock chip samples of pyritic basaltic tuff peaked at 90 ppm Cu and 90 ppm Zn and are not regarded as the source of the stream sediment anomaly. A soil survey was carried out over the anomaly in the extreme N of the area. The peak soil values were 160 ppm Cu and 460 ppm Zn. The results from the auger drilling showed no appreciable increase at depth. Rock chip sampling was carried out in the extreme N anomaly where outcrop permitted but the results were not given. The geochemical anomaly is attributed to high background values over basaltic tuffs and agglomerates and to cultural contamination.

DRILLING - In the anomaly in the extreme N of the area, auger holes were drilled to bedrock or to a maximum depth of 0.78 m to test for any enhancement in base metal values within the soil profile at depth.

2) Area 2 -

GEOLOGY - Geological traversing of the area was completed. The area is underlain by tuffs, tuffaceous sandstone and shale of Unit 1 cut by shear zones trending NW. This shearing is accompanied by minor quartz veining and local sericite and chlorite-hematite alteration.

GEOCHEMISTRY - Further stream sediment samples were collected to validate the original anomaly. The sampling failed to confirm this anomaly but located an area of high background copper values. Rock chip samples of altered tuff returned analyses of up to 290 ppm Cu, which adequately explain the stream sediment geochemical anomaly.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - No indications of massive sulphide deposits were found, and the tenement was relinquished.

RECORDER: Paul Blake

DATE: 02/03/1994.

COMPANY REPORT SUMMARY SHEET

CR: 7071 **STATUS:** Open

TITLE: A to P 1951M. Report to the Mines Department, Queensland, for the six month period ending 20 December 1978.

AUTHOR(S): J. Newton-Smith **DATE:** March 1979

ATP/EP No.: ATP 1951M

COMPANY HOLDING TITLE: Australian Anglo American Limited

COMPANY SUBMITTING REPORT: Australian Anglo American Limited

DATE GRANTED: 20/06/1978 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 40 km SW of Bajool

MINING DISTRICT:

MINES/PROSPECTS: Mt Raglan, Mt Turret, Spring Hill, and Cedar Vale Mines

EXPLORATION TARGETS/MODELS: Copper, lead, & zinc

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To determine the potential of the Mt Holly beds as a host to base metal sulphide deposits of volcanogenic origin. The Capella Creek beds have been extensively prospected for volcanogenic sulphides, but the Mount Holly beds and Barmundoo beds appear to have been largely ignored.

GEOLOGY -

REGIONAL - The Mt Holly beds and the Barmundoo beds, together with their lateral equivalents, the Capella Creek beds, represents a sequence of Lower to Middle Devonian volcanic and volcanic derived sedimentary units which form the basement to the Yarrol Basin.

LOCAL - The published geological units of the Capella Creek beds and Mt Holly beds have been disregarded in favour of three distinct mappable units. Unit 1 comprises a sequence of volcanic agglomerate, tuffaceous sandstone, shale, mudstone, and minor chert. The tuffaceous sandstone varies from coarse to fine grained and small pebble bands have been observed. Unit 2 consists largely of a sequence of green basaltic agglomerate to tuff with minor green trachyte tuff in the S. Isolated ignimbrite has also been observed. These pyroclastic rocks are interbedded with volcanic derived mudstone, siltstone, and minor sandstone. Lenticular bodies of fine grained pure crystalline limestone are located towards the top of the sequence. Unit 3 comprises a sequence of fine grained dacitic tuff with interbedded tuffaceous siltstone and mudstone. Unit 1 is regarded as the oldest of the units mapped but it is probably at least in part contemporaneous with Unit 2. Unit 1 is undoubtedly part of the Capella Creek beds, probably the lateral equivalents of the Lower Capella Creek beds. This unit is everywhere in fault contact with Unit 2, the fault being marked by a line of abandoned gold workings and quartz blows. The lower predominantly pyroclastic part of Unit 2 becomes finer in grain size to the SE with an increasing marine influence. The marine influence extended northwards in late Unit 2 time when coralline limestone accumulated around the flanks of the volcanic centres. The association of coralline limestone with the closing stage of basic to intermediate pyroclastic activity is also noted in the Calliope beds to the E of the Boyne Rift and it is considered that Unit 2 and the Calliope beds are lateral equivalents. A hiatus separated Unit 2 from Unit 3 with a change from basic to acid volcanic activity and a probable reduction

in the marine influence witnessed by the ignimbritic nature of the volcanic debris. If the correlation between Units 1 and 2 and the Lower Capella Creek beds is found to be valid, Unit 3 would represent the middle acid sequence of the Capella Creek beds.

The dominant structural feature of the ATP is a series of tightly folded NNW trending folds. Typically the anticlines have steeply dipping E limbs and more gently dipping W limbs. Overfolding has not been observed. Associated with this folding is a well developed slaty cleavage in the fine grained members and fracture cleavage in the more competent beds. Superimposed on the NNW fold axis is a secondary axis of open folding trending NE. A series of prominent NE trending linear features cross the area parallel to the major discordant granites at Diglum and Glassford.

MINERALISATION/ALTERATION - The principal mineral occurrences are shear controlled quartz veins containing minor gold. This mineralisation is confined to Units 1 and 2.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - International Nickel (ATP 994M)

GEOLOGICAL MAPPING - The ATP was covered by reconnaissance geological mapping at 1:100,000 scale. Mapping was largely confined to road cut exposures and was accomplished in two days

GEOCHEMISTRY

- **stream sediment sampling** - A stream sediment survey was carried out with 202 samples collected. The copper pattern reflects the shearing with associated gold mineralisation between Unit 1 and Unit 2 with the highest values present over Unit 2 in the NE part of the ATP. High zinc values complement the high copper values in the NE area. Lead values are uniformly low. The following 2 anomalies were defined; (**Area 1**) A large complex Cu/Zn anomaly mainly underlain by Unit 2 and associated limestone with some Unit 1 in the SW. Part of the anomaly can be attributed to gold-bearing quartz veins and perhaps some of the Cu response is due to the increase in pH of the streams by the presence of limestone. Much of the anomaly is unexplained. (**Area 2**) A copper anomaly evident in two samples underlain by Unit 1 and the anomaly is probably related to gold-bearing quartz veins. This area was also found to be anomalous by International Nickel (ATP 994M)

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Proposed work program for the following six month period is to follow-up the geochemical anomalies.

RECORDER: Paul Blake **DATE:** 01/03/1994.

COMPANY REPORT SUMMARY SHEET

CR: 7309 **STATUS:** Open

TITLE: A to P 1951M. Final report to the Mines Department for that part relinquished on June 20 1979.

AUTHOR(S): J. Newton-Smith **DATE:** August 1979

ATP/EP No.: ATP 1951M

COMPANY HOLDING TITLE: Australian Anglo American Limited

COMPANY SUBMITTING REPORT: Australian Anglo American Limited

DATE GRANTED: 20/06/1978 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 40 km SW of Bajool

MINING DISTRICT:

MINES/PROSPECTS: Mt Raglan, Mt Turret, Spring Hill, and Cedar Vale Mines

EXPLORATION TARGETS/MODELS: Copper, lead, & zinc

SUMMARY:

LOCALISED EXPLORATION/PROSPECTS

1) Area 2 - recognised from the stream sediment survey in CR 7071.

GEOLOGY - Geological traversing of the area was completed. The area is underlain by tuffs, tuffaceous sandstone and shale of Unit 1 cut by shear zones trending NW. This shearing is accompanied by minor quartz veining and local sericite and chlorite-hematite alteration.

GEOCHEMISTRY - Further stream sediment samples were collected to validate the original anomaly. The sampling failed to confirm this anomaly but located an area of high background copper values. Rock chip samples of altered tuff returned analyses of up to 290 ppm Cu, which adequately explain the stream sediment geochemical anomaly.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Geochemical techniques have failed to show any indication of massive sulphide deposits of volcanogenic origin in the S and NW parts of ATP 1951. Therefore these areas have been relinquished.

RECORDER: Paul Blake **DATE:** 01/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 7310 **STATUS:** Open

TITLE: A to P 1951M. Six monthly report to the Mines Department for that area retained on 20th June 1979.

AUTHOR(S): J. Newton-Smith **DATE:** August 1979

ATP/EP No.: ATP 1951M

COMPANY HOLDING TITLE: Australian Anglo American Limited

COMPANY SUBMITTING REPORT: Australian Anglo American Limited

DATE GRANTED: 20/06/1978 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 40 km SW of Bajool

MINING DISTRICT:

MINES/PROSPECTS: Mt Raglan, Mt Turret, Spring Hill, and Cedar Vale Mines

EXPLORATION TARGETS/MODELS: Copper, lead, & zinc

SUMMARY:

LOCALISED EXPLORATION/PROSPECTS

1) Area 1 - recognised from the stream sediment survey in CR 7071.

GEOLOGY - Geological traversing of the area was completed. The area is largely underlain by basaltic agglomerate, tuff, and tuffaceous shale of Unit 2, with a large limestone outcrop to the N. Tuffaceous sandstone and shale of Unit 1 outcrop in the W, separated from Unit 2 by a prominent NW trending shear zone. Several minor shears parallel this major shear and contain minor gold-bearing quartz veins which are exposed in a series of shallow diggings.

GEOCHEMISTRY - Further stream sediment sampling was undertaken to validate the original anomaly. Three areas of coincident copper and zinc response are evident and received geological traversing. The copper/zinc anomaly in the S of the area is attributed to scrap metal debris in the creek and no further work is warranted. The copper/zinc anomaly in the NW of the area is attributed to abandoned gold diggings and no further work is warranted. The cause of the copper/zinc anomaly on the extreme N edge of the area has not been established. The several areas of monoelemental response are regarded as high background and were not investigated. Rock chip samples of pyritic basaltic tuff peaked at 90 ppm Cu and 90 ppm Zn and are not regarded as the source of the stream sediment anomaly.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Proposed work program for the following six month period is to follow-up the N copper/zinc anomaly.

RECORDER: Paul Blake **DATE:** 01/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 7568 **STATUS:** Open

TITLE: A to P 1951M. Final report to the Mines Department.

AUTHOR(S): J. Newton-Smith **DATE:** November 1979

ATP/EP No.: ATP 1951M

COMPANY HOLDING TITLE: Australian Anglo American Limited

COMPANY SUBMITTING REPORT: Australian Anglo American Limited

DATE GRANTED: 20/06/1978 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 40 km SW of Bajool

MINING DISTRICT:

MINES/PROSPECTS: Mt Raglan, Mt Turret, Spring Hill, & Cedar Vale Mines, Area 1.

EXPLORATION TARGETS/MODELS: Copper, lead, & zinc

SUMMARY:

LOCALISED EXPLORATION/PROSPECTS

1) Area 1 - testing the anomaly at the extreme N edge of the area.

GEOLOGY - The area is underlain by basaltic agglomerate, tuff and tuffaceous shale of Unit 2. The tuff and agglomerate are locally chloritised and epidotised, and contain minor disseminated pyrite. Quartz veining commonly with minor pyrite is present throughout the area.

GEOCHEMISTRY - A soil survey was carried out. The peak values were 160 ppm Cu and 460 ppm Zn. The results from the auger drilling showed no appreciable increase at depth. Rock chip sampling was carried out where outcrop permitted but the results were not given. The geochemical anomaly is attributed to high background values over basaltic tuffs and agglomerates and to cultural contamination.

DRILLING - Auger holes were drilled to bedrock or to a maximum depth of 0.78 m to test for any enhancement in base metal values within the soil profile at depth.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - No indications of massive sulphide deposits were found, and the tenement was relinquished.

RECORDER: Paul Blake **DATE:** 02/03/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 2079M

COMPANY HOLDING TITLE: Australian Anglo American Limited

COMPANY SUBMITTING REPORT: Australian Anglo American Limited

DATE GRANTED: 19/02/1979 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 35 km ESE of Bajool

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS/MODELS: Copper, lead, zinc

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File- 7380, 7918*

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To determine the potential of Mt Holly beds to host base metal sulphides deposits of volcanogenic origin.

GEOLOGY -

REGIONAL - The Mt Holly beds, together with their lateral equivalents, the Barmundoo beds and the Capella Creek beds, represents a sequence of Lower to Middle Devonian volcanic and volcanic derived sedimentary units which form the basement to the Yarrol Basin.

LOCAL - The Mount Holly beds have been divided into three mappable units. Unit 1 comprises a sequence of volcanic agglomerate, tuffaceous sandstone, shale, mudstone, and minor chert. The tuffaceous sandstone varies from coarse to fine grained and small pebble bands have been observed. Unit 2 comprises a sequence of green basaltic agglomerate to tuff interbedded with volcanic derived mudstones, siltstones, and minor sandstones. A prominent slump horizon containing large blocks of tuffaceous sandstone and shale in a mudstone matrix occurs in a road cut on the old Bruce Highway (GR 823 668). Lenticular bodies of fine-grained pure crystalline limestone are located towards the top of the sequence. Unit 3 comprises a sequence of fine grained dacitic tuff with interbedded tuffaceous siltstone and mudstone. Unit 1 is regarded as the oldest of the units mapped but it is probably at least in part contemporaneous with Unit 2. Unit 1 is undoubtedly part of the Capella Creek beds, probably the lateral equivalents of the Lower Capella Creek beds. This unit is everywhere in fault contact with Unit 2, the fault being marked by a line of abandoned gold workings and quartz blows. The lower predominantly pyroclastic part of Unit 2 becomes finer in grain size to the SE with an increasing marine influence. The marine influence extended northwards in late Unit 2 time when coralline limestone accumulated around the flanks of the volcanic centres. A hiatus separated Unit 2 from Unit 3 with a change from basic to acid volcanic activity and a probable reduction in the marine influence witnessed by the ignimbritic nature of the volcanic debris. If the correlation between Units 1 and 2 and the Lower Capella Creek beds is found to be valid, Unit 3 would represent the middle acid sequence of the Capella Creek beds.

The dominant structural feature of the ATP is a series of tightly folded NNW trending folds. Typically the anticlines have steeply dipping E limbs and more gently dipping W limbs. Overfolding has not been observed. Associated with this folding is a well developed slaty cleavage in the fine grained members and fracture cleavage in the more competent beds. Superimposed on the NNW fold axis is a secondary axis of open folding trending NE. A series of prominent NE trending linear features cross the area parallel to the major discordant granites at Diglum and Glassford.

MINERALISATION/ALTERATION - No mineral occurrences are reported from the ATP, but minor shear controlled quartz veins containing gold and copper mineralisation are present in Units 1 and 2 to the N and S of the area.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Exploration for limestone by Darra (ATP 683M); Comalco (ATP 878M); and Dampier (ATP 1416M).

GEOLOGICAL MAPPING - The ATP was covered by reconnaissance geological mapping in a scale of 1:100,000. Mapping was largely confined to roadcut exposures and was accomplished in two days.

GEOCHEMISTRY

- **stream sediment sampling** - A -80 mesh stream sediment survey was conducted over the area. 10 anomalous areas were identified; (1) A Cu anomaly evident in one sample from a drainage basin close to the contact between Unit 2 and Unit 3. (2) A Cu anomaly evident in two samples from a drainage basin underlain by Unit 3. (3) A large Cu anomaly evident in 18 samples peaking at 125 ppm with minor enhancement in Zn values. The area is underlain by the contact between Unit 2 and Unit 3 with isolated limestone outcrops. (4) A large Cu anomaly evident in 12 samples, three of which show associated Zn anomalies. This area lies in the same stratigraphic position as Area 3 on the opposing flank of a syncline. (5) A zinc anomaly evident in three samples peaking at 125 ppm. The area is underlain by Unit 3. (6) A low order Zn response from one sample from a small drainage basin underlain by unit 3. (7) A highly anomalous Pb/Zn response from one sample from a small drainage basin underlain by Unit 3. Contamination is suspected. (8) A Zn anomaly evident in one sample from a small drainage basin close to the contact between Unit 2 and Unit 3. (9) A Zn anomaly evident in one sample from a drainage basin underlain by Unit 2. (10) A Cu and Zn anomaly evident in two samples underlain by Unit 2 close to a major shear separating Unit 2 from the Lower Carboniferous sediments of the Boyne Rift.

A follow-up stream sediment survey was carried out to validate the initial survey. The follow-up sampling failed to repeat anomalies in the following areas, Area 6, Area 7, and Area 8. The copper anomalies were confirmed in Area 1 (250 ppm Cu), Area 2, and Area 3; the copper and zinc anomalies were confirmed in Area 4 with peak values of 170 ppm Cu and 100 ppm Zn; the anomalous zinc in Area 5 was confirmed with a peak value of 150 ppm Zn; in Area 9, the survey confirmed the copper anomaly, but did not confirm the zinc anomaly; and in Area 10 the zinc anomaly was confirmed, but the copper anomaly was not confirmed. The copper anomalies are attributed to high background situations over basalt and basalt derived sediments. Zinc anomalies are attributed to high background situations over fine grained tuffaceous sediments.

- **rock chip sampling** - Rock chip samples collected of the basalt in Area 1 returned a maximum of 380 ppm Cu. Rock chip samples of basalt derived sediments in Area 3 returned a maximum of 196 ppm.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Conventional geochemical techniques have failed to show any indication of massive sulphide deposits of volcanogenic origin within the ATP. It is recommended that the tenement be relinquished.

RECORDER: Paul Blake

DATE: 25/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 7380 **STATUS:** Open

TITLE: Report to the Department of Mines, Queensland, for the six month period ending 19th August 1979. A to P 2079M

AUTHOR(S): J. Newton-Smith **DATE:** August 1979

ATP/EP No.: ATP 2079M

COMPANY HOLDING TITLE: Australian Anglo American Limited

COMPANY SUBMITTING REPORT: Australian Anglo American Limited

DATE GRANTED: 19/02/1979 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 35 km ESE of Bajool

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: Copper, lead, zinc

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To determine the potential of Mt Holly beds to host base metal sulphides deposits of volcanogenic origin.

GEOLOGY -

REGIONAL - The Mt Holly beds, together with their lateral equivalents, the Barmundoo beds and the Capella Creek beds, represents a sequence of Lower to Middle Devonian volcanic and volcanic derived sedimentary units which form the basement to the Yarrol Basin.

LOCAL - The Mount Holly beds have been divided into three mappable units. Unit 1 comprises a sequence of volcanic agglomerate, tuffaceous sandstone, shale, mudstone, and minor chert. The tuffaceous sandstone varies from coarse to fine grained and small pebble bands have been observed. Unit 2 comprises a sequence of green basaltic agglomerate to tuff interbedded with volcanic derived mudstones, siltstones, and minor sandstones. A prominent slump horizon containing large blocks of tuffaceous sandstone and shale in a mudstone matrix occurs in a road cut on the old Bruce Highway (GR 823 668). Lenticular bodies of fine-grained pure crystalline limestone are located towards the top of the sequence. Unit 3 comprises a sequence of fine grained dacitic tuff with interbedded tuffaceous siltstone and mudstone. Unit 1 is regarded as the oldest of the units mapped but it is probably at least in part contemporaneous with Unit 2. Unit 1 is undoubtedly part of the Capella Creek beds, probably the lateral equivalents of the Lower Capella Creek beds. This unit is everywhere in fault contact with Unit 2, the fault being marked by a line of abandoned gold workings and quartz blows. The lower predominantly pyroclastic part of Unit 2 becomes finer in grain size to the SE with an increasing marine influence. The marine influence extended northwards in late Unit 2 time when coralline limestone accumulated around the flanks of the volcanic centres. A hiatus separated Unit 2 from Unit 3 with a change from basic to acid volcanic activity and a probable reduction in the marine influence witnessed by the ignimbritic nature of the volcanic debris. If the correlation between Units 1 and 2 and the Lower Capella Creek beds is found to be valid, Unit 3 would represent the middle acid sequence of the Capella Creek beds.

The dominant structural feature of the ATP is a series of tightly folded NNW trending folds. Typically the anticlines have steeply dipping E limbs and more gently dipping W limbs. Overfolding has not been observed. Associated with this folding is a well developed slaty cleavage in the fine grained members and fracture cleavage in the more competent beds. Superimposed on the NNW fold axis is a secondary axis of open folding trending NE. A series of prominent NE trending linear features cross the area parallel to the major discordant granites at Diglum and Glassford.

MINERALISATION/ALTERATION - No mineral occurrences are reported from the ATP, but minor shear controlled quartz veins containing gold and copper mineralisation are present in Units 1 and 2 to the N and S of the area.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Exploration for limestone by Darra (ATP 683M); Comalco (ATP 878M); and Dampier (ATP 1416M).

GEOLOGICAL MAPPING - The ATP was covered by reconnaissance geological mapping in a scale of 1:100,000. Mapping was largely confined to roadcut exposures and was accomplished in two days.

GEOCHEMISTRY

- **stream sediment sampling** - A -80 mesh stream sediment survey was conducted over the area. 10 anomalous areas were identified; (1) A Cu anomaly evident in one sample from a drainage basin close to the contact between Unit 2 and Unit 3. (2) A Cu anomaly evident in two samples from a drainage basin underlain by Unit 3. (3) A large Cu anomaly evident in 18 samples peaking at 125 ppm with minor enhancement in Zn values. The area is underlain by the contact between Unit 2 and Unit 3 with isolated limestone outcrops. (4) A large Cu anomaly evident in 12 samples, three of which show associated Zn anomalies. This area lies in the same stratigraphic position as Area 3 on the opposing flank of a syncline. (5) A zinc anomaly evident in three samples peaking at 125 ppm. The area is underlain by Unit 3. (6) A low order Zn response from one sample from a small drainage basin underlain by unit 3. (7) A highly anomalous Pb/Zn response from one sample from a small drainage basin underlain by Unit 3. Contamination is suspected. (8) A Zn anomaly evident in one sample from a small drainage basin close to the contact between Unit 2 and Unit 3. (9) A Zn anomaly evident in one sample from a drainage basin underlain by Unit 2. (10) A Cu and Zn anomaly evident in two samples underlain by Unit 2 close to a major shear separating Unit 2 from the Lower Carboniferous sediments of the Boyne Rift.

RECORDER: Paul Blake

DATE: 25/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 7918 **STATUS:** Open

TITLE: Final report to the Department of Mines, Queensland. Authority to Prospect 2079M, Mt Larcom.

AUTHOR(S): J. Newton-Smith **DATE:** February 1980

ATP/EP No.: ATP 2079M

COMPANY HOLDING TITLE: Australian Anglo American Limited

COMPANY SUBMITTING REPORT: Australian Anglo American Limited

DATE GRANTED: 19/02/1979 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 35 km ESE of Bajool

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: Copper, lead, zinc

SUMMARY:

REGIONAL EXPLORATION

GEOCHEMISTRY

- **stream sediment sampling** - Further stream sediment sampling was carried out to validate the initial survey. The follow-up sampling failed to repeat anomalies in the following areas, Area 6, Area 7, and Area 8. The copper anomalies were confirmed in Area 1 (250 ppm Cu), Area 2, and Area 3; the copper and zinc anomalies were confirmed in Area 4 with peak values of 170 ppm Cu and 100 ppm Zn; the anomalous zinc in Area 5 was confirmed with a peak value of 150 ppm Zn; in Area 9, the survey confirmed the copper anomaly, but did not confirm the zinc anomaly; and in Area 10 the zinc anomaly was confirmed, but the copper anomaly was not confirmed. The copper anomalies are attributed to high background situations over basalt and basalt derived sediments. Zinc anomalies are attributed to high background situations over fine grained tuffaceous sediments.

- **rock chip sampling** - Rock chip samples collected of the basalt in Area 1 returned a maximum of 380 ppm Cu. Rock chip samples of basalt derived sediments in Area 3 returned a maximum of 196 ppm.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Conventional geochemical techniques have failed to show any indication of massive sulphide deposits of volcanogenic origin within the ATP. It is recommended that the tenement be relinquished.

RECORDER: Paul Blake **DATE:** 25/02/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 2149M

COMPANY HOLDING TITLE: Southern Pacific Petroleum NL and Central Pacific Minerals NL

COMPANY SUBMITTING REPORT:

DATE GRANTED: 22/06/1979

PERIOD:

1:100 000 SHEET NAME(S): Bajool & Gladstone

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Two areas; one N of Mt Larcom, other 3 km SW of Yarwun

MINING DISTRICT:

MINES/PROSPECTS: McCabe Limestone Prospect

EXPLORATION TARGETS/MODELS: Limestone

TRANSFERS, JOINT VENTURES, etc: JV between Southern Pacific Petroleum NL and Central Pacific Minerals NL

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File-* 7661, 8139, 8393, 9925

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To cover potential supplies of limestone which are needed for sulphur control in the Rundle Oil Shale Project.

GEOLOGY -

LOCAL - The ATP area is underlain by clastic, volcanoclastic and volcanic rocks of the Devonian-Carboniferous Yarrol Basin Sequence. The limestone units investigated are Lower Carboniferous (Visean) in age, and are part of the Caswell Creek Group.

The S area is underlain by 3 generalised units. The E unit comprises brown and grey shales and dark green and grey basic volcanics. The central zone is similar to the E zone, except that it contains a significant proportion of quartzites. The W area is dominated by basic volcanics with minor limestones. All units dip steeply to the W and are of Devonian or Lower Carboniferous age. A small portion of the Targinie Adamellite intrudes the E unit at the N margin of the area. The limestones in the area are all less than 10 m thick. Five limestone bands have been identified and reserves have been estimated; band 1 is 1,001,200 tonnes; band 2 is 1,430,300 tonnes; band 3 is 858,300 tonnes; band 4 is 858,300 tonnes; and band 5 is unsuitable. The reserves cited for bands 1, 2, and 3 are conjectural as the outcrop is poor. The reserves for band 4 are regarded as reasonably assured.

The N area is underlain by a series extending from Lower Devonian to Upper Carboniferous, but faulted in a complex fashion in the central section. The lithologies involved include shales, lavas, tuffs, conglomerates, greywackes and sandstones, but the unit of particular interest is a crinoidal limestone. The limestone is clean with limited detrital matter. Abundant crinoid plates occur in the lower section, along with brachiopods and various algal, coralline, and foraminiferal remains. The type section is 65 m thick, but generally the thickness would appear to be somewhat less, around 40 m. The reserves in this area are not by no means large (25.9 million tonnes), but the greater thickness and flatter dip makes the situation more attractive than the S area.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Q.C.L. investigated the area as a possible limestone source.

GEOLOGICAL MAPPING - The N area was mapped by Jell (1961) as part of an honours thesis, and the map is included in the report. Reconnaissance geological mapping was carried out in the S area by traversing and aerial photography.

GEOCHEMISTRY

- **stream sediment sampling** - 430 -80 mesh reconnaissance stream sediment samples were collected to cover both areas. In the S area, copper ranged from 8 to 75 ppm, lead ranged from 5 to 25 ppm, and zinc ranged from 25 to 180 ppm. In the N area, copper ranged from 10 to 25 ppm; lead ranged from 5 to 50 ppm; and zinc ranges from 20 to 90 ppm. No obvious mineralisation is related to the samples considered anomalous.

LOCALISED EXPLORATION/PROSPECTS

1)McCabe Limestone Prospect - unnamed until CR 9925, and was referred to in these summaries as the Mt Larcom area.

GEOLOGY - The limestone is 60 to 75 m thick, and dips southerly between 60 and 70°. The limestone is split into two distinct beds by an igneous unit in one hole, and a tuffaceous calcarenite in another hole. The limestone is highly fossiliferous at the top and bottom. It ranges from calcarenitic types to intraformational breccias. An extrusive igneous rock occurring within the limestone is described as an altered porphyritic lava. Underlying the limestone is tuffaceous pelite ranging from silty to argillaceous siltstone with pervasive carbonaceous matter (Gonong Creek Formation). Overlying the limestone is a lithic crystal tuff of felsic intermediate affinity (Zebu Gully Formation). Abundant pyrite was observed associated with fractures. The environment of deposition of these units is considered to be a bank or marginal reef with proximal volcanism and having a turbulent tidal current component.

DRILLING - 5 holes were drilled to assess continuity of the limestone bed in the area. A total of 532 m were drilled, of which 503.5 was cored. Given that the strike length of the limestone is 984 m, there is an estimated 25.9 million tonnes of limestone.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Given that a full-scale commercial operation for shale oil at Rundle appears to be at least a decade away, continuing exploration for limestone reserves cannot be justified at present.

RECORDER: Paul Blake **DATE:** 24/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 7661 **STATUS:** Open

TITLE: Progress report, Authority to Prospect 2149M, 22nd June, 1979 to 21st January, 1980

AUTHOR(S): R. Fidler **DATE:** March 1980

ATP/EP No.: ATP 2149M

COMPANY HOLDING TITLE: Southern Pacific Petroleum NL

COMPANY SUBMITTING REPORT:

DATE GRANTED: 22/06/1979 **PERIOD:**

1:100 000 SHEET NAME(S): Bajool & Gladstone

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Two areas; one N of Mt Larcom, other 3 km SW of Yarwun

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: Limestone

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To cover potential supplies of limestone which are needed for sulphur control in the Rundle Oil Shale Project.

GEOLOGY -

LOCAL - The S area is underlain by 3 generalised units. The E unit comprises brown and grey shales and dark green and grey basic volcanics. The central zone is similar to the E zone, except that it contains a significant proportion of quartzites. The W area is dominated by basic volcanics with minor limestones. All units dip steeply to the W and are of Devonian or Lower Carboniferous age. A small portion of the Targinie Adamellite intrudes the E unit at the N margin of the area. The limestones in the area are all less than 10 m thick. Five limestone bands have been identified and reserves have been estimated; band 1 is 1,001,200 tonnes; band 2 is 1,430,300 tonnes; band 3 is 858,300 tonnes; band 4 is 858,300 tonnes; and band 5 is unsuitable. The reserves cited for bands 1, 2, and 3 are conjectural as the outcrop is poor. The reserves for band 4 are regarded as reasonably assured.

The N area is underlain by a series extending from Lower Devonian to Upper Carboniferous, but faulted in a complex fashion in the central section. The lithologies involved include shales, lavas, tuffs, conglomerates, greywackes and sandstones, but the unit of particular interest is a crinoidal limestone. The limestone is clean with limited detrital matter. Abundant crinoid plates occur in the lower section, along with brachiopods and various algal, coralline, and foraminiferal remains. The type section is 65 m thick, but generally the thickness would appear to be somewhat less, around 40 m. The reserves in this area are not by no means large, but the greater thickness and flatter dip makes the situation more attractive than the S area.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Q.C.L. investigated the area as a possible limestone source.

GEOLOGICAL MAPPING - The N area was mapped by Jell (1961) as part of an honours thesis, and the map is included in the report. Reconnaissance geological mapping was carried out in the S area by traversing and aerial photography.

GEOCHEMISTRY

- **stream sediment sampling** - 430 -80 mesh reconnaissance stream sediment samples were collected to cover both areas. In the S area, copper ranged from 8 to 75 ppm, lead ranged from 5 to 25 ppm, and zinc ranged from 25 to 180 ppm. In the N area, copper ranged from 10 to 25 ppm; lead ranged from 5 to 50 ppm; and zinc ranges from 20 to 90 ppm. No obvious mineralisation is related to the samples considered anomalous. Resampling of the anomalous sites should be carried out.

RECORDER: Paul Blake

DATE: 24/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 8139 **STATUS:** Open

TITLE: Progress report - A to P 2149M. 21 January - 22 June, 1980.

AUTHOR(S): **DATE:**

ATP/EP No.: ATP 2149M

COMPANY HOLDING TITLE: Southern Pacific Petroleum NL and Central Pacific Minerals NL

COMPANY SUBMITTING REPORT:

DATE GRANTED: 22/06/1979 **PERIOD:**

1:100 000 SHEET NAME(S): Bajool & Gladstone

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Two areas; one N of Mt Larcom, other 3 km SW of Yarwun

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: Limestone

SUMMARY:

GEOLOGY -

LOCAL - The ATP area is underlain by clastic, volcanoclastic and volcanic rocks of the Devonian-Carboniferous Yarrol Basin Sequence. The limestone units investigated are Lower Carboniferous (Visean) in age, and are part of the Caswell Creek Group.

LOCALISED EXPLORATION/PROSPECTS

1) Mt Larcom area (called McCabe Limestone Prospect in CR 9925)

GEOLOGY - The limestone is 60 to 75 m thick, and dips southerly between 60 and 70°. The limestone is split into two distinct beds by an igneous unit in one hole, and a tuffaceous calcarenite in another hole. The limestone is highly fossiliferous at the top and bottom. It ranges from calcarenitic types to intraformational breccias. An extrusive igneous rock occurring within the limestone is described as an altered porphyritic lava. Underlying the limestone is tuffaceous pelite ranging from silty to argillaceous siltstone with pervasive carbonaceous matter (Gonong Creek Formation). Overlying the limestone is a lithic crystal tuff of felsic intermediate affinity (Zebu Gully Formation). Abundant pyrite was observed associated with fractures. The environment of deposition of these units is considered to be a bank or marginal reef with proximal volcanism and having a turbulent tidal current component.

DRILLING - 3 holes were drilled to assess continuity of the limestone bed in the area. A total of 316.5 m were drilled, of which 288 was cored. Given that the strike length of the limestone is 984 m, there is an estimated 25.9 million tonnes of limestone.

RECORDER: Paul Blake **DATE:** 24/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 8393 **STATUS:** Open

TITLE: Relinquishment report for Authority to Prospect 2149 M.

AUTHOR(S): D.A. Henstridge **DATE:** December 1980

ATP/EP No.: ATP 2149M

COMPANY HOLDING TITLE: Southern Pacific Petroleum NL and Central Pacific Minerals NL

COMPANY SUBMITTING REPORT:

DATE GRANTED: 22/06/1979 **PERIOD:**

1:100 000 SHEET NAME(S): Bajool & Gladstone

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Two areas; one N of Mt Larcom, other 3 km SW of Yarwun

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: Limestone

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The entire S area and part of the N area were relinquished. None of the areas relinquished returned significantly anomalous stream sediment results, and no large bodies of limestone occur in these areas.

RECORDER: Paul Blake **DATE:** 24/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 9925 **STATUS:** Open

TITLE: Final report for Authority to Prospect 2149M (McCabe Limestone Prospect).

AUTHOR(S): D.A. Henstridge **DATE:** February 1982

ATP/EP No.: ATP 2149M

COMPANY HOLDING TITLE: Southern Pacific Petroleum NL and Central Pacific Minerals NL

COMPANY SUBMITTING REPORT:

DATE GRANTED: 22/06/1979 **PERIOD:**

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: North of Mt Larcom.

MINING DISTRICT:

MINES/PROSPECTS: McCabe Limestone Prospect

EXPLORATION TARGETS\MODELS: Limestone

SUMMARY:

LOCALISED EXPLORATION/PROSPECTS

1) McCabe Limestone Prospect

DRILLING - 2 core holes were drilled to access continuity of limestone beds, with a total depth of 215.5 m. One hole intersected 60 m of limestone, while the other intersected a fault at 43.5 m and was stopped.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Given that a full-scale commercial operation for shale oil at Rundle appears to be at least a decade away, continuing exploration for limestone reserves cannot be justified at present.

RECORDER: Paul Blake **DATE:** 24/02/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 2581M

COMPANY HOLDING TITLE: Getty Oil Development Company

COMPANY SUBMITTING REPORT: Getty Oil Development Company

DATE GRANTED: September, 1980 **PERIOD:** 6 months

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Approximately 40 kms W of Rockhampton

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: precious and base metals

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File- 8748*

SUMMARY:

REASON FOR ACQUISITION OF TITLE - Possible similarities between the Mount Morgan pipe structure and the Dee circular structure identified in the area using a Landsat image. And also a possible contact pyrometasomatic mineralisation related to an intrusive at depth.

Postulated that the 'Dee Structure' may be an underlying deposit in the Capella Creek Beds.

GEOLOGY -

REGIONAL - The major rock units within the immediate vicinity of the A to P are the Middle Devonian Capella Creek Beds, Mount Morgan Tonalite and the Upper Devonian Dee Volcanics. The report examines these units based on the descriptions provided by Kirkegaard and others (1970).

MINERALISATION/ALTERATION - Mount Morgan (Devonian?) and Mount Chalmers (Permian?) volcanogenic copper gold deposits. Both are lensoid to pipelike deposits consisting of massive sulphide to siliceous stringer of disseminated gold ore. They are associated with crude circular to dome-like features, and occur within rhyolitic to dacitic volcanic sequences. Minor native copper and chalcocite mineralisation is associated with an andesite tuff in the Dee Volcanics but is considered to be too low grade and irregular for a sustained mining operation.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION -Geopeko Ltd. (ATP 508M) did reconnaissance stream sediment sampling, regional geological mapping, and grid based geochemical sampling and mapping of copper occurrences in the Dee Volcanics. The geochemical results were poor and the grid area was not anomalous.

LOCALISED EXPLORATION/PROSPECTS1)The Dee Grid Area

GEOLOGY - Agglomerates, dacitic volcanics, ashflow tuffs and andesitic volcanics of the Upper Devonian Dee Volcanics. (Associated with the agglomerates are minor outcrops of pyritic tuff and flow banded ?rhyolite.

GEOCHEMISTRY - 204 minus 80 mesh soil samples were collected and assayed for Cu, Pb, Zn, Ba and As. Results were discouraging with copper contours reflecting background for andesitic volcanics, while Pb, An, and As were only 40 ppm, 100 ppm, and 5 ppm respectively.

GEOPHYSICS - Geoterrex Pty Ltd carried out five lines of dipole to dipole IP over the Dee Grid. Several lines show horizontal layering probably caused by weathering. No significant anomalies were detected.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Drilling not justified due to circular structures probably being related to unexposed granitic intrusive rather than underlying ore body. Dee Volcanics of the area are unprospective, as opposed to the more favourable Capella Creek Beds.

RECORDER: Simon Crouch

DATE:17/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 8748 **STATUS:** Open

TITLE: Authority to Prospect 2581M, Dee - Queensland. Six monthly and final report.

AUTHOR(S): G. Hamilton **DATE:** March, 1981

ATP/EP No.: ATP 2581M

COMPANY HOLDING TITLE: Getty Oil Development Company

COMPANY SUBMITTING REPORT: Getty Oil Development Company

DATE GRANTED: September, 1980 **PERIOD:** 6 months

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Approximately 40 kms W of Rockhampton

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS/MODELS: precious and base metals

SUMMARY:

REASON FOR ACQUISITION OF TITLE - Possible similarities between the Mount Morgan pipe structure and the Dee circular structure identified in the area using a Landsat image. And also a possible contact pyrometasomatic mineralisation related to an intrusive at depth. Postulated that the 'Dee Structure' may be an underlying deposit in the Capella Creek Beds.

GEOLOGY -

REGIONAL - The major rock units within the immediate vicinity of the A to P are the Middle Deconian Capella Creek Beds, Mount Morgan Tonalite and the Upper Devonian Dee Volcanics. The report examines these units based on the descriptions provided by Kirkegaard and others (1970).

MINERALISATION/ALTERATION - Mount Morgan (Devonian?) and Mount Chalmers (Permian?) volcanogenic copper gold deposits. Both are lensoid to pipelike deposits consisting of massive sulphide to siliceous stringer of disseminated gold ore. Associated with crude circular to dome-like features, they occur within rhyolitic to dacitic volcanic sequences. Minor native copper and chalcocite mineralisation is associated with an andesite tuff in the Dee Volcanics but is considered to be too low grade and irregular for a sustained mining operation.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION -Geopeko Ltd. (ATP 508M) did reconnaissance stream sediment sampling, regional geological mapping, and grid based geochemical sampling and mapping of copper occurrences in the Dee Volcanics. The geochemical results were poor.

LOCALISED EXPLORATION/PROSPECTS

1)The Dee Grid Area

GEOLOGY - Agglomerates, dacitic volcanics, ashflow tuffs and andesitic volcanics of the Upper Devonian Dee Volcanics. (Agglomerates associated with minor outcrops of pyritic tuff and flow banded ?rhyolite).

GEOCHEMISTRY - 204 minus 80 mesh soil samples were collected and assayed for Cu, Pb, Zn, Ba and As. Results were discouraging with copper contours reflecting background for andesitic volcanics, while Pb, An, and As were only 40 ppm, 100 ppm, and 5 ppm respectively.

GEOPHYSICS - Geoterrex Pty Ltd carried out five lines of dipole to dipole IP over the Dee Grid. Several lines show horizontal layering probably caused by weathering. No significant anomalies were detected.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Drilling not justified due to circular structures probably being related to unexposed granitic intrusive rather than underlying ore body. Dee Volcanics of the area are unprospective, as opposed to the more favourable Capella Creek Beds.

RECORDER: Simon Crouch **DATE:** 17/02/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 2607M

COMPANY HOLDING TITLE: Electrolytic Zinc Co., A/Asia Ltd.

COMPANY SUBMITTING REPORT: Electrolytic Zinc Co., A/Asia Ltd.

DATE GRANTED: 22/09/1980 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Approximately 60 km S of Rockhampton

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: base and precious metals

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File- 9120*

SUMMARY:

REASON FOR ACQUISITION OF TITLE - Explore for base and precious metals. Targeting of anomalies.

GEOLOGY -

REGIONAL - Located on the eastern Rockhampton Block known as the Mount Larcom-Mount Holly Fault Block. Details of the regional geology can be found in the Rockhampton-Port Clinton 1:250 000 Sheet Area report by Kirkegaard & others (1970). ATP 2607M covers Raglan, Ulam and Langmorn goldfields.

LOCAL - Kennecott Exploration conducted porphyry copper exploration over the Bajool Granodiorite with interest in a series of quartz breccia pipes and the Limonite Hill prospect.

MINERALISATION/ALTERATION - The Limonite Hill prospect contains fracture and vein controlled chalcopyrite and molybdenum mineralisation associated with weak to moderate quartz-sericite-pyrite alteration in a small granodiorite-quartz monzonite porphyry complex.

No significant indications of mineralisation found apart from old workings. Several manganiferous gossanous ironstones and jasper bodies containing limonite casts after pyrite were analysed but were not enriched in base or precious metals.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Summary of the old gold fields are detailed in Kirkegaard & others (1970). For limestone reserves Dampier Mining (ATP 1416: 1974-1977) drill tested the limestone sequence at Hut Creek-Machine Creek area. Kennecott Exploration (ATP 667M: 1969-1970) and Esso Australia Ltd. (ATP 1087M: 1972-1973) conducted porphyry copper exploration over the Bajool Granodiorite. Australian Anglo American Prospecting Ltd. explored ATP's 1950M, 1951M, and 2079M in the Marmor-Raglan-Mount Larcom district.

GEOLOGICAL MAPPING - Seven thousand metre thick type section of the Mount Holly Beds between Ambrose and Horrigan Creek. Two sequences based on reconnaissance mapping and Anglo American's petrographic descriptions.

1) Unit 1 - A 2200 m thick unit equivalent to D2 Anglo American (Newton-Smith, 1979). Outcrops in a series of anticlinal structures composed of coarse to fine-grained volcanoclastics, siltstones, mudstones, and weakly pyritic radiolarian cherts, with interbedded green felsic to mafic tuffs, basalts and limestone lenses. Several strike faults at base of sequence. Central part of unit Gedinnian (Lower Devonian) in age based on conodont and coral fauna. Limestone fauna presumably higher in the unit gives an upper Lower Devonian to lower Middle Devonian age.

2) Unit 2 - Equivalent to Anglo American's D3 sequence, and conformable to Unit 1. Best exposure in synclinal structure in a belt extending from N of Mount Erebus to the Mount Raglan-Mount Turrett area W of Bracewell. Green to mottled pink, massive unsorted and possibly welded rhyolitic and dacitic ash tuffs, with subordinate andesitic tuffs and porphyritic basalts. Also, minor interbedded siltstone, tuffaceous arenites and mudstone. Near top of unit limestone fauna of lower Middle Devonian age. The volcanic lithologies are altered and metamorphosed to actinolite stage of the greenschist facies.

Several unnamed Permian granodiorite plutons outcrop to the west of ATP 2607. Minor diorite intrusions such as at the Queenslander Mine, and occasional quartz feldspar porphyry and feldspar porphyry dykes intruding the Mount Holly Beds also occur.

No structural analysis was attempted. Available data indicates the Mount Holly Beds and equivalents are broadly folded along NNE axes spaced 2-4 km apart. Metamorphism probably occurred during a Mid Devonian orogenic episode. A second period of tectogenesis in the Mid to Late Permian produced minor tightening of fold axes.

GEOCHEMISTRY

- **stream sediment sampling** - Four hundred and one samples were taken and analysed for Cu, Pb, Zn and Ag. Data Set A represented drainage from sequences within Unit 1, and Data Set B represented drainage from pyroclastics and minor associated flows mostly within Unit 2. Results similar to those obtained by Aust. Anglo American (1979). Their data proved useful in planning detailed geochemical sampling to fully check and outline anomalous zones. In general, background and threshold levels were higher in Group 2 than in Group 1, and within Unit 1 volcanic sequences (particularly mafic), had higher background than adjacent sediments.

LOCALISED EXPLORATION/PROSPECTS

GEOLOGY - Three major, and a number of minor multi element and single element anomalies have been delineated. These are A, B, and C, all within Unit 1.

A) Little Horrigan Creek Area - Zn and As anomaly within siltstone to mudstone and lesser limestone and chert.

B) Little Scrubby Creek Area - Moderate widespread Cu anomaly (up to 120 ppm) within albite-epidote-chlorite±actinolite altered pyroclastic and plagioclase - porphyritic basalt.

C) Bracewell - Cedarvale Area - Broad complex zone composed of numerous individual, often multi-element anomalies.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Recommended follow up sampling, with anomalies mapped and fully defined by grid soil sampling and/or rock chip sampling. Relinquished ATP 2607 to be granted ATP 3001 which encompasses the former.

RECORDER: Simon Crouch **DATE:** 18/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 9120 **STATUS:** Open

TITLE: Raglan - Gladstone Mining District, Queensland. First sixth monthly and final report.

AUTHOR(S): R.J. Close & D.J. Whitten **DATE:** May, 1981

ATP/EP No.: ATP 2607M

COMPANY HOLDING TITLE: Electrolytic Zinc Co., A/Asia Ltd.

COMPANY SUBMITTING REPORT: Electrolytic Zinc Co., A/Asia Ltd.

DATE GRANTED: 22/09/1980 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Approximately 60 km S of Rockhampton

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS/MODELS: base and precious metals

SUMMARY:

REASON FOR ACQUISITION OF TITLE - Explore for base and precious metals. Targeting of anomalies.

GEOLOGY -

REGIONAL - Located on the eastern Rockhampton Block known as the Mount Larcom-Mount Holly Fault Block. Details of the regional geology can be found in the Rockhampton-Port Clinton 1:250 000 Sheet Area report by Kirkegaard & others (1970). ATP 2607M covers Raglan, Ulam and Langmorn goldfields.

LOCAL - Kennecott Exploration conducted porphyry copper exploration over the Bajool Granodiorite with interest in a series of quartz breccia pipes and the Limonite Hill prospect.

MINERALISATION/ALTERATION - The Limonite Hill prospect contains fracture and vein controlled chalcopyrite and molybdenum mineralisation associated with weak to moderate quartz-sericite-pyrite alteration in a small granodiorite-quartz monzonite porphyry complex.

No significant indications of mineralisation found apart from old workings. Several manganiferous gossanous ironstones and jasper bodies containing limonite casts after pyrite were analysed but were not enriched in base or precious metals.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Summary of the old gold fields are detailed in Kirkegaard & others (1970). For limestone reserves Dampier Mining (ATP 1416: 1974-1977) drill tested the limestone sequence at Hut Creek-Machine Creek area. Kennecott Exploration (ATP 667M: 1969-1970) and Esso Australia Ltd. (ATP 1087M: 1972-1973) conducted porphyry copper exploration over the Bajool Granodiorite. Australian Anglo American Prospecting Ltd. explored ATP's 1950M, 1951M, and 2079M in the Marmor-Raglan-Mount Larcom district.

GEOLOGICAL MAPPING - Seven thousand metre thick type section of the Mount Holly Beds between Ambrose and Horrigan Creek. Two sequences based on reconnaissance mapping and Anglo American's petrographic descriptions.

1) Unit 1 - A 2200 m thick unit equivalent to D2 Anglo American (Newton-Smith, 1979). Outcrops in a series of anticlinal structures composed of coarse to fine-grained volcanoclastics, siltstones, mudstones, and weakly pyritic radiolarian cherts, with interbedded green felsic to mafic tuffs, basalts and limestone lenses. Several strike faults at base of sequence. Central part of unit Gedinnian (Lower Devonian) in age based on conodont and coral fauna. Limestone fauna presumably higher in the unit gives an upper Lower Devonian to lower Middle Devonian age.

2) Unit 2 - Equivalent to Anglo American's D3 sequence, and conformable to Unit 1. Best exposure in synclinal structure in a belt extending from N of Mount Erebus to the Mount Raglan-Mount Turrett area W of Bracewell. Green to mottled pink, massive unsorted and possibly welded rhyolitic and dacitic ash tuffs, with subordinate andesitic tuffs and porphyritic basalts. Also, minor interbedded siltstone, tuffaceous arenites and mudstone. Near top of unit limestone fauna of lower Middle Devonian age. The volcanic lithologies are altered and metamorphosed to actinolite stage of the greenschist facies.

Several unnamed Permian granodiorite plutons outcrop to the west of ATP 2607. Minor diorite intrusions such as at the Queenslander Mine, and occasional quartz feldspar porphyry and feldspar porphyry dykes intruding the Mount Holly Beds also occur.

No structural analysis was attempted. Available data indicates the Mount Holly Beds and equivalents are broadly folded along NNE axes spaced 2-4 km apart. Metamorphism probably occurred during a Mid Devonian orogenic episode. A second period of tectogenesis in the Mid to Late Permian produced minor tightening of fold axes.

GEOCHEMISTRY

- **stream sediment sampling** - Four hundred and one samples were taken and analysed for Cu, Pb, Zn and Ag. Data Set A represented drainage from sequences within Unit 1, and Data Set B represented drainage from pyroclastics and minor associated flows mostly within Unit 2. Results similar to those obtained by Aust. Anglo American (1979). Their data proved useful in planning detailed geochemical sampling to fully check and outline anomalous zones. In general, background and threshold levels were higher in Group 2 than in Group 1, and within Unit 1 volcanic sequences (particularly mafic), had higher background than adjacent sediments.

LOCALISED EXPLORATION/PROSPECTS

GEOLOGY - Three major, and a number of minor multi element and single element anomalies have been delineated. These are A, B, and C, all within Unit 1.

A) Little Horrigan Creek Area - Zn and As anomaly within siltstone to mudstone and lesser limestone and chert.

B) Little Scrubby Creek Area - Moderate widespread Cu anomaly (up to 120 ppm) within albite-epidote-chlorite±actinolite altered pyroclastic and plagioclase - porphyritic basalt.

C) Bracewell - Cedarvale Area - Broad complex zone composed of numerous individual, often multi-element anomalies.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Recommended follow up sampling, with anomalies mapped and fully defined by grid soil sampling and/or rock chip sampling. Relinquished ATP 2607 to be granted ATP 3001 which encompasses the former.

RECORDER: Simon Crouch **DATE:** 18/02/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 2749M

COMPANY HOLDING TITLE: Peko-Wallsend Operations Ltd

COMPANY SUBMITTING REPORT: Peko-Wallsend Operations Ltd.

DATE GRANTED: **PERIOD:**

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 18 km SW of Bajool

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: precious and base metals

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File- 10308*

SUMMARY:

REASON FOR ACQUISITION OF TITLE - Examine rocks lying to the west of the favourable horizon of Moongan Rhyolite.

GEOLOGY -

LOCAL - Sequence of andesite and andesitic tuff shallowly dipping 30° to the SW. These rocks are stratigraphically above the Moongan Rhyolite. The andesitic rocks are part of the Capella Creek Beds.

MINERALISATION/ALTERATION - The only mineralisation recorded was on the 15000E line, consisting of disseminated pyrite.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Major planned programme of gridding and survey work commenced but curtailed due to financial restrictions.

RECORDER: Simon Crouch **DATE:** 18/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 10308 **STATUS:** Open

TITLE: Authority to Prospect 2749M. Final Report to Queensland Department of Mines.

AUTHOR(S): A. Taube **DATE:** May, 1982

ATP/EP No.: ATP 2749M

COMPANY HOLDING TITLE: Peko-Wallsend Operations Ltd

COMPANY SUBMITTING REPORT: Peko-Wallsend Operations Ltd.

DATE GRANTED: **PERIOD:**

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 18 km SW of Bajool

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS/MODELS: precious and base metals

SUMMARY:

REASON FOR ACQUISITION OF TITLE - Examine rocks lying to the west of the favourable horizon of Moongan Rhyolite.

GEOLOGY -

LOCAL - Sequence of andesite and andesitic tuff shallowly dipping 30° to the SW. These rocks are stratigraphically above the Moongan Rhyolite. The andesitic rocks are part of the Capella Creek Beds.

MINERALISATION/ALTERATION - The only mineralisation recorded was on the 15000E line, consisting of disseminated pyrite.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Major planned programme of gridding and survey work commenced but curtailed due to financial restrictions.

RECORDER: Simon Crouch **DATE:** 18/02/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 2751M

COMPANY HOLDING TITLE: Peko-Wallsend Operations Ltd.

COMPANY SUBMITTING REPORT: Peko-Wallsend Operations Ltd.

DATE GRANTED: **PERIOD:**

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 20 km WSW of Bajool

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: precious and base metals

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File-* 10621

SUMMARY:

REASON FOR ACQUISITION OF TITLE - Examine rocks lying to the west of the favourable horizon of Moongan Rhyolite.

GEOLOGY -

LOCAL - Sequence of andesite and andesitic tuff shallowly dipping 30° to the SW. These rocks are stratigraphically above the Moongan Rhyolite. The andesitic rocks are part of the Capella Creek Beds.

MINERALISATION/ALTERATION - The only mineralisation recorded was on the 15000E line, consisting of disseminated pyrite.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Major planned programme of gridding and survey work commenced but curtailed due to financial restrictions.

RECORDER: Simon Crouch **DATE:** 21/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 10621 **STATUS:** Open

TITLE: Authority to Prospect 2751M. Final report to Queensland Department of Mines.

AUTHOR(S): A. Taube **DATE:** May, 1982

ATP/EP No.: ATP 2751M

COMPANY HOLDING TITLE: Peko-Wallsend Operations Ltd.

COMPANY SUBMITTING REPORT: Peko-Wallsend Operations Ltd.

DATE GRANTED: **PERIOD:**

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 20 km WSW of Bajool

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS/MODELS: precious and base metals

SUMMARY:

REASON FOR ACQUISITION OF TITLE - Examine rocks lying to the west of the favourable horizon of Moongan Rhyolite.

GEOLOGY -

LOCAL - Sequence of andesite and andesitic tuff shallowly dipping 30° to the SW. These rocks are stratigraphically above the Moongan Rhyolite. The andesitic rocks are part of the Capella Creek Beds.

MINERALISATION/ALTERATION - The only mineralisation recorded was on the 15000E line, consisting of disseminated pyrite.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Major planned programme of gridding and survey work commenced but curtailed due to financial restrictions.

RECORDER: Simon Crouch **DATE:** 21/02/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 2861M

COMPANY HOLDING TITLE: Geopeko

COMPANY SUBMITTING REPORT: Geopeko

DATE GRANTED: 21/01/1981 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan, Banana and Biloela

1:250 000 SHEET NAME(S): Rockhampton and Monto

LOCATION: 50 km SSE of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Mount Bob Skarns, E.D. Gold Show, Gunpowder Creek Porphyry Copper, Argoon Copper Show, and Mount Eugenie Gossans.

EXPLORATION TARGETS/MODELS: Gold and base metals

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File- 9784, 10296*

SUMMARY:

GEOLOGY -

LOCAL - The dominant unit within the ATP is the Youlambie Conglomerate (conglomerate and lithic/feldspathic sandstone interbedded with mudstone, tuff, and acid lava). A much older unit crops out as an inlier within the Mount Eugenie anticline, and may be the equivalent to the Moongan Rhyolite. These rocks consist of rhyolite, dacitic and rhyolitic tuff, chert, and lapilli tuff that are more strongly sheared and have a pronounced cleavage development when compared to the overlying Youlambie Conglomerate. The Moongan Rhyolite equivalents contain small gossans of interest. In the E part of the ATP, equivalents of the Pond Formation (tuff, conglomerate, sandstone, and mudstone) crop out. This formation hosts the Gunpowder Creek Skarn complex. In the W part of the ATP the Yarrol and Owl Creek Formations are inferred to crop out. Intruding the sequence during the Late Permian is the Mount Gerard Complex and the Galloway Plains Tonalite.

REGIONAL EXPLORATION

GEOCHEMISTRY

- **stream sediment sampling** - 345 stream sediment samples were collected from the area. Results were generally low and single point anomalies exist reflecting known mineralisation. Copper values ranged from 10 to 90 ppm Cu. Two discrete anomalies are reflected. The 90 ppm Cu value was from the creek draining Gunpowder Creek copper skarn. The other locality is 1 km S of Mount Eugenie where 80 ppm Cu was returned. No values were considered anomalous for lead (30 to 75 ppm Pb). Zinc returned 30 to 360 ppm Zn, defining two anomaly clusters which are considered worthy of follow-up. One cluster drains the Mount Eugenie gossans and the other is located 2½ km ESE of Lancefield Homestead.

LOCALISED EXPLORATION/PROSPECTS

1) Mount Bob Skarns - latitude 24°03'00", longitude 150°40'00". Note: these grid references appear to be inaccurate.

GEOLOGY - The skarns and gossans are situated on the N and W slopes of Mount Bob. Mount Bob is on the E side of the upper reaches of Cattle Creek. Small cellular gossans often after pyrite are found within the granite complex or on the contact between the granite and the sediments. These probably represent fractures or small shear zones.

GEOCHEMISTRY - Only one gossan returned encouraging results. The gossan is a 0.5 m wide vein (?) of malachite and azurite exposed on the contact between the granite and the sediments on the NW slope of Mt Bob. A sample of the gossan returned 1.2 g/t Au, 26 g/t Ag, 2.8% Cu, 50 ppm Pb and 830 ppm Zn. This zone of mineralisation is unlikely to be large enough to warrant further exploration.

2) E.D. Gold Show - latitude 24°03'00", longitude 150°39'00". Note: these grid references appear to be inaccurate.

GEOLOGY - This area is a quartz stockwork within (?) granitised metasediments of the Mount Gerard Complex. The quartz veins carry economic gold and silver values over significant areas. The lease is being worked sporadically by the owners.

3) Gunpowder Creek Porphyry Copper - latitude 24°01'00", longitude 150°41'00". Note: these grid references appear to be inaccurate.

GEOLOGY - A small diorite stock intrudes a series of tuffaceous sediments, slates, and limestones of the Lower Carboniferous Pond Formation. Very small copper-bearing skarn assemblages are formed on the contacts, but no significant areas of mineralisation occur.

4) Argoon Copper Show - latitude 24°03'00", longitude 150°38'00". Note: these grid references appear to be inaccurate. Situated below Mount Eugenie, on the E side of the Cattle Creek.

GEOLOGY - Mineralisation in the show consists of secondary chalcocite, cuprite, malachite, and azurite associated with limonite, jasper or chert fragments and quartz. This mineralised assemblage, magnetite-rich in part, is within a 1 to 2 m wide shear zone which can be traced for approximately 500 m. It is unlikely that significant mineralisation will be found away from the shear zone. The mineralisation appears to be poddy within the shear and an economic size increase is also unlikely.

GEOCHEMISTRY - 5 rock chip samples collected of various rock types in the area returned 0.009% to 0.55% Cu and traces of Au. One sample of carbonate ore returned 21% Cu and traces of Au.

5) Mount Eugenie Gossans - latitude 24°03'00", longitude 150°30'20". Note: these grid references appear to be inaccurate. Situated approximately 1 km N of Mount Eugenie.

GEOLOGY - The geology in this area is complex. Small poddy gossans crop out in a NE trend over a strike length of 500 m, adjacent to a rhyolite fragmental and rhyolite tuff sequence. The northernmost gossan carries malachite and azurite, and a local prospector reported encouraging gold and silver values.

GEOCHEMISTRY - Rock chip samples from the southern pod returned disappointing values of 780 ppm Cu, 65 ppm Pb, 640 ppm Zn, trace g/t Ag, and 0 g/t Au. No further work is proposed for the area.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Due to the lack of results, the area was relinquished.

RECORDER: Paul Blake

DATE: 19/01/1995.

COMPANY REPORT SUMMARY SHEET

CR: 9784 **STATUS:** Open

TITLE: Report to Queensland Department of Mines on Authority to Prospect 2861M, Biloela area, Queensland, for 6-month period ending 24 June 1981.

AUTHOR(S): A. Taube & S. Carthew **DATE:** April 1981

ATP/EP No.: ATP 2861M

COMPANY HOLDING TITLE: Geopeko

COMPANY SUBMITTING REPORT: Geopeko

DATE GRANTED: 21/01/1981 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan, Banana and Biloela

1:250 000 SHEET NAME(S): Rockhampton and Monto

LOCATION: 50 km SSE of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Mount Bob Skarns, E.D. Gold Show, Gunpowder Creek Porphyry Copper, Argoon Copper Show, and Mount Eugenie Gossans.

EXPLORATION TARGETS/MODELS: Gold and base metals

SUMMARY:

GEOLOGY -

LOCAL - The dominant unit within the ATP is the Youlambie Conglomerate (conglomerate and lithic/feldspathic sandstone interbedded with mudstone, tuff, and acid lava). A much older unit crops out as an inlier within the Mount Eugenie anticline, and may be the equivalent to the Moongan Rhyolite. These rocks consist of rhyolite, dacitic and rhyolitic tuff, chert, and lapilli tuff that are more strongly sheared and have a pronounced cleavage development when compared to the overlying Youlambie Conglomerate. The Moongan Rhyolite equivalents contain small gossans of interest. In the E part of the ATP, equivalents of the Pond Formation (tuff, conglomerate, sandstone, and mudstone) crop out. This formation hosts the Gunpowder Creek Skarn complex. In the W part of the ATP the Yarrol and Owl Creek Formations are inferred to crop out. Intruding the sequence during the Late Permian is the Mount Gerard Complex and the Galloway Plains Tonalite.

REGIONAL EXPLORATION

GEOCHEMISTRY

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LOCALISED EXPLORATION/PROSPECTS

1) Mount Bob Skarns - latitude 24°03'00", longitude 150°40'00". Note: these grid references appear to be inaccurate.

GEOLOGY - The skarns and gossans are situated on the N and W slopes of Mount Bob. Mount Bob is on the E side of the upper reaches of Cattle Creek. Small cellular gossans often after pyrite are found within the granite complex or on the contact between the granite and the sediments. These probably represent fractures or small shear zones.

GEOCHEMISTRY - Only one gossan returned encouraging results. The gossan is a 0.5 m wide vein (?) of malachite and azurite exposed on the contact between the granite and the sediments on the NW slope of Mt Bob. A sample of the gossan returned 1.2 g/t Au, 26 g/t Ag, 2.8% Cu, 50 ppm Pb and 830 ppm Zn. This zone of mineralisation is unlikely to be large enough to warrant further exploration.

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GEOLOGY - A small diorite stock intrudes a series of tuffaceous sediments, slates, and limestones of the Lower Carboniferous Pond Formation. Very small copper-bearing skarn assemblages are formed on the contacts, but no significant areas of mineralisation occur.

4) Argoon Copper Show - latitude 24°03'00", longitude 150°38'00". Note: these grid references appear to be inaccurate. Situated below Mount Eugenie, on the E side of the Cattle Creek.

GEOLOGY - Mineralisation in the show consists of secondary chalcocite, cuprite, malachite, and azurite associated with limonite, jasper or chert fragments and quartz. This mineralised assemblage, magnetite-rich in part, is within a 1 to 2 m wide shear zone which can be traced for approximately 500 m. It is unlikely that significant mineralisation will be found away from the shear zone. The mineralisation appears to be poddy within the shear and an economic size increase is also unlikely.

GEOCHEMISTRY - 5 rock chip samples collected of various rock types in the area returned 0.009% to 0.55% Cu and traces of Au. One sample of carbonate ore returned 21% Cu and traces of Au.

5) Mount Eugenie Gossans - latitude 24°03'00", longitude 150°30'20". Note: these grid references appear to be inaccurate. Situated approximately 1 km N of Mount Eugenie.

GEOLOGY - The geology in this area is complex. Small poddy gossans crop out in a NE trend over a strike length of 500 m, adjacent to a rhyolite fragmental and rhyolite tuff sequence. The northernmost gossan carries malachite and azurite, and a local prospector reported encouraging gold and silver values.

GEOCHEMISTRY - Rock chip samples from the southern pod returned disappointing values of 780 ppm Cu, 65 ppm Pb, 640 ppm Zn, trace g/t Ag, and 0 g/t Au. No further work is proposed for the area.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Due to the lack of results, the area was relinquished.

RECORDER: Paul Blake

DATE: 04/05/1994.

COMPANY REPORT SUMMARY SHEET

CR: 10296 **STATUS:** Open

TITLE: Report to Queensland Department of Mines on Authority to Prospect 2816M, Biloela area.

AUTHOR(S): A. Taube & S. Carthew **DATE:** May 1982

ATP/EP No.: ATP 2861M

COMPANY HOLDING TITLE: Geopeko

COMPANY SUBMITTING REPORT: Geopeko

DATE GRANTED: 21/01/1981 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan, Banana and Biloela

1:250 000 SHEET NAME(S): Rockhampton and Monto

LOCATION: 50 km SSE of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Mount Bob Skarns, E.D. Gold Show, Gunpowder Creek Porphyry Copper, Argoon Copper Show, and Mount Eugenie Gossans.

EXPLORATION TARGETS\MODELS: Gold and base metals

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - This company report summarises CR 9784.

RECORDER: Paul Blake **DATE:** 19/01/1995.

AUTHORITY TO PROSPECT SUMMARY SHEET

CR: 11536 **STATUS:** Open

TITLE: Final Report on ATP 2982M in the Rockhampton District

AUTHOR(S): l'Ons M.E. **DATE:** September 1982

ATP/EP No.: 2982M

COMPANY HOLDING TITLE:

COMPANY SUBMITTING REPORT:

DATE GRANTED: April 1981 **PERIOD:** 1 yr

1:100 000 SHEET NAME(S): Mount Morgan, Ridgeland

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 35 km WSW of Rockhampton

MINING DISTRICT:

MINES/PROSPECTS: Native Cat diggings

EXPLORATION TARGETS\MODELS: Gold placer deposits

SUMMARY:

REASON FOR ACQUISITION OF TITLE - Exploration mainly for placer gold, also looked at local lode gold potential.

GEOLOGY -

MINERALISATION/ALTERATION - Alluvial gold occurs in the Native Cat area with gold values of about 0.75 g/m³ in reserves of 60 000 to 100 000 m³. The alluvial gold appears to be derived from the gold mineralisation associated with the intrusion of diorite into the Native Cat Andesite.

LOCALISED EXPLORATION/PROSPECTS - Alluvial deposits in the creeks in the area were prospected using a gold panning dish and a small portable dry blower (16 bulk samples were tested). Areas of old diggings were also defined and assessed where possible. A geological map over the area was produced from 1:25 000 and 1:30 000 black and white air photos.

GEOLOGY - The alluvial gold appears to be derived from the gold mineralisation associated with the intrusion of diorite into the Native Cat Andesite. The gold mineralisation, it seems, occurs in association with iron and minor copper sulphides in chloritic, altered rocks within the andesites adjacent to the diorite contact. The alluvial gold is coarse grained in nature reflection its original grain size. As the alluvial deposits are not high it is assumed that the gold is either widely disseminated through the original host rock, or confined to narrow, rich zones. No mineralised quartz was found in the Native Cat area and no quartz pebbles were observed in the gold bearing alluvials. Rock chip samples from the hydrothermally altered andesites near the diorite intrusion returned values at 0.1 ppm with on at 0.5 ppm. There does not appear to be any potential for economic hard rock gold mineralisation. However, all the alluvials derived from the andesite/diorite are prospective.

GEOCHEMISTRY - Rock chip samples from the hydrothermally altered andesites near the diorite intrusion returned values at 0.1 ppm with on at 0.5 ppm.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - There does not appear to be any potential for economic hard rock gold mineralisation, but all alluvial deposits from andesite/diorite contact must be considered prospective. Although no reason for the relinquishment was stated, mention was made of the scarcity of surface and underground water.

RECORDER: Simon Crouch and Jan Domagala **DATE:**17/5/94.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: 2982M

COMPANY HOLDING TITLE: Mr J. Richardson

COMPANY SUBMITTING REPORT: Mr J. Richardson

DATE GRANTED: April, 1981 **PERIOD:** 1 year

1:100 000 SHEET NAME(S): Mount Morgan, Ridglands

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 35 km WSW of Rockhampton

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS/MODELS: gold

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File*- 11536

SUMMARY:

REASON FOR ACQUISITION OF TITLE - The exploration effort mainly aimed at locating economic placer deposits of gold.

MINERALISATION/ALTERATION - Gold mineralisation associated with a dioritic body which has intruded the Native Cat Andesite. Associated with iron and copper sulphides in chloritic, altered rocks within the andesites adjacent to the dioritic contact. Gold coarse-grained and seems to be disseminated throughout the andesite. Most prospective area near Native Cat gold diggings.

REGIONAL EXPLORATION

GEOLOGICAL MAPPING - J. Richardson prospected the alluvial deposits in the creeks using pan dish and dry blower, as well as searching old diggings. Sixteen bulk samples were taken in the prospective area around Native Cat diggings. Ore reserves of approx. 60 000 to 100 000 m³ with average grade of 0.75 g/m³. Further considerable reserves appear just outside the ATP area on Golden Spur Creek. M.E. l'Ons did photogeological interpretation of 1:25 000 and 1:30 000 B/W aerial photos, and spent three days in the field. Rock chip samples were taken to determine the source of the alluvial gold.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - There does not appear to be any potential for economic hard rock gold mineralisation, but all alluvial deposits from andesite/diorite contact must be considered prospective.

RECORDER: Simon Crouch **DATE:** 24/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 11536 **STATUS:** Open

TITLE: Final Report on Authority to Prospect 2982M in the Rockhampton district.

AUTHOR(S): M.E. l'Ons **DATE:** September, 1982

ATP/EP No.: 2982M

COMPANY HOLDING TITLE: Mr J. Richardson

COMPANY SUBMITTING REPORT: Mr J. Richardson

DATE GRANTED: April, 1981 **PERIOD:** 1 year

1:100 000 SHEET NAME(S): Mount Morgan, Ridglands

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 35 km WSW of Rockhampton

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: gold

SUMMARY:

REASON FOR ACQUISITION OF TITLE - The exploration effort mainly aimed at locating economic placer deposits of gold.

MINERALISATION/ALTERATION - Gold mineralisation associated with a dioritic body which has intruded the Native Cat Andesite. Associated with iron and copper sulphides in chloritic, altered rocks within the andesites adjacent to the dioritic contact. Gold coarse-grained and seems to be disseminated throughout the andesite. Most prospective area near Native Cat gold diggings.

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FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - There does not appear to be any potential for economic hard rock gold mineralisation, but all alluvial deposits from andesite/diorite contact must be considered prospective.

RECORDER: Simon Crouch **DATE:** 24/02/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 3001M

COMPANY HOLDING TITLE: Electrolytic Zinc Company of Australasia Ltd.

COMPANY SUBMITTING REPORT: Electrolytic Zinc Company of Australasia Ltd.

DATE GRANTED: 13/04/1981 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 60 km S of Rockhampton

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: precious and base metals

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File*- 10618, 10619, 12469

SUMMARY:

REASON FOR ACQUISITION OF TITLE - Targets for precious and base metals within the Mount Holly Beds.

GEOLOGY -

REGIONAL - Located on the eastern Rockhampton Block known as the Mount Larcom-Mount Holly Fault Block. Details of the regional geology can be found in the Rockhampton-Port Clinton 1:250 000 Sheet Area report by Kirkegaard & others (1970). ATP 2607M covers Raglan, Ulam and Langmorn goldfields.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Summary of the old gold fields are detailed in Kirkegaard & others (1970). For limestone reserves Dampier Mining (ATP 1416: 1974-1977) drill tested the limestone sequence at Hut Creek-Machine Creek area. Kennecott Exploration (ATP 667M: 1969-1970) and Esso Australia Ltd. (ATP 1087M: 1972-1973) conducted porphyry copper exploration over the Bajool Granodiorite. Australian Anglo American Prospecting Ltd. explored ATP's 1950M, 1951M, and 2079M in the Marmor-Raglan-Mount Larcom district.

GEOLOGICAL MAPPING - Seven thousand metre thick type section of the Mount Holly Beds between Ambrose and Horrigan Creek. Two sequences based on reconnaissance mapping and Anglo American's petrographic descriptions.

ATP 3001 is almost solely within the Mount Holly Beds. Upper sequences of felsic ash flow tuffs with minor interbedded volcanoclastic sediments and limestones incorporated within Units 2 and 3, may be the lateral if not temporal equivalents of the lower Middle Devonian Capella Creek Group. This sequence may therefore have potential for volcanogenic mineralisation similar to Mount Morgan. Major fault zones, felsic volcanics, mineralised plutons and reactive sedimentary host sequences indicate prospectivity for precious and base metals. Sampling indicates localised enrichment.

Previous units 1 and 2 (see ATP 2607M) have been subdivided. Old Unit 1 into proposed Unit 1 - Raglan Beds and Unit 3 - Horrigan Creek Beds; old Unit 2 into proposed Unit 2 - Mount Erebus Beds and Unit 4 - Mount Alma Beds.

1) Unit 1 - A 2200 m thick unit equivalent to D2 Anglo American (Newton-Smith, 1979). Outcrops in a series of anticlinal structures composed of coarse to fine-grained volcanoclastics, siltstones, mudstones, and weakly pyritic radiolarian cherts, with interbedded green felsic to mafic tuffs, basalts and limestone lenses. Several strike faults at base of sequence. Central part of unit Gedinnian (Lower Devonian) in age based on conodont and coral fauna. Limestone fauna presumably higher in the unit gives an upper Lower Devonian to lower Middle Devonian age.

2) Unit 2 - Monotonous 5000 m thick sequence of felsic to intermediate tuffs and minor sediments. The dominant unit of the sequence within ATP 3001. Green to mottled pink, massive unsorted and possibly welded rhyolitic and dacitic ash flow tuffs, with subordinate andesitic tuffs and porphyritic basalts. Minor interbedded siltstones, tuffaceous arenites and mudstones are recessive in this sequence. The volcanic lithologies are altered and

metamorphosed to actinolite stage of the greenschist facies. Ground mass is usually fine quartz with patches of albite, epidote, chlorite, and calcite.

3) Unit 3 - Similar to Unit 1 but separated on structural grounds. Estimated thickness of type sequence approximately 1500 m. A large sigmoidal shaped limestone body has been included in the sequence. Structural relationships S of Cedavale indicate Unit 3 underlies Unit 4.

4) Unit 4 - Best known in the SW of ATP 3001 between Zamia Knob and Almacombe Homestead. Andesitic pyroclastics, intermediate tuff and subordinate siltstones and arenites outcropping in a broad syncline W of Cedarvale. This sequence unconformably overlies Middle Devonian strata of the Mount Cedric Beds to the west, and is considered to be Upper Devonian and equivalent to Dee Volcanics. Similar rocks N in the Scrubby Creek area, however structural relationships in this area unclear.

5) Intrusives - Several unnamed Permian granodiorite plutons outcrop to the west of ATP 2607. Minor diorite intrusions such as at the Queenslander Mine, and occasional quartz feldspar porphyry and feldspar porphyry dykes intruding the Mount Holly Beds also occur.

6) Structure - Sedimentary sequences, particularly Unit 3 in the Horigans Creek area, appear more highly deformed than the more massive sequences of Unit 2. Fold arcs, set an average 1-5 km apart, are aligned parallel to the regional NNW structural trend. Major NNW structure have distinctive photo-lineament patterns and are marked in the field by intense schistosity, quartz veining and silicification. Quartz-feldspar porphyry and/or trachyte dyke swarms occur in the vicinity of Raglan Creek. Vertical movement is suspected along these structures. Transcurrent ENE trending faults and photolineaments are also recognized. Sinistral movement (several kilometres) is suspected.

GEOCHEMISTRY

- **stream sediment sampling** - Stream sediment anomalous zones, primarily within Unit 2 and 3 have been retained in the reduced Authority. Little work carried out. Arsenic anomalism in Unit 3 N of Horigans Creek and S of Bracewell in process of being examined.

Four hundred and one samples were taken over the whole ATP and analysed for Cu, Pb, Zn and Ag (see ATP 2607M). Three hundred and three follow up stream sediment samples (after ATP 2607M) were taken over the whole ATP and analysed for Cu, Pb, Zn and Ag. Data Set A represented drainage from sequences within Unit 1, and Data Set B represented drainage from pyroclastics and minor associated flows mostly within Unit 2. Results similar to those obtained by Aust. Anglo American (1979). Their data proved useful in planning detailed geochemical sampling to fully check and outline anomalous zones. In general, background and threshold levels were higher in Group 2 than in Group 1, and within Unit 1 volcanic sequences (particularly mafic), had higher background than adjacent sediments.

LOCALISED EXPLORATION/PROSPECTS

GEOLOGY - Three major, and a number of minor multi element and single element anomalies have been delineated. These are A, B, and C, all within Unit 1.

A) Anomalous Zone 1. - Little Horigan Creek Area (Zone A) - Follow up sampling confirmed As anomaly (75 ppm) within siltstone to mudstone and lesser limestone and chert. Traverses and rock chip samples from adjacent fractured and Mn stained sediments failed to detect mineralisation or enrichment in base metals or arsenic. Attributed to higher background values within some of the siltstones, mudstones, and andesitic volcanoclastic sediments. Arsenic (180, 105 ppm) enrichment in Fe-rich calcreted rubble. Mercury anomalies (2.7, 1.8 ppm) attributed to andesitic pyroclastics.

B) Anomaly 2 - Zn anomaly (205 ppm) in micaceous siltstone.

C) Anomalous Zone 3. - South of Little Horigan Creek - Follow-up sampling of low order As anomaly (max. 55 ppm). Downstream from zone of human disturbance suggest contamination.

D) Anomaly 4 - Ten Mile Creek Area - Low order As anomaly (40 ppm) in basaltic tuff and agglomerate. No evidence of mineralisation.

E) Anomaly 5 - South of Mount Despair - Low order Cu anomaly (79 ppm) within epidote-chlorite altered silicified basaltic tuff.

F) Anomaly 6 - East of Mount Despair - Low order Cu anomaly (71 ppm) similar to Anomaly 5.

G) Anomalous Zone 7. - Little Scrubby Creek Area (Zone B) - Follow-up of Cu anomaly, 18 values (up to 147 ppm) within albite-epidote-chlorite±actinolite altered pyroclastic and plagioclase - porphyritic basalt. Note two anomalous Zn values (max. 143 ppm).

H) Anomalous Zone 8. - Four Mile Creek Area - Thirteen anomalous Cu values (max. 147 ppm); 8 moderate Zn values (max. 193 ppm); and one high order Zn/Pb anomaly (5650 ppm/98 ppm) occur within a zone similar to Zone 7. The geochemical response is attributed to the same cause, however sample 18562 (141 ppm Cu, 98 ppm Pb, 5650 ppm Zn, 24 ppm As) is of interest.

I) Anomalous Zone 9 - Three low order Zn anomalies (max. 142 ppm). Felsic tuffs with minor pyrite.

J) Anomalous Zone 10. - Bracewell Area - Moderate Cu/Zn anomaly. Three anomalous samples (max. 160 ppm Cu, 123 ppm Zn).

K) Anomalies 11 to 23 - Low priority, low order Zn anomalies (max. 139 ppm), attributed to higher background levels within basaltic derived sediments.

L) Anomaly 24 - Cattle Creek Area - Follow-up on high order Zn and Cu anomaly, shown to be homestead contamination.

M) Anomaly 25 - Oaky Creek - Low priority single Cu anomaly (70 ppm) within albite-epidote-chlorite basaltic tuff.

In addition to follow-up of stream sediment anomalies a programme of soil and rock chip sampling was undertaken around the old workings at Mount Raglan over an area of about 350 m x 250 m within which quartz-hematite-jasper bodies outcrop. Jaspers sedimentary and tectonic in character.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Authority originally 80 sub-blocks, including 73 sub-blocks from previously held ATP 2697M, but has since been reduced to 40 sub-blocks.

Geological mapping confirmed thick Lower Devonian sequence of dominantly felsic subaerial pyroclastics interbedded with marine volcanoclastic sediments containing minor calcareous horizons.

RECORDER: Simon Crouch **DATE:** 22/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 10618 **STATUS:** Open

TITLE: Authority to Prospect No. 3001M. Raglan - Gladstone mining district, Queensland. Half-yearly report to 31 April, 1982.

AUTHOR(S): R.J. Close **DATE:** July, 1982

ATP/EP No.: ATP 3001M

COMPANY HOLDING TITLE: Electrolytic Zinc Company of Australasia Ltd.

COMPANY SUBMITTING REPORT: Electrolytic Zinc Company of Australasia Ltd.

DATE GRANTED: 13/04/1981 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 60 km S of Rockhampton

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: precious and base metals

SUMMARY:

REASON FOR ACQUISITION OF TITLE - Targets for precious and base metals within the Mount Holly Beds.

GEOLOGY -

REGIONAL - Details of the regional geology of the surrounding Rockhampton and Port Clinton 1:250 000 geological sheets are given in Kirkegaard & others (1970).

LOCAL - Kennecott Exploration conducted porphyry copper exploration over the Bajool Granodiorite with interest in a series of quartz breccia pipes and the Limonite Hill prospect.

MINERALISATION/ALTERATION - The Limonite Hill prospect contains fracture and vein controlled chalcopyrite and molybdenum mineralisation associated with weak to moderate quartz-sericite-pyrite alteration in a small granodiorite-quartz monzonite porphyry complex.

No significant indications of mineralisation found apart from old workings. Several manganiferous gossanous ironstones and jasper bodies containing limonite casts after pyrite were analysed but were not enriched in base or precious metals.

Along central section of Oakey Creek in the Cedarvale district, mapping has located patchy disseminated pyrite mineralisation in fine to coarse, well bedded volcanoclastics interbedded with cobble to boulder andesitic conglomerates and agglomerates. Coarse nature of agglomerates and presence of minor diorite intrusives indicate proximity of an eruptive centre in the area.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Summary of the old gold fields are detailed in Kirkegaard & others (1970). For limestone reserves Dampier Mining (ATP 1416: 1974-1977) drill tested the limestone sequence at Hut Creek-Machine Creek area. Kennecott Exploration (ATP 667M: 1969-1970) and Esso Australia Ltd. (ATP 1087M: 1972-1973) conducted porphyry copper exploration over the Bajool Granodiorite. Australian Anglo American Prospecting Ltd. explored ATP's 1950M, 1951M, and 2079M in the Marmor-Raglan-Mount Larcom district.

GEOLOGICAL MAPPING - ATP 3001 is almost solely within the Mount Holly Beds. Upper sequences of felsic ash flow tuffs with minor interbedded volcanoclastic sediments and limestones incorporated within Units 2 and 3, may be the lateral if not temporal equivalents of the lower Middle Devonian Capella Creek Group. This sequence may therefore have potential for volcanogenic mineralisation similar to Mount Morgan. Major fault zones, felsic volcanics, mineralised plutons and reactive sedimentary host sequences indicate prospectivity for precious and base metals. Sampling indicates localised enrichment.

Previous units 1 and 2 (see ATP 2607M) have been subdivided. Old Unit 1 into proposed Unit 1 - Raglan Beds and Unit 3 - Horrigan Creek Beds; old Unit 2 into proposed Unit 2 - Mount Erebus Beds and Unit 4 - Mount Alma Beds.

1) Unit 1 - A 2200 m thick unit equivalent to D2 Anglo American (Newton-Smith, 1979). Outcrops in a series of anticlinal structures composed of coarse to fine-grained volcanoclastics, siltstones, mudstones, and weakly pyritic radiolarian cherts, with interbedded green felsic to mafic tuffs, basalts and limestone lenses. Several strike faults at base of sequence. Central part of unit Gedinnian (Lower Devonian) in age based on conodont and coral fauna. Limestone fauna presumably higher in the unit gives an upper Lower Devonian to lower Middle Devonian age.

2) Unit 2 - Monotonous 5000 m thick sequence of felsic to intermediate tuffs and minor sediments. The dominant unit of the sequence within ATP 3001. Green to mottled pink, massive unsorted and possibly

welded rhyolitic and dacitic ash flow tuffs, with subordinate andesitic tuffs and porphyritic basalts. Minor interbedded siltstones, tuffaceous arenites and mudstones are recessive in this sequence. The volcanic lithologies are altered and metamorphosed to actinolite stage of the greenschist facies. Ground mass is usually fine quartz with patches of albite, epidote, chlorite, and calcite.

3) Unit 3 - Similar to Unit 1 but separated on structural grounds. Estimated thickness of type sequence approximately 1500 m. A large sigmoidal shaped limestone body has been included in the sequence. Structural relationships S of Cedavale indicate Unit 3 underlies Unit 4.

4) Unit 4 - Best known in the SW of ATP 3001 between Zamia Knob and Almacoombe Homestead. Andesitic pyroclastics, intermediate tuff and subordinate siltstones and arenites outcropping in a broad syncline W of Cedarvale. This sequence unconformably overlies Middle Devonian strata of the Mount Cedric Beds to the west, and is considered to be Upper Devonian and equivalent to Dee Volcanics. Similar rocks N in the Scrubby Creek area, however structural relationships in this area unclear.

5) Intrusives - Several unnamed Permian granodiorite plutons outcrop to the west of ATP 2607. Minor diorite intrusions such as at the Queenslander Mine, and occasional quartz feldspar porphyry and feldspar porphyry dykes intruding the Mount Holly Beds also occur.

6) Structure - Sedimentary sequences, particularly Unit 3 in the Horigans Creek area, appear more highly deformed than the more massive sequences of Unit 2. Fold arcs, set an average 1-5 km apart, are aligned parallel to the regional NNW structural trend. Major NNW structure have distinctive photo-lineament patterns and are marked in the field by intense schistosity, quartz veining and silicification. Quartz-feldspar porphyry and/or trachyte dyke swarms occur in the vicinity of Raglan Creek. Vertical movement is suspected along these structures. Transcurrent ENE trending faults and photolineaments are also recognized. Sinistral movement (several kilometres?) is suspected.

GEOCHEMISTRY

- **stream sediment sampling** - Stream sediment anomalous zones, primarily within Unit 2 and 3 have been retained in the reduced Authority. Little work carried out. Arsenic anomalism in Unit 3 N of Horigans Creek and S of Bracewell in process of being examined.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Authority originally 80 sub-blocks, including 73 sub-blocks from previously held ATP 2697M, but has since been reduced to 40 sub-blocks.

RECORDER: Simon Crouch **DATE:** 22/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 10619 **STATUS:** Open

TITLE: Authority to Prospect No. 3001M. Raglan - Gladstone mining district, Queensland. First sixth monthly report to Queensland Department of Mines - December, 1981.

AUTHOR(S): R.J. Close & D.J. Whitten **DATE:** December, 1981

ATP/EP No.: ATP 3001M

COMPANY HOLDING TITLE: Electrolytic Zinc Company of Australasia Ltd.

COMPANY SUBMITTING REPORT: Electrolytic Zinc Company of Australasia Ltd.

DATE GRANTED: 13/04/1981 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 60 km S of Rockhampton

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: precious and base metals

SUMMARY:

REASON FOR ACQUISITION OF TITLE - Explore for base and precious metals. Targeting of anomalies.

GEOLOGY -

REGIONAL - Located on the eastern Rockhampton Block known as the Mount Larcom-Mount Holly Fault Block. Details of the regional geology can be found in the Rockhampton-Port Clinton 1:250 000 Sheet Area report by Kirkegaard & others (1970). ATP 2607M covers Raglan, Ulam and Langmorn goldfields.

LOCAL - Kennecott Exploration conducted porphyry copper exploration over the Bajool Granodiorite with interest in a series of quartz breccia pipes and the Limonite Hill prospect.

MINERALISATION/ALTERATION - The Limonite Hill prospect contains fracture and vein controlled chalcopyrite and molybdenum mineralisation associated with weak to moderate quartz-sericite-pyrite alteration in a small granodiorite-quartz monzonite porphyry complex.

No significant indications of mineralisation found apart from old workings. Several manganiferous gossanous ironstones and jasper bodies containing limonite casts after pyrite were analysed but were not enriched in base or precious metals.

Along central section of Oakey Creek in the Cedarvale district, mapping has located patchy disseminated pyrite mineralisation in fine to coarse, well bedded volcanoclastics interbedded with cobble to boulder andesitic conglomerates and agglomerates. Coarse nature of agglomerates and presence of minor diorite intrusives indicate proximity of an eruptive centre in the area.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Summary of the old gold fields are detailed in Kirkegaard & others (1970). For limestone reserves Dampier Mining (ATP 1416: 1974-1977) drill tested the limestone sequence at Hut Creek-Machine Creek area. Kennecott Exploration (ATP 667M: 1969-1970) and Esso Australia Ltd. (ATP 1087M: 1972-1973) conducted porphyry copper exploration over the Bajool Granodiorite. Australian Anglo American Prospecting Ltd. explored ATP's 1950M, 1951M, and 2079M in the Marmor-Raglan-Mount Larcom district.

GEOLOGICAL MAPPING - Seven thousand metre thick type section of the Mount Holly Beds between Ambrose and Horrigan Creek. Two sequences based on reconnaissance mapping and Anglo American's petrographic descriptions.

1) Unit 1 - A 2200 m thick unit equivalent to D2 Anglo American (Newton-Smith, 1979). Outcrops in a series of anticlinal structures composed of coarse to fine-grained volcanoclastics, siltstones, mudstones, and weakly pyritic radiolarian cherts, with interbedded green felsic to mafic tuffs, basalts and limestone lenses. Several strike faults at base of sequence. Central part of unit Gedinnian (Lower Devonian) in age based on conodont and coral fauna. Limestone fauna presumably higher in the unit gives an upper Lower Devonian to lower Middle Devonian age.

2) Unit 2 - Equivalent to Anglo American's D3 sequence, and conformable to Unit 1. Best exposure in synclinal structure in a belt extending from N of Mount Erebus to the Mount Raglan-Mount Turrett area W of Bracewell. Green to mottled pink, massive unsorted and possibly welded rhyolitic and dacitic ash tuffs, with subordinate andesitic tuffs and porphyritic basalts. Also, minor interbedded siltstone, tuffaceous arenites and mudstone. Near top of unit limestone fauna of lower Middle Devonian age. The volcanic lithologies are altered and metamorphosed to actinolite stage of the greenschist facies.

Several unnamed Permian granodiorite plutons outcrop to the west of ATP 2607. Minor diorite intrusions such as at the Queenslander Mine, and occasional quartz feldspar porphyry and feldspar porphyry dykes intruding the Mount Holly Beds also occur.

No structural analysis was attempted. Available data indicates the Mount Holly Beds and equivalents are broadly folded along NNE axes spaced 2-4 km apart. Metamorphism probably occurred during a Mid Devonian orogenic episode. A second period of tectogenesis in the Mid to Late Permian produced minor tightening of fold axes.

GEOCHEMISTRY

- **stream sediment sampling** - Four hundred and one samples were taken over the whole ATP and analysed for Cu, Pb, Zn and Ag (see ATP 2607M). Three hundred and three follow up stream sediment samples (after ATP 2607M) were taken over the whole ATP and analysed for Cu, Pb, Zn and Ag. Data Set A represented drainage from sequences within Unit 1, and Data Set B represented drainage from pyroclastics and minor associated flows mostly within Unit 2. Results similar to those obtained by Aust. Anglo American (1979). Their data proved useful in planning detailed geochemical sampling to fully check and outline anomalous zones. In general, background and threshold levels were higher in Group 2 than in Group 1, and within Unit 1 volcanic sequences (particularly mafic), had higher background than adjacent sediments.

LOCALISED EXPLORATION/PROSPECTS

GEOLOGY - Three major, and a number of minor multi element and single element anomalies have been delineated. These are A, B, and C, all within Unit 1.

A) Little Horrigan Creek Area (Zone 1) - Follow up sampling confirmed As anomaly (75 ppm) within siltstone to mudstone and lesser limestone and chert. Traverses and rock chip samples from adjacent fractured and Mn stained sediments failed to detect mineralisation or enrichment in base metals or arsenic.

B) Anomaly 2 - Zn anomaly (205 ppm) in micaceous siltstone.

C) Anomaly 3 - Follow-up sampling of low order As anomaly. Downstream from zone of human disturbance suggest contamination.

D) Anomaly 4 - Low order As anomaly (40 ppm) in basaltic tuff and agglomerate. No evidence of mineralisation.

E) Anomaly 5 - Low order Cu anomaly (79 ppm) within epidote-chlorite altered silicified basaltic tuff.

F) Anomaly 6 - Low order Cu anomaly (71 ppm).

G) Little Scrubby Creek Area (Zone 7) - Follow-up of Cu anomaly (up to 147 ppm) within albite-epidote-chlorite±actinolite altered pyroclastic and plagioclase - porphyritic basalt. Note two anomalous Zn values (max. 143 ppm).

H) Four Mile Creek Area (Zone 8) - Thirteen anomalous Cu values (max. 147 ppm); 8 moderate Zn values (max. 193 ppm); and one high order Zn/Pb anomaly (5650 ppm/98 ppm) occur within a zone similar to Zone 7. The geochemical response is attributed to the same cause, however sample 18562 (141 ppm Cu, 98 ppm Pb, 5650 ppm Zn, 24 ppm As) is of interest.

I) Zone 9 - Three low order Zn anomalies (max. 142 ppm). Felsic tuffs with minor pyrite.

J) Bracewell Area (Zone 10) - Moderate Cu/Zn anomaly. Three anomalous samples (max. 160 ppm Cu, 123 ppm Zn).

K) Anomalies 11 to 23 - Low priority, low order Zn anomalies (max. 139 ppm), attributed to higher background levels within basaltic derived sediments.

L) Anomaly 24 - Follow-up on high order Zn and Cu anomaly, shown to be homestead contamination.

M) Anomaly 25 - Low priority single Cu anomaly (70 ppm) within albite-epidote-chlorite basaltic tuff.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Reconnaissance geological mapping confirmed thick Lower Devonian sequence of dominantly felsic subaerial pyroclastics interbedded with marine volcanoclastic sediments containing minor calcareous horizons.

Follow-up stream sediment geochemistry and limited rock chip sampling has generally failed to confirm previous single low order anomalies. However, anomalous zones 1,7,8 (previously broad zones A,B under ATP 2607M) were confirmed and better defined. Results indicate cause due to high background levels and contamination. Recommend investigation of zone 8.

RECORDER: Simon Crouch **DATE:** 23/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 12469 **STATUS:** Open

TITLE: Authority to Prospect No. 3001M. Raglan - Gladstone mining district, Queensland. Third monthly and final report to Queensland Department of Mines - June, 1983.

AUTHOR(S): N.F. Rutherford **DATE:** June 1983

ATP/EP No.: ATP 3001M

COMPANY HOLDING TITLE: Electrolytic Zinc Company of Australasia Ltd.

COMPANY SUBMITTING REPORT: Electrolytic Zinc Company of Australasia Ltd.

DATE GRANTED: 13/04/1981 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 60 km S of Rockhampton

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS/MODELS: precious and base metals

SUMMARY:

REASON FOR ACQUISITION OF TITLE - Explore for base and precious metals. Targeting of anomalies. Targets for precious and base metals within the Mount Holly Beds.

GEOLOGY -

REGIONAL - Located on the eastern Rockhampton Block known as the Mount Larcom-Mount Holly Fault Block. Details of the regional geology can be found in the Rockhampton-Port Clinton 1:250 000 Sheet Area report by Kirkegaard & others (1970). ATP 2607M covers Raglan, Ulam and Langmorn goldfields.

LOCAL - Kennecott Exploration conducted porphyry copper exploration over the Bajool Granodiorite with interest in a series of quartz breccia pipes and the Limonite Hill prospect.

MINERALISATION/ALTERATION - The Limonite Hill prospect contains fracture and vein controlled chalcopyrite and molybdenum mineralisation associated with weak to moderate quartz-sericite-pyrite alteration in a small granodiorite-quartz monzonite porphyry complex.

No significant indications of mineralisation found apart from old workings. Several manganiferous gossanous ironstones and jasper bodies containing limonite casts after pyrite were analysed but were not enriched in base or precious metals.

Along central section of Oakey Creek in the Cedarvale district, mapping has located patchy disseminated pyrite mineralisation in fine to coarse, well bedded volcanoclastics interbedded with cobble to boulder andesitic conglomerates and agglomerates. Coarse nature of agglomerates and presence of minor diorite intrusives indicate proximity of an eruptive centre in the area.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Summary of the old gold fields are detailed in Kirkegaard & others (1970). For limestone reserves Dampier Mining (ATP 1416: 1974-1977) drill tested the limestone sequence at Hut Creek-Machine Creek area. Kennecott Exploration (ATP 667M: 1969-1970) and Esso Australia Ltd. (ATP 1087M: 1972-1973) conducted porphyry copper exploration over the Bajool Granodiorite. Australian Anglo American Prospecting Ltd. explored ATP's 1950M, 1951M, and 2079M in the Marmor-Raglan-Mount Larcom district.

GEOLOGICAL MAPPING - ATP 3001 is almost solely within the Mount Holly Beds. Upper sequences of felsic ash flow tuffs with minor interbedded volcanoclastic sediments and limestones incorporated within Units 2 and 3, may be the lateral if not temporal equivalents of the lower Middle Devonian Capella Creek Group. This sequence may therefore have potential for volcanogenic mineralisation similar to Mount Morgan. Major fault zones, felsic volcanics, mineralised plutons and reactive sedimentary host sequences indicate prospectivity for precious and base metals. Sampling indicates localised enrichment.

Previous units 1 and 2 (see ATP 2607M) have been subdivided. Old Unit 1 into proposed Unit 1 - Raglan Beds and Unit 3 - Horrigan Creek Beds; old Unit 2 into proposed Unit 2 - Mount Erebus Beds and Unit 4 - Mount Alma Beds.

1) Unit 1 - A 2200 m thick unit equivalent to D2 Anglo American (Newton-Smith, 1979). Outcrops in a series of anticlinal structures composed of coarse to fine-grained volcanoclastics, siltstones, mudstones, and weakly pyritic radiolarian cherts, with interbedded green felsic to mafic tuffs, basalts and limestone lenses. Several strike faults at base of sequence. Central part of unit Gedinnian (Lower Devonian) in age based on conodont and coral fauna. Limestone fauna presumably higher in the unit gives an upper Lower Devonian to lower Middle Devonian age.

2) Unit 2 - Monotonous 5000 m thick sequence of felsic to intermediate tuffs and minor sediments. The dominant unit of the sequence within ATP 3001. Green to mottled pink, massive unsorted and possibly welded rhyolitic and dacitic ash flow tuffs, with subordinate andesitic tuffs and porphyritic basalts. Minor interbedded siltstones, tuffaceous arenites and mudstones are recessive in this sequence. The volcanic lithologies are altered and metamorphosed to actinolite stage of the greenschist facies. Ground mass is usually fine quartz with patches of albite, epidote, chlorite, and calcite.

3) Unit 3 - Similar to Unit 1 but separated on structural grounds. Estimated thickness of type sequence approximately 1500 m. A large sigmoidal shaped limestone body has been included in the sequence. Structural relationships S of Cedavale indicate Unit 3 underlies Unit 4.

4) Unit 4 - Best known in the SW of ATP 3001 between Zamia Knob and Almacombe Homestead. Andesitic pyroclastics, intermediate tuff and subordinate siltstones and arenites outcropping in a broad syncline W of Cedarvale. This sequence unconformably overlies Middle Devonian strata of the Mount Cedric Beds to the west, and is considered to be Upper Devonian and equivalent to Dee Volcanics. Similar rocks N in the Scrubby Creek area, however structural relationships in this area unclear.

5) Intrusives - Several unnamed Permian granodiorite plutons outcrop to the west of ATP 2607. Minor diorite intrusions such as at the Queenslander Mine, and occasional quartz feldspar porphyry and feldspar porphyry dykes intruding the Mount Holly Beds also occur.

6) Structure - Sedimentary sequences, particularly Unit 3 in the Horrigan's Creek area, appear more highly deformed than the more massive sequences of Unit 2. Fold arcs, set an average 1-5 km apart, are aligned parallel to the regional NNW structural trend. Major NNW structures have distinctive photo-lineament patterns and are marked in the field by intense schistosity, quartz veining and silicification. Quartz-feldspar porphyry and/or trachyte dyke swarms occur in the vicinity of Raglan Creek. Vertical movement is suspected along these structures. Transcurrent ENE trending faults and photolineaments are also recognized. Sinistral movement (several kilometres?) is suspected.

GEOCHEMISTRY

- **stream sediment sampling** - Four hundred and one samples were taken over the whole ATP and analysed for Cu, Pb, Zn and Ag (see ATP 2607M). Three hundred and three follow up stream sediment samples (after ATP 2607M) were taken over the whole ATP and analysed for Cu, Pb, Zn and Ag. Data Set A represented drainage from sequences within Unit 1, and Data Set B represented drainage from pyroclastics and minor associated flows mostly within Unit 2. Results similar to those obtained by Aust. Anglo American (1979). Their data proved useful in planning detailed geochemical sampling to fully check and outline anomalous zones. In general, background and threshold levels were higher in Group 2 than in Group 1, and within Unit 1 volcanic sequences (particularly mafic), had higher background than adjacent sediments.

LOCALISED EXPLORATION/PROSPECTS

GEOLOGY - Three major, and a number of minor multi element and single element anomalies have been delineated. These are A, B, and C, all within Unit 1.

A) Anomalous Zone 1. - Little Horrigan Creek Area (Zone A) - Follow up sampling confirmed As anomaly (75 ppm) within siltstone to mudstone and lesser limestone and chert. Traverses and rock chip samples from adjacent fractured and Mn stained sediments failed to detect mineralisation or enrichment in base metals or arsenic. Attributed to higher background values within some of the siltstones, mudstones, and andesitic volcanoclastic sediments. Arsenic (180, 105 ppm) enrichment in Fe-rich calcreted rubble. Mercury anomalies (2.7, 1.8 ppm) attributed to andesitic pyroclastics.

B) Anomaly 2 - Zn anomaly (205 ppm) in micaceous siltstone.

C) Anomalous Zone 3. - South of Little Horrigan Creek - Follow-up sampling of low order As anomaly (max. 55 ppm). Downstream from zone of human disturbance suggest contamination.

D) Anomaly 4 - Ten Mile Creek Area - Low order As anomaly (40 ppm) in basaltic tuff and agglomerate. No evidence of mineralisation.

E) Anomaly 5 - South of Mount Despair - Low order Cu anomaly (79 ppm) within epidote-chlorite altered silicified basaltic tuff.

F) Anomaly 6 - East of Mount Despair - Low order Cu anomaly (71 ppm) similar to Anomaly 5.

G) Anomalous Zone 7. - Little Scrubby Creek Area (Zone B) - Follow-up of Cu anomaly, 18 values (up to 147 ppm) within albite-epidote-chlorite±actinolite altered pyroclastic and plagioclase - porphyritic basalt. Note two anomalous Zn values (max. 143 ppm).

H) Anomalous Zone 8. - Four Mile Creek Area - Thirteen anomalous Cu values (max. 147 ppm); 8 moderate Zn values (max. 193 ppm); and one high order Zn/Pb anomaly (5650 ppm/98 ppm) occur within a zone similar to Zone 7. The geochemical response is attributed to the same cause, however sample 18562 (141 ppm Cu, 98 ppm Pb, 5650 ppm Zn, 24 ppm As) is of interest.

I) Anomalous Zone 9 - Three low order Zn anomalies (max. 142 ppm). Felsic tuffs with minor pyrite.

J) Anomalous Zone 10. - Bracewell Area - Moderate Cu/Zn anomaly. Three anomalous samples (max. 160 ppm Cu, 123 ppm Zn).

K) Anomalies 11 to 23 - Low priority, low order Zn anomalies (max. 139 ppm), attributed to higher background levels within basaltic derived sediments.

L) Anomaly 24 - Cattle Creek Area - Follow-up on high order Zn and Cu anomaly, shown to be homestead contamination.

M) Anomaly 25 - Oaky Creek - Low priority single Cu anomaly (70 ppm) within albite-epidote-chlorite basaltic tuff.

In addition to follow-up of stream sediment anomalies a programme of soil and rock chip sampling was undertaken around the old workings at Mount Raglan over an area of about 350 m x 250 m within which quartz-hematite-jasper bodies outcrop. Jaspers sedimentary and tectonic in character.

GEOCHEMISTRY - The follow-up anomalies can be attributed to variations in background levels between various volcanic, volcanoclastic or sedimentary units or to minor pyritisation or alteration or veins within them. No anomalies of economic grade. Conclusions drawn here also based on work done at ATP 3185M.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Geological mapping confirmed thick Lower Devonian sequence of dominantly felsic subaerial pyroclastics interbedded with marine volcanoclastic sediments containing minor calcareous horizons.

Follow-up stream sediment geochemistry, rock chip sampling and reconnaissance of anomalies has resulted in no follow-up work. Results at Mount Raglan suggest minor gold mineralisation of low grade. No potential exists for low grade disseminated or replacement gold or volcanogenic base metal deposit in the Authority.

RECORDER: Simon Crouch **DATE:** 24/02/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 3045M

COMPANY HOLDING TITLE: Alcoa of Australia Limited

COMPANY SUBMITTING REPORT: Alcoa of Australia Limited

DATE GRANTED: 17/04/1981 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 13 km SW of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Mt Gordon, Iron Gully, Westwood, and Dee Mines.

EXPLORATION TARGETS/MODELS: Gold-bearing vein stockworks or breccia pipes

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File-* 10015, 10904, 11853

SUMMARY:

REASON FOR ACQUISITION OF TITLE - Gold-bearing vein stockworks or breccia pipes

GEOLOGY -

REGIONAL - The descriptions of the geological units identified in the company report has been obtained from the explanatory notes on the Geology of the Rockhampton 1:250 000 Sheet area. The area contains the Capella Creek beds, Boulder Creek Grit, Pond Formation, Neils Creek Clastics, Youlambie Conglomerate, Rookwood Volcanics, Razorback beds, Undifferentiated Upper Cretaceous Volcanic Rocks, Ultramafic rocks, Bouldercombe Complex, and Kyle Mohr Granodiorite.

LOCAL - The Lower Permian Youlambie Conglomerate in the N part of the project area appears to be down-faulted against the Carboniferous Pond Formation to the S. Faulting has occurred along a S-W trend which, if extended, intersects the Mount Morgan orebody 5 km NE of the E margin of the ATP. Faulting appears to be pre-Permian as the Kyle Mohr Granodiorite, intruded on the fault, is not displaced. To the S of the Kyle Mohr Granodiorite the Pond Formation, Boulder Creek Grit and Capella Creek beds strike NNW to NNE and dip W at 5 to 45°. In the central part of the ATP, a wedge of Neils Creek Clastics crops out between the Mount Battery and Iron Bark Faults. To the N of the Kyle Mohr Granodiorite the Youlambie Conglomerate is folded into anticlines and synclines around the intrusive and show dips of up to 50°. The Bouldercombe Complex is intruded along the N side of the Youlambie Conglomerate.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - BHP (ATP 532M); and Geopeko (ATP 302M).

GEOLOGICAL MAPPING - A 1:25 000 scale air photogeological interpretation and reconnaissance geological traversing has been done.

GEOPHYSICS

- **airborne surveys** - An airborne radiometric and magnetic survey was completed. The airborne magnetic survey showed high relief over the Bouldercombe Complex. Outcrops of Cretaceous basalt on the S margin of the complex were also clearly outlined. The peripheral area of the Kyle Mohr Granodiorite has high magnetic relief, as opposed to the relatively subdued central zone. Large anomalies occur over gabbroic intrusives in the S, suggesting the extent of these intrusives is greater than suggested by outcrop. On the central W margin of the area, a zone of anomalies is attributed to basalts within the Rookwood Volcanics. Linear "sharp" anomalies throughout the area are attributed to basic dykes. 28 magnetic anomalies were defined for evaluation. The airborne radiometric survey indicated that the central part of the Kyle Mohr Granodiorite contained high potassium anomalies, while the peripheral (magnetic) zone had a low potassium response. The Permian Youlambie Conglomerate in the W of the area contained several high amplitude anomalies. Potassium anomalies were located for evaluation. Only low amplitude uranium and thorium anomalies coincide with the potassium anomalies. Follow-up of the airborne anomalies was undertaken with four potassium and 28 magnetic anomalies selected as possible targets for breccia-hosted mineralisation. The selection of both magnetic and radiometric targets was based on the premise that such mineralisation will contain accessory pyrrhotite and/or magnetite and may exhibit potassic alteration. Many of the anomalies were found to be caused by dolerite or diorite dykes or plugs. Others were found to represent areas of fractures and xenoliths occurring in the peripheral zone of the Kyle Mohr Granodiorite. Xenoliths are commonly diorite, but fragments of sedimentary rocks also occur. Basalt flows in the S part of the area were also the cause of some anomalies. Following this work, 8 magnetic anomalies and one radiometric anomaly (coincident with a magnetic anomaly) were selected for detailed investigation by ground magnetic surveys.
- **ground surveys** - 8 areas (anomalies) were covered by detailed ground magnetic surveys. The results in Anomaly 1 (Middle Creek Grid) indicated two shallow-source anomalies attributed to diorite dykes/plugs, and a third anomaly at depth whose source is hidden. The results in Anomaly 2 (Sandy Creek Grid) are thought to indicate a concealed basalt flow. Anomaly 3 (Top Rock Creek Grid (North)) is located adjacent to a major NE-SW trending lineament, and has a high magnetic background which is thought to be due to xenoliths present in the area. Anomaly 4 (Top Rock Creek Grid (South)) is also located adjacent to a lineament, and the source of the anomaly is a diorite dyke system. Anomaly 5 (Fence Grid) is located in the peripheral zone of the Kyle Mohr Granodiorite, and the magnetic response is attributed to the granite-hosted xenoliths, with the xenoliths being composed of basic dyke material. Anomaly 6 (Oak Creek Grid) is also located in the peripheral zone of the Kyle Mohr Granodiorite in an area of dolerite dykes, and the source of the anomaly is interpreted as a dolerite dyke/plug at depth. Anomaly 7 (Little Oak Creek Grid) is attributed to a combination of xenoliths and a basic plug with flanking veins; small amounts of malachite were located near some of the veins. Anomaly 8 (Westwood Gold Mine Grid) has almost coincident potassium and magnetic anomalies, but the source of the anomaly is not exposed and is interpreted as an intrusive plug.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The two areas of interest remaining are Anomaly 1 (Middle Creek Grid) and Anomaly 8 (Westwood Gold Mine Grid). However, further work in these areas was curtailed as a result of a corporate policy decision to reduce expenditure on exploration, and the ATP was relinquished.

RECORDER: Paul Blake

DATE: 22/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 10015 **STATUS:** Open

TITLE: Authority to Prospect 3045M, Mount Morgan. First half-yearly report 17 April 1981 to 17 October 1981

AUTHOR(S): K.G. Phillips **DATE:** January 1982

ATP/EP No.: ATP 3045M

COMPANY HOLDING TITLE: Alcoa of Australia Limited

COMPANY SUBMITTING REPORT: Alcoa of Australia Limited

DATE GRANTED: 17/04/1981 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 13 km SW of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Mt Gordon, Iron Gully, Westwood, and Dee Mines.

EXPLORATION TARGETS/MODELS: Gold-bearing vein stockworks or breccia pipes

SUMMARY:

GEOLOGY -

REGIONAL - The descriptions of the geological units identified in the company report has been obtained from the explanatory notes on the Geology of the Rockhampton 1:250 000 Sheet area. The area contains the Capella Creek beds, Boulder Creek Grit, Pond Formation, Neils Creek Clastics, Youlambie Conglomerate, Rookwood Volcanics, Razorback beds, Undifferentiated Upper Cretaceous Volcanic Rocks, Ultramafic rocks, Bouldercombe Complex, and Kyle Mohr Granodiorite.

LOCAL - The Lower Permian Youlambie Conglomerate in the N part of the project area appears to be down-faulted against the Carboniferous Pond Formation to the S. Faulting has occurred along a S-W trend which, if extended, intersects the Mount Morgan orebody 5 km NE of the E margin of the ATP. Faulting appears to be pre-Permian as the Kyle Mohr Granodiorite, intruded on the fault, is not displaced. To the S of the Kyle Mohr Granodiorite the Pond Formation, Boulder Creek Grit and Capella Creek beds strike NNW to NNE and dip W at 5 to 45°. In the central part of the ATP, a wedge of Neils Creek Clastics crops out between the Mount Battery and Iron Bark Faults. To the N of the Kyle Mohr Granodiorite the Youlambie Conglomerate is folded into anticlines and synclines around the intrusive and show dips of up to 50°. The Bouldercombe Complex is intruded along the N side of the Youlambie Conglomerate.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - BHP (ATP 532M); and Geopeko (ATP 302M).

GEOLOGICAL MAPPING - A 1:25 000 scale air photogeological interpretation and reconnaissance geological traversing has been done.

GEOFYSICS

- **airborne surveys** - An airborne radiometric and magnetic survey was completed and the interpretation is given in CR 10904.

RECORDER: Paul Blake **DATE:** 21/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 10940 **STATUS:** Open

TITLE: Authority to Prospect 3045M, Mount Morgan. First annual report 17 April, 1981 to 17 April, 1982.

AUTHOR(S): G.M. Rankine **DATE:** July 1982

ATP/EP No.: ATP 3045M

COMPANY HOLDING TITLE: Alcoa of Australia Limited

COMPANY SUBMITTING REPORT: Alcoa of Australia Limited

DATE GRANTED: 17/04/1981 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 13 km SW of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Mt Gordon, Iron Gully, Westwood, and Dee Mines.

EXPLORATION TARGETS/MODELS: Gold-bearing vein stockworks or breccia pipes

SUMMARY:

REGIONAL EXPLORATION

GEOPHYSICS

- **airborne surveys** - The airborne magnetic survey showed high relief over the Bouldercombe Complex. Outcrops of Cretaceous basalt on the S margin of the complex were also clearly outlined. The peripheral area of the Kyle Mohr Granodiorite has high magnetic relief, as opposed to the relatively subdued central zone. Large anomalies occur over gabbroic intrusives in the S, suggesting the extent of these intrusives is greater than suggested by outcrop. On the central W margin of the area, a zone of anomalies is attributed to basalts within the Rookwood Volcanics. Linear "sharp" anomalies throughout the area are attributed to basic dykes. 28 magnetic anomalies were defined for evaluation. The airborne radiometric survey indicated that the central part of the Kyle Mohr Granodiorite contained high potassium anomalies, while the peripheral (magnetic) zone had a low potassium response. The Permian Youlambie Conglomerate in the W of the area contained several high amplitude anomalies. Potassium anomalies were located for evaluation. Only low amplitude uranium and thorium anomalies coincide with the potassium anomalies.

RECORDER: Paul Blake

DATE: 21/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 11853 **STATUS:** Open

TITLE: Authority to Prospect 3045M, Mount Morgan, Queensland. Final report.

AUTHOR(S): G.M. Rankine **DATE:** January 1983

ATP/EP No.: ATP 3045M

COMPANY HOLDING TITLE: Alcoa of Australia Limited

COMPANY SUBMITTING REPORT: Alcoa of Australia Limited

DATE GRANTED: 17/04/1981 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 13 km SW of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Mt Gordon, Iron Gully, Westwood, and Dee Mines.

EXPLORATION TARGETS/MODELS: Gold-bearing vein stockworks or breccia pipes

SUMMARY:

REGIONAL EXPLORATION

GEOPHYSICS

- **airborne surveys** - Follow-up of the airborne anomalies was undertaken with four potassium and 28 magnetic anomalies selected as possible targets for breccia-hosted mineralisation. The selection of both magnetic and radiometric targets was based on the premise that such mineralisation will contain accessory pyrrhotite and/or magnetite and may exhibit potassic alteration. Many of the anomalies were found to be caused by dolerite or diorite dykes or plugs. Others were found to represent areas of fractures and xenoliths occurring in the peripheral zone of the Kyle Mohr Granodiorite. Xenoliths are commonly diorite, but fragments of sedimentary rocks also occur. Basalt flows in the S part of the area were also the cause of some anomalies. Following this work, 8 magnetic anomalies and one radiometric anomaly (coincident with a magnetic anomaly) were selected for detailed investigation by ground magnetic surveys.
- **ground surveys** - 8 areas (anomalies) were covered by detailed ground magnetic surveys. The results in Anomaly 1 (Middle Creek Grid) indicated two shallow-source anomalies attributed to diorite dykes/plugs, and a third anomaly at depth whose source is hidden. The results in Anomaly 2 (Sandy Creek Grid) are thought to indicate a concealed basalt flow. Anomaly 3 (Top Rock Creek Grid (North)) is located adjacent to a major NE-SW trending lineament, and has a high magnetic background which is thought to be due to xenoliths present in the area. Anomaly 4 (Top Rock Creek Grid (South)) is also located adjacent to a lineament, and the source of the anomaly is a diorite dyke system. Anomaly 5 (Fence Grid) is located in the peripheral zone of the Kyle Mohr Granodiorite, and the magnetic response is attributed to the granite-hosted xenoliths, with the xenoliths being composed of basic dyke material. Anomaly 6 (Oak Creek Grid) is also located in the peripheral zone of the Kyle Mohr Granodiorite in an area of dolerite dykes, and the source of the anomaly is interpreted as a dolerite dyke/plug at depth. Anomaly 7 (Little Oak Creek Grid) is attributed to a combination of xenoliths and a basic plug with flanking veins; small amounts of malachite were located near some of the veins. Anomaly 8 (Westwood Gold Mine Grid) has almost coincident potassium and magnetic anomalies, but the source of the anomaly is not exposed and is interpreted as an intrusive plug.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The two areas of interest remaining are Anomaly 1 (Middle Creek Grid) and Anomaly 8 (Westwood Gold Mine Grid). However, further work in these areas was curtailed as a result of a corporate policy decision to reduce expenditure on exploration, and the ATP was relinquished.

RECORDER: Paul Blake **DATE:** 22/02/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

CR: 10463 **STATUS:** Open

TITLE: A. to P. 3123M. Report for the six monthly period ended 3rd March 1982

AUTHOR(S): P. Walker **DATE:** June 1982

ATP/EP No.: ATP 3123M

COMPANY HOLDING TITLE: Arpedco Pty. Limited

COMPANY SUBMITTING REPORT: Eastmet Limited

DATE GRANTED: 03/09/1981 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 22 km SSE of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: Magnetite in layered gabbro

TRANSFERS, JOINT VENTURES, etc: JV between Arpedco Pty. Limited and Eastmet Limited

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File- 10463*

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To explore for magnetite in the Eulogie Park Gabbro.

GEOLOGY -

LOCAL - The area contains a layered basic intrusive known as the Eulogie Park Gabbro. There are several layers of magnetite-rich rock within the intrusive. Petrological work on some samples from three of the magnetite-rich layers revealed that there is an extremely intimate relationship between the magnetite and the ilmenite exsolved solution lamellae. This relationship is on such a small scale that economic separation is not possible. Therefore the magnetite is unsuitable for coal washing.

REGIONAL EXPLORATION

GEOCHEMISTRY

- **rock chip sampling** - 3 bulk rock chip samples were collected from three magnetite-rich layers of the Eulogie Park Gabbro. No anomalous values were recorded in the elements analysed, with the results ranging from 25 to 50 ppm Cu, 20 to 55 ppm Ni, 90 to 155 ppm Co, 25 to 65 ppm Cr, 600 ppm to 0.12% Mn, 0.19 to 0.20% V, and 2.52 to 6.37% Ti.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Given the negative results on the ability to extract the magnetite for coal washing. It was decided to relinquish the area.

RECORDER: Paul Blake **DATE:** 21/02/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 3150M

COMPANY HOLDING TITLE: Nord Resources (Pacific) Pty. Ltd.

COMPANY SUBMITTING REPORT: Nord Resources (Pacific) Pty. Ltd.

DATE GRANTED: October, 1981 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 25 km W of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Westwood Palladium Mine

EXPLORATION TARGETS/MODELS: Platinoid mineralisation in layered gabbro

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File- 10906, 11322*

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To search for platinoid mineralisation in the Westwood layered gabbro complex.

GEOLOGY -

LOCAL - Nord speculates that the Westwood Gabbro is not a small discrete and regionally young intrusion disturbed by faulting and intruded by peridotite pipes. An analogy with the cumulate zone of the Papuan Ultramafic belt is suggested. In this view, the Westwood Gabbro, together with other layered gabbro slivers in the area, would be among the oldest rocks in the region and could have affinities with the basic volcanics which crop out to the W. The Fred Creek Complex occurs to the N of the ATP and is described as gabbroic with pyroxenite and dolerite layers. Pyrite is common and chalcopyrite is not unusual. Drill logs from BHP report chlorite, epidote, calcite and some silicification. This suggests more structural disturbance than was seen at Westwood. The Windah Gabbro is a layered gabbro similar to that at Westwood, but no pyroxenites, sulphides nor copper were seen.

MINERALISATION/ALTERATION - Palladium, gold, and platinum concentrations in a layered gabbro

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - B.H.P did exploration and drilling on the Gabbro in the early 1970's.

LOCALISED EXPLORATION/PROSPECTS

1) Westwood Palladium Mine area - (referred to in this company report as a gold mine)

GEOLOGY - The Westwood Complex is dominantly gabbroic but also contains anorthosite, troctolite, and pyroxenites as minor members of the layered sequence. The gabbros themselves display a wide variety of compositions and grain size. Olivine gabbros are particularly common and hypersthene and hornblende gabbro are present. Magnetite, the only spinel to have been reported, is prominent and reaches concentrations of 20% in some gabbro varieties. Chromite is apparently not present. There are several small bodies of peridotite within the complex and as these are in cross cutting relationships to the trends of layering they are thought to be dykes. Also present are small carbonate veins and a number of acid and intermediate dykes. On its south side, the complex is in contact with the Rookwood Volcanics (basic volcanic suite containing chert bands and pillow lavas). The contact is intrusive with hornfelsing of the volcanics. The N margin of the gabbro is intruded by a younger granite (Bouldercombe Complex). A short field inspection revealed that the gold-copper mineralisation was associated with a pyroxenite unit.

GEOCHEMISTRY - Assays were done on drill pulp supplied by B.H.P. from their drilling. A total of 329 samples of pulps were analysed. Only 8 samples had detectable levels of platinum with the highest values being 0.120 ppm. Palladium was detected in 91% of the samples, and of these 12% were above 0.2 ppm. Gold was detected in 75% of the samples, and of these 80% showed values above 0.10 ppm. The soil geochemical data of BHP was reinterpreted. Copper shows a strong anomalous zone with a trend coincident with the interpreted strike of the layering, and includes the known gold and palladium occurrences. Anomalous nickel shows an antithetical relationship with the copper anomaly, the significance of which is obscure. Additional soil sampling was undertaken to get data on the platinum, palladium and gold distribution. This work was restricted to three areas, two being over peridotite pipes in the W half of the area, and one over the old mine area. Platinum results were not informative, but gold and palladium showed particularly interesting anomalies, in the range of 0.05 to 0.5 ppm, in the

mine area. The gold and palladium indicate an enriched zone concordant with the interpreted strike of the layering, but is much more restricted than the copper anomaly. The anomalous zone is not on the same horizon as the old mine, but is stratigraphically above it. On the gold results, the mine lies on a cross cutting trend. Samples were assayed from 3 costeans dug across the anomalous zone in the mine area. The results confirmed the presence of anomalous values for precious metals. However, the values were too low to be considered economic. Copper ranged from 24 to 5000 ppm, and the highest values in the precious metals was 1 ppm Ag, 0.95 ppm Au, 1.3 ppm Pd, and 0.2 ppm Pt.

DRILLING - Study of the B.H.P. drilling pattern suggests that if the new interpretation of the attitude of the layering is correct, none of the holes tested the layer whose outcrop would correspond with the gold and palladium anomaly.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Some horizons within the Westwood Gabbro (Complex) are unusually rich in gold, platinum and palladium, but the concentrations are not economic.

RECORDER: Paul Blake **DATE:** 21/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 10906 **STATUS:** Open

TITLE: Report on operations on A to P 3150M, Westwood, Queensland, for the half year to April 1982.

AUTHOR(S): W.A. McGee **DATE:**

ATP/EP No.: ATP 3150M

COMPANY HOLDING TITLE: Nord Australex Nominees Pty. Ltd.

COMPANY SUBMITTING REPORT: Nord Australex Nominees Pty. Ltd.

DATE GRANTED: October, 1981 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 25 km W of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Westwood Palladium Mine

EXPLORATION TARGETS/MODELS: Platinoid mineralisation in layered gabbro

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To search for platinoid mineralisation in the Westwood layered gabbro complex.

GEOLOGY -

LOCAL - Nord speculates that the Westwood Gabbro is not a small discrete and regionally young intrusion disturbed by faulting and intruded by peridotite pipes. An analogy with the cumulate zone of the Papuan Ultramafic belt is suggested. In this view, the Westwood Gabbro, together with other layered gabbro slivers in the area, would be among the oldest rocks in the region and could have affinities with the basic volcanics which crop out to the W.

MINERALISATION/ALTERATION - Palladium, gold, and platinum concentrations in a layered gabbro

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - B.H.P did exploration and drilling on the Gabbro in the early 1970's.

LOCALISED EXPLORATION/PROSPECTS

1) Westwood Palladium Mine area - (referred to in this company report as a gold mine)

GEOLOGY - A short field inspection revealed that the gold-copper mineralisation was associated with a pyroxenite unit.

GEOCHEMISTRY - Assays were done on drill pulp supplied by B.H.P. from their drilling. Both gold and palladium were anomalous, and sporadic traces of platinum occurred. These results are considered to warrant further work. Further details of the results of the drilling are given in CR 11322. The soil geochemical data of BHP was reinterpreted. Copper shows a strong anomalous zone with a trend coincident with the interpreted strike of the layering, and includes the known gold and palladium

occurrences. Anomalous nickel shows an antithetical relationship with the copper anomaly, the significance of which is obscure. Additional soil sampling was undertaken to get data on the platinum, palladium and gold distribution. This work was restricted to three areas, two being over peridotite pipes in the W half of the area, and one over the old mine area. Platinum results were not informative, but gold and palladium showed particularly interesting anomalies, in the range of 0.05 to 0.5 ppm, in the mine area. The gold and palladium indicate an enriched zone concordant with the interpreted strike of the layering, but is much more restricted than the copper anomaly. The anomalous zone is not on the same horizon as the old mine, but is stratigraphically above it. On the gold results, the mine lies on a cross cutting trend.

DRILLING - Study of the B.H.P. drilling pattern suggests that if the new interpretation of the attitude of the layering is correct, none of the holes tested the layer whose outcrop would correspond with the gold and palladium anomaly.

RECORDER: Paul Blake

DATE: 18/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 11322 **STATUS:** Open

TITLE: Final Report on the Westwood Layered Gabbro Complex. Authority to Prospect 3150M, Queensland.

AUTHOR(S): W.A. McGee **DATE:** October 1982

ATP/EP No.: ATP 3150M

COMPANY HOLDING TITLE: Nord Resources (Pacific) Pty. Ltd.

COMPANY SUBMITTING REPORT: Nord Resources (Pacific) Pty. Ltd.

DATE GRANTED: October, 1981 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 25 km W of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Westwood Palladium Mine

EXPLORATION TARGETS/MODELS: Platinoid mineralisation in layered gabbro

SUMMARY:

GEOLOGY -

LOCAL - The Fred Creek Complex occurs to the N of the ATP and is described as gabbroic with pyroxenite and dolerite layers. Pyrite is common and chalcopyrite is not unusual. Drill logs from BHP report chlorite, epidote, calcite and some silicification. This suggests more structural disturbance than was seen at Westwood. The Windah Gabbro is a layered gabbro similar to that at Westwood, but no pyroxenites, sulphides nor copper were seen.

LOCALISED EXPLORATION/PROSPECTS

1) Westwood Palladium Mine area

GEOLOGY - The complex is dominantly gabbroic but also contains anorthosite, troctolite, and pyroxenites as minor members of the layered sequence. The gabbros themselves display a wide variety of compositions and grain size. Olivine gabbros are particularly common and hypersthene and hornblende gabbro are present. Magnetite, the only spinel to have been reported, is prominent and reaches concentrations of 20% in some gabbro varieties. Chromite is apparently not present. There are several small bodies of peridotite within the complex and as these are in cross cutting relationships to the trends of layering they are thought to be dykes. Also present are small carbonate veins and a number of acid and intermediate dykes. On its south side, the complex is in contact with the Rookwood Volcanics (basic volcanic suite containing chert bands and pillow lavas). The contact is intrusive with hornfelsing of the volcanics. The N margin of the gabbro is intruded by a younger granite (Bouldercombe Complex).

GEOCHEMISTRY - A total of 329 samples of pulps from BHP's drilling were analysed. Only 8 samples had detectable levels of platinum with the highest values being 0.120 ppm. Palladium was detected in 91% of the samples, and of these 12% were above 0.2 ppm. Gold was detected in 75% of the samples, and of these 80% showed values above 0.10 ppm. Samples were assayed from 3 costeans dug across the anomalous zone. The results confirmed the presence of anomalous values for precious

metals. However, the values were too low to be considered economic. Copper ranged from 24 to 5000 ppm, and the highest values in the precious metals was 1 ppm Ag, 0.95 ppm Au, 1.3 ppm Pd, and 0.2 ppm Pt.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Some horizons within the Westwood Gabbro (Complex) are unusually rich in gold, platinum and palladium, but the concentrations are not economic.

RECORDER: Paul Blake **DATE:** 18/02/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 3185M

COMPANY HOLDING TITLE: Electrolytic Zinc Company of Australasia Limited

COMPANY SUBMITTING REPORT: Electrolytic Zinc Company of Australasia Limited

DATE GRANTED: 27/11/1982 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 30 km S of Rockhampton

MINING DISTRICT:

MINES/PROSPECTS: Raglan and Langmorn Gold fields; Mt Bennett, Mt Raglan, Mt Turret, Duke of York and Cedar Vale reef mines, Two Mile Diggings.

EXPLORATION TARGETS\MODELS: Disseminated or replacement gold.

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File-* 10958, 11836, 12484

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To explore for disseminated or replacement gold mineralisation.

GEOLOGY -

REGIONAL - The ATP is situated in the N part of the Yarrol Province, and forms part of the eastern Rockhampton Block.

LOCAL - The ATP straddles the contact between the Lower Devonian section of the Mt Holly Group, and the Lower Carboniferous Crana beds. Recent mapping has shown that four units can now be defined within the Mt Holly Group covered by ATP 3185M and 3001M. These units range in age from Lower Devonian to possibly Upper Devonian. Unit 1 is thought to be Lower Devonian and is informally called the Raglan beds. It crops out within and on the W limb of a major anticline between Epala and Five Mile Creek W of Mt Holly. This unit is composed of fine-grained volcanoclastics, siltstones, mudstones and weakly pyritic radiolarian cherts with interbedded green felsic to mafic tuffs, basalts and limestone lenses. Units 2 & 3 are considered to be equivalent to the Capella Creek beds, and Unit 4 is considered equivalent to the Dee Volcanics. Unit 1 is the only unit of the Mt Holly Group to outcrop within the ATP. In the NE part of the ATP is the Lower Carboniferous Crana beds. This sequence is typified by horizons of calcarenite locally oolite and less commonly calcirudite. Dominant lithologies are feldspathic and lithic greywacke, siltstone, mudstone, tuff and a few beds of light grey limestone. The base of the sequence is not exposed and is suspected of being faulted against the Raglan beds. A single major anticline with a highly sheared axial zone is interpreted within the ATP. Major NNW trending structures which have distinctive photo-lineament patterns are marked in the field by intense schistosity, (cleavage), quartz veining, and local silicification. Quartz-feldspar porphyry, granite and/or trachyte dyke swarms occur in the vicinity of Raglan Creek, along a set of major structures which transects the E part of the ATP.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - A summary of the old gold workings in this area is in the explanation notes for the Rockhampton 1:250000 Geology Sheet. Recent work by Dampier Mining (ATP 1416M); Australian Anglo American Prospecting Ltd (ATP 1950M, 1951M and 2079M); and EZ (ATP 2067M).

GEOCHEMISTRY

- **stream sediment sampling** - 109 stream sediment samples were collected, but no significant anomalies were indicated within the Raglan beds. Sequences of the Crana beds E of Raglan, exhibited higher (maximum of 30 ppm As) values than the Raglan beds.

- **rock chip sampling** - Rock chip samples were collected from limestone lenses due E of Raglan and NE of Raglan Station, but do not exhibit anomalous geochemistry. A sample of dump material from a pit in quartz-veined altered felsic pyroclastics located within a major shear-fault zone N of Raglan Creek, gave 6.6 ppm Au, 60 ppm As, 1.6 ppm Ag, and 390 ppm Pb.

LOCALISED EXPLORATION/PROSPECTS

1) Mount Holly Grid - Occurs to the E of Mount Holly, and just to the S of the Bruce Highway.

GEOLOGY - The Raglan beds in this area dip moderately to the W and consist of a sequence of fossiliferous micritic limestones with interbedded tuffaceous arenite and siltstone which grade up into intermediate-andesitic tuffs and pyroclastics containing relatively minor interbeds of volcanoclastic

shale and arenite. Towards the base the limestone unit are several lenses of relatively pure crinoid and coral-rich micrite. In the NW part of the grid, pyroclastics are the dominant lithology and then dacite and andesite flows occur. A major lineament zone trending NNW passes through the central part of the grid. The presence of quartz veins in outcrop, float and drill chips, together with local Fe-Mn staining and strong foliation of the sediments suggest that this is a zone of shearing and possible fluid movement. No significant hydrothermal alteration is evident in outcrop or drill cuttings.

GEOCHEMISTRY - 61 rock chips were sampled in an uncontrolled survey. Results confirmed the presence of sporadic gold mineralisation, but indicated there was no obvious base metal association with the gold. Best values were 4.2 ppm Au, 55 ppm As, 510 ppm Zn, 260 ppm Cu, and 170 ppm Pb. 232 samples from the auger drilling were assayed. These results delineated a series of weakly anomalous (>0.03 ppm Au) gold zones trending sub-parallel to stratigraphy within the S and central sections of the calcareous sequence. Maximum values of 0.18 and 0.19 ppm Au were recorded close to a ridge top near the top of the limestone sequence where it is intersected by a broad NNW trending shear zone. This area has a distinct arsenic halo with a maximum of 80 ppm in a background of 5 ppm As. There is no base metal or silver association with the gold zones. Base metal values appear to reflect lithological control. Copper (maximum 116 ppm Cu) and zinc (maximum 330 ppm Zn) are relatively elevated in the tuffaceous and volcanoclastic sequence whilst higher arsenic (maximum 30 ppm As) and to a lesser extent lead (max. 27 ppm Pb) values are confined to the calcareous sequence. The assays from the rotary percussion drilling did not support the results from the shallower auger drilling. Only 3 samples from the rotary percussion drilling analysed >0.03 ppm Au. Arsenic and thallium, used as indicators of an epithermal environment of gold mineralisation are generally low. However, zones of elevated values of up to 50 ppm As and 22 ppm Tl do occur within the silty limestone and shale horizons towards the base of the calcareous sequence. This could be due to hydrothermal or epithermal mineralisation which has no significant Cu, Pb, Zn, or Ag expression, a feature typical of replacement sediment hosted gold deposits of the Carlin type. The highly anomalous gold results in the reconnaissance work may be related to sporadic gold quartz vein mineralisation and would as such have no economic significance.

GEOPHYSICS - A ground magnetic survey was conducted over the grid. In general the magnetics reflect the regional NNW structural trend with several significant linear positive anomalies. The centrally disposed linear anomaly is relatively narrow (50 m) and may reflect an underlying mafic intrusion such as a diorite dyke. The major NNW trending shear-fault zone mapped across the grid is reflected by a magnetic trough. Rapid variations in the magnetic pattern in the W, together with apparent offsets of anomalous zones suggest that an ENE trending structural break occurs in this area. This is supported by a photolineament along this zone. In the W half of the grid, magnetic patterns may also be responding to lithological units. Andesitic-intermediate tuffs appear to define magnetic highs, whilst volcanoclastic sediments outcrop in magnetic lows. The calcareous sequence to the E does not have any definable magnetic expression.

DRILLING - Auger soil/bedrock sampling to an average depth of 0.5 m was conducted. 333 rotary percussion holes, averaging 5 m deep, were drilled to obtain bedrock samples from the gold zones.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - It was concluded that the anomalous gold and arsenic values in the Mt Holly grid are probably related to both minor shear-controlled quartz vein gold (\pm arsenical pyrite) mineralisation and locally enhanced levels in the vicinity of intrusive dioritic dykes, a feature noted at a number of other localities in the region. There does not appear to be evidence of significant disseminated or hydrothermal replacement gold mineralisation. These results downgraded the potential of other areas, such as the weak arsenic anomalies in the Crana beds. Further exploration did not seem warranted, and the ATP was relinquished.

RECORDER: Paul Blake

DATE: 18/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 10958 **STATUS:** Open

TITLE: Authority to Prospect No. 3185M, "Mt. Holly", Gladstone Mining District, Queensland. First six monthly report to Queensland Department of Mines.

AUTHOR(S): R.J. Close **DATE:** July 1982

ATP/EP No.: ATP 3185M

COMPANY HOLDING TITLE: Electrolytic Zinc Company of Australasia Limited

COMPANY SUBMITTING REPORT: Electrolytic Zinc Company of Australasia Limited

DATE GRANTED: 27/11/1982 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 30 km S of Rockhampton

MINING DISTRICT:

MINES/PROSPECTS: Raglan and Langmorn Gold fields; Mt Bennett, Mt Raglan, Mt Turret, Duke of York and Cedar Vale reef mines, Two Mile Diggings.

EXPLORATION TARGETS/MODELS: Disseminated or replacement gold.

SUMMARY:

GEOLOGY -

REGIONAL - The ATP is situated in the N part of the Yarrol Province, and forms part of the eastern Rockhampton Block.

LOCAL - The ATP straddles the contact between the Lower Devonian section of the Mt Holly Group, and the Lower Carboniferous Crana beds. Recent mapping has shown that four units can now be defined within the Mt Holly Group covered by ATP 3185M and 3001M. These units range in age from Lower Devonian to possibly Upper Devonian. Unit 1 is thought to be Lower Devonian and is informally called the Raglan beds. It crops out within and on the W limb of a major anticline between Epala and Five Mile Creek W of Mt Holly. This unit is composed of fine-grained volcanoclastics, siltstones, mudstones and weakly pyritic radiolarian cherts with interbedded green felsic to mafic tuffs, basalts and limestone lenses. Units 2 & 3 are considered to be equivalent to the Capella Creek beds, and Unit 4 is considered equivalent to the Dee Volcanics. Unit 1 is the only unit of the Mt Holly Group to outcrop within the ATP. In the NE part of the ATP is the Lower Carboniferous Crana beds. This sequence is typified by horizons of calcarenite locally oolite and less commonly calcirudite. Dominant lithologies are feldspathic and lithic greywacke, siltstone, mudstone, tuff and a few beds of light grey limestone. The base of the sequence is not exposed and is suspected of being faulted against the Raglan beds. A single major anticline with a highly sheared axial zone is interpreted within the ATP. Major NNW trending structures which have distinctive photo-lineament patterns are marked in the field by intense schistosity, (cleavage), quartz veining, and local silicification. Quartz-feldspar porphyry, granite and/or trachyte dyke swarms occur in the vicinity of Raglan Creek, along a set of major structures which transects the E part of the ATP.

REGIONAL EXPLORATION

GEOCHEMISTRY

- **stream sediment sampling** - 109 stream sediment samples were collected, but no significant anomalies were indicated within the Raglan beds. Sequences of the Crana beds E of Raglan, exhibiting higher (maximum of 30 ppm As) values than the Raglan beds need to be investigated, however, limited follow-up geochemistry is required to test the zones of weak arsenic anomalism.

- **rock chip sampling** - Rock chip samples were collected from limestone lenses due E of Raglan and NE of Raglan Station, but do not exhibit anomalous geochemistry. A sample of dump material from a pit in quartz-veined altered felsic pyroclastics located within a major shear-fault zone N of Raglan Creek, gave 6.6 ppm Au, 60 ppm As, 1.6 ppm Ag, and 390 ppm Pb.

LOCALISED EXPLORATION/PROSPECTS

1) Mount Holly Grid - Occurs to the E of Mount Holly, and just to the S of the Bruce Highway.

GEOLOGY - The Raglan beds in this area dip moderately to the W and consist of a sequence of fossiliferous micritic limestones with interbedded tuffaceous arenite and siltstone which grade up into intermediate-andesitic tuffs and pyroclastics containing relatively minor interbeds of volcanoclastic shale and arenite. Towards the base the limestone unit are several lenses of relatively pure crinoid and coral-rich micrite. In the NW part of the grid, pyroclastics are the dominant lithology and then dacite and andesite flows occur. A major lineament zone trending NNW passes through the central part of the grid. The presence of quartz veins in outcrop, float and drill chips, together with local Fe-Mn staining and strong foliation of the sediments suggest that this is a zone of significant shearing and possible fluid movement. No significant hydrothermal alteration is evident in outcrop or cuttings.

GEOCHEMISTRY - 61 rock chips were sampled in an uncontrolled survey. Results confirmed the presence of sporadic gold mineralisation, but indicated there was no obvious base metal association with the gold. Best values were 4.2 ppm Au, 55 ppm As, 510 ppm Zn, 260 ppm Cu, and 170 ppm Pb. 232 samples from the auger drilling were assayed. These results delineated a series of weakly anomalous (>0.03 ppm Au) gold zones trending sub-parallel to stratigraphy within the S and central sections of the calcareous sequence. Maximum values of 0.18 and 0.19 ppm Au were recorded close to a ridge top near the top of the limestone sequence where it is intersected by a broad NNW trending shear zone. This area has a distinct arsenic halo with a maximum of 80 ppm in a background of 5 ppm As. There is no base metal or silver association with the gold zones. Base metal values appear to reflect lithological control. Copper (maximum 116 ppm Cu) and zinc (maximum 330 ppm Zn) are relatively elevated in the tuffaceous and volcanoclastic sequence whilst higher arsenic (maximum 30 ppm As) and to a lesser extent lead (max. 27 ppm Pb) values are confined to the calcareous sequence. The assays from the rotary percussion drilling did not support the results from the shallower auger drilling. Only 3 samples from the rotary percussion drilling analysed >0.03 ppm Au. Arsenic and thallium, used as indicators of an epithermal environment of gold mineralisation are generally low. However, zones of elevated values of up to 50 ppm As and 22 ppm Tl do occur within the silty limestone and shale horizons towards the base of the calcareous sequence. This could be due to hydrothermal or epithermal mineralisation which has no significant Cu, Pb, Zn, or Ag expression, a feature typical of replacement sediment hosted gold deposits of the Carlin type. The highly anomalous gold results in the reconnaissance work may be related to sporadic gold quartz vein mineralisation and would as such have no economic significance.

GEOPHYSICS - A ground magnetic survey was conducted over the grid. In general the magnetics reflect the regional NNW structural trend with several significant linear positive anomalies. The centrally disposed linear anomaly is relatively narrow (50 m) and may reflect an underlying mafic intrusion such as a diorite dyke. The major NNW trending shear-fault zone mapped across the grid is reflected by a magnetic trough. Rapid variations in the magnetic pattern in the W, together with apparent offsets of anomalous zones suggest that an ENE trending structural break occurs in this area. This is supported by a photolineament along this zone. In the W half of the grid, magnetic patterns may also be responding to lithological units. Andesitic-intermediate tuffs appear to define magnetic highs, whilst volcanoclastic sediments outcrop in magnetic lows. The calcareous sequence to the E does not have any definable magnetic expression.

DRILLING - Auger soil/bedrock sampling to an average depth of 0.5 m was conducted. 333 rotary percussion holes, averaging 5 m deep, were drilled to obtain bedrock samples from the gold zones.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - A detailed study of the Mt Holly Grid does not appear to indicate the presence of significant hydrothermal-epithermal alteration and associated gold mineralisation. The grid area also has limited potential for disseminated/replacement gold mineralisation.

RECORDER: Paul Blake

DATE: 19/01/1995.

COMPANY REPORT SUMMARY SHEET

CR: 11836 **STATUS:** Open

TITLE: Authority to Prospect No. 3185M, "Mt. Holly", Gladstone mining district, Queensland.

AUTHOR(S): N.F. Rutherford **DATE:** December 1982

ATP/EP No.: ATP 3185M

COMPANY HOLDING TITLE: Electrolytic Zinc Company of Australasia Limited

COMPANY SUBMITTING REPORT: Electrolytic Zinc Company of Australasia Limited

DATE GRANTED: 27/11/1982 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 30 km S of Rockhampton

MINING DISTRICT:

MINES/PROSPECTS: Raglan and Langmorn Gold fields; Mt Bennett, Mt Raglan, Mt Turret, Duke of York and Cedar Vale reef mines, Two Mile Diggings.

EXPLORATION TARGETS/MODELS: Disseminated or replacement gold.

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To explore for disseminated or replacement gold mineralisation.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - A summary of the old gold workings in this area is given in the explanation notes for the Rockhampton 1:250000 Geology Sheet. Recent work by Dampier Mining (ATP 1416M); Australian Anglo American Prospecting Ltd (ATP 1950M, 1951M and 2079M); and EZ (ATP 2067M).

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The area was reduced in size at the end of the period, from 17 to 8 sub-blocks.

RECORDER: Paul Blake **DATE:** 18/02/1993.

COMPANY REPORT SUMMARY SHEET

CR: 12484 **STATUS:** Open

TITLE: Authority to Prospect No. 3185M, "Mt. Holly", Gladstone mining district, Queensland. Final report to Queensland Department of Mines, June 1983.

AUTHOR(S): N.F. Rutherford **DATE:** June 1983

ATP/EP No.: ATP 3185M

COMPANY HOLDING TITLE: Electrolytic Zinc Company of Australasia Limited

COMPANY SUBMITTING REPORT: Electrolytic Zinc Company of Australasia Limited

DATE GRANTED: 27/11/1982 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 30 km S of Rockhampton

MINING DISTRICT:

MINES/PROSPECTS: Raglan and Langmorn Gold fields; Mt Bennett, Mt Raglan, Mt Turret, Duke of York and Cedar Vale reef mines, Two Mile Diggings.

EXPLORATION TARGETS/MODELS: Disseminated or replacement gold.

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - All of the information given in CR 11836 is also given in this report. It was concluded that the anomalous gold and arsenic values in the Mt Holly grid are probably related to both minor shear-controlled quartz vein gold (\pm arsenical pyrite) mineralisation and locally enhanced levels in the vicinity of intrusive dioritic dykes, a feature noted at a number of other localities in the region. There does not appear to be evidence of significant disseminated or hydrothermal replacement gold mineralisation. These results downgraded the potential of other areas, such as the weak arsenic anomalies in the Crana beds. Further exploration did not seem warranted, and the ATP was relinquished.

RECORDER: Paul Blake **DATE:** 18/02/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 3212M

COMPANY HOLDING TITLE: Circular Quay Holdings Pty. Ltd.

COMPANY SUBMITTING REPORT: Gold Fields Exploration P/L

DATE GRANTED: 10/02/1982 **PERIOD:**

1:100 000 SHEET NAME(S): Bajool & Gladstone

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Mt Larcom area

MINING DISTRICT:

MINES/PROSPECTS: Small un-named manganese mine

EXPLORATION TARGETS\MODELS: Volcanogenic copper, gold, lead, zinc, silver deposits of the Mount Chalmers type

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File-* 11494, 11719

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To explore for volcanogenic copper, gold, lead, zinc, silver deposits of the Mount Chalmers type.

GEOLOGY -

REGIONAL - The ATP encompasses part of the southern extension of the Berserker Graben. The graben comprises a sequence of rhyolitic to andesitic volcanics and volcanic sediments.

LOCAL - A sequence of alternating jasper and dacite dominates the oldest formation in the SE corner of the ATP. It is thought to be Devonian in age, and is part of the lower formation of the Curtis Island Group. The jasper is by far the most voluminous rock type, and is nearly pure, very fine grained quartz, rich in iron, and contains minute lithic fragments. It is clearly bedded and extensively intruded by fine quartz veins. A manganese deposit within the jasperous horizon south of the Mt Miller property was worked prior to 1963. The deposit was moderately small and worked as an underground operation, with stilpnomelane as the main source of the manganese. The dacites are quite rich in quartz and contains variable quantities of sanidine feldspar, biotite, chlorite, pyroxene, and calcite. This member is quite tuffaceous and contains small quartz rich lithic fragments. A sequence of fine grained andesites and rhyodacites interbedded with fine grained sandstones and siltstones occurs in the W and S portions of the ATP. The andesites are the most prominent lithology and contain abundant albite with chlorite, biotite, calcite, and rare epidote and sphene, plus opaques. The rhyodacite horizons are prominent near Yarwun township. This rock contains very little quartz, with chlorite and biotite, albite and orthopyroxene, lacking opaque minerals. A sequence of andesite interbedded with thinly bedded, fine grained quartz mica siltstones occurs in the W portion of the area. This sequence is part of the Yarrol Basin and is fault bounded against the Curtis Island Group S of Yarwun. Cherty lenses occur, and two jasperous horizons also occur. A fossiliferous limestone outcrop N of Mt Larcom may be associated with this formation. The limestone contains tabulate corals and crinoids.

The Berserker beds at Mt Larcom are dominated by slightly altered sequence of dacitic and andesitic volcanics, with the andesitic volcanic dominating the sequence. The dacitic horizons which occur along Scrubby Creek and near Yarwun are quite brecciated, and contain quartz with slightly sericitised albite, biotite, chlorite, and epidote. Some lithic fragments rich in quartz are also present. The grains are supported in a very fine grained glassy groundmass. The andesites are fine to medium grained containing fine grained albite with calcite, epidote, chlorite, biotite, sericite, and some pyroxene, and rare opaques and lithic fragments. The rock is extensively brecciated in a couple of areas, but is not normally so. Small quantities of sulphide have been recorded in some samples. Apart from the weak and persistent pyritic alteration, no alteration was observed within the weakly stream sediment anomalous area. The Targinie Granite intrudes the Berserker beds along the E margin of the Mt Larcom range, from Mt Sugarloaf to Scrubby Creek. The granite falls within the adamellite field containing albite and orthoclase with quartz, diopside, biotite, chlorite, epidote, and allanite. The summit of Mt Larcom is a quartz-rich rhyolite breccia which may be a remnant volcanic plug.

REGIONAL EXPLORATION

GEOCHEMISTRY

- **stream sediment sampling** - An initial stream survey with 235 samples collected was conducted. The maximum values recorded were 115 ppm Cu, 135 ppm Pb, 280 ppm Zn, and 0.62% Mn. All these values were associated with dacite and andesitic rocks belonging to the Berserker beds sequence, with a moderately anomalous area stretching from Sneaker Gully to the Butterville homestead, and to a lesser extent, S to Cherry Creek. Average values received for the area was 50 ppm Cu, 45 ppm Pb, 65 ppm Zn,

and 800 ppm Mn. A second survey was conducted, with 73 stream sediment samples collected. The highest values were from samples taken at the W side of Mt Larcom itself. The average results are 42 ppm Cu, 32 ppm Pb, and 63 ppm Zn, and are thus slightly lower than those from the initial samples program.

- **rock chip sampling** - A total of 38 rock chip samples were collected, with the peak results of 0.76% Cu, 90 ppm Pb, 220 ppm Zn, and 85 ppb Au.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The weakly anomalous stream sediment values are thought to be due to primary differences in the andesite chemistry rather than alteration events. Also, after an examination of the creeks in the area, it was determined that most had a high gradient, and the differences in enrichment of the metals could be due to natural sediment traps. It is recommended that the ATP be relinquished.

RECORDER: Paul Blake

DATE: 17/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 11494 **STATUS:** Open

TITLE: Authority to Prospect 3212 M. Report to Queensland Department of Mines for six months ended 10 August, 1982.

AUTHOR(S): P. Hills **DATE:**

ATP/EP No.: ATP 3212M

COMPANY HOLDING TITLE: Circular Quay Holdings Pty. Ltd.

COMPANY SUBMITTING REPORT: Gold Fields Exploration P/L

DATE GRANTED: 10/02/1982 **PERIOD:**

1:100 000 SHEET NAME(S): Bajool & Gladstone

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Mt Larcom area

MINING DISTRICT:

MINES/PROSPECTS: Small un-named manganese mine

EXPLORATION TARGETS\MODELS: Volcanogenic copper, gold, lead, zinc, silver deposits of the Mount Chalmers type

SUMMARY:

GEOLOGY -

REGIONAL - The ATP encompasses part of the southern extension of the Berserker Graben. The graben comprises a sequence of rhyolitic to andesitic volcanics and volcanic sediments.

LOCAL - A sequence of alternating jasper and dacite dominates the oldest formation in the SE corner of the ATP. It is thought to be Devonian in age, and is part of the lower formation of the Curtis Island Group. The jasper is by far the most voluminous rock type, and is nearly pure, very fine grained quartz, rich in iron, and contains minute lithic fragments. It is clearly bedded and extensively intruded by fine quartz veins. A manganese deposit within the jasperous horizon south of the Mt Miller property was worked prior to 1963. The deposit was moderately small and worked as an underground operation, with stilpnomelane as the main source of the manganese. The dacites are quite rich in quartz and contains variable quantities of sanidine feldspar, biotite, chlorite, pyroxene, and calcite. This member is quite tuffaceous and contains small quartz rich lithic fragments. A sequence of fine grained andesites and rhyodacites interbedded with fine grained sandstones and siltstones occurs in the W and S portions of the ATP. The andesites are the most prominent lithology and contain abundant albite with chlorite, biotite, calcite, and rare epidote and sphene, plus opaques. The rhyodacite horizons are prominent near Yarwun township. This rock contains very little quartz, with chlorite and biotite, albite and orthopyroxene, lacking opaque minerals. A sequence of andesite interbedded with thinly bedded, fine grained quartz mica siltstones occurs in the W portion of the area. This sequence is part of the Yarrol Basin and is fault bounded against the Curtis Island Group S of Yarwun. Cherty lenses occur, and two jasperous horizons also occur. A fossiliferous limestone outcrop N of Mt Larcom may be associated with this formation. The limestone contains tabulate corals and crinoids.

The Berserker beds at Mt Larcom are dominated by slightly altered sequence of dacitic and andesitic volcanics. The dacitic horizons which occur along Scrubby Creek and near Yarwun are quite brecciated, and contain quartz with slightly sericitised albite, biotite, chlorite, and epidote. Some lithic fragments rich

in quartz are also present. The grains are supported in a very fine grained glassy groundmass. The andesites are fine to medium grained containing fine grained albite with calcite, epidote, chlorite, biotite, sericite, and some pyroxene, and rare opaques and lithic fragments. The rock is extensively brecciated in a couple of areas, but is not normally so. Small quantities of sulphide have been recorded in some samples. The Targinie Granite intrudes the Berserker beds along the E margin of the Mt Larcom range, from Mt Sugarloaf to Scrubby Creek. The granite falls within the adamellite field containing albite and orthoclase with quartz, diopside, biotite, chlorite, epidote, and allanite. The summit of Mt Larcom is a quartz-rich rhyolite breccia which may be a remnant volcanic plug.

REGIONAL EXPLORATION

GEOCHEMISTRY

- **stream sediment sampling** - 235 stream sediment samples were collected from the ATP. The maximum values recorded were 115 ppm Cu, 135 ppm Pb, 280 ppm Zn, and 0.62% Mn. All these values were associated with dacite and andesitic rocks belonging to the Berserker beds sequence, with a moderately anomalous area stretching from Sneaker Gully to the Butterville homestead, and to a lesser extent, S to Cherry Creek. Average values received for the area was 50 ppm Cu, 45 ppm Pb, 65 ppm Zn, and 800 ppm Mn.

- **rock chip sampling** - A total of 37 rock chip samples were collected, with the peak results of 0.76% Cu, 90 ppm Pb, 220 ppm Zn, and 85 ppb Au.

RECORDER: Paul Blake **DATE:** 16/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 11719 **STATUS:** Open

TITLE: Authority to Prospect 3212M (Mount Larcom). Final report and report for six months ending 10 February, 1983.

AUTHOR(S): M.J. Hunter **DATE:** February 1983

ATP/EP No.: ATP 3212M

COMPANY HOLDING TITLE: Circular Quay Holdings Pty. Ltd.

COMPANY SUBMITTING REPORT: Gold Fields Exploration P/L

DATE GRANTED: 10/02/1982 **PERIOD:**

1:100 000 SHEET NAME(S): Bajool & Gladstone

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Mt Larcom area

MINING DISTRICT:

MINES/PROSPECTS: Small un-named manganese mine

EXPLORATION TARGETS\MODELS: Volcanogenic copper, gold, lead, zinc, silver deposits of the Mount Chalmers type

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To explore for volcanogenic copper, gold, lead, zinc, silver deposits of the Mount Chalmers type.

REGIONAL EXPLORATION

GEOLOGICAL MAPPING - Apart from the weak and persistent pyritic alteration, no alteration was observed within the weakly stream sediment anomalous area. The normal outcropping rock type is andesitic though several different types of andesite were observed. Each type resembles most likely an individual lava flow. Generally the observed andesite is remarkably fresh, which can be attributed to the lack of any major metasomatism or alteration event.

GEOCHEMISTRY

- **stream sediment sampling** - 73 follow stream sediment samples were collected. The highest values were from samples taken at the W side of Mt Larcom itself. The average results are 42 ppm Cu, 32 ppm Pb, and 63 ppm Zn, and are thus slightly lower than those from the initial samples program.

- **rock chip sampling** - 1 rock chip sample was collected, but only traces of metals were recorded.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The weakly anomalous stream sediment values are thought to be due to primary differences in the andesite chemistry rather than alteration events. Also, after an examination of the creeks in the area, it was determined that most had a high gradient, and the differences in enrichment of the metals could be due to natural sediment traps. It is recommended that the ATP be relinquished.

RECORDER: Paul Blake **DATE:** 17/02/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 3293M

COMPANY HOLDING TITLE: BHP Minerals Limited

COMPANY SUBMITTING REPORT: BHP Minerals Limited

DATE GRANTED: 08/04/1982 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 15 km S of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Horse Creek, Horse Creek South, Bull Creek and Hamilton Creek Prospects

(Grid areas)

EXPLORATION TARGETS\MODELS: Gold and Base Metals

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open-* 11561, 12895

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To explore for Mt Morgan-type mineralisation.

GEOLOGY -

LOCAL - The oldest rocks in the ATP are the Middle Devonian Capella Creek beds (acid to intermediate tuffs and flows, ash-flow tuff, tuffaceous arenite, conglomerate, mudstone and coralline limestone). This sequence was intruded by the Mount Morgan Tonalite during the Middle Devonian, and locally mineralisation was associated with this event. The first rocks of the Yarrol Basin sequence, the Upper Devonian Dee Volcanics and Bouldercombe Grit are andesitic to rhyolitic volcanics and tuffaceous sediments. The Carboniferous Pond Formation (acid tuffs and tuffaceous sediments), and the Neil's Creek Clastics (tuffaceous sediments, conglomerate, and oolitic limestone) are also present. The Permian Youlambie Conglomerate (conglomerate, arenite, mudstone with spherulitic rhyolite flows) represents sediment derived from the uplift of the W part of the Yarrol Basin towards the Lower Permian. The Lower Jurassic Razorback beds (quartz arenite, siltstone, and conglomerate) are flat lying fresh-water sediments which form the Razorback Range to the W of Mt Morgan. Other sediments in the area are Tertiary mudstones and arenites, and Quaternary alluvium. The Upper Permian Bouldercombe Complex (granodiorite, adamellite, granite, diorite, quartz gabbro and monzonite), and the Kyle Mohr Granodiorite (granodiorite, tonalite, pegmatite and aplite) are both multiple intrusion bodies. The Eulogie Park Gabbro is a layered body. Upper Permian un-named gabbro and diorite intrusives have been mapped in the vicinity of the Eulogie Park Gabbro, particularly to the N. Upper Cretaceous basalt flows occur to the W of Eulogie Park and to the W of Mt Morgan.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Geopeko Ltd (ATP 508M), and Getty Oil Developments (ATP 2581M). Examination of the data led to the establishment of the S area of the ATP as the most prospective area to commence field work.

GEOLOGICAL MAPPING - Initial field work consisted of finding and visiting old mine sites within the ATP to establish a background knowledge of the known mineralisation.

GEOCHEMISTRY

- **stream sediment sampling** - Analysis of Geopeko's stream sediment survey returned the following results. Isolated copper anomalies occur over all major rock types. Zinc anomalies are almost exclusively confined to areas of Dee Volcanics, Mt Morgan Tonalite, and Capella Creek beds. Zinc anomalies cluster in the Hamilton Creek grid area immediately E of the Mine Corridor-type acid volcanics. Another major concentration of anomalies occurs in the NE of the ATP, over Mt Morgan Tonalite and adjacent Capella Creek beds. Scattered lead anomalies occur over the Mt Morgan Tonalite and Capella Creek beds. There is a concentration of anomalous lead samples immediately S and E of the Mine Corridor-type acid volcanics. Coincident lead and zinc anomalies are rare, occurring only in the Hamilton Creek Grid area.

GEOPHYSICS

- **ground surveys** - Based on the assessment of the results by previous company exploration, a gravity and ground magnetic survey was carried out on the Dee Volcanics near Mt Hoopbound. The results will be given in the first six monthly report for ATP 3539M

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - ATP 3293M was voluntarily relinquished so that the larger ATP 3539M could be obtained.

RECORDER: Paul Blake

DATE: 16/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 11561 **STATUS:** Open

TITLE: Authority to Prospect 3293M, Mt. Morgan, Queensland. Report for the six months ended 7th October, 1982.

AUTHOR(S): **DATE:**

ATP/EP No.: ATP 3293M

COMPANY HOLDING TITLE: BHP Minerals Limited

COMPANY SUBMITTING REPORT: BHP Minerals Limited

DATE GRANTED: 08/04/1982 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 15 km S of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: Gold and Base Metals

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To explore for Mt Morgan-type mineralisation

GEOLOGY -

LOCAL - The oldest rocks in the ATP are the Middle Devonian Capella Creek beds (acid to intermediate tuffs and flows, ash-flow tuff, tuffaceous arenite, conglomerate, mudstone and coralline limestone). This sequence was intruded by the Mount Morgan Tonalite during the Middle Devonian, and locally mineralisation was associated with this event. The first rocks of the Yarrol Basin sequence, the Upper Devonian Dee Volcanics and Bouldercombe Grit are andesitic to rhyolitic volcanics and tuffaceous sediments. The Carboniferous Pond Formation (acid tuffs and tuffaceous sediments), and the Neil's Creek Clastics (tuffaceous sediments, conglomerate, and oolitic limestone) are also present. The Permian Youlambie Conglomerate (conglomerate, arenite, mudstone with spherulitic rhyolite flows) represents sediment derived from the uplift of the W part of the Yarrol Basin towards the Lower Permian. The Lower Jurassic Razorback beds (quartz arenite, siltstone, and conglomerate) are flat lying fresh-water sediments which form the Razorback Range to the W of Mt Morgan. Other sediments in the area are Tertiary mudstones and arenites, and Quaternary alluvium. The Upper Permian Bouldercombe Complex (granodiorite, adamellite, granite, diorite, quartz gabbro and monzonite), and the Kyle Mohr Granodiorite (granodiorite, tonalite, pegmatite and aplite) are both multiple intrusion bodies. The Eulogie Park Gabbro is a layered body. Upper Permian un-named gabbro and diorite intrusives have been mapped in the vicinity of the Eulogie Park Gabbro, particularly to the N. Upper Cretaceous basalt flows occur to the W of Eulogie Park and to the W of Mt Morgan.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Geopeko Ltd (ATP 508M), and Getty Oil Developments (ATP 2581M). Examination of the data led to the establishment of the S area of the ATP as the most prospective area to commence field work.

GEOLOGICAL MAPPING - Initial field work consisted of finding and visiting old mine sites within the ATP to establish a background knowledge of the known mineralisation.

GEOCHEMISTRY

- **stream sediment sampling** - 43 stream sediment samples were collected to compare with previous company results. The results were not given.

RECORDER: Paul Blake **DATE:** 16/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 12895 **STATUS:** Open

TITLE: Authority to Prospect 3293M Mt. Morgan, Qld. Final report

AUTHOR(S): **DATE:**

ATP/EP No.: ATP 3293M

COMPANY HOLDING TITLE: BHP Minerals Limited

COMPANY SUBMITTING REPORT: BHP Minerals Limited

DATE GRANTED: 08/04/1982 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 15 km S of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Horse Creek, Horse Creek South, Bull Creek and Hamilton Creek Prospects
(Grid areas)

EXPLORATION TARGETS\MODELS: Gold and Base Metals

SUMMARY:

REGIONAL EXPLORATION

GEOCHEMISTRY

- **stream sediment sampling** - Analysis of Geopeko's stream sediment survey returned the following results. Isolated copper anomalies occur over all major rock types. Zinc anomalies are almost exclusively confined to areas of Dee Volcanics, Mt Morgan Tonalite, and Capella Creek beds. Zinc anomalies cluster in the Hamilton Creek grid area immediately E of the Mine Corridor-type acid volcanics. Another major concentration of anomalies occurs in the NE of the ATP, over Mt Morgan Tonalite and adjacent Capella Creek beds. Scattered lead anomalies occur over the Mt Morgan Tonalite and Capella Creek beds. There is a concentration of anomalous lead samples immediately S and E of the Mine Corridor-type acid volcanics. Coincident lead and zinc anomalies are rare, occurring only in the Hamilton Creek Grid area.

GEOPHYSICS

- **ground surveys** - Based on the assessment of the results by previous company exploration, a gravity and ground magnetic survey was carried out on the Dee Volcanics near Mt Hoopbound. The results will be given in the first six monthly report for ATP 3539M

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - ATP 3293M was voluntarily relinquished so that the larger ATP 3539M could be obtained.

RECORDER: Paul Blake **DATE:** 16/02/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 3314M

COMPANY HOLDING TITLE: Haoma Gold Mines N.L.

COMPANY SUBMITTING REPORT: Jacia Natural Resources Consultants

DATE GRANTED: 23/06/1982 **PERIOD:** 1 year

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 16 km S of Bajool

MINING DISTRICT:

MINES/PROSPECTS: Austerity Copper Mine

EXPLORATION TARGETS\MODELS: Mount Morgan style disseminated gold-copper deposits and/or a Mount Chalmers type massive gold-copper mineralisation.

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File*- 11697, 12709, 12726, 12956, 14130

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To explore for Mount Morgan style disseminated gold-copper deposits and/or a Mount Chalmers type massive gold-copper mineralisation.

GEOLOGY -

REGIONAL - The Authority lies in the Calliope Block which is interpreted to be a remnant of an Island Arc formed in the Late Silurian to Middle Devonian. It includes the Capella Creek beds, Calliope beds, and the Mt Holly beds.

LOCAL - Crystal tuff interbedded with andesite and minor lapilli tuff sequence dominates the lithologies in the ATP. The crystal tuff is brown-green in colour and is composed of fine grained amphibole-chlorite + epidote and feldspar crystals. Fine grained brown and blue-green units may be andesite flows or fine grained tuffs. Vesicles indicative of lavas were not common. Limestone units in the area vary from 5 m to over 200 m in width and are commonly persistent along strike. Thin multi-layered chert bands and coral colonies within the limestone are present. The limestone is commonly recrystallised, forming a saccharoidal marble. In the S part of the ATP, dark grey vuggy textured calc-silicates are present. These comprise amphibole, calcite, chert and garnet, and occur near granite. Most acid volcanic rocks in the area are present to the S of the Ulam marble quarry. Fine grained buff to light grey siliceous feldspar-quartz-sericite rock is present with feldspar and/or quartz crystal acid tuff. The quartz crystal tuff is most common in the vicinity of the Austerity copper prospect. Pyrite and silica alteration are locally present. The clastic sedimentary units identified in the area are derived from volcanic material. Fine grained interbedded greywacke, chert, and sericite-quartz schist are probably derived from volcanic materials. Some of the units mapped as clastic sediments may be siliceous acid tuffs. Massive and thin bedding characteristics of these units are present. A fine to medium grained granodiorite crops out over the W part of the ATP. Minor andesite and acid dykes are present in the ATP.

Two major sequences younging in an E direction are sub-divided. The lower sequence essentially consists of two acid tuff horizons interbedded with siliceous greywacke, andesite tuffs and ?flows, and shallow water limestones. The top of this sequence is largely the limestone bed mined for lime and marble. The upper sequence consists of a thick pile of andesitic tuffs and flows with some thin limestone beds near its base. Two folding generations are recognised in the ATP. The first generation occurred at the end of the Middle Devonian, and the folding is very tight and the axis trend N to NNW. The area was refolded along NNW axis into broad open structures during the Late Permian.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - BHP (ATP 1416M); and Australian Anglo American Ltd (ATP 1950M).

GEOLOGICAL MAPPING - The area was mapped in good detail at 1:25000 scale.

GEOCHEMISTRY

- **stream sediment sampling** - A limited regional stream sediment sampling program was undertaken with 20 samples collected from the central portion of the ATP, around the Austerity Copper Prospect. Two anomalous geochemical zones were outlined. The first (Anomaly 1) is anomalous in zinc (up to 180 ppm) and copper (up to 320 ppm) and drains the Austerity Copper Prospect. The second area (Anomaly 2) is anomalous in zinc (up to 380 ppm), and this area drains andesitic tuffs.

- **rock chip sampling** - 12 rock chip samples were collected from the central portion of the ATP. Rock chip samples from the stream sediment anomaly 2 area were anomalous in zinc (up to 130 ppm), lead (160 ppm) and copper (120 ppm)

LOCALISED EXPLORATION/PROSPECTS

1) Austerity Copper Prospect - This area consists of a number of pits. The stream sediment anomaly "Anomaly 1" was also over this area.

GEOLOGY - The pits contain Fe oxide, malachite, azurite, pyrite, and chalcopyrite. Pyrite and chalcopyrite grains appear confined to thin (<1 cm) feldspar-quartz veinlets set in a fine grained, grey quartz-feldspar-sericite matrix with porphyritic quartz grains up to 4 mm. Mineralisation occurs in altered acid tuff and may be stratigraphically controlled or foliation controlled.

GEOCHEMISTRY - A soil survey was conducted to investigate the area. Two major multi-element anomalous areas were identified. Area A contains up to 1800 ppm Zn, 1250 ppm Cu, 590 ppm Ba, 0.15 ppm Au, 75 ppm Pb, and 16 ppm As. This area is in the vicinity of a fault which separates limestone from acid volcanics, and a number of shallow pits occur in this area. Area B contains isolated Cu, Zn, Au, As, and Ba anomalies. The highest values were 1800 ppm Cu, 0.85 ppm Au, and 26 ppm As. The Austerity Copper Prospect occurs in this area. A third area (Area C) covers a silicified breccia zone that forms an elongate structure with the long axis perpendicular to bedding. This area contains anomalous zinc (up to 580 ppm) and arsenic (up to 18 ppm). Gold at 0.1 ppm Au is also present.

GEOPHYSICS - An IP survey was conducted over this area. In the Austerity Mine area, the results are thought to indicate massive or stringered sulphides. In the Southern Fault Zone there was a response, but the results are difficult to interpret due to the influence of overhead powerlines. The results are considered to be less encouraging than those in the Austerity Mine area.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Rationalisation of Haoma's tenements in the area has resulted in conditional surrender of the ATP and ATP application 12/83 in favour of ATP 3774M.

RECORDER: Paul Blake

DATE: 14/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 11697 **STATUS:** Open

TITLE: Authority to Prospect No. 3314M, Austerity - east Queensland. Report for the six months ending December 22nd, 1982.

AUTHOR(S): M. Elliot & M. Harris **DATE:** December 1982

ATP/EP No.: ATP 3314M

COMPANY HOLDING TITLE: Haoma Gold Mines N.L.

COMPANY SUBMITTING REPORT: Jacia Mine Management and Consulting Services

DATE GRANTED: 23/06/1982 **PERIOD:** 1 year

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 16 km S of Bajool

MINING DISTRICT:

MINES/PROSPECTS: Austerity Copper Mine

EXPLORATION TARGETS\MODELS: Mount Morgan style disseminated gold-copper deposits and/or a Mount Chalmers type massive gold-copper mineralisation.

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To explore for Mount Morgan style disseminated gold-copper deposits and/or a Mount Chalmers type massive gold-copper mineralisation.

GEOLOGY -

REGIONAL - The Authority lies in the Calliope Block which is interpreted to be a remnant of an Island Arc formed in the Late Silurian to Middle Devonian. It includes the Capella Creek beds, Calliope beds, and the Mt Holly beds.

LOCAL - Crystal tuff interbedded with andesite and minor lapilli tuff sequence dominates the lithologies in the ATP. The crystal tuff is brown-green in colour and is composed of fine grained amphibole-chlorite + epidote and feldspar crystals. Fine grained brown and blue-green units may be andesite flows of fine grained tuffs. Vesicles indicative of lavas were not common. Limestone units in the area vary from 5 m to over 200 m in width and are commonly persistent along strike. Thin multi-layered chert bands and coral colonies within the limestone are present. The limestone is commonly recrystallised, forming a saccharoidal marble. In the S part of the ATP, dark grey vuggy textured calc-silicates are present. These comprise amphibole, calcite, chert and garnet, and occur near granite. Most acid volcanic rocks in the area are present to the S of the Ulam marble quarry. Fine grained buff to light grey siliceous feldspar-quartz-sericite rock is present with feldspar and/or quartz crystal acid tuff. The quartz crystal tuff is most common in the vicinity of the Austerity copper prospect. Pyrite and silica alteration are locally present. The clastic sedimentary units identified in the area are derived from volcanic material. Fine grained interbedded greywacke, chert, and sericite-quartz schist are probably derived from volcanic materials. Some of the units mapped as clastic sediments may be siliceous acid tuffs. Massive and thin bedding characteristics of these units are present. A fine to medium grained granodiorite crops out over the W part of the ATP. Minor andesite and acid dykes are present in the ATP.

Two major sequences younging in an E direction are sub-divided. The lower sequence essentially consists of two acid tuff horizons interbedded with siliceous greywacke, andesite tuffs and flows, and shallow water limestones. The top of this sequence is largely the limestone bed mined for lime and marble. The upper sequence consists of a thick pile of andesitic tuffs and flows with some thin limestone beds near its base. Two folding generations are recognised in the ATP. The first generation occurred at the end of the Middle Devonian, and the folding is very tight and the axis trend N to NNW. The area was refolded along NNW axis into broad open structures during the Late Permian.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - BHP (ATP 1416M); and Australian Anglo American Ltd (ATP 1950M).

GEOLOGICAL MAPPING - The area was mapped in good detail.

GEOCHEMISTRY

- **stream sediment sampling** - A limited regional stream sediment sampling program was undertaken with 20 samples collected from the central portion of the ATP, around the Austerity Copper Prospect. Two anomalous geochemical zones were outlined. The first (Anomaly 1) is anomalous in zinc (up to 180 ppm) and copper (up to 320 ppm) and drains the Austerity Copper Prospect. The second area (Anomaly 2) is anomalous in zinc (up to 380 ppm), and this area drains andesitic tuffs.

- **rock chip sampling** - 12 rock chip samples were collected from the central portion of the ATP. Rock chip samples from the stream sediment anomaly 2 area were anomalous in zinc (up to 130 ppm), lead (160 ppm) and copper (120 ppm)

LOCALISED EXPLORATION/PROSPECTS

1) Austerity Copper Prospect - This area consists of a number of pits. The stream sediment anomaly "Anomaly 1" was also over this area.

GEOLOGY - The pits contain Fe oxide, malachite, azurite, pyrite, and chalcopyrite. Pyrite and chalcopyrite grains appear confined to thin (<1 cm) feldspar-quartz veinlets set in a fine grained, grey quartz-feldspar-sericite matrix with porphyritic quartz grains up to 4 mm. Mineralisation occurs in altered acid tuff and may be stratigraphically controlled or foliation controlled.

GEOCHEMISTRY - A soil survey was conducted to investigate the area. Two major multi-element anomalous areas were identified. Area A contains up to 1800 ppm Zn, 1250 ppm Cu, 590 ppm Ba, 0.15 ppm Au, 75 ppm Pb, and 16 ppm As. This area is in the vicinity of a fault which separates limestone from acid volcanics, and a number of shallow pits occur in this area. Area B contains isolated Cu, Zn, Au, As, and Ba anomalies. The highest values were 1800 ppm Cu, 0.85 ppm Au, and 26 ppm As. The Austerity Copper Prospect occurs in this area. A third area (Area C) covers a silicified breccia zone that forms an elongate structure with the long axis perpendicular to bedding. This area contains anomalous zinc (up to 580 ppm) and arsenic (up to 18 ppm). Gold at 0.1 ppm Au is also present.

RECORDER: Paul Blake

DATE: 11/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 12709 **STATUS:** Open

TITLE: Authority to Prospect No.3314M, Austerity - east Queensland. Report on area relinquished June 22nd, 1983.

AUTHOR(S): D.I. Young **DATE:** July 1983

ATP/EP No.: ATP 3314M

COMPANY HOLDING TITLE: Haoma Gold Mines N.L.

COMPANY SUBMITTING REPORT: Jacia Natural Resources Consultants

DATE GRANTED: 23/06/1982 **PERIOD:** 1 year

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 16 km S of Bajool

MINING DISTRICT:

MINES/PROSPECTS: Austerity Copper Mine

EXPLORATION TARGETS\MODELS: Mount Morgan style disseminated gold-copper deposits and/or a Mount Chalmers type massive gold-copper mineralisation.

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The area relinquished was mapped as a thick sequence of lithic intermediate tuffs and lavas with no associated mineralisation. This unprospective lithology downgraded the area.

RECORDER: Paul Blake **DATE:** 14/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 12726 **STATUS:** Open

TITLE: Authority to Prospect No. 3314M, Austerity - east Queensland. Report for the six months ending June 22nd, 1983.

AUTHOR(S): D.I. Young **DATE:** July 1983

ATP/EP No.: ATP 3314M

COMPANY HOLDING TITLE: Haoma Gold Mines N.L.

COMPANY SUBMITTING REPORT: Jacia Natural Resources Consultants

DATE GRANTED: 23/06/1982 **PERIOD:** 1 year

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 16 km S of Bajool

MINING DISTRICT:

MINES/PROSPECTS: Austerity Copper Mine

EXPLORATION TARGETS\MODELS: Mount Morgan style disseminated gold-copper deposits and/or a Mount Chalmers type massive gold-copper mineralisation.

SUMMARY:

LOCALISED EXPLORATION/PROSPECTS

1) Austerity Prospect

GEOPHYSICS - An IP survey was conducted over this area. In the Austerity Mine area, the results are thought to indicate massive or stringered sulphides. In the Southern Fault Zone there was a response, but the results are difficult to interpret due to the influence of overhead powerlines. The results are considered to be less encouraging than those in the Austerity Mine area.

RECORDER: Paul Blake **DATE:** 14/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 12956 **STATUS:** Open

TITLE: Authority to Prospect No. 3314M, Austerity - east Queensland. Report for the six months ending December, 22nd 1983.

AUTHOR(S): D.I. Young **DATE:** December 1983

ATP/EP No.: ATP 3314M

COMPANY HOLDING TITLE: Haoma Gold Mines N.L.

COMPANY SUBMITTING REPORT: Jacia Natural Resources Consultants

DATE GRANTED: 23/06/1982 **PERIOD:** 1 year

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 16 km S of Bajool

MINING DISTRICT:

MINES/PROSPECTS: Austerity Copper Mine

EXPLORATION TARGETS\MODELS: Mount Morgan style disseminated gold-copper deposits and/or a Mount Chalmers type massive gold-copper mineralisation.

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - No new geological or exploration information is given in this report. Haoma Gold Mines N.L. was trying to acquire more land to cover the available extent of the favourable horizons identified so far.

RECORDER: Paul Blake **DATE:** 14/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 14130 **STATUS:** Open

TITLE: Authority to Prospect No. 3314M, Austerity - east Queensland. Final report and report for the six months ending June 23rd, 1984.

AUTHOR(S): M.R. Harris **DATE:** April 1985

ATP/EP No.: ATP 3314M

COMPANY HOLDING TITLE: Haoma Gold Mines N.L.

COMPANY SUBMITTING REPORT: Jacia Natural Resources Consultants

DATE GRANTED: 23/06/1982 **PERIOD:** 1 year

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 16 km S of Bajool

MINING DISTRICT:

MINES/PROSPECTS: Austerity Copper Mine

EXPLORATION TARGETS\MODELS: Mount Morgan style disseminated gold-copper deposits and/or a Mount Chalmers type massive gold-copper mineralisation.

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Rationalisation of Haoma's tenements in the area has resulted in conditional surrender of the ATP and ATP application 12/83 in favour of ATP 3774M.

RECORDER: Paul Blake **DATE:** 14/02/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

COMPANY REPORT SUMMARY SHEET

CR: 12067 **STATUS:** Open

TITLE: Final report on Authority to Prospect 3356 M, Fred Creek, Queensland.

AUTHOR(S): W.A. McGee **DATE:** May 1983

ATP/EP No.: ATP 3356M

COMPANY HOLDING TITLE: Nord Resources (Pacific) Pty Ltd

COMPANY SUBMITTING REPORT: Nord Resources (Pacific) Pty Ltd

DATE GRANTED: 13/10/1982 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 30 km WNW of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: Precious metals in gabbro

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File- 12067*

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To follow-up minor gold and copper showings in the Fred Creek Gabbro detected by BHP.

GEOLOGY -

LOCAL - The gabbros are considered to be Late Permian in age, but the evidence is tenuous. The gabbros in the Westwood area have previously been regarded as discrete intrusions, but it is possible that they could all be disjointed fragments of a large intrusion complex. Such a complex would be part of an ophiolite suite, and may include the adjacent Permian volcanics and the ultramafics N and E of Rockhampton. To the N of the Fred Creek Gabbro is the Bouldercombe Complex. Several quartz reefs have been mapped in the area in the past. The reefs trend NE and are present in both the gabbro and granite. Scattered observations of outcrops and drill core logs indicate that medium grained gabbro, usually layered, is the most common rock type. Pyroxenite was seen in a few outcrops, and dolerite is reported in logs. Basalt dykes occur within the gabbro near the contact with the Permian volcanics (S contact of the Gabbro).

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - There are shallow pits, evidently of some antiquity in quartz on the W side of Fred Creek. Modern exploration by BHP (ATP 532M).

LOCALISED EXPLORATION/PROSPECTS

1) Fred Creek Prospect

GEOLOGY - Field investigation of the BHP drilling location suggests that the holes were sited to test a copper bearing quartz vein within gabbro, but close to the contact with the basalts. The quartz reef is approximately 1.8 m wide. There is minor and irregular silicification in the wall rocks over approximately 3 m on either side. It was found that the gold values in the drill holes was from the veins and alteration. These veins are narrow, but steeply dipping, accounting for the long intersections in the drill holes which are vertical. These reefs are considered to have no potential for economic quantities of mineralisation. Field investigation of the gabbro revealed no lithologies favourable for stratiform precious metal accumulations. Several quartz reefs in adamellite were located in the NW part of this area.

GEOCHEMISTRY - Pulps from 4 BHP holes were found at BHP core store at Rockhampton and sampled. The results show that platinum and palladium concentrations were very low, but gold was occasionally present in significant concentration. One sample (representing a 1.5 m section) assayed 7.88 ppm Au and was within a 4.6 m section which averaged 4.90 ppm Au. Several other samples assayed more than 1 ppm, but the majority were between 0.1 ppm and 0.5 ppm Au. Two samples of the quartz reef in the drilling area returned uneconomic values for silver and gold. Rock chip samples were collected of goethitic breccias occurring in the basalts but returned only minor traces of gold and silver. One sample of quartz veining from the adamellite with visible copper mineralisation was assayed, but it returned only minor silver.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Due to the poor results the prospect was abandoned.

RECORDER: Paul Blake

DATE: 11/02/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

CR: 12975 **STATUS:** Open

TITLE: Authority to Prospect No. 3526M, "Ulam Range", Mount Morgan Mining District, Queensland.

First six monthly and final report for period ending 3rd January 1984.

AUTHOR(S): N.F. Rutherford **DATE:** March 1984

ATP/EP No.: ATP 3526M

COMPANY HOLDING TITLE: Electrolytic Zinc Company of Australasia Ltd.

COMPANY SUBMITTING REPORT: Electrolytic Zinc Company of Australasia Ltd.

DATE GRANTED: 04/07/1983 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan & Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 40 to 70 km S of Rockhampton

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: Volcanic hosted precious and base metals

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File- 12975*

SUMMARY:

REASON FOR ACQUISITION OF TITLE - The felsic volcanics in the area were considered prospective for base and precious metals. Also, the Mt. Cedric beds with major limestone units was considered to have potential for disseminated epithermal or replacement precious metals.

GEOLOGY -

LOCAL - The ATP lies almost entirely within Middle Devonian and overlapping Upper Devonian sequences in the hinge zone of the Gracemere Arch. In the Mount Morgan area the sequence is lower Middle Devonian Mine Corridor sequence, upper Middle Devonian Upper Capella Creek beds, and Upper Devonian Dee Volcanics. The sequence in the Dee Range area is lower Middle Devonian Moongan Rhyolite and Lower Cappella Creek beds, upper Middle Devonian Upper Capella Creek beds and Upper Raspberry Creek beds, and Upper Devonian Dee Volcanics. In the Ulam Range area the sequence is lower Middle Devonian Ulam beds and Moongan Rhyolite, upper Middle Devonian Mt Cedric beds and Upper Capella Creek beds, and Upper Devonian Mt Alma beds and Dee Volcanics. The lower Middle Devonian sequences of the Moongan Rhyolite and Ulam beds appears the most prospective for volcanogenic mineralisation. They are composed of quartz-feldspar porphyry, rhyolite, acid pyroclastics with minor intermediate to basic tuffs and most importantly banded sequences of interbedded chert, tuff and limestone. These banded sequences, locally jasperous, are thought to be partially exhalative and equivalent to the upper part of the Mine sequence containing massive stratabound mineralisation at Mt Morgan. The Ulam beds outcrop within an anticlinal structure separated from the overlying Upper Capella Ck beds by a series of E-W or ENE sinistral wrench faults which are typical of the district. The Upper Capella Creek beds outcrop mainly within the W limb of a regional syncline on the W of the Dee Range. They consist of acid and intermediate lithic tuff, feldspar and quartz-feldspar porphyry, and acid to intermediate volcanics. Chert bands are interbedded with the volcanics in the NW, whilst limestone, sandstone and conglomerate interbeds are more common in the SE. In the south the Ulam beds are overlain by the Mt Cedric beds which occupy a regional S plunging anticlinal fold nose. The Mt Cedric beds consist of interbedded lithic tuff with abundant interbedded limestone and minor quartz-feldspar porphyry or acid tuff. This sequence is unconformably overlain by intermediate to basic flows of the Ayridie Andesite which together with an intermediate lithic tuff and argillite sequence known as the Mt Alma beds are equated with the Dee Volcanics to the W. N of Mt Cedric, sequences are intruded and hornfelsed by the Stockyard Creek granodiorite. Skarns are developed in the Mt Cedric beds.

MINERALISATION/ALTERATION - The frequency of Cu-Au mineralisation occurrence within the Capella Creek Group in the Mt Morgan - Moonmera - Struck Oil region, was considered indicative of the mineralisation potential of equivalent strata to the S. A number of minor occurrences of base and precious metal mineralisation are reported from the volcanic sequence to the SE of Mt Morgan. The Kangaroo Creek/Diggers Dive gold mineralisation within the Mt Cedric beds may have been indicative of potential for replacement gold mineralisation in the limestones of that area.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Geopeko (ATP 508M).

GEOLOGICAL MAPPING - Geochemically anomalous areas from Geopeko's work were field checked. Anomalies in the Upper Capella Creek beds and Ulam beds were checked, but no sign of alteration or mineralisation were seen. The Mt Cedric beds were also checked. Much of the limestone has been recrystallised, some is now coarse and saccharoidal. Included are impure sandy, pebbly and skarn units. Calc-silicates are common in places throughout the units, with garnet, epidote and

wollastonite. The metamorphism has been caused by the Stockyard Creek Granodiorite. No areas of interest were noted in the field, though field assessment was limited.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Detailed assessment of previous exploration data and field reconnaissance significantly downgrade the potential of this area for volcanogenic or replacement base and precious metals. No evidence of significant or even minor alteration was noted and more detailed work is not warranted. The area was therefore relinquished.

RECORDER: Paul Blake **DATE:** 10/02/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 3539M

COMPANY HOLDING TITLE: BHP Minerals Ltd

COMPANY SUBMITTING REPORT: BHP Minerals Ltd

DATE GRANTED: 15/02/1983 **PERIOD:** 2.5 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 45 km S of Rockhampton

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS/MODELS: precious and base metals

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File*- 13047, 13710, 13711, 14881, 14882

Confidential-

SUMMARY: ATP 3539M was reduced from 100 sub-blocks to 50 sub-blocks on July 15, 1984. The lease was surrendered July 15, 1985.

REASON FOR ACQUISITION OF TITLE - Locating a Mount Morgan-type Cu-Au deposit.

GEOLOGY -

REGIONAL - Located in the Gracemere Block. The block contains Upper Devonian to Permian rocks of the Yarrol Basin and overly basement rocks of the Upper Silurian to Middle Devonian. The basement is intruded by Mount Morgan Tonalite, and the Yarrol Basin sequence is intruded by Upper Permian intermediate to basic intrusives. The report goes into greater detail of the units as described by Kirkegaard, Shaw, & Murray (1970) and Murray (1975)

LOCAL - Fault contact between the Dee Volcanics and Mount Morgan Tonalite. Dee Volcanics lap up onto the tonalite. Several Mount Morgan Tonalite outcrops found within the Dee Volcanics to the south of Bull Creek Granite, and outliers of Dee Volcanics found on hills overlying the tonalite. Apparent basal horizon of Dee Volcanics containing boulders of (mineralised) Mount Morgan Tonalite.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Geopeko Ltd. (ATP 508M), Getty Oil Development Co. Ltd. (ATP 2581M), and BHP Minerals Ltd. (ATP 3293M).

Exploration over the relinquished ATP 3293M included a review of previous data; familiarisation with geology and mineralisation of the area including 26 stream sediment samples; a gravity survey over

Bullbound grid. Exploration of ATP 3539M included a aeromagnetic and aerial radiometric survey by Aerodata McPhar Pty. Ltd.; soil and rock chip geochemical and geological follow-up of anomalous stream sediment samples; stream sediment, soil and rock chip geochemical and geological follow-up of the radiometric anomaly in the north; new aerial photography to create digital terrain models used for terrain corrections of gravity data; inspection of Geopeko's mapping over Hamilton Creek North and South grids, and completion of soil geochemical and UTEM surveys (the UTEM survey including Hamilton Creek); UTEM survey over Horse Creek grid and Trotter Creek grid; percussion drilling of two UTEM and six gravity anomalies for a total of 859 m; and four Downhole Electromagnetic surveys.

GEOPHYSICS

- **airborne surveys** - Aeromagnetic and aerial radiometric data flown over part of the ATP by Aerodata McPhar Pty. Ltd. in May, 1984.

Magnetic data showed little correlation to the mapped lithologies indicating variable magnetic mineral component within the volcanic and intrusive rocks. Results indicate a low coinciding with Mount Morgan mine flanked east and west by magnetic highs representing deeper magnetic sources either within or below the Tonalite. A subtle magnetic change defining the boundary between Dee Volcanics and Mount Morgan Tonalite is virtually masked by the 'highs'. The smaller magnetic features can be associated with hornfelsed contact zones within granitic rocks. Lack of correlatable data precluded any follow-up work.

The radiometrics highlight boundaries between Devonian rocks and the Carboniferous, Permian and Jurassic rocks. A large potassium anomaly was defined and considered an alteration zone warranting follow-up.

- **ground surveys** - Approximately 1560 gravity stations over the Bullbound grid. Ground magnetic survey conducted.

Terrain corrections were produced over the Bullbound grid using gravity data and a digital terrain model. Results show a significant gradient decrease to the east within the Dee Volcanic units, west of the contact zone with the Mount Morgan Tonalite. The gradient shows an inconsistent change at the contact zone and to the east. Seven anomalies were selected for testing. All were small and less than 100 m deep. None were considered to represent Mount Morgan 'sized' orebody.

Ground magnetic data used to assist with mapping of the contact between the Dee Volcanics and Mount Morgan Tonalite showed erratic results although the contact can be recognized as a break in the character of the data along many of the profiles.

The results of the UTEM survey in general, showed no strong conductors although two anomalies (one located at Hamilton Creek South grid the other at Horse Creek South grid) warranted further testing. The first indicates an anomalous area along a linear conductive zone. The second is on the contact between Mine Corridor rocks and Mount Morgan Tonalite, indicating the possibility of a deeper.

Five downhole EM's were done with resultant flat profiles indicating no conductive bodies within the vicinity of the boreholes.

GEOCHEMISTRY

- **stream sediment sampling** - Results of stream sediment sampling in 1982 available - 15-680 ppm Cu; 30-85 ppm Pb; 40-160 ppm Zn; .003-.240 ppm Au; 0.4-1.5 ppm Ag; <1-60 ppm As. No follow up work.

Twenty-six samples were collected from within ATP 3293M. Values of 0.0240 ppm Au; 60 ppm As; 680 ppm Cu; 85 ppm Pb; and 160 ppm Zn were detected in five samples in the vicinity of Mount Victoria. Background 0.015 ppm Au; 1.5 ppm Ag; 10 ppm As; 60 ppm Cu; 40 ppm Pb; and 65 ppm Zn.

Thirty stream sediment samples were taken in the vicinity of the potassium radiometric anomaly. Two populations exist. One draining from the Razorback Beds north of the Dee River: 0.348 ppm Au; 15 ppm As; 467 ppm Cu; 37 ppm Pb; and 120 ppm Zn. The second from south of the Dee River where there are no Razorback Beds has consistently lower copper and gold values: 1.6 ppm Au; 11 ppm As; 109 ppm Cu; 37 ppm Pb; and 106 ppm Zn. Values from the nine five kilogram samples for cyanide-

leach gold extraction were all elevated, between 14.8 and 0.650 ppb(?) Au. The 14.8 ppb was thought to be anomalous.

rock chip sampling - Follow-up work from stream sediment sampling around Mount Victoria. Seven rock chip samples were taken from a carboniferous grit band of the Razorback Beds at the Mount Victoria Mine, and from a ferruginous conglomerate unit of the same beds, on a ridge above the mine. Values: 37 to 201 ppm Cu; 9 to 30 ppm Pb; 12 to 278 ppm Zn; 9 ppm As; and 0.015 to 0.140 ppm Au.

- **soil sampling** - Follow-up work from stream sediment sampling around Mount Victoria. Thirty-eight samples taken with 0.354 ppm Au; 16 ppm As; 323 ppm Cu; 17 ppm Pb; 133 ppm Zn. The generally higher values of gold, copper and zinc were obtained at top of spur close to outcrop of Razorback Beds. The values obtained from the area are probably from material shedding from either the Razorback Beds of sediments resting on the basal unconformity. Low lead values from soil samples are inconsistent with the stream sediment samples.

Another 29 soil samples were collected after stream sediment and cyanide-leach values were obtained: 0.110 ppm Au; 220 ppm As; 138 ppm Cu; 18 ppm Pb; and 138 ppm Zn.

LOCALISED EXPLORATION/PROSPECTS

GEOLOGY - Geological expectation in the Dee River area revealed apparently conformable rhyolitic flows and pyroclastics overlying cherty sediments cropping out on the crest of the hills over which the two broad anomalies lie.

1) Bullbound Grid

GEOLOGY - Upper Devonian Boulder Creek Grit conformably overlies the Upper Devonian Dee Volcanics (mapped on Mount Hoopbound), which in turn mantle the Middle Devonian Mount Morgan Tonalite and the Bull Creek Granite. The Boulder Creek Grit and Dee Volcanics dip 10° to the west. The Dee Volcanics unconformably overlie Mount Morgan Tonalite to the north but is a faulted contact in the south.

GEOPHYSICS - New aerial photography to generate a digital terrain model to assist with terrain corrections for the gravity data. Ground magnetics was processed and is presented as stacked profiles.

GEOCHEMISTRY

- **stream sediment sampling** - The 1982 stream sediment sampling located five samples judged as anomalous in gold and base metals in a conglomerate band in the Jurassic cover near the unconformity with the Dee Volcanics.

- **rock chip sampling** - Five rock chip samples from the conglomerate contained low Au (0.015 to 0.062 ppm). This probably explains gold content of stream sediment samples. However results do not explain high base metal values (Cu: 37 to 75 ppm; Pb: 9 to 21 ppm; Zn: 12 to 278 ppm).

DRILLING - Six vertical percussion holes were drilled on gravity anomalies on the Bullbound grid. Discouraging results with Au values from 0.096 ppm to <0.005 ppm; As <49 ppm; and Cu <830 ppm.

2) Hamilton Creek Grids North and South - located 6 and 8 km respectively south of Mount Morgan.

GEOLOGY - Within the Hamilton Creek North grid quartz feldspar porphyry is in contact with Mount Morgan Tonalite and also dips west under the Dee Volcanics. In the Hamilton Creek and Hamilton Creek South grids, a quartz porphyry has apparently faulted off the porphyry to the north and dips SW beneath Dee Volcanics. East of this block of porphyry is an embayment in the Mount Morgan Tonalite with limestone, fine tuffs, agglomerates and quartz feldspar porphyry (Capella Creek Beds or Dee Volcanics).

GEOPHYSICS - Three hundred and seventy-seven soil samples commenced in May over Hamilton Creek North and Hamilton Creek South with all samples analysed for copper, lead, zinc and gold.

Three hundred and sixty samples had Au values above the .005 threshold. All lead, and corresponding copper and zinc values above 40 ppm lie in the Dee Volcanics. The Mine Corridor rocks appear depleted in base metals relative to the Dee Volcanics and Mount Morgan Tonalite. Gold was relatively low with no clear correlation with the base metals or with geology mapped. Most anomalous gold values were on Hamilton Creek North grid but were distributed across Dee Volcanics, Mine Corridor, and Mount Morgan Tonalite rocks in a random manner. Currently no geochemical soil anomalies are indicated.

GEOCHEMISTRY - Three hundred and seventy-seven soil samples were collected from the 'A' horizon. Most gold values occur on the Hamilton Creek North grid. There was no clear correlation between anomalous base metal and gold value, nor with geology as mapped. Overall, no significant anomalies found.

DRILLING - A vertical percussion hole of 142 m depth was drilled to test the UTEM anomaly on the Hamilton Creek South grid. Results were poor (Au <0.048 ppm).

3) Horse Creek South Grid - covers the south portion of the Mine Corridor.

GEOLOGY - Surrounded by Mount Morgan Tonalite, Capella Creek Beds and Dee Volcanics, the Mine Corridor constitutes quartz feldspar porphyry, silicified ferruginous quartz porphyry, and fine acid volcanics, terminated to the south by a fault. South east of the Corridor there is lithic tuff, fossiliferous limestone, calc silicate hornfels and fine-grained acid volcanics (Capella Creek Beds or Dee Volcanics). Mount Morgan Tonalite occurs as quartz diorite or granodiorite. Intermediate and gabbroic dykes also occur.

DRILLING - A vertical percussion hole of 172 m depth was drilled on the UTEM anomaly on the Horse Creek South grid. Results discouraging (Au 0.197 ppm).

4) Trotter Creek

GEOLOGY - Quaternary alluvials over possible Dee Volcanics.

GEOPHYSICS - Three shallow conductive zones delineated by UTEM.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The six month period from July, 1983 was office based involving processing and plotting the geophysical data, and drafting and interpreting geological mapping. The company report details work based on previous exploration by Geopeko Ltd. (ATP 508M), Getty Oil Development Co. Ltd. (ATP 2581M), and BHP Minerals Ltd. (ATP 3293M).

Only checks of the mapped geology was done. Based on the work done by Geopeko Ltd. and Getty Oil Development it was considered not a prospective area for a 'Mount Morgan type' orebody. No further exploration was carried out by BHP Minerals Ltd..

Half the area was relinquished 15/07/1984 due to lack of prospectivity.

Testing for Mount Morgan style gold-copper mineralisation failed to detect significant mineralisation.

RECORDER: Simon Crouch **DATE:** 16/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 13047 **STATUS:** Open

TITLE: Authority to Prospect 3539M, Mount Morgan, Queensland. Report for six months ended 15 January, 1984.

AUTHOR(S): **DATE:** January, 1984

ATP/EP No.: ATP 3539M

COMPANY HOLDING TITLE: BHP Minerals Ltd

COMPANY SUBMITTING REPORT: BHP Minerals Ltd

DATE GRANTED: **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 45 km S of Rockhampton

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS:

SUMMARY:

GEOLOGY -

REGIONAL - Dee Volcanics and Mount Morgan Tonalite, and an area of Boulder Creek Grit mapped overlying the Dee Volcanics on Mount Hoopbound.

LOCAL - Fault contact between the Dee Volcanics and Mount Morgan Tonalite. Dee Volcanics lap up onto the tonalite. Several Mount Morgan Tonalite outcrops found within the Dee Volcanics to the south of Bull Creek Granite, and outliers of Dee Volcanics found on hills overlying the tonalite. Apparent basal horizon of Dee Volcanics containing boulders of (mineralised) Mount Morgan Tonalite.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Geopeko Ltd. (ATP 508M), Getty Oil Development Co. Ltd. (ATP 2581M), and BHP Minerals Ltd. (ATP 3293M).

GEOPHYSICS

- **ground surveys** - Approximately 1560 gravity stations over the Bullbound grid. Ground magnetic survey conducted.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - This current period was office based involving processing and plotting the geophysical data, and drafting and interpreting geological mapping. The company report details work based on previous exploration by Geopeko Ltd. (ATP 508M), Getty Oil Development Co. Ltd. (ATP 2581M), and BHP Minerals Ltd. (ATP 3293M).

RECORDER: Simon Crouch **DATE:** 11/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 13710 **STATUS:** Open

TITLE: Authority to Prospect 3539M, Mount Morgan, Queensland. Relinquishment report for the period to 15 July, 1984.

AUTHOR(S): **DATE:** July, 1984

ATP/EP No.: ATP 3539M

COMPANY HOLDING TITLE: BHP Minerals Ltd

COMPANY SUBMITTING REPORT: BHP Minerals Ltd

DATE GRANTED: 15/02/1983 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 45 km S of Rockhampton

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: precious and base metals

SUMMARY:

GEOLOGY -

REGIONAL - Located in the Gracemere Block. The block contains Upper Devonian to Permian rocks of the Yarrol Basin and overly basement rocks of the Upper Silurian to Middle Devonian. The basement is intruded by Mount Morgan Tonalite, and the Yarrol Basin sequence is intruded by Upper Permian intermediate to basic intrusives. The report goes into greater detail of the units as described by Kirkegaard, Shaw, & Murray (1970) and Murray (1975)

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Only checks of the mapped geology was done. Based on the work done by Geopeko Ltd. and Getty Oil Development it was considered not a prospective area for a 'Mount Morgan type' orebody. No further exploration was carried out by BHP Minerals Ltd. Half the area was relinquished 15/07/1984 due to lack of prospectivity.

RECORDER: Simon Crouch **DATE:** 11/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 13711 **STATUS:** Open

TITLE: Authority to Prospect 3539M, Mount Morgan, Queensland. Report for six months ended 15 July, 1984.

AUTHOR(S): **DATE:** July, 1984

ATP/EP No.: ATP 3539M

COMPANY HOLDING TITLE: BHP Minerals Ltd

COMPANY SUBMITTING REPORT: BHP Minerals Ltd

DATE GRANTED: 15/02/1983 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 45 km S of Rockhampton

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS/MODELS: precious and base metals

SUMMARY:

REASON FOR ACQUISITION OF TITLE - Locating a Mount Morgan-type Cu-Au deposit.

GEOLOGY -

REGIONAL - Located in the Gracemere Block. The block contains Upper Devonian to Permian rocks of the Yarrol Basin and overly basement rocks of the Upper Silurian to Middle Devonian. The basement is intruded by Mount Morgan Tonalite, and the Yarrol Basin sequence is intruded by Upper Permian intermediate to basic intrusives. The report goes into greater detail of the units as described by Kirkegaard, Shaw, & Murray (1970) and Murray (1975)

GEOCHEMISTRY

- **stream sediment sampling** - Results of stream sediment sampling in 1982 available - 15-680 ppm Cu; 30-85 ppm Pb; 40-160 ppm Zn; .003-.240 ppm Au; 0.4-1.5 ppm Ag; <1-60 ppm As. No follow up work.

GEOPHYSICS

- **airborne surveys** - Aeromagnetic and aerial radiometric data flown over part of the ATP by Aerodata McPhar Pty. Ltd. in May, 1984.

LOCALISED EXPLORATION/PROSPECTS

1) Hamilton Creek North and South Grids

GEOPHYSICS - Three hundred and seventy-seven soil samples commenced in May over Hamilton Creek North and Hamilton Creek South with all samples analysed for copper, lead, zinc and gold. Three hundred and sixty samples had Au values above the .005 threshold. All lead, and corresponding copper and zinc values above 40 ppm lie in the Dee Volcanics. The Mine Corridor rocks appear

depleted in base metals relative to the Dee Volcanics and Mount Morgan Tonalite. Gold was relatively low with no clear correlation with the base metals or with geology mapped. Most anomalous gold values were on Hamilton Creek North grid but were distributed across Dee Volcanics, Mine Corridor, and Mount Morgan Tonalite rocks in a random manner. Currently no geochemical soil anomalies are indicated.

2) Bullbound Grid

GEOPHYSICS - New aerial photography to generate a digital terrain model to assist with terrain corrections for the gravity data. Ground magnetics was processed and is presented as stacked profiles.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Only checks of the mapped geology was done. Based on the work done by Geopeko Ltd. and Getty Oil Development it was considered not a prospective area for a 'Mount Morgan type' orebody. No further exploration was carried out by BHP Minerals Ltd. Half the area was relinquished 15/07/1984 due to lack of prospectivity.

RECORDER: Simon Crouch **DATE:** 11/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 14881 **STATUS:** Open

TITLE: Authority to Prospect 3539M, Mount Morgan, Queensland. Report for six months ended 15 January, 1985.

AUTHOR(S): C.A. Porter **DATE:** January, 1985

ATP/EP No.: ATP 3539M

COMPANY HOLDING TITLE: BHP Minerals Ltd

COMPANY SUBMITTING REPORT: BHP Minerals Ltd

DATE GRANTED: 15/02/1983 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 45 km S of Rockhampton

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: precious and base metals

SUMMARY:

GEOCHEMISTRY

- **stream sediment sampling** - The 1982 stream sediment sampling located five samples judged as anomalous in gold and base metals in a conglomerate band in the Jurassic cover near the unconformity with the Dee Volcanics.

- **rock chip sampling** - Five rock chip samples from the conglomerate contained low Au (0.015 to 0.062 ppm). Results do not explain high base metal values (Cu: 37 to 75 ppm; Pb: 9 to 21 ppm; Zn: 12 to 278 ppm).

GEOPHYSICS

- **airborne surveys** - UTEM survey carried out over the six northern grid areas (Hamilton Creek North, Hamilton Creek South, Trotter Creek, Horse Creek South, Horse Creek, and Hamilton Creek) by Lamontagne Geophysics (Aust.) Pty. Ltd. during August and September, 1984. Results - no strong conductor detected.

- **ground surveys** - Gravity results over Bullbound grid still pending. Terrain models have been generated and a three-dimensional gravity modelling programme is being used to generate terrain corrected data.

RECORDER: Simon Crouch **DATE:** 14/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 14882 **STATUS:** Open

TITLE: Authority to Prospect 3539M, Mount Morgan, Queensland. Final Report.

AUTHOR(S): A.A. Durbin & J.A. Forwood **DATE:** December, 1985

ATP/EP No.: ATP 3539M

COMPANY HOLDING TITLE: BHP Minerals Ltd

COMPANY SUBMITTING REPORT: BHP Minerals Ltd

DATE GRANTED: 15/02/1983 **PERIOD:** 2.5 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 45 km S of Rockhampton

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: precious and base metals

SUMMARY: ATP 3539M was reduced from 100 sub-blocks to 50 sub-blocks on July 15, 1984. The lease was surrendered July 15, 1985.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Exploration over the relinquished ATP 3293M included a review of previous data; familiarisation with geology and mineralisation of the area including 26 stream sediment samples; a gravity survey over Bullbound grid. Exploration of ATP 3539M included a aeromagnetic and aerial radiometric survey by Aerodata McPhar Pty. Ltd.; soil and rock chip geochemical and geological follow-up of anomalous stream sediment samples; stream sediment, soil and rock chip geochemical and geological follow-up of the radiometric anomaly in the north; new aerial photography to create digital terrain models used for terrain corrections of gravity data; inspection of Geopeko's mapping over Hamilton Creek North and South grids, and completion of soil geochemical and UTEM surveys (the UTEM survey including Hamilton Creek); UTEM survey over Horse Creek grid and Trotter Creek grid; percussion drilling of two UTEM and six gravity anomalies for a total of 859 m; and four Downhole Electromagnetic surveys.

GEOCHEMISTRY

- **stream sediment sampling** - Twenty-six samples were collected from within ATP 3293M. Values of 0.0240 ppm Au; 60 ppm As; 680 ppm Cu; 85 ppm Pb; and 160 ppm Zn were detected in five samples in the vicinity of Mount Victoria. Background 0.015 ppm Au; 1.5 ppm Ag; 10 ppm As; 60 ppm Cu; 40 ppm Pb; and 65 ppm Zn.

Thirty stream sediment samples were taken in the vicinity of the potassium radiometric anomaly. Two populations exist. One draining from the Razorback Beds north of the Dee River: 0.348 ppm Au; 15 ppm As; 467 ppm Cu; 37 ppm Pb; and 120 ppm Zn. The second from south of the Dee River where there are no Razorback Beds has consistently lower copper and gold values: 1.6 ppm Au; 11 ppm As; 109 ppm Cu; 37 ppm Pb; and 106 ppm Zn. Values from the nine five kilogram samples for cyanide-leach gold extraction were all elevated, between 14.8 and 0.650 ppb(?) Au. The 14.8 ppb was thought to be anomalous.

rock chip sampling - Follow-up work from stream sediment sampling around Mount Victoria. Seven rock chip samples were taken from a carboniferous grit band of the Razorback Beds at the Mount

Victoria Mine, and from a ferruginous conglomerate unit of the same beds, on a ridge above the mine. Values: 37 to 201 ppm Cu; 9 to 30 ppm Pb; 12 to 278 ppm Zn; 9 ppm As; and 0.015 to 0.140 ppm Au.

- **soil sampling** - Follow-up work from stream sediment sampling around Mount Victoria. Thirty-eight samples taken with 0.354 ppm Au; 16 ppm As; 323 ppm Cu; 17 ppm Pb; 133 ppm Zn. The generally higher values of gold, copper and zinc were obtained at top of spur close to outcrop of Razorback Beds. The values obtained from the area are probably from material shedding from either the Razorback Beds of sediments resting on the basal unconformity. Low lead values from soil samples are inconsistent with the stream sediment samples.

Another 29 soil samples were collected after stream sediment and cyanide-leach values were obtained: 0.110 ppm Au; 220 ppm As; 138 ppm Cu; 18 ppm Pb; and 138 ppm Zn.

GEOPHYSICS

- **airborne surveys** - Magnetic data showed little correlation to the mapped lithologies indicating variable magnetic mineral component within the volcanic and intrusive rocks. Results indicate a low coinciding with Mount Morgan mine flanked east and west by magnetic highs representing deeper magnetic sources either within or below the Tonalite. A subtle magnetic change defining the boundary between Dee Volcanics and Mount Morgan Tonalite is virtually masked by the 'highs'. The smaller magnetic features can be associated with hornfelsed contact zones within granitic rocks. Lack of correlatable data precluded any follow-up work.

The radiometrics highlight boundaries between Devonian rocks and the Carboniferous, Permian and Jurassic rocks. A large potassium anomaly was defined and considered an alteration zone warranting follow-up.

- **ground surveys** - Terrain corrections were produced over the Bullbound grid using gravity data and a digital terrain model. Results show a significant gradient decrease to the east within the Dee Volcanic units, west of the contact zone with the Mount Morgan Tonalite. The gradient shows an inconsistent change at the contact zone and to the east. Seven anomalies were selected for testing. All were small and less than 100 m deep. None were considered to represent Mount Morgan 'sized' orebody.

Ground magnetic data used to assist with mapping of the contact between the Dee Volcanics and Mount Morgan Tonalite showed erratic results although the contact can be recognized as a break in the character of the data along many of the profiles.

The results of the UTEM survey in general, showed no strong conductors although two anomalies (one located at Hamilton Creek South grid the other at Horse Creek South grid) warranted further testing.

The first indicates an anomalous area along a linear conductive zone. The second is on the contact between Mine Corridor rocks and Mount Morgan Tonalite, indicating the possibility of a deeper.

Five downhole EM's were done with resultant flat profiles indicating no conductive bodies within the vicinity of the boreholes.

LOCALISED EXPLORATION/PROSPECTS

GEOLOGY - Geological expectation in the Dee River area revealed apparently conformable rhyolitic flows and pyroclastics overlying cherty sediments cropping out on the crest of the hills over which the two broad anomalies lie.

1) Bullbound Grid

GEOLOGY - Upper Devonian Boulder Creek Grit conformably overlies the Upper Devonian Dee Volcanics (mapped on Mount Hoopbound), which in turn mantle the Middle Devonian Mount Morgan Tonalite and the Bull Creek Granite. The Boulder Creek Grit and Dee Volcanics dip 10° to the west. The Dee Volcanics unconformably overlie Mount Morgan Tonalite to the north but is a faulted contact in the south.

DRILLING - Six vertical percussion holes were drilled on gravity anomalies on the Bullbound grid. Discouraging results with Au values from 0.096 ppm to <0.005 ppm; As <49 ppm; and Cu <830 ppm.

2) Hamilton Creek Grids North and South - located 6 and 8 km respectively south of Mount Morgan.

GEOLOGY - Within the Hamilton Creek North grid quartz feldspar porphyry is in contact with Mount Morgan Tonalite and also dips west under the Dee Volcanics. In the Hamilton Creek and Hamilton Creek South grids, a quartz porphyry has apparently faulted off the porphyry to the north and dips SW beneath Dee Volcanics. East of this block of porphyry is an embayment in the Mount Morgan Tonalite with limestone, fine tuffs, agglomerates and quartz feldspar porphyry (Capella Creek Beds or Dee Volcanics).

GEOCHEMISTRY - Three hundred and seventy-seven soil samples were collected from the 'A' horizon. Most gold values occur on the Hamilton Creek North grid. There was no clear correlation between anomalous base metal and gold value, nor with geology as mapped. Overall, no significant anomalies found.

DRILLING - A vertical percussion hole of 142 m depth was drilled to test the UTEM anomaly on the Hamilton Creek South grid. Results were poor (Au <0.048 ppm).

3) Horse Creek South Grid - covers the south portion of the Mine Corridor.

GEOLOGY - Surrounded by Mount Morgan Tonalite, Capella Creek Beds and Dee Volcanics, the Mine Corridor constitutes quartz feldspar porphyry, silicified ferruginous quartz porphyry, and fine acid volcanics, terminated to the south by a fault. South east of the Corridor there is lithic tuff, fossiliferous limestone, calc silicate hornfels and fine-grained acid volcanics (Capella Creek Beds or Dee Volcanics). Mount Morgan Tonalite occurs as quartz diorite or granodiorite. Intermediate and gabbroic dykes also occur.

DRILLING - A vertical percussion hole of 172 m depth was drilled on the UTEM anomaly on the Horse Creek South grid. Results discouraging (Au 0.197 ppm).

4) Trotter Creek

GEOLOGY - Quaternary alluvials over possible Dee Volcanics.

GEOPHYSICS - Three shallow conductive zones delineated by UTEM.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Testing for Mount Morgan style gold-copper mineralisation failed to detect significant mineralisation.

RECORDER: Simon Crouch **DATE:** 15/02/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 3544M

COMPANY HOLDING TITLE: J.W. and B.R. Richardson

COMPANY SUBMITTING REPORT: CSR Limited

DATE GRANTED: 25 July 1983 **PERIOD:** 1 year

1:100 000 SHEET NAME(S): Mount Morgan (8950), Ridglands (8951), Rookwood (8851).

1:250 000 SHEET NAME(S):

LOCATION: 35 km SW of Rockhampton

MINING DISTRICT:

MINES/PROSPECTS: Native Cat, Golden Spur.

EXPLORATION TARGETS/MODELS: Epithermal/hydrothermal gold mineralisation hosted by intermediate or acid volcanic sequences associated with high-level intrusives.

TRANSFERS, JOINT VENTURES, etc: CSR formed a Joint Venture with J.W. and B.R. Richardson on 12 March 1984. CSR is manager of the tenement.

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File*-12990, 13789, 14883

Confidential-

SUMMARY:

REGIONAL EXPLORATION

PREVIOUS EXPLORATION -BHP explored ATP 532M for base metals, principally copper. Eight areas were investigated in detail but no economic mineralisation was discovered. None of the eight detailed areas were located within ATP 3544M.

Mineral Deposits Ltd explored for base and precious metals using stream sediment sampling and IP geophysical surveys within ATP 1585M. One combined percussion/diamond hole was drilled. Investigations were centred on the northern edge of the Stanwell Valley where an anomalous copper zone was interpreted as being associated with the contact of the Native Cat Andesite and sediments of the Stanwell Valley. No economic mineralisation was found.

MINING HISTORY - At the time of writing of CR 12990, small scale alluvial gold mining was being carried out by J.W. Richardson near the Native Cat Prospect. A summary of production figures and geological notes on previous mines within the tenement is presented below.

Stanwell Goldfield

Native Cat Mine - Produced 6.2 kg Au from 270 t of ore at 23 g/t. Gold occurs in a pyritic quartz reef. Country rock is the Native Cat Andesite consisting of andesitic flows, tuffs and minor trachyandesite (Lower Permian Rookwood Volcanics).

Westwood Gold Mine - Located 16 km WSW of Mount Morgan. Produced 4 kg of gold from 230 t of ore at 17.4 g/t. Mineralisation occurs within a few feet of the underwall of a dolerite dyke where it intrudes slates. Gold is associated with quartz and arsenopyrite. Country rocks are possibly Lower Permian Youlambie Conglomerate.

Ridgeland Goldfield

Gold in this area is probably related to the Lower Permian Ridgeland Granodiorite, as is the gold in the Canoona and Morinish Goldfields.

Morning Star Mine - Locality stated in this report as "unknown".
Produced 0.3 kg of gold from 8 t of ore. Small quartz reef 0.5 m wide assaying 50 g/t.

Rosewood Goldfield

Gold from this area is probably related to the Lower Permian Ridgeland Granodiorite. Several nuggets up to 100 ozs were found by alluvial mining. Little information is available on reefs.

Caledonia Reef - Location unknown. Quartz with pyrite and chalcopyrite.

Great Northern Copper Mine - Location unknown. Quartz reef with chalcopyrite and copper oxides.

MINING LEASES - Two mining leases are held within the tenement area. MLA 1047 "Golden Horseshoe" (Parish Morinish, Livingstone) granted for a period of ten years from 1/4/82. MLA 1079 "Morinish Ore" (Parish Morinish, Livingstone) applied for on 29/3/83.

GEOCHEMISTRY

Stream sediment sampling - 61 samples were sampled during the reporting period. At each site, a 5 kg bulk gold sample and a ferruginous gravel sample was collected.

Rock chip sampling - Six rock chip samples were collected during general reconnaissance of the tenement.

LOCALISED EXPLORATION/PROSPECTS

NATIVE CAT MINE AREA

GEOLOGY - Quartz-sericite-pyrite alteration is abundant at, and hydrothermal breccias occur at the Native Cat Prospect. Four grab samples of altered andesite taken at random from small dumps near the prospect returned values ranging from 14 to 118 ppm Au.

A total of 427 dip and strike measurements of joint planes were taken in the grid area. Rose diagrams were plotted and highlighted three principal joint sets.

11 rocks were collected in the Native Cat grid for petrological investigation. Two main rock-types are present - andesite and quartz-trachyte.

GEOCHEMISTRY - 9 stream sediment samples and four rock chip samples were collected and assayed during the first six-monthly period to 24 January 1984.

The old Native Cat Mine was gridded and soil samples collected at 50 m spacing. Composite rock chip samples were collected from trenches excavated in the Native Cat Mine area (see "trenching" below). Five dump samples were collected from old spoil heaps on the gridded area. 17 composite channel samples were collected from two trenches which had been excavated near the present alluvial workings at the head of Golden Spur Creek.

TRENCHING - 11 trenches were excavated in the Native Cat Mine area. Trenches ranged from 10 to 120 m with an average depth of 2 m. A total of 108 composite rock chip samples were collected from 9 of the 11 trenches. Samples were mainly 1 m composite channel samples taken along the base of one wall of each trench sampled.

MINERALISATION - Soil and rock chip sampling have outlined a zone of Au, Cu, Pb, Zn and Co anomalism centred around old workings over an area of 450 x 150 m. A lode zone consisting of microfractured, silicified and altered andesite was intersected in three trenches, TA, TC and TJ. The highest results were obtained in trench A where consecutive 1 m composite trench wall samples averaged 6 m of 7.1 g/t Au or 4 m of 10.3 g/t Au. The true width of the mineralised zone is uncertain but rock chip samples taken from similar lode material taken from old dumps adjacent to small pits returned assay results ranging from trace to 112 ppm.

The mineralisation is considered to be of hydrothermal origin, derived from the intrusive diorite and localised in fracture zones in the andesite. The shear zones are possibly related to movement along the margins of the intrusive diorite or associated with extensional stresses along the Stanwell Fault.

DRILLING - A total of 13 reverse circulation percussion holes were drilled on the Native Cat Grid. The drillholes were selectively sampled for geochemical analysis. Minor base metal and gold anomalies

were recorded with the highest values in drillhole NCRC-13, where an average of 2.48 ppm gold was recorded in altered andesite between 6 and 13 m.

Supergene enrichment in poddy haematitic shear zones in the Native Cat Andesite is considered to account for the majority of the anomalous gold and base metal values returned from the drilling program.

Primary hydrothermal-style mineralisation was intersected in drillhole NCRC-1 at 26 m (0.4 m of pyritic quartz) and is similar to dump material located near NCRC-3, presumably derived from an adjacent major shaft which is still standing to 15 m. The shallow, highly oxidised (supergene) mineralisation intersected in NCRC-13 is of limited extent and follows a line of old workings for about 70 m.

ROSEWOOD AREA

Six stream sediment samples were collected and assayed.

GOLDEN SPUR

Five rock chip samples were collected and assayed. One rock from the Golden Spur area was also submitted for petrological examination.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - It was concluded that the Native Cat grid area showed little economic potential and the tenement was surrendered and the joint venture terminated.

RECORDER: M.A. Hayward **DATE:**10/3/94.

COMPANY REPORT SUMMARY SHEET

CR:12990 **STATUS:**Open file

TITLE:Exploration report on ATP 3544M "Native Cat Prospect", Queensland for six months ending 24th January 1984.

AUTHOR(S):R.J. Osborne **DATE:**February 1984

ATP/EP No.:ATP 3544M

COMPANY HOLDING TITLE:J.W. and B.R. Richardson

COMPANY SUBMITTING REPORT:CSR Limited

DATE GRANTED:25 July 1983 **PERIOD:**1 year

1:100 000 SHEET NAME(S):Mount Morgan (8950), Ridglands (8951), Rookwood (8851).

1:250 000 SHEET NAME(S):

LOCATION:35 km SW of Rockhampton

MINING DISTRICT:

MINES/PROSPECTS:Native Cat, Golden Spur.

EXPLORATION TARGETS\MODELS:Epithermal/hydrothermal gold mineralisation hosted by intermediate or acid volcanic sequences associated with high-level intrusives.

SUMMARY:

REGIONAL EXPLORATION

PREVIOUS EXPLORATION -BHP explored ATP 532M for base metals, principally copper. Eight areas were investigated in detail but no economic mineralisation was discovered. None of the eight detailed areas were located within ATP 3544M.

Mineral Deposits Ltd explored for base and precious metals using stream sediment sampling and IP geophysical surveys within ATP 1585M. One combined percussion/diamond hole was drilled. Investigations were centred on the northern edge of the Stanwell Valley where an anomalous copper zone was interpreted as being associated with the contact of the Native Cat Andesite and sediments of the Stanwell Valley. No economic mineralisation was found.

MINING HISTORY - At the time of writing of CR 12990, small scale alluvial gold mining was being carried out by J.W. Richardson near the Native Cat Prospect. A summary of production figures and geological notes on previous mines within the tenement is presented below.

Stanwell Goldfield

Native Cat Mine - Produced 6.2 kg Au from 270 t of ore at 23 g/t. Gold occurs in a pyritic quartz reef. Country rock is the Native Cat Andesite consisting of andesitic flows, tuffs and minor trachyandesite (Lower Permian Rookwood Volcanics).

Westwood Gold Mine - Located 16 km WSW of Mount Morgan. Produced 4 kg of gold from 230 t of ore at 17.4 g/t. Mineralisation occurs within a few feet of the underwall of a dolerite dyke where it intrudes slates. Gold is associated with quartz and arsenopyrite. Country rocks are possibly Lower Permian Youlambie Conglomerate.

Ridglands Goldfield

Gold in this area is probably related to the Lower Permian Ridglands Granodiorite, as is the gold in the Canoona and Morinish Goldfields.

Morning Star Mine - Locality stated in this report as "unknown".

Produced 0.3 kg of gold from 8 t of ore. Small quartz reef 0.5 m wide assaying 50 g/t.

Rosewood Goldfield

Gold from this area is probably related to the Lower Permian Ridglands Granodiorite. Several nuggets up to 100 ozs were found by alluvial mining. Little information is available on reefs.

Caledonia Reef - Location unknown. Quartz with pyrite and chalcopyrite.

Great Northern Copper Mine - Location unknown. Quartz reef with chalcopyrite and copper oxides.

MINING LEASES - Two mining leases are held within the tenement area. MLA 1047 "Golden Horseshoe" (Parish Morinish, Livingstone) granted for a period of ten years from 1/4/82. MLA 1079 "Morinish Ore" (Parish Morinish, Livingstone) applied for on 29/3/83.

LOCALISED EXPLORATION/PROSPECTS

GEOLOGY - One rock from the Golden Spur area, and three from the Native Cat area were submitted for petrological examination.

Quartz-sericite-pyrite alteration is abundant at, and hydrothermal breccias occur at the Native Cat Prospect. Four grab samples of altered andesite taken at random from small dumps near the prospect returned values ranging from 14 to 118 ppm Au.

GEOCHEMISTRY -

Native Cat Prospect - 9 stream sediment samples and four rock chip samples were collected and assayed.

Rosewood area - Six stream sediment samples were collected and assayed.

Golden Spur - Five rock chip samples were collected and assayed.

RECORDER:M.A. Hayward **DATE:**3/3/94.

COMPANY REPORT SUMMARY SHEET

CR:13789 **STATUS:**Confidential

TITLE:ATP 3544M "Native Cat", Queensland, Report on exploration for six months ended 25 July 1984.

AUTHOR(S):R.J. Osborne **DATE:**September 1984

ATP/EP No.:ATP 3544M

COMPANY HOLDING TITLE:J.W. and B.R. Richardson

JOINT VENTURES - CSR formed a Joint Venture with J.W. and B.R. Richardson on 12 March 1984. CSR is manager of the tenement.

COMPANY SUBMITTING REPORT:CSR Limited.

DATE GRANTED:25 July 1983, renewed for a further 1 year on 25/7/1984 **PERIOD:**Initially 1 year, but renewed for a further 1 year.

1:100 000 SHEET NAME(S):Mount Morgan (8950), Ridglands (8951), Rookwood (8851).

1:250 000 SHEET NAME(S):Rockhampton (SF56-13), Duaringa (SF55-16)

LOCATION:35 km SW of Rockhampton

MINING DISTRICT:

MINES/PROSPECTS:Native Cat, Golden Spur.

EXPLORATION TARGETS/MODELS:Epithermal/hydrothermal gold mineralisation hosted by intermediate or acid volcanic sequences associated with high-level intrusives.

SUMMARY:

REGIONAL EXPLORATION

GEOCHEMISTRY

Stream sediment sampling - 61 samples were sampled during the reporting period. At each site, a 5 kg bulk gold sample and a ferruginous gravel sample was collected.

Rock chip sampling -Six rock chip samples were collected during general reconnaissance of the tenement.

LOCALISED EXPLORATION/PROSPECTS

GEOLOGY - A total of 427 dip and strike measurements of joint planes were taken in the grid area. Rose diagrams were plotted and highlighted three principal joint sets.

11 rocks were collected in the Native Cat grid for petrological investigation. Two main rock-types are present - andesite and quartz-trachyte.

GEOCHEMISTRY -The old Native Cat Mine was gridded and soil samples collected at 50 m spacing. Composite rock chip samples were collected from trenches excavated in the Native Cat Mine area (see below). Five dump samples were collected from old spoil heaps on the gridded area. 17 composite channel samples were collected from two trenches which had been excavated near the present alluvial workings at the head of Golden Spur Creek.

TRENCHING - 11 trenches were excavated in the Native Cat Mine area. Trenches ranged from 10 to 120 m with an average depth of 2 m. A total of 108 composite rock chip samples were collected from 9 of the 11 trenches. Samples were mainly 1 m composite channel samples taken along the base of one wall of each trench sampled.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE -Soil and rock chip sampling have outlined a zone of Au, Cu, Pb, Zn and Co anomalism centred around old workings over an area of 450 x 150 m. A lode zone consisting of microfractured, silicified and altered andesite was intersected in three trenches, TA, TC and TJ. The highest results were obtained in trench A where consecutive 1 m composite trench wall samples averaged 6 m of 7.1 g/t Au or 4 m of 10.3 g/t Au. The true width of the mineralised zone is uncertain but rock chip samples taken from similar lode material taken from old dumps adjacent to small pits returned assay results ranging from trace to 112 ppm.

The mineralisation is considered to be of hydrothermal origin, derived from the intrusive diorite and localised in fracture zones in the andesite. The shear zones are possibly related to movement along the margins of the intrusive diorite or associated with extensional stresses along the Stanwell Fault.

RECORDER:M.A. Hayward **DATE:**7/3/94.

COMPANY REPORT SUMMARY SHEET

CR:14883 **STATUS:**Open file

TITLE:ATP 3544M Native Cat Queensland, Final Report

AUTHOR(S):R.J. Osborne **DATE:**November 1985

ATP/EP No.:ATP 3544M

COMPANY HOLDING TITLE:J.W. and B.R. Richardson

JOINT VENTURES - CSR formed a Joint Venture with J.W. and B.R. Richardson on 12 March 1984. CSR is manager of the tenement.

COMPANY SUBMITTING REPORT:CSR Limited.

DATE GRANTED:25 July 1983, renewed for a further 1 year on 25/7/1984 **PERIOD:**Initially 1 year, but renewed for a further 1 year.

1:100 000 SHEET NAME(S):Mount Morgan (8950), Ridglands (8951), Rookwood (8851).

1:250 000 SHEET NAME(S):Rockhampton (SF56-13), Duaringa (SF55-16)

LOCATION:35 km SW of Rockhampton

MINING DISTRICT:

MINES/PROSPECTS:Native Cat, Golden Spur.

EXPLORATION TARGETS\MODELS:Epithermal/hydrothermal gold mineralisation hosted by intermediate or acid volcanic sequences associated with high-level intrusives.

SUMMARY:

LOCALISED EXPLORATION/PROSPECTS

DRILLING -A total of 13 reverse circulation percussion holes were drilled on the Native Cat Grid. The drillholes were selectively sampled for geochemical analysis. Minor base metal and gold anomalies were recorded with the highest values in drillhole NCRC-13, where an average of 2.48 ppm gold was recorded in altered andesite between 6 and 13 m.

Supergene enrichment in poddy haematitic shear zones in the Native Cat Andesite is considered to account for the majority of the anomalous gold and base metal values returned from the drilling program.

Primary hydrothermal-style mineralisation was intersected in drillhole NCRC-1 at 26 m (0.4 m of pyritic quartz) and is similar to dump material located near NCRC-3, presumably derived from an adjacent major shaft which is still standing to 15 m. The shallow, highly oxidised (supergene) mineralisation intersected in NCRC-13 is of limited extent and follows a line of old workings for about 70 m.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - It was concluded that the grid area showed little economic potential and the tenement was surrendered and the joint venture terminated.

RECORDER:M.A. Hayward **DATE:**7/3/94.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 3700M

COMPANY HOLDING TITLE: CRA Exploration Pty Ltd

COMPANY SUBMITTING REPORT: CRA Exploration Pty Ltd

DATE GRANTED: 05/01/1984 **PERIOD:** 1 year

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 17 km WSW of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Westwood Gold Mine

EXPLORATION TARGETS\MODELS: Lode or disseminated gold deposit

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File-* 14058, 14059

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To investigate a combined magnetic and radiometric anomaly situated within 400m of the Westwood Gold Mine.

GEOLOGY -

REGIONAL - Dominated by shale, siltstone and rhyolite interpreted as part of the Youlambie Conglomerate.

LOCAL - An andesite dyke through the sediments and striking into the main magnetic anomaly interpreted as a igneous body.

MINERALISATION/ALTERATION - Minor silicification and epidote.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - BHP (ATP 532M: 1968-1972); Alcoa of Australia Ltd (ATP 3045M: 1981-1982)

GEOCHEMISTRY

- **rock chip sampling** - Five samples collected from dump at Westwood shaft for orientation purposes. Brecciated ironstone at 2.53% Pb, and gossan sample at 42.9 ppm Au and 1.58% As.

- **soil sampling** - Total of 148 samples collected at 25m intervals on the geophysical grid between 0.1 and 0.5m depth by hand augering and then sieved to -180 microns. Results vary - 10 to 170 ppm Pb; 15 to 270 ppm Zn; 5 to 180 ppm Cu; 4 to 145 ppm As; up to 30 ppb Au; up to 10 ppm Bi; up to 400 ppb Hg; 50 to 1250 ppm Mn; and 0.73 to 5.34% Fe.

GEOPHYSICS

- **ground surveys** - Magnetometry covering shaft and anomaly, 11 E-W lines at 50m separation and 2 N-S lines at 100m separation. Total count readings using a scintillometer.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Based on geochemical, geophysical and geological investigations it is concluded that - 1) the anomaly appears to be igneous; 2) the Alcoa radiometric anomaly is probably elevated background potassium; and 3) there is no significant geochemical anomalies associated with the magnetics and radiometrics.

RECORDER: Simon Crouch **DATE:** 10/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 14058 **STATUS:** Open

TITLE: Westwood A to P 3700m, Rockhampton area, Queensland. Report on investigations for the first six months of tenure ended September 4, 1984.

AUTHOR(S):A.R. Hughes **DATE:** November 1984

ATP/EP No.: ATP 3700M

COMPANY HOLDING TITLE: CRA Exploration Pty Ltd

COMPANY SUBMITTING REPORT: CRA Exploration Pty Ltd

DATE GRANTED: 05/01/1984 **PERIOD:** 1 year

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 17 km WSW of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Westwood Gold Mine

EXPLORATION TARGETS/MODELS: Lode or disseminated gold deposit

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To investigate a combined magnetic and radiometric anomaly situated within 400m of the Westwood Gold Mine.

GEOLOGY -

REGIONAL - Dominated by shale, siltstone and rhyolite interpreted as part of the Youlambie Conglomerate.

LOCAL - An andesite dyke through the sediments and striking into the main magnetic anomaly interpreted as a igneous body.

MINERALISATION/ALTERATION - Minor silicification and epidote.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - BHP (ATP 532M: 1968-1972); Alcoa of Australia Ltd (ATP 3045M: 1981-1982)

GEOLOGICAL MAPPING - Geological observations were recorded at soil sample sites.

GEOCHEMISTRY

- **rock chip sampling** - Five samples collected from dump at Westwood shaft for orientation purposes. Brecciated ironstone at 2.53% Pb, and gossan sample at 42.9 ppm Au and 1.58% As.

- **soil sampling** - Total of 148 samples collected at 25m intervals on the geophysical grid between 0.1 and 0.5m depth by hand augering and then sieved to -180 microns. Results vary - 10 to 170 ppm Pb; 15 to 270 ppm Zn; 5 to 180 ppm Cu; 4 to 145 ppm As; up to 30 ppb Au; up to 10 ppm Bi; up to 400 ppb Hg; 50 to 1250 ppm Mn; and 0.73 to 5.34% Fe.

GEOPHYSICS

- **ground surveys** - Magnetometry covering shaft and anomaly, 11 E-W lines at 50m separation and 2 N-S lines at 100m separation. Total count readings using a scintillometer.

RECORDER: Simon Crouch

DATE: 10/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 14059 **STATUS:** Open

TITLE: Westwood A to P 3700m, Rockhampton area, Queensland. Report on investigation for the second six months of tenure ended March 4, 1985, and final report.

AUTHOR(S): A.R. Hughes **DATE:** January, 1985

ATP/EP No.: ATP 3700M

COMPANY HOLDING TITLE: CRA Exploration Pty Ltd

COMPANY SUBMITTING REPORT: CRA Exploration Pty Ltd

DATE GRANTED: 05/01/1984 **PERIOD:** 1 year

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 17 km WSW of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Westwood Gold Mine

EXPLORATION TARGETS\MODELS: Lode or disseminated gold deposit

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Based on geochemical, geophysical and geological investigations it is concluded that - 1) the anomaly appears to be igneous; 2) the Alcoa radiometric anomaly is probably elevated background potassium; and 3) there is no significant geochemical anomalies associated with the magnetics and radiometrics.

RECORDER: Simon Crouch **DATE:** 10/02/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 3774M

COMPANY HOLDING TITLE: Haoma Gold Mines N.L.

COMPANY SUBMITTING REPORT: Jacia Natural Resources Consultants at first, later by Billiton Australia (metals division of the Shell Company of Australia Limited

DATE GRANTED: 26/06/1984 **PERIOD:** 2 year

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 16 km S of Bajool

MINING DISTRICT:

MINES/PROSPECTS: Austerity Copper Mine

EXPLORATION TARGETS\MODELS: Mount Morgan style disseminated gold-copper deposits and/or a Mount Chalmers type massive gold-copper mineralisation.

TRANSFERS, JOINT VENTURES, etc: JV between Haoma Gold Mines N.L. and Billiton Australia (metals division of the Shell Company of Australia Limited

LEASES TAKEN OUT:

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To continue the exploration work conducted in this area by Haoma Gold Mines N.L. under ATP 3314M. The results indicate that the Austerity Prospect had the best chance of economic mineralisation in the tenement, and ATP 3314M was voluntarily relinquished so that ATP 3774M could be taken out, allowing for better coverage and exploration of the host lithology.

GEOLOGY -

REGIONAL - The Authority lies in the Calliope Block which is interpreted to be a remnant of an Island Arc formed in the Late Silurian to Middle Devonian. It includes the Capella Creek beds, Calliope beds, and the Mt Holly beds.

LOCAL - Crystal tuff interbedded with andesite and minor lapilli tuff sequence dominates the lithologies in the ATP, and lie essentially E of the Austerity Prospect. The crystal tuff is brown-green in colour and is composed of fine grained amphibole-chlorite + epidote and feldspar crystals. Fine grained brown and blue-green units may be andesite flows or fine grained tuffs. Vesicles indicative of lavas were not common. Limestone units in the area vary from 5 m to over 200 m in width and are commonly persistent along strike. Thin multi-layered chert bands and coral colonies within the limestone are present. The limestone is commonly recrystallised, forming a saccharoidal marble. In the S part of the ATP, dark grey vuggy textured calc-silicates are present. These comprise amphibole, calcite, chert and garnet, and occur near granite. The limestones are commonly interbedded with dacitic and andesitic tuffs. Most acid volcanic rocks in the area are present to the S of the Ulam marble quarry. The acid volcanics have been mapped in three main groups; fine acid tuffs, porphyritic rhyolite-dacite tuffs, and rhyolite-dacite lithic tuffs. Some massive sulphide clasts were seen in the rhyolite-dacite lithic tuffs. Fine grained interbedded greywacke, chert, and sericite-quartz schist are probably derived from volcanic materials. Some of the units mapped as clastic sediments may be siliceous acid tuffs. Massive and thin bedding characteristics of these units are present. A moderately developed foliation is observed in some units. These rocks occur W of the Austerity Prospect area. A fine to medium grained granodiorite crops out over the W part of the ATP. Minor andesite - meta dolerite dykes are present in the area particularly in the Austerity Copper Mine area.

The sequence represented at Austerity youngs in an E direction and can be subdivided into three formations. An unconformable relationship appears to exist between the lower formation and upper two. The rocks exposed appear to span Middle Devonian to Upper Devonian ages are correlated with Capella Creek beds, and Dee Volcanics of the main Dee Range suite. The lithologies in the Austerity Prospect area are equated with Geopeko's Ulam Beds, Mt Cedric beds, and Mt Alina beds. Two folding generations are recognised in the ATP. The first generation occurred at the end of the Middle Devonian, and the folding is very tight and the axis trend N to NNW. The area was refolded along NNW axis into broad open structures during the Late Permian.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Esso (ATP 1087M), B.H.P. (ATP 1416M), and Australian Anglo American Ltd (ATP 1950M).

GEOCHEMISTRY

- **stream sediment sampling** - A stream sediment survey was carried out over the area with 84 samples collected. Three anomalous geochemical zones were defined. Area 1 is an area anomalous in Zn (up to 180 ppm) and Cu (up to 320 ppm) and drains the Austerity Copper prospect region containing acid tuffs with minor limestones and andesitic tuffs. Area 2 is a zone 1 km SE of Austerity Copper Mine comprising andesitic tuffs. The stream sediment samples were anomalous in Zn (up to 380 ppm). Area 3 is 2.3 km SSW of Austerity Copper Mine and a stream sediment sample was anomalous in Zn (170 ppm) and was associated with pyritic altered acid tuffs.

LOCALISED EXPLORATION/PROSPECTS

1) Austerity Copper Prospect

GEOLOGY - The Austerity Copper Prospect consists of a number of shallow pits containing Fe oxide, malachite, azurite, pyrite and chalcopyrite. Pyrite and chalcopyrite grains appear confined to thin (<1 cm) feldspar-quartz veinlets. The mineralisation occurs in altered acid tuff and may be stratigraphically controlled or a result of the intrusion of numerous intermediate to basic dykes that occur in the locality. Three mineralisation styles are evident in this area. The first style is stratabound base metal which is shown at the North Gossan (Anomaly A). The gossan occurs in altered quartz eye acid tuffs which dip steeply to the E. Alteration consists of intense sericite/chlorite development with siliceous alteration. This alteration zone trends SE to South Hill. The second

style is cross-cutting quartz vein, an example of which occurs at the Austerity Copper mine (Anomaly B). The third style is fault-related quartz stockwork plus pyrite. This type occurs at South Hill and the Powerline Prospect.

GEOCHEMISTRY - A soil survey was conducted over the prospect with 405 samples collected. The results indicated 3 major multi-element anomalous areas. Anomaly A contains up to 1800 ppm Zn, 1250 ppm Cu, 590 ppm Ba, 0.15 ppm Au, 75 ppm Pb, and 16 ppm As, and is associated with massive sulphide gossans. Anomaly B represents an anomalous stratigraphic zone approximately 75 m thick and at least 700 m long, and passing through the Austerity Copper Mine. The highest values were 1800 ppm Cu, 0.85 ppm Au, and 26 ppm As. A third area (Area C) covers a silicified breccia zone that forms an elongate structure with the long axis perpendicular to bedding. This area contains anomalous zinc (up to 390 ppm), copper (up to 270 ppm), and arsenic (up to 18 ppm). Gold at 0.1 ppm Au is also present. A fourth area called Anomaly D occurs stratigraphically higher than Anomaly B and is associated with the limestones in this area passing up into overlying andesitic/basic tuffs. This area contains anomalous copper (up to 290 ppm), gold (0.05 ppm), and arsenic (36 ppm). This zone is at least 300 m long, and is open to the E. Rock chip samples from stratabound gossan material assayed up to 1.08 g/t Au, 0.56% Cu, 0.57% Zn and 18 g/t Ag. Rock chip samples from cross-cutting veins returned values ranging from 0.13 ppm to 22.30 ppm Au, 520 ppm to 1.87% Cu, 60 to 80 ppm Zn, and 5 to 7 ppm Ag. Rock chip samples of the fault-related quartz stockwork returned maximums of 0.03 ppm Au, <1 ppm Ag, 320 ppm Cu, 230 ppm Zn, and 25 ppm Pb.

Rock chip samples were collected from 6 costeans in various parts of this prospect area. Two costeans were across Anomaly A, with maximum values of 0.45 ppm Au, 0.38% Cu, and 1.35% Zn. Three costeans were across Anomaly B, with maximum values of 0.95 ppm Au, and 0.43% Cu. One costean was across Anomaly D, but it returned only low responses.

Assay results from hole ASB1 were disappointing with maximum grades of 0.02 ppm Au, 125 ppm Cu, 25 ppm Pb, 200 ppm Zn, and <1 ppm Ag. The assay results from ASB2 & 3 were also disappointing with maximum values in ASB2 of <0.5 g/t Au, 340 ppm Cu, 25 ppm Pb, 330 ppm Zn and 2 g/t Ag. Maximum values in ASB3 were 4 m at 1.12 g/t Au, 280 ppm Cu, 20 ppm Pb, 95 ppm Zn, and 1 g/t Ag. Assay results from ASB4 were all very low, with maximum values of 0.02 ppm Au, 30 ppm Cu, 20 ppm Pb, 125 ppm Zn, and <1 g/t Ag. Assay from ASB5 indicate three main mineralised zones; 40-50 m with 900 ppm Cu, 700 ppm Pb, 0.72% Zn, 4.4 ppm Ag, and 0.08 g/t Au; 62-68 m with 0.26% Cu, 20 ppm Pb, 1.91% Zn, 3 ppm Ag, and 0.46 g/t Au; 76-88 m with 0.14% Cu, 20 ppm Pb, 0.35% Zn, 2 ppm Ag, and 0.24 g/t Au.

GEOPHYSICS - An IP survey returned good results probably associated with massive and disseminated sulphides. A ground magnetic survey was also conducted and proved useful in defining zones of intermediate to basic intrusives, fault zones and basic lithologies. Andesitic/basic tuffs on the E limits of the grid were magnetic and were probably the source of the low order aeromagnetic anomaly defined by Esso in 1972-73. The acid/intermediate tuff sequence is of variable magnetic character with limestone units showing broadly higher magnetic character. A TEM Sirotem survey was conducted, but no deep seated conductors were recognised. Minor surficial conductors were traced to cross faulting and lithological variations.

DRILLING - 5 percussion holes totalling 446 m were drilled. One hole (ASB1) drilled on fault-related quartz stock work; two holes (ASB1 & 2) on cross-cutting quartz veins; and two holes (ASB4 & 5) on stratabound base metal. In ASB1, a 38 m zone of intensely silicified pyrite stockwork was intersected. In ASB2 & 3, narrow quartz veins were fairly common. In ASB4 & 5 intersected mostly sericitised/chloritised quartz eye tuff. ASB4 had only traces of disseminated pyrite. In ASB5, several very siliceous zones with disseminated pyrite and base metal sulphides were intersected. Disseminated magnetite was also common.

2) Area 2

GEOCHEMISTRY - A soil survey was conducted over this area to follow-up the stream sediment anomaly. A total of 350 samples were collected. Broad low order copper anomalies were found (up to 140 ppm Cu), with spot highs of zinc, lead, and arsenic, and patchy barium anomalous areas. These anomalies can be attributed to higher background lithologies. Anomalous zinc in streams is not explained by this soil survey.

3) Area 3 (Powerlines Prospect)

GEOCHEMISTRY - 51 soil samples were collected from this area. Patchy coincident barium and arsenic anomalies of low order (320 ppm Ba, 18 ppm As) were found with spot highs of lead and zinc. The single stream anomaly (zinc) would be explained by low order spot highs of this nature.

GEOPHYSICS - An IP survey was carried out over this area, but the results are difficult to interpret due to influence of the overhead powerlines, but were considered less encouraging than those of the Austerity zone.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Regional work indicates that the Austerity area is the only prospective zone in the ATP. Detailed work in this area did not indicate economical mineralisation. Therefore the ATP was relinquished.

RECORDER: Paul Blake **DATE:** 15/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 13969 **STATUS:** Open

TITLE: Authority to Prospect No. 3774M, Austerity - east Queensland. Report for six months ended 26.12.84.

AUTHOR(S): D.I. Young **DATE:** December 1984

ATP/EP No.: ATP 3774M

COMPANY HOLDING TITLE: Haoma Gold Mines N.L.

COMPANY SUBMITTING REPORT: Jacia Natural Resources Consultants

DATE GRANTED: 26/06/1984 **PERIOD:** 2 year

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 16 km S of Bajool

MINING DISTRICT:

MINES/PROSPECTS: Austerity Copper Mine

EXPLORATION TARGETS\MODELS: Mount Morgan style disseminated gold-copper deposits and/or a Mount Chalmers type massive gold-copper mineralisation.

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To continue the exploration work conducted in this area by Haoma Gold Mines N.L. under ATP 3314M. The work involved stream sediment, soil and rock chip sampling, and an IP geophysical survey. The results indicate that the Austerity Prospect had the best chance of economic mineralisation in the tenement, and ATP 3314M was voluntarily relinquished so that ATP 3774M could be taken out, allowing for better coverage and exploration of the host lithology.

GEOLOGY -

REGIONAL - The Authority lies in the Calliope Block which is interpreted to be a remnant of an Island Arc formed in the Late Silurian to Middle Devonian. It includes the Capella Creek beds, Calliope beds, and the Mt Holly beds.

LOCAL - Crystal tuff interbedded with andesite and minor lapilli tuff sequence dominates the lithologies in the ATP, and lie essentially E of the Austerity Prospect. The crystal tuff is brown-green in colour and is composed of fine grained amphibole-chlorite + epidote and feldspar crystals. Fine grained brown and blue-green units may be andesite flows or fine grained tuffs. Vesicles indicative of lavas were not common. Limestone units in the area vary from 5 m to over 200 m in width and are commonly persistent along strike. Thin multi-layered chert bands and coral colonies within the limestone are present. The limestone is commonly recrystallised, forming a saccharoidal marble. In the S part of the ATP, dark grey vuggy textured calc-silicates are present. These comprise amphibole, calcite, chert and garnet, and occur near granite. The limestones are commonly interbedded with dacitic and andesitic tuffs. Most acid volcanic rocks in the area are present to the S of the Ulam marble quarry. The acid volcanics have been mapped in three main groups; fine acid tuffs, porphyritic rhyolite-dacite tuffs, and rhyolite-dacite lithic tuffs. Some massive sulphide clasts were seen in the rhyolite-dacite lithic tuffs. Fine grained interbedded greywacke, chert, and sericite-quartz schist are probably derived from volcanic materials. Some of the units mapped as clastic sediments may be siliceous acid tuffs. Massive and thin bedding characteristics of these units are present. A moderately developed foliation is observed in some units. These rocks occur W of the Austerity Prospect area. A fine to medium grained granodiorite crops out over the W part of the ATP. Minor andesite - meta dolerite dykes are present in the area particularly in the Austerity Copper Mine area.

The sequence represented at Austerity youngs in an E direction and can be subdivided into three formations. An unconformable relationship appears to exist between the lower formation and upper two. The rocks exposed appear to span Middle Devonian to Upper Devonian ages are correlated with Capella Creek beds, and Dee Volcanics of the main Dee Range suite. The lithologies in the Austerity Prospect area are equated with Geopeko's Ulam Beds, Mt Cedric beds, and Mt Alina beds. Two folding generations are recognised in the ATP. The first generation occurred at the end of the Middle Devonian, and the folding is very tight and the axis trend N to NNW. The area was refolded along NNW axis into broad open structures during the Late Permian.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Esso (ATP 1087M), B.H.P. (ATP 1416M), and Australian Anglo American Ltd (ATP 1950M).

GEOCHEMISTRY

- **stream sediment sampling** - A stream sediment survey was carried out over the area with 84 samples collected. Three anomalous geochemical zones were defined. Area 1 is an area anomalous in Zn (up to 180 ppm) and Cu (up to 320 ppm) and drains the Austerity Copper prospect region containing acid tuffs with minor limestones and andesitic tuffs. Area 2 is a zone 1 km SE of Austerity Copper Mine comprising andesitic tuffs. The stream sediment samples were anomalous in Zn (up to 380 ppm). Area 3 is 2.3 km SSW of Austerity Copper Mine and a stream sediment sample was anomalous in Zn (170 ppm) and was associated with pyritic altered acid tuffs.

- **rock chip sampling** - Rock chip samples from Area 2 of the stream sediment survey were anomalous in Zn (up to 130 ppm), Pb (160 ppm), and Cu (120 ppm).

LOCALISED EXPLORATION/PROSPECTS

1) Austerity Copper Prospect

GEOLOGY - The Austerity Copper Prospect consists of a number of shallow pits containing Fe oxide, malachite, azurite, pyrite and chalcopyrite. Pyrite and chalcopyrite grains appear confined to thin (<1 cm) feldspar-quartz veinlets. The mineralisation occurs in altered acid tuff and may be stratigraphically controlled or a result of the intrusion of numerous intermediate to basic dykes that occur in the locality.

GEOCHEMISTRY - A soil survey was conducted over the prospect with 405 samples collected. The results indicated 3 major multi-element anomalous areas. Anomaly A contains up to 1800 ppm Zn, 1250 ppm Cu, 590 ppm Ba, 0.15 ppm Au, 75 ppm Pb, and 16 ppm As, and is associated with massive sulphide gossans. Anomaly B represents an anomalous stratigraphic zone approximately 75 m thick and at least 700 m long, and passing through the Austerity Copper Mine. The highest values were 1800 ppm Cu, 0.85 ppm Au, and 26 ppm As. A third area (Area C) covers a silicified breccia zone that forms an elongate structure with the long axis perpendicular to bedding. This area contains anomalous zinc (up to 390 ppm), copper (up to 270 ppm), and arsenic (up to 18 ppm). Gold at 0.1 ppm Au is also present. A fourth area called Anomaly D occurs stratigraphically higher than Anomaly B and is associated with the limestones in this area passing up into overlying andesitic/basic tuffs. This area contains anomalous copper (up to 290 ppm), gold (0.05 ppm), and arsenic (36 ppm). This zone is at least 300 m long, and is open to the E. Rock chip samples of gossan at Anomaly D returned 260 to 1700 ppm Cu, and 5.7 to 16 g/t Au. Rock chip samples were collected from 6 costeans in various parts of this prospect area, but all samples returned only weak mineralisation values.

GEOPHYSICS - An IP survey returned good results probably associated with massive and disseminated sulphides. A ground magnetic survey was also conducted and proved useful in defining zones of intermediate to basic intrusives, fault zones and basic lithologies. Andesitic/basic tuffs on the E limits of the grid were magnetic and were probably the source of the low order aeromagnetic anomaly defined by Esso in 1972-73. The acid/intermediate tuff sequence is of variable magnetic character with limestone units showing broadly higher magnetic character.

2) Area 2

GEOCHEMISTRY - A soil survey was conducted over this area to follow-up the stream sediment anomaly. A total of 350 samples were collected. Broad low order copper anomalies were found (up to 140 ppm Cu), with spot highs of zinc, lead, and arsenic, and patchy barium anomalous areas. These anomalies can be attributed to higher background lithologies. Anomalous zinc in streams is not explained by this soil survey.

3) Area 3 (Powerlines Prospect)

GEOCHEMISTRY - 51 soil samples were collected from this area. Patchy coincident barium and arsenic anomalies of low order (320 ppm Ba, 18 ppm As) were found with spot highs of lead and zinc. The single stream anomaly (zinc) would be explained by low order spot highs of this nature.

GEOPHYSICS - An IP survey was carried out over this area, but the results are difficult to interpret due to influence of the overhead powerlines, but were considered less encouraging than those of the Austerity zone.

RECORDER: Paul Blake

DATE: 14/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 15161 **STATUS:** Open

TITLE: Authority to Prospect 3774M - Austerity. Final report, August 1985.

AUTHOR(S): P. Ruxton & B. Harley **DATE:** August 1985

ATP/EP No.: ATP 3774M

COMPANY HOLDING TITLE: Haoma Gold Mines N.L.

COMPANY SUBMITTING REPORT: Billiton Australia (metals division of the Shell Company of Australia Limited

DATE GRANTED: 26/06/1984 **PERIOD:** 2 year

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 16 km S of Bajool

MINING DISTRICT:

MINES/PROSPECTS: Austerity Copper Mine

EXPLORATION TARGETS\MODELS: Mount Morgan style disseminated gold-copper deposits and/or a Mount Chalmers type massive gold-copper mineralisation.

SUMMARY:

REGIONAL EXPLORATION

GEOCHEMISTRY

- **stream sediment sampling** - 4 bulk leach samples were collected. The maximum value of 8.0 ppb Au indicates that the area is anomalous.

- **soil sampling** - Minor soil sampling was done to test that done by Jacia. The result were consistent.

LOCALISED EXPLORATION/PROSPECTS

1) Austerity Copper Prospect

GEOLOGY - Three mineralisation styles are evident in this area. The first style is stratabound base metal which is shown at the North Gossan (Anomaly A). The gossan occurs in altered quartz eye acid tuffs which dip steeply to the E. Alteration consists of intense sericite/chlorite development with siliceous alteration. This alteration zone trends SE to South Hill. The second style is cross-cutting quartz vein, an example of which occurs at the Austerity Copper mine. The third style is fault-related quartz stockwork plus pyrite. This type occurs at South Hill and the Powerline Prospect.

GEOCHEMISTRY - More details are given about the costeaning. Two costeans were across Anomaly A, with maximum values of 0.45 ppm Au, 0.38% Cu, and 1.35% Zn. Three costeans were across Anomaly B, with maximum values of 0.95 ppm Au, and 0.43% Cu. One costean was across Anomaly D, but it returned only low responses. Rock chip samples from stratabound gossan material assayed up to 1.08 g/t Au, 0.56% Cu, 0.57% Zn and 18 g/t Ag. Rock chip samples from cross-cutting veins returned values ranging from 0.13 ppm to 22.30 ppm Au, 520 ppm to 1.87% Cu, 60 to 80 ppm Zn, and 5 to 7 ppm Ag. Rock chip samples of the fault-related quartz stockwork returned maximums of 0.03 ppm Au, <1 ppm Ag, 320 ppm Cu, 230 ppm Zn, and 25 ppm Pb. Assay results from hole ASB1 were disappointing with maximum grades of 0.02 ppm Au, 125 ppm Cu, 25 ppm Pb, 200 ppm Zn, and <1 ppm Ag. The assay results from ASB2 & 3 were also disappointing with maximum values in ASB2 of <0.5 g/t Au, 340 ppm Cu, 25 ppm Pb, 330 ppm Zn and 2 g/t Ag. Maximum values in ASB3 were 4 m at 1.12 g/t Au, 280 ppm Cu, 20 ppm Pb, 95 ppm Zn, and 1 g/t Ag. Assay results from ASB4 were all very low, with maximum values of 0.02 ppm Au, 30 ppm Cu, 20 ppm Pb, 125 ppm Zn, and <1 g/t Ag. Assay from ASB5 indicate three main mineralised zones; 40-50 m with 900 ppm Cu, 700 ppm Pb, 0.72% Zn, 4.4 ppm Ag, and 0.08 g/t Au; 62-68 m with 0.26% Cu, 20 ppm Pb, 1.91% Zn, 3 ppm Ag, and 0.46 g/t Au; 76-88 m with 0.14% Cu, 20 ppm Pb, 0.35% Zn, 2 ppm Ag, and 0.24 g/t Au.

GEOPHYSICS - A TEM Sirotem survey was conducted, but no deep seated conductors were recognised. Minor surficial conductors were traced to cross faulting and lithological variations.

DRILLING - 5 percussion holes totalling 446 m were drilled. One hole (ASB1) drilled on fault-related quartz stock work; two holes (ASB1 & 2) on cross-cutting quartz veins; and two holes (ASB4 & 5) on stratabound base metal. In ASB1, a 38 m zone of intensely silicified pyrite stockwork was intersected. In ASB2 & 3, narrow quartz veins were fairly common. In ASB4 & 5 intersected mostly sericitised/chloritised quartz eye tuff. ASB4 had only traces of disseminated pyrite. In ASB5, several very siliceous zones with disseminated pyrite and base metal sulphides were intersected. Disseminated magnetite was also common.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Regional work indicates that the Austerity area is the only prospective zone in the ATP. Detailed work in this area did not indicate economical mineralisation. Therefore the ATP was relinquished.

RECORDER: Paul Blake

DATE: 15/02/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 3777M

COMPANY HOLDING TITLE: Menzies Gold NL (1983-85), Saracen Minerals NL (1986)

COMPANY SUBMITTING REPORT: Menzies Gold NL, Saracen Minerals NL

DATE GRANTED: 26/10/1983, (Saracen (?)) **PERIOD:**

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Forty-six kilometres southeast of Rockhampton

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: Gold

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File-* 14219, 14732, 15966

SUMMARY:

The 'Queenslander' does not present a suitable target for Menzies Gold NL. The Mount Holly Beds warrant investigation. Menzies Gold NL concluded the area needed more detailed mapping to define the localisation of gold.

REASON FOR ACQUISITION OF TITLE - Defining either a small high grade resource associated with quartz reefing at the 'Queenslander', or and open-cut disseminated orebody associated with late stage dyking in the Mount Holly Beds.

A drilling program by Saracen Minerals NL was intended to test the potential of the zone of gold-bearing quartz-reef mineralisation along the ridge in which the 'Queenslander' reef occurs, and to test for possible presence of disseminated mineralisation adjacent to the quartz reefs.

GEOLOGY -

REGIONAL - The area is situated on the Mount Larcom - Mount Holly Fault Block of the eastern Rockhampton Block (see Kirkegaard & others, 1970). Within the Rockhampton Block the oldest sequence is the Late Silurian to Mid Devonian calcalkalic continental margin volcanics, volcanoclastic sediments and limestones of the Mount Holly Beds. Deformation of the Siluro-Devonian sequences was caused by the Mount Morgan Tonalite. The Yarrol Basin Sequence (including the Dee Volcanics) unconformably overlies the Siluro-Devonian rocks. To the east are the younger Crana Beds, Rockhampton Group, and the Caswell Creek Group. The Berserker Beds represent the final phase of deposition in the eastern Yarrol Basin. The area was uplifted, folded and faulted in the Upper Permian before emplacement of calc-alkalic batholith complexes.

LOCAL - The Ulam Gold Field is localised around a dioritic intrusion which is exposed through Lower Devonian Mount Holly Beds. Presence of a local(?) unconformity in the head of Little Horrihan Creek - a 70-100 m sequence of welded andesitic to dacitic tuffs and agglomerates with minor sedimentary units overlies a more acidic tuff with associated chert and quartzite beds. The quartz reef gold mineralisation of the 'Queenslander' reef system is confined to the upper part of this lower sequence and is stratigraphically bound by a more resistant intermediate volcanoclastic unit. This may imply mineralisation is stratigraphically controlled; or mineralisation conduits showed mechanical preference to the underlying formation. The second suggestion is preferred.

MINERALISATION/ALTERATION - Gold mineralisation is associated with quartz veins, and there is some disseminated gold. The dykes predate the veins and mineralisation and are thought not important as potential targets. Flat, NW dipping shear controls emplacement of veins. The ore shoots are small and lenticular. A diorite intrusive in the SW provides a more suitable host rock, possibly providing fluids and/or structural control. The reef has been severely faulted by NE trending dextral faults. Shoot control unknown. There is white buck quartz and a later stage semi-translucent crystalline variety which probably introduced the gold mineralisation.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Gold discovered in 1893 in the Ulam goldfield. Gibb Maitland (1894) details the workings as at 1894. At that time the field produced 31 477 g of Au from 483 t of ore. Kirkegaard & others (1970) state that from 1894 to 1905 the 'Queenslander' supposedly produced 43 327 g of Au. Therefore, total hardrock production for the field was around 74 648 g. Since 1969 companies to look at the area include Kennecott, Esso and Electrolytic Zinc.

GEOLOGICAL MAPPING - During 1985 Menzies Gold NL was in joint venture with Energy Minerals Pty. Ltd.

GEOCHEMISTRY - No real correlation between gold and other elements analysed. Arsenic and gold values are low, although early workers described the gold to be related to As-py-gal bearing rocks.

- **stream sediment sampling** - Inspection and follow-up of the As anomalies concluded that the low order anomalies were the result of secondary surficial scavenging of arsenic associated with Mn stained carbonate-bearing sediments.

- **rock chip sampling** - Twenty-nine rock chip and dump grab samples were taken from near the old Ulam workings. Gold values were low, although most samples taken from altered wall rock and not from reef material. Samples of the pyritic iron-stained 'felsite' (dacitic dykes) have gold values of 1-2 ppm.

Sample 12616 (0.013 ppm Au) - dark grey chert subcrop.

Sample 12617 (<0.005 ppm Au) - strata 150 m away and vertically above the reef. quartz

Samples from the fresh or partly weathered diorite gave 0.01 ppm Au to <0.005 ppm.

LOCALISED EXPLORATION/PROSPECTS - Work by Saracen Minerals NL.

GEOCHEMISTRY - Hole 1 (30-32 m): 0.2 ppm Au

Hole 2 (18-20 m): 0.18 ppm Au

Hole 3 (2-8 m): 0.18 ppm Au

Hole 4 (50-52 m): 0.18 ppm Au

Hole 5 (36-38 m): 0.24 ppm Au

(56-58 m): 0.24 ppm Au

Results indicate absence of disseminated mineralisation (Au); and possible intersections of narrow quartz reefs, of uneconomic size and grade.

DRILLING - Five non-core rotary drill-holes were sunk along the N-S ridge to a maximum depth of 82 m. Total meterage was 336 m. Drilling was done by C. Ward, of Bouldercombe. Holes were located at 50 m intervals, with the southernmost hole located adjacent to an abandoned shaft ('Seaview'(?)), and drilled vertically.

Holes 1 (0-54 m), 3 (0-76 m), 4 (0-82 m), and 5 (0-70 m) all intersected chert/silicified mudstone. Hole 2 at 0-18 m intersected andesite(?), then at 18-54 m chert/silicified mudstone. The apparent strike of the sediment is N-S, with a near vertical dip. No significant thickness of quartz reef was encountered.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The 'Queenslander' group of reefs was too small for a company size operation. Follow-up of As geochemical anomalies obtained by Electrolytic Zinc on AP3001M did not define any area of interest. Menzies believes the area attractive to major exploration companies.

Saracen Minerals NL stated the area they drilled was not considered prospective for economic gold occurrence, under present day conditions.

RECORDER: Simon Crouch **DATE:** 04/05/1994.

COMPANY REPORT SUMMARY SHEET

CR: 14219 **STATUS:** Open

TITLE: First Six-monthly report on AP3777M Ulam.

AUTHOR(S): Paul Ingram **DATE:** April 1985

ATP/EP No.: ATP 3777M

COMPANY HOLDING TITLE: Menzies Gold NL

COMPANY SUBMITTING REPORT: Menzies Gold NL

DATE GRANTED: 26/10/1983 **PERIOD:**

1:100 000 SHEET NAME(S):Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Forty-six kilometres southeast of Rockhampton

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: Gold

SUMMARY:

REASON FOR ACQUISITION OF TITLE -

GEOLOGY -

REGIONAL - The area is situated on the Mount Larcom - Mount Holly Fault Block of the eastern Rockhampton Block (see Kirkegaard & others, 1970). The oldest rocks in the region are the metamorphosed and deformed quartz greywacke sequence of the Pre-Devonian Curtis Island Group. Within the Rockhampton Block the oldest sequence is the Late Silurian to Mid Devonian calcalkalic continental margin volcanics, volcanoclastic sediments and limestones of the Mont Holly Beds. Volcanic lithologies range from basalt to rhyolite; with dacitic to rhyolitic pyroclastics, andesitic flows and pyroclastics and relatively minor tholeiitic basalt flows. Associated sediments include medium to fine-grained volcanoclastics, coralline limestone and minor radiolarian chert and conglomerate. Deformation of the Siluro-Devonian sequences was caused by the Mount Morgan Tonalite. The Yarrol Basin Sequence (including the Dee Volcanics) unconformably overlie the Siluro-Devonian rocks. To the east are the younger Crana Beds, Rockhampton Group, and the Caswell Creek Group. The Berserker Beds represent the final phase of deposition in the eastern Yarrol Basin. The area was uplifted, folded and faulted in the Upper Permian before emplacement of calc-alkalic batholith complexes. Local granitoids include Galloway Plains Tonalite, Targinnie Adamellite, and unnamed plutons south of Bajool and at Langmorn. A series of NNW trending faults mark the boundary between the Rockhampton and Coastal blocks and is equated with the Broad Sound Fault Zone

MINERALISATION/ALTERATION - Gold mineralisation is associated with quartz veins, and there is some disseminated gold. Circa 1894, early workers recognised a relationship between gold-bearing portions of the reef and altered felsic dykes. Sampling by Menzies returned 1.9 ppm Au at one of these dykes (pyritised and sericitised) near the 'Earl of Mar'. The dykes predate the veins and mineralisation and are thought not important as potential targets. Flat, NW dipping shear controls emplacement of veins. The ore shoots are small and lenticular. A diorite intrusive in the SW provides a more suitable host rock, possibly providing fluids and/or structural control. Structurally, the reef dips NNE at 15-20° and strikes along the eastern side of the steep ridge (Central Queensland Reef, St Josephs, etc), and reappears on the western side at the Queenslander, Rockhampton and possibly True Blue. The reef has

been severely faulted by NE trending dextral faults. Shoot control unknown, but are narrow in width and length. There is white buck quartz and a later stage semi-translucent crystalline variety which probably introduced the gold mineralisation.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Gold discovered in 1893 in the Ulam goldfield. Gibb Maitland (1894) details the workings as at 1894. At that time the field produced 31 477 g of Au from 483 t of ore. Kirkegaard & others (1970) state that from 1894 to 1905 the 'Queenslander' supposedly produced 43 327 g of Au. Therefore, total hardrock production for the field was around 74 648 g. Since 1969 companies to look at the area include Kennecott, Esso and Electrolytic Zinc.

GEOCHEMISTRY - No real correlation between gold and other elements analysed. Arsenic and gold values are low, although early workers described the gold to be related to As-py-gal bearing rocks.

RECORDER: Simon Crouch **DATE:** 04/05/1994.

COMPANY REPORT SUMMARY SHEET

CR: 14732 **STATUS:** Open

TITLE: Annual report on AP3777M Ulam

AUTHOR(S): Paul Ingram **DATE:** September 1985

ATP/EP No.: ATP 3777M

COMPANY HOLDING TITLE: Menzies Gold NL

COMPANY SUBMITTING REPORT: Menzies Gold NL

DATE GRANTED: 26/10/1983 **PERIOD:**

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Forty-six kilometres southeast of Rockhampton

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: Gold

SUMMARY:

The 'Queenslander' does not present a suitable target for Menzies Gold NL. Geochemical anomalies defined by Electrolytic Zinc in earlier work were due to superficial scavenging and offer little hope of indicating gold mineralisation. The Mount Holly Beds warrant investigation for Mount Morgan style mineralisation and also disseminated replacement style. Menzies Gold NL concluded the area needed more detailed mapping to define the localisation of gold.

REASON FOR ACQUISITION OF TITLE - Defining either a small high grade resource associated with quartz reefing at the 'Queenslander', or and open-cut disseminated orebody associated with late stage dyking in the Mount Holly Beds.

GEOLOGY -

LOCAL - The Ulam Gold Field is localised around a dioritic intrusion which is exposed through Lower Devonian Mount Holly Beds. Presence of a local(?) unconformity in the head of Little Horrigan Creek - a 70-100 m sequence of welded andesitic to dacitic tuffs and agglomerates with minor sedimentary units overlies a more acidic tuff with associated chert and quartzite beds. The quartz reef gold mineralisation of the 'Queenslander' reef system is confined to the upper part of this lower sequence and is stratigraphically bound by a more resistant intermediate volcanoclastic unit. This may imply mineralisation is stratigraphically controlled; or mineralisation conduits showed mechanical preference to the underlying formation. The second suggestion is preferred.

MINERALISATION/ALTERATION - Mapping showed the gold mineralisation at 'Queenslander' is confined to a flat-dipping white crystalline quartz vein.

REGIONAL EXPLORATION

GEOLOGICAL MAPPING - During 1985 Menzies Gold NL was in joint venture with Energy Minerals Pty. Ltd.

GEOCHEMISTRY

- **stream sediment sampling** - Inspection and follow-up of the As anomalies concluded that the low order anomalies were the result of secondary surficial scavenging of arsenic associated with Mn stained carbonate-bearing sediments.

- **rock chip sampling** - Twenty-nine rock chip and dump grab samples were taken from near the old Ulam workings. Gold values were low, although most samples taken from altered wall rock and not from reef material. Samples of the pyritic iron-stained 'felsite' (dacitic dykes) have gold values of 1-2 ppm.

Sample 12616 (0.013 ppm Au) - dark grey chert subcrop.

Sample 12617 (<0.005 ppm Au) - strata 150 m away and vertically above the reef. quartz

Samples from the fresh or partly weathered diorite gave 0.01 ppm Au to <0.005 ppm.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The 'Queenslander' group of reefs was too small for a company size operation. Follow-up of As geochemical anomalies obtained by Electrolytic Zinc on AP3001M did not define any area of interest. Menzies believes the area attractive to major exploration companies.

RECORDER: Simon Crouch **DATE:** 04/05/1994.

COMPANY REPORT SUMMARY SHEET

CR: 15966 **STATUS:** Open

TITLE: Report on Exploratory Drilling Program, August 1986.

AUTHOR(S): R.M. Tucker **DATE:** October 1986

ATP/EP No.: ATP 3777M

COMPANY HOLDING TITLE: Saracen Minerals NL

COMPANY SUBMITTING REPORT: Saracen Minerals NL

DATE GRANTED: **PERIOD:**

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Forty-six kilometres southeast of Rockhampton

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: Gold

SUMMARY:

REASON FOR ACQUISITION OF TITLE - A drilling program was intended to test the potential of the zone of gold-bearing quartz-reef mineralisation along the ridge in which the 'Queenslander' reef occurs, and to test for possible presence of disseminated mineralisation adjacent to the quartz reefs.

LOCALISED EXPLORATION/PROSPECTS

GEOCHEMISTRY - Hole 1 (30-32 m): 0.2 ppm Au

Hole 2 (18-20 m): 0.18 ppm Au

Hole 3 (2-8 m): 0.18 ppm Au

Hole 4 (50-52 m): 0.18 ppm Au

Hole 5 (36-38 m): 0.24 ppm Au

(56-58 m): 0.24 ppm Au

Results indicate absence of disseminated mineralisation (Au); and possible intersections of narrow quartz reefs, of uneconomic size and grade.

DRILLING - Five non-core rotary drill-holes were sunk along the N-S ridge to a maximum depth of 82 m. Total meterage was 336 m. Drilling was done by C. Ward, of Bouldercombe. Holes were located at 50 m intervals, with the southernmost hole located adjacent to an abandoned shaft ('Seaview'(?)), and drilled vertically.

Holes 1 (0-54 m), 3 (0-76 m), 4 (0-82 m), and 5 (0-70 m) all intersected chert/silicified mudstone. Hole 2 at 0-18 m intersected andesite(?), then at 18-54 m chert/silicified mudstone. The apparent strike of the sediment is N-S, with a near vertical dip. No significant thickness of quartz reef was encountered.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Area not considered prospective for economic gold occurrence, under present day conditions.

RECORDER: Simon Crouch **DATE:** 04/05/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 3858M

COMPANY HOLDING TITLE: Carpentaria Exploration Company Pty. Ltd.

COMPANY SUBMITTING REPORT: Carpentaria Exploration Company Pty. Ltd.

DATE GRANTED: 09/11/1984 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Twenty-five kilometres west of Gladstone - 150°51'E, 23°55'S

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS/MODELS: Gold

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File-* 14530

SUMMARY:

REASON FOR ACQUISITION OF TITLE - Primarily to cover the Mount Raglan gold prospect.

GEOLOGY -

LOCAL - Chert (jasper) and silicified mudstone and tuff beds are found within a sequence of acid tuffs (crystals, lapilli) and fine grained tuffaceous sediments. The sequence generally dips 45° to 65° E but has been subjected to isoclinal folding.

MINERALISATION/ALTERATION - The gold mineralisation can be associated with the cherts and jaspers.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Minor gold has been produced from several shafts and adits at Mount Raglan, Mount Turrett (E part of Mount Raglan prospect) and Cedar Vale. Stream sediment work was done by Australian Anglo American Prospecting Ltd. and Electrolytic Zinc Corporation of Australasia Limited. The latter also did soil sampling.

GEOLOGICAL MAPPING - The area was gridded and mapped at 1:1000 scale.

GEOCHEMISTRY

- **rock chip sampling** - One hundred and twenty-one rock chip samples were collected and assayed for Au, Cu, Pb, Zn, Ag, Bi, Sb, Fe, Mn, As, Ni, Cd, Mo, Co, Cr, and Sn.

- **soil sampling** - Sixteen soil samples were collected and assayed for Cu, Pb, Zn, Ag, and Au.

GEOPHYSICS

- **ground surveys** - A ground magnetic survey was done of the Mount Raglan prospect. Readings were taken every 25 m along grid lines 50 m apart. The main anomalies were associated with andesite.

LOCALISED EXPLORATION/PROSPECTS

DRILLING - Seven percussion drill holes involving 600.5 m of drilling were done. All drill samples returned <1 g/t Au, the best at 0.28 g/t Au.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Drill hole assays indicated no large tonnage, economic gold deposit at Mount Raglan.

RECORDER: Simon Crouch **DATE:** 04/05/1994.

COMPANY REPORT SUMMARY SHEET

CR: 14530 **STATUS:** Open

TITLE: Authority to Prospect No.3858M 'Almacoombe' Gladstone Mining District - First 6 monthly and final report.

AUTHOR(S): J.A. Nenke **DATE:** August 1985

ATP/EP No.: ATP 3858M

COMPANY HOLDING TITLE: Carpentaria Exploration Company Pty. Ltd.

COMPANY SUBMITTING REPORT: Carpentaria Exploration Company Pty. Ltd.

DATE GRANTED: 09/11/1984 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: Twenty-five kilometres west of Gladstone - 150°51'E, 23°55'S

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: Gold

SUMMARY:

REASON FOR ACQUISITION OF TITLE - Primarily to cover the Mount Raglan gold prospect. Initial interest in the area dealt with the possible potential of the Lower Devonian Mount Holly Beds for hosting volcanogenic massive sulphide mineralisation with a significant precious metal content.

GEOLOGY -

LOCAL - Chert (jasper) and silicified mudstone and tuff beds are found within a sequence of acid tuffs (crystals, lapilli) and fine grained tuffaceous sediments. The sequence generally dips 45° to 65° E but has been subjected to isoclinal folding.

MINERALISATION/ALTERATION - The gold mineralisation can be associated with the cherts and jaspers.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Minor gold has been produced from several shafts and adits at Mount Raglan, Mount Turrett (E part of Mount Raglan prospect) and Cedar Vale. A battery was constructed at Mount Raglan but was only operated for a short time. Stream sediment work was done by Australian Anglo American Prospecting Ltd. and Electrolytic Zinc Corporation of Australasia Limited. The latter also did soil sampling (<0.05 g/t Au), and rock sampling (1.8 g/t Au from a 3 m sample of jasper).

GEOLOGICAL MAPPING - The area was gridded and mapped at 1:1000 scale.

GEOCHEMISTRY

- **rock chip sampling** - One hundred and twenty-one rock chip samples were collected and assayed for Au, Cu, Pb, Zn, Ag, Bi, Sb, Fe, Mn, As, Ni, Cd, Mo, Co, Cr, and Sn. The best anomalous gold assays were:

1.98 g/t Au - 4 m trench sample
1.07 g/t Au - 9 m trench sample, includes 4 m of 2.1 g/t Au
3.7 g/t Au - 3 m outcrop
1.8 g/t Au - 2 m outcrop
4.69 g/t Au - dump sample

- **soil sampling** - Sixteen soil samples were collected and assayed for Cu, Pb, Zn, Ag, and Au. One sample returned 0.2 g/t Au but the rest were below 0.1 g/t Au.

GEOPHYSICS

- **ground surveys** - A ground magnetic survey was done of the Mount Raglan prospect. Readings were taken every 25 m along grid lines 50 m apart. The main anomalies were associated with andesite.

LOCALISED EXPLORATION/PROSPECTS

DRILLING - Seven percussion drill holes involving 600.5 m of drilling were done. All drill samples returned <1 g/t Au, the best at 0.28 g/t Au.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Drill hole assays indicated no large tonnage, economic gold deposit at Mount Raglan.

RECORDER: Simon Crouch **DATE:** 04/05/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: 3953 & 4007

COMPANY HOLDING TITLE: Circular Quay Holdings (wholly owned subsidiary of RGC)

COMPANY SUBMITTING REPORT: Circular Quay Holdings, Elders Resources/Peko Exploration Ltd., & RGC Exploratoin Pty. Ltd.

DATE GRANTED: 3953 on 31/1/85, 4007 on 17/5/85 **PERIOD:** 5yrs

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 3953 extends N and SE of Mount Morgan. 4007 is SE of Mount Morgan adjoining 3953.

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS/MODELS: Mount Morgan type gold deposits

TRANSFERS, JOINT VENTURES, etc: Circular Quay Holdings, minority interest held by Elders Resources/Peko Exploration Ltd., and evaluation work done by RGC Exploratoin Pty. Ltd.

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File*-14825, 15866, 15867, 15934, 17015, 17016, 18403, 18404, 19160, 19993, 21402, 22408.

Confidential-

COMMENTS:

Two discrete areas were being worked during the final phase of exploration: the 'Morganite' prospect and 'The Dee Range Prospect'.

GEOLOGY: The oldest rocks in the area are the middle-Devonian Capella Creek Group which is unconformably overlain by the Upper Devonian and Permo-Carboniferous sequences. The Capella Creek Group is intruded by the Mt Morgan Tonalite and all are folded into a broad anticline, the axis of which coincides with The Dee Range. These units are truncated to the N, E, & S by Permian batholiths and to the W are overlain by the Permian Bowen Basin sediments. Jurassic outliers are present in the north.

Host Rock: The Dee Range mineralisation is hosted in a subdivision of the middle-Devonian Capella Group, informally termed The Mt Warner volcanics. These volcanics are coeval with the Mine Corridor volcanics (informal unit) which hosts the Morganite prospect and the Mount Morgan mineralisation, both of which lie in a volcanic roof pendant within the Mt Morgan Tonalite. These volcanic rocks are strongly deformed in both areas and accommodate extensive shear zones associated with low angle faulting. However, the timing of mineralisation differs in the two prospects, with respect to this shearing deformation. In the Dee Range prospect, the mineralisation pre-dates the deformation, whereas in the Mt Morgan Mine, the mineralisation and alteration post-date and overprint the deformation.

Mineralisation:

- Morganite prospect: The style of mineralisation in this prospect is identical to the Mount Morgan Mine, which is considered by R.G.C. to be a metasomatic replacement deposit within the Mine Corridor Volcanics, very probably related to a phase of the Mt Morgan Tonalite. The volcanics are pervasively altered with the products of silica-chlorite-pyrite where alteration is intense. Pyrite content is generally 2-10%, probable average of 5%, with an intersection through a 12m breccia zone containing 50% pyrite as cement.

R.G.C. exploration activities undertaken in this prospect include 16 percussion holes, 9 diamond drill holes as well as a comprehensive EM - 37 TEM survey

- The Dee Range prospect: The mineralised area, which extends discontinuously over about 8km, displays most of the features of classic volcanogenic deposits. Anomalous geochemistry, with values of Cu, Pb, and Zn exceeding several hundreds of ppm, extends the full length of the Dee Range. Outcropping gossans are generally lensoidal (10 x 2m), massive or semi-massive sulphide or hematite-sulphide gossans derived from pyrite and sphalerite, usually with some chalcopyrite and galena. The lensoidal nature of the mineralised zones may reflect the primary size and distribution of the bodies or, alternatively, they represent structurally dismembered portions of larger mineralised bodies.

Conclusions: There are several styles of mineralisation in the area including porphyry copper, auriferous quartz veins, however, only the Morganite and Dee Range prospects are considered to have the potential to become economic deposits.

- **The Morganite prospect** is still deemed to have potential, as the alteration and metal values are similar to those of the alteration envelope around the Mount Morgan ore deposit (the Morganite prospect yielded only low Au values, seldom >0.2 g/t, and at best, base metal values are only geochemically elevated).

- **The Dee Range prospect** remains prospective, as a large area of anomalous geochemistry which extends for about 4km remains untested. Further drilling and geophysics was recommended for the mineralisation centred on 10600E.

The tenements were relinquished after several phases of exploration, as farm-in partners were not forthcoming into the project.

Recorder: JAN DOMAGALA **Date:**10/1/94.

SUMMARY OF PROSPECTS INVESTIGATED IN ATP's 3953 & 4007

In 1983 when Gold Fields Exploration assumed management of the project in the Mount Morgan area, it changed its exploration strategy from a model based on volcanogenic base metal massive sulphide mineralisation to a model on gold mineralisation in other geological environments (such as gold bearing skarns, gold associated with the tops of porphyry systems, and gold occurring with acid volcanic piles as epigenetic veining or in fumarolic alteration zones). This change in exploration strategy stemmed from a reinterpretation of the Mount Morgan and nearby deposits to metasomatic replacement deposits within the Mine Corridor Volcanics, very probably related to a phase of the Mt Morgan Tonalite. The Dee Range mineralisation is generally considered to be a VMS deposit and some workers still consider the Mount Morgan deposit as a similar deposit.

As a consequence of the change in exploration strategy, the company surrendered ATP 508M and took up ATP 3953M early in 1985 and ATP 4007M (adjoining ATP 3953M) several months later. At the time of granting, 3953M extended north-west and south-east of Mt Morgan, whereas 4007M extended south-east adjacent to 3953M.

Exploration activity over the two A to P's was centred mainly round two areas:

- 1) the **Morganite - Mount Morgan area** just north of Mount Morgan, and
- 2) the **Dee Range** area, south-east of Mount Morgan.

Numerous other prospects were also explored to varying degrees, and are listed below in alphabetical order.

AJAX PROSPECT (CR 15866, 15867B)

A review of the available data on the Ajax Prospect is presented in CR 15867B. Petrological descriptions of core are also included.

LOCATION - The prospect (D47) is located 23 45'N, 150 30'E, approximately 40km south of Rockhampton.

PREVIOUS EXPLORATION - Copper carbonate was discovered at Ajax in 1920. The Prospect yielded about 30 tons of secondary ore in 1921, about 22 tons in 1937, and 49.8 tons averaging 0.02 g/t Au, 53.4 g/t Ag, and 7.67% Cu during the period 1/7/75 to 30/6/76.

From 1972 the area had been explored intermittently by Geopeko and subsequently by Geopeko and Gold Fields Exploration Pty Ltd in Jount Venture. The data includes:

- Regional mapping
- Detailed mapping and supporting petrology (1974, 1978, and 1980)
- Core examination
- B and C horizon geochemistry for Cu, Pb, Zn, and Mn
- Core and rock chip analysis
- Limited IP (1964)
- SP and TEM (1974)
- Resistivity and IP (1974)
- Horizontal loop multifrequency EM (1975)
- Dipole-dipole time domain IP and ground magnetic survey (1986)
- Percussion and diamond drilling (1975-1978, and 1980)

GEOLOGY - The prospect lies within the gently folded (dips average 20-30°, but reaching 60°) middle Devonian felsic volcanics referred to as the Moongan Rhyolite or as Mount Warner Volcanics (Taub, 1984). The unit consists largely of acid tuffs, with minor flows, clastic sediments, cherts, jaspers, and limestones. The overlying Capella Creek Beds, in contrast, comprise andesitic tuffs, lithic tuffs, and calcareous tuffs with lesser andesitic flows, limestones and clastic sediments. Three main units were identified 1) Footwall Tuffs, 2) Mineralised Horizon, 3) Hanging Wall Tuffs.

The report has a good cartoon cross-section of the deposit (Fig. 4)

CONCLUSIONS - The Ajax deposit is interpreted as a small poorly developed volcanogenic deposit remobilised and dislocated by metamorphism and shearing. The mineralised rock is restricted to a zone extending about 250m long, 50m wide, and 80m deep, and does not appear to be part of larger mineralised system. Based on current knowledge, the Ajax deposit has no economic potential for major companies, however, potential does exist for small high grade mineralisation. The sporadic high Au values will also attract some attention.

BUNDALEER AREA (CR 15866)

Detailed geological mapping was carried out over the Bundaleer area north of Mt Morgan. No further mention was made of this area in later reports.

CENTRE AND BULL CREEKS AREA (CR17015)

LOCATION - Bajool GR 2560 73560

GEOLOGY - Zones of alteration (seldom exceeding 2 m x 10 m, with largest 50 m x 50 m; pyritic alteration) in acid and intermediate volcanic rocks of the Capella Creek Beds.

GEOCHEMISTRY - 47 samples of alteration zones returned negligible Au and Ag values.

CHAMPION PROSPECT (CR 18403, 19160)

Information is based substantially on a report by G.W. Morrison for R.G.C. (no other reference given), with addition of data gained subsequently, as well as historical data from QGMJ, Mines Dept Annual Reports, and records at the Mt Morgan Exploration office.

LOCATION - about 3 km north-east of Mt Morgan

GEOLOGY - The country rock consists of the granodioritic phase ('formation') of the Upper Devonian Mount Morgan Tonalite. It is cut by andesite porphyry dykes (grey or green) and related breccias and veins along joint planes and shear zones. Andesitic breccias are limited to linear zones which parallel the prominent dykes, shears, or vein orientations. They are typically green, matrix supported, with sub-rounded clasts of andesite and granodiorite, up to a few cms in diameter, in a fine medium grained rock-flour matrix. These breccias are interpreted as having formed at shallow to intermediate depths during dyke emplacement through the explosive interaction between andesitic magma and the groundwater occupying the shear zones. Mineralisation appears to be contemporaneous with the shearing, brecciation, and dyke emplacement.

MINERALISATION - Gold workings date back to about 1878. They were put down principally on quartz veins, dykes, shear zones, and any combination of the three. Few exceeded 25 tonnes total output. Workings include: **Retrieve, Champion, (New Champion), South Champion, North Champion, Peuts, Golden Crown, and Welcome.**

Three principal orientations of linear structures were identified, on the basis of distribution of workings, dykes, shear zones, prominent joint sets and cracks. These are:

- NE for the **Champion, Golden Crown, Welcome, and Retrieve Reefs**, as well as dykes and joints
- ENE for the **Peuts, South Champion, and North Champion Reefs**, plus shears and joints
- E-ESE for the prominent dykes in the north, south and east central parts of the grid, associated joints, the principal creeks and the chloritic alteration zone

The lodes in the area are combinations of:

- sheared and altered granodiorite porphyry ('formation')
- andesite porphyry dykes
- magnetite and or sulphide-bearing sheared dykes
- breccia
- quartz, quartz-sulphide and quartz-calcite veins

Three main styles of mineralisation were identified:

- Comb quartz-pyrite-chalcopyrite veins up to 10cm thick either single, branching or in sets, hosted in formation as at **Champion, North Champion, Golden Crown, and Central Retrieve.**
- Breccia and sheared dyke with stringy, poddy and locally massive sphalerite-chalcopyrite-arsenopyrite as at **Peuts.**
- Amphibole-chlorite-magnetite-pyrite-chalcopyrite-molybdenite rock after sheared and altered andesite as at **South Champion and Peuts.**

GEOCHEMISTRY (surface) - The preliminary exploration program was not very successful as results tended to confirm what was known. Quartz vein samples returned Au in excess of 5 g/t with a maximum of 18 g/t (historical records indicated 15-30 g/t and locally up to 120 g/t). Formation samples returned values of detectable gold with about half in excess of 0.5 g/t (historical records indicate 1-2 g/t with one exceptional 15 g/t). High Au is generally associated with elevated Cu and occasionally, elevated to high Ag. Soil samples (approx 300) were analysed for Au and As, similarly with no significant findings.

DRILLING - A 16 hole RC percussion program totalling 905 m was carried out to test the Champion lodes (include Champion, Golden Crown, Retrieve, and Peuts). All holes passed through chloritic granodiorite with or without andesite dykes. All holes intersected the lodes which comprised sheared, moderately pyritic, sericitised granodiorite with a characteristic green coloration, plus a variable amount of quartz vein. The quartz ranges from 5% to 60% of the total sample volume and averages approx 15%. In many cases, an irregular halo of weak alteration marked by pinking of feldspars and weak pyritisation surrounded the lodes.

GEOCHEMISTRY (drill hole) - Drill hole samples were analysed for Au, Ag, and Cu. Most of the lodes contain geochemically elevated to anomalous Au values, however, only three significant intersections were defined, of which only one could be described as potentially economical (hole 13 at Peuts which returned an average value of 6.1 g/t at interval 43 - 48 m; with a maximum value of 19.5 g/t). The other significant intersections were in holes 7 which returned Au values up to 2.09 g/t but over a very short interval. The highest Au value from the other holes was 0.62 g/t.

CONCLUSION - The lodes in this prospect were considered to be adequately tested, with very limited economic gold mineralisation. The economic potential was deemed low, and, of the targets tested, the Peuts and North Champion are the most promising.

DEE RANGE PROSPECT (Upper Nine Mile Creek [UNMC], Spring Creek, Mt Alexander, Mt Hopeful - CR 18403, 19160)

The Mount Dick area is described separately below.

This exploration program was a continuation of the major program conducted by Geopeko from 1979-1983 (A to P 508M).

(No stratigraphic sequence implied)

A thrust regime is proposed for the area. Thrusting is suggested by strong bed-parallel shear within the Banded Sequence and by the presence of strike-parallel contacts likely to be faults. A south-over-north sense of shear is indicated.

Notional and schematic cross-sections as well as stereographic plots are included in the report.

GEOCHEMISTRY

- **The Banded Sequence** - Samples were taken from previously unsampled adidts, costeans and alteration zones. Low to moderate base values (averages for Cu 470, 215, 160; Zn 1380, 1220, 730; Pb 2250, 295, 810 ppm;), and weakly anomalous Ag (averages of 1, 1, 2 ppm) and Au (averages of 0.08, 0.02, 0.02) were returned.

Results of the earlier comprehensive soil sampling program are included:

Cu, Pb, Zn: most of the anomalous area is confined to the **Banded Sequence**, but in the NW it also encompasses the **Footwall Sequence**. The **Mt Alexander** alteration zone has scattered alteration, particularly associated with the core pyrite rich area.

Au: the main anomaly (max 0.27 ppm) lies in the **Upper Nine Mile Creek** area, with scattered lower order anomalies in other areas including **Spring Creek** and **Mt Alexander**.

Ag: the main anomaly is centred on the **Upper Nine Mile Creek** area.

As and **Sb:** did not add to the picture as the results are compatible with the Cu, Pb, and Zn.

On the basis of geology and geochemistry the **Banded Sequence** is the most prospective sequence in the area.

GEOPHYSICS: A report (Rutter, 1988) on transient electromagnetic and induced polarisation data from Dee Range, Mt Morgan, Queensland, is included in this report.

A modern SIROTEM survey was recommended over the Banded Sequence. An earlier SIROTEM survey proved unsuccessful.

CONCLUSIONS - On the basis of geology and geochemistry the **Banded Sequence** is the most prospective sequence in the area. Recommendations for follow-up work include:

- 1) Additional mapping of area between 8300E and 11200E to resolve the structural complexity.
- 2) Conduct a SIROTEM survey between 9500E and 11000E followed by accurate drilling.
- 3) If successful extend SIROTEM to 12000E and 15000E - 15500E.
- 4) Additional rock chip sampling at Mt Alexander.

DEE RANGE PROSPECT (Mt Dick area - CR 15867A, 19993, 21402)

The Upper Nine Mile Creek [UNMC], Spring Creek, Mt Alexander, Mt Hopeful areas are described separately above.

GEOLOGY - see above.

DRILLING - CR 15867A includes the results of two holes drilled at Mt Dick (MD1, MD2) to test beneath outcrops of weakly auriferous gossan, taking into account SIROTEM and IP data. Drill hole samples were analysed for Cu, Pb, Zn, Ag, and Au. No significant values were obtained (Au values <0.01 ppm).

Several years later (CR 19993) two more holes were drilled (MD-3 and MD-4; total 432.9 m) and intersected the targets defined by the coincident SIROTEM and I.P. responses. The holes intersected a wide zone of disseminated pyrite with zones of massive and semi-massive pyrite. In addition to pyrite the only other sulphide present is small traces of chalcopyrite. Both holes reflected abundant evidence of faulting and zones of intense shearing.

A subsequent hole was drilled (MD-5 which was redrilled due to collapsing - MD-5A) and reported in CR21402. This hole was drilled to test an 'eye' of a fixed-loop TEM anomaly. These holes intersected variably silicified and chloritic andesites with pyrite up to 10%, and a short interval (to 4 m at about 110-120 m) of what could be described as massive sulphide (about 50% pyrite and minor cpy).

GEOCHEMISTRY - About 150 rock chip samples from MD-3 & MD-4 were analysed for Au, Ag, Cu, Zn, and Pb but results were disappointing (CR 19993). Detectable (0.01 ppm) to geochemically elevated Au (0.02+ ppm) values were intersected over large intervals. However, only two intervals, one metre each, returned values around 0.17 g/t; both were associated with silica-chlorite-pyrite alteration and some jasper. Ag is low. Increased Cu values (1.15% over 3 m) is associated with more massive pyrite at the top of a zone of intense silicification. Zn is locally elevated and Pb is rarely above background levels.

Au results from MD-5 & 5A are patchy (max 0.5 g/t) and usually associated with higher Ag values (max 13 g/t), but appear unrelated to base metal values. A massive sulphide (mainly pyrite) interval over about 4 m contains elevated Cu, Pb, and Zn and locally up to 3.74% Cu.

CONCLUSIONS - The target drilled turned out to be a large alteration halo, however, it did not adequately account for the TEM anomaly. Although geochemical results are disappointing, the area is still deemed to be prospective due to the presence of elevated Au and Cu values in a large alteration system. It was proposed that this halo could be peripheral to a massive sulphide deposit, located either laterally or at depth.

EMU CREEK PROSPECT (CR 15867A, 18403)

As a result of continued reconnaissance of ATP 4007M, an extensive zone of pyritic alteration was located in this area and reported on in CR 15867A. Follow-up work is reported on in CR 18403 and is summarised below.

LOCATION - on Emu Creek at GR 2454 73618 on the edge of the Rockhampton 1:100 000 Sheet.

GEOLOGY - Rocks consist of undifferentiated mid Devonian Ulam Beds which consist of acid-intermediate flows and pyroclastics with undetermined orientations.

MINERALISATION - Exploration target was the linear, NW striking zone of hydrothermal alteration, which can be traced over a distance of about 1km then intermittently for another km (shown on map). Maximum thickness is up to 70m. The zone consists of silica-pyrite alteration (mainly confined to the central part), and white clay (? weathered argillic or quartz-sericite) - pyrite alteration. Propylitic-pyrite alteration is developed erratically up to 200m from the core zone. Two small breccias to several metres were also noted.

GEOCHEMISTRY - A total of 45 rock-chip samples were analysed for Ag and Au but no significant Au values were returned.

FAB PROSPECT - (CR 15866)

GEOCHEMISTRY - 100 rock chip samples were collected from the main zones of pyritic alteration in this prospect; only one sample returned significant Au values.

HILL CLIMB - (CR 15866, 17016)

LOCATION - 150° 28'E, 23° 46'N

MINERALISATION - Alteration is confined to linear zones (tens of metres by hundreds of metres) within a medium-grained adamellite phase of the Mt Morgan Tonalite, near the contact with the Dee Volcanics. The alteration comprises pyrite and iron staining but is usually only feldspar destructive, with small amounts of silicification.

GEOCHEMISTRY - Appendix 5 in CR 15866 lists the results of 22 samples which returned negligible results. CR 17016 includes the results of 25 rock chip samples analysed for Ag (<0.5 g/t) and Au (mostly <0.008 g/t with few 0.02 g/t).

MORGANITE PROSPECT - (Upper Mundic, Forty Wheeler, Great North Lode - CR 15866, 15867A, 17015, 17016, 19160, 19993, 21402)

LOCATION - The prospect is located about 1.5 km north east of Mt Morgan Mine. It lies at the northern end of the Mt Morgan Mine Corridor and includes an area of pyritic alteration about 2 km x 800 m in area (believed to be continuous beneath the Razorback Beds); it also includes the prospects previously referred to as **Upper Mundic, Forty Wheeler, Morganite, and Great North Lode** (CR 15867A).

GEOLOGY - The area comprises a range of medium grained granite variants and sub-volcanic rhyolites adjacent to the tonalite phase of the Mt Morgan Tonalite. Appendix four in CR's 17016 & 18403 includes a report and map on the bedrock geology in the Morganite-Great North Lode area (R.H. Stillitoe). The rocks in the area are interpreted as hornfelsed and hydro-thermally altered roof pendant overlying a trondhjemite pluton which, on the west side of the area, is intruded by a younger quartz diorite body. Intrusive breccias were formed in the roof pendant, with the local intrusion of magma and associated mechanical breakage. Hydrothermal breccias are also present and are commonly difficult to distinguish from the intrusive breccias. The roof zone of the trondhjemite pluton was identified as the most prospective zone for gold.

A petrological description of eight core samples is included in CR 17016.

MINERALISATION/ALTERATION (CR 15867A)- Alteration styles range from propylitic to quartz-sericite-pyrite to silica-pyrite. Hydraulic fracturing and weak brecciation is widespread and several true breccias have

developed. The host rocks are medium-grained adamellites and a variety of texturally variable rhyolites ranging from medium-grained to aphanitic, very likely to be part of a sub-volcanic phase of the Mt Morgan Tonalite. Few, if any true volcanics are present, but some may outcrop as roof pendants on the south side of Mills Gully.

GEOPHYSICS - A TEM survey was undertaken in the Morganite area (report included as Appendix 1 in CR 21402). Of a large number of anomalies defined by the survey, six targets were recommended for follow up drilling. However, four were considered to reflect geological contacts, whereas the other two which lay beneath the Dee Volcanics, were considered to have potential and were drilled (one hole per target).

DRILLING & DRILL SAMPLE GEOCHEMISTRY - Several phases of drilling were carried out in the prospect.

CR 15886 reports on the drilling of 16 percussion holes in the Morganite (M1) prospect. These holes were drilled because the Morganite prospect has similar geological features to the Mt Morgan deposit, and also to delineate any patterns in alteration or geochemical anomalies. Another hole was drilled at the Mt Morgan mine to compare trace element data. **Geochemistry** - Samples were analysed for Au, Ni, Cu, Pb, Zn, Ba, As, with several for Ag & S. Hole 1 recorded the only persistent gold values of up to 0.1 g/t, with background values of 0.015-0.192 g/t. One isolated Au value of 0.63 g/t with elevated Zn values was recorded in silicified, pyritic volcanic rocks in Hole 11. Trace element data suggests a depletion in values away from the ore-zone. Trace element values from the Morganite area was found to be similar to values from the Mt Morgan drill hole.

CR 15867A - Diamond hole MC-2 (957 m), drilled in 1970 and not previously sampled, was re-examined, sampled, and samples analysed (Cu, Pb, Zn, Ag, Fe, Mn, Ca, Mo, Co, Ni, As, Bi, Hg, Sb, Ge, Te, Ba, Au). The hole passed through pyritic and chloritised granite varieties, with the lowermost 300 m strongly hydraulically fractured and locally brecciated. No element zonation was apparent and no significant Au values were returned, with one exception at 670 m which carried 4.5 ppm Au (Au appears to be associated with a 5 cm wide quartz-pyrite vein). Resampling of the core row which contained the quartz-pyrite vein returned 12 ppm Au.

Drill core from holes drilled into the central part of the Northern Mine Corridor (63/4, 5,6,7,8) was also re-examined. Zones of weak to moderate pyritisation were present in three of the holes, none of which had been analysed for Au. None of the samples collected from the pyritised zones were anomalous in Au values.

CR 17016 - Four diamond drill holes (MM-1, 1A, 2, & 3) were completed (in CR 17015 two holes were proposed to test the alteration zone adjacent to the contact with the tonalite). **Geochemistry** - About 400 drill hole samples were analysed for Ag and Au but the majority returned negligible results.

CR 19160 - Another three diamond drill holes (M4, M5, M6 for a total of 484 m) were drilled as a continuation of the drilling program. **Geochemistry** - About 200 drill hole samples were analysed for Ag, Au, and Cu but the majority returned low results. The background level of gold in the more altered sections is geochemically elevated (ie detectable) in the range of 0.02-0.03 ppm, with a few scattered higher values around 0.1 ppm to a maximum of 0.32 ppm. The higher Au values appear to be a function of pyrite content rather than alteration type and are found in both highly and moderately silicified intersections. Ag values are almost always below detection levels and Cu, at best, geochemically elevated.

CR21402 - Follow-up drilling was recommended for six targets which were defined by a TEM survey (a report on this survey is included as Appendix 1 in CR 21402). Of the six target anomalies defined by geophysics, four were considered to reflect geological contacts, whereas the other two which lay beneath the Dee Volcanics, were considered to have potential and were drilled (one hole per target). **Geochemistry** - All the Au values are below detection levels, and Ag values are mostly b.d.l. Base metals, at best, are locally geochemically elevated.

ROCK CHIP GEOCHEMISTRY - **CR 15867A** reports on the rock chip sampling which was extended to cover the scarp zone beneath the Razorback Beds. Au values were negligible with the exception of one sample from the south side of Mills Gully which returned 0.3 g/t (samples collected during earlier surveys returned similar low values, with isolated values to 0.69 g/t). However, these results should be treated cautiously as the sampled rocks are extensively leached.

CONCLUSIONS - Although the prospect consists of an extensive zone of alteration in a favourable geological setting, the exploration program (16 pdh, 9 ddh, and geophysics) failed to find an economic deposit. Virtually all the mineralisation encountered has been pyrite, with rare base metal sulphides and low sporadic Au and Ag values. However, the area is still considered to be prospective. This is based on the reasonably consistent geochemically elevated to weakly anomalous gold values, as well as the geological setting and proximity to the Mt Morgan deposit.

QUEEN OF SHEBA - (CR 15867A)

As a result of continued reconnaissance of ATP 4007M, an extensive zone of pyritic alteration was located in this area. No follow-up work on this area was reported in later reports.

RAZORBACK BEDS - (CR 15867B)

CR 15867B includes a report on 'Palaeocurrent and Facies in the Razorback Beds'. This study was undertaken with the aim of locating the primary source of the gold.

PREVIOUS EXPLORATION - Dunstan (1901) and Reid (1939) reported the occurrence of gold in the alluvial sediments of the Jurassic Razorback Beds, which unconformably overlie the Palaeozoic ore-bearing rocks in the Mount Morgan area. Gold workings were observed in the Morganite (2km north of Mt Morgan), and Mt Victoria (3.5km southwest of Mt Morgan) prospects.

GEOLOGY - The Jurassic Razorback Beds consist of sequences of extensively cross-stratified quartzitic sandstones with interbedded silty claystone and conglomerates. Conglomerate clasts include rocks which are identical to the basement rocks of the Mt Morgan deposit.

CONCLUSIONS

- The non-marine Razorback Beds contain alluvial gold in the pebbly sandstone facies near the base of the sequence.
- The unit was developed in a braidplain or braided river system.
- Palaeoslope direction of the unit dips north.
- The source for the alluvial gold at Morganite is the Mt Morgan deposit.
- The source for the alluvial gold at Mt Victoria appears to be south of Mt Morgan.
- Further basin analysis on the unit may localise, more precisely, the primary source of the gold.

SHADOW PROSPECT - (CR 17015, 17016)

LOCATION - Bajool GR 2540 73660

GEOLOGY - The prospect occurs in altered rhyolitic porphyry dykes (up to 200m x 50m) which have intruded and introduced local alteration into the andesitic volcanics of the Capella Creek Beds.

GEOCHEMISTRY - 23 samples analysed for Au and Ag returned generally negligible results.

SHORT CUT PROSPECT - (CR 15866, 17016)

GEOLOGY - The rocks in the area consist of a mafic granodiorite phase of the Mt Morgan tonalite which has been intruded by porphyritic rhyolite. Both rock types have been altered over an area of about 250 m x 450 m.

GEOCHEMISTRY - 35 rock samples were collected from an area of about 20 m diameter in the alteration zone. Negligible values for Ag (mostly <0.5 g/t) and Au (mostly <0.005 g/t with minor 0.01 g/t) were returned (CR 17016). In CR 15866 the results of three samples analysed for Ag and Au, are included in Appendix 5, but results are not significant.

THOMASES PROSPECT - (CR 15867A, 17015, 17016)

LOCATION - Thomases Gossan lies about 5.5 km north of Mt Morgan Mine.

GEOLOGY - It is a small malachite rich gossan lying within highly leached volcanic rocks just beneath the base of the Razorback Beds. The outcrop in the area is extremely poor and consists of intensely supergene leached iron stained rock and includes weathered and intensely silicified, formerly pyritic intermediate lava or tuff (petrographic details are included in CR 15867A). At the turn of the century it was mined for Cu.

The rocks in the area are dominantly andesitic volcanics of the Moongan sequence with intrusions of the adamellite phase of the Bouldercombe Complex as well as two generations of dykes. These rocks are overlain by the essentially flat lying Cretaceous Razorback Beds.

The Thomas Gossan comprises a marginal breccia zone within a 'tuffsite' pipe approx 50 m in diameter. The breccia consists of angular and sedimentary fragments up to 2 m, in a matrix of mostly quartz-bearing tuffsite with local areas of massive sulphides (completely oxidised) which were mined in the 1920s. East of the gossan, but separated by an area of unaltered rocks, is an apparently continuous area of hydrothermal alteration (500 m x 300 m). These altered rocks consist of weathered, intensely silicified, formerly pyritic intermediate lava or tuff with a sugary texture.

Appendix four in CR 17016 includes a report based on an inspection of the recently drilled core in the altered zone to the east of the main gossan. The core comprises hornfelsed andesitic volcanic rocks transitional to intrusive breccia. The breccia is essentially identical to the intrusive breccias in the Morganite-Great North Lode Prospect. The Thomases Gossan is also interpreted as a roof pendant overlying a pluton.

DRILLING - Earlier drill holes (14 pdh drilled in 1978 by Geopeko) intersected weakly pyritic andesite with geochemically anomalous, but low Cu and Zn (Taub, 1978). During this investigation (CR 15867A), percussion chips analysed for Au produced negligible values.

Another three diamond drill holes (TG-2, 3, & 4) were drilled to test the altered zone to the east, and reported on in CR 17016.

GEOCHEMISTRY - Samples collected around the gossan returned negligible Au values as did samples from the 1978 drilling program (CR 15867A).

In the later drilling program, in the altered zone to the east, about 180 drill hole samples were analysed for Ag and Au but the majority also returned negligible results (CR 17016).

TROTTERS CREEK EAST - (CR 15866)

The area had been worked on earlier by Geopeko Ltd when the prospect was designated as 'Discoverer 60' - reported on by Frets, 1974; Taub, 1976; Delaney, 1985. During this survey (CR 15866) the area was grided, mapped, and sampled but assay results were disappointing. It was recommended that no further work be done on the area, but mapping and sampling be carried out in the altered intrusives in the adjacent areas.

GEOPHYSICS - IP and magnetics carried out in the area was rendered useless by the strong masking effect of adjacent transmission lines and numerous earthed fences.

WATTLE GULLY DRAINAGE AREA - (CR 15867A)

As part of the stream sediment program initiated during the six month period ending 31st January, the <180 micron fraction of samples was analysed for Au, Cu, Pb, Zn, Ag, & Mn. Anomalous areas were identified and the **Wattle Gully** drainage which produced the highest Au values (to 2ppm) was further investigated. However, much of the area has been contaminated by wind-borne Au, Cu, Pb, and probably Ag from the Mt Morgan mine smelter. The Wattle Gully values appear to reflect this contamination.

COMPANY REPORT SUMMARY SHEET

CR: 14825 **STATUS:** Open

TITLE: Six monthly report A to P 3953 Mt Morgan, Qld., for the period 31st January to 31st July, 1985

AUTHOR(S): Delaney, W. **DATE:** July 1985

ATP/EP No.:3953

COMPANY HOLDING TITLE: Peko Exploration Ltd and joint partner Circular Quay Holdings Pty Ltd
(Division of RGS)

COMPANY SUBMITTING REPORT: Goldfields Exploration Pty Ltd (Division of RGS)

DATE GRANTED: 31/1/85 **PERIOD:** 2yrs

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: NW and SE of Mt Morgan

MINING DISTRICT:

MINES/PROSPECTS:Morganite (M1), Magnetite Blow (M3), Belgamba (M6), Trotters Creek (M8), Razorback Mine (M29); (M refers to the magnetic target anomaly number)

EXPLORATION TARGETS\MODELS:

SUMMARY:

REASON FOR ACQUISITION OF TITLE - A change in the exploration strategy from volcanogenic base metal massive sulphide mineralisation to gold mineralisation in other geological environments (such as gold bearing skarns, gold associated with the tops of porphyry systems, and gold occurring with acid volcanic piles as epigenetic veining or in fumarolic alteration zones) prompted the surrender of the previous tenure (A to P 508M) and the acquisition of A to P 3953M. This change in strategy was instigated by Gold Fields Exploration when it assumed management of the project in January 1983.

GEOLOGY -

Mineralisation/alteration - The conceptual model for the genesis of the Mt Morgan deposit was reappraised following a review of available data. Results indicated that the ore body could be related to the intrusive tonalite rather than to a volcanogenic source. The exploration emphasis was therefore refocused onto the tonalite, in particular to contact zones and areas of silica pyrite alteration.

EXPLORATION - Available airborne magnetic data was re-interpreted to delineate a series of targets which were examined during the period covered by this report. Twenty-nine magnetic anomalies in the Mt Morgan and Dee Range areas were identified and inspected (although only 13 sites are described in the report). Work on these sites included ground magnetometer traverses, geological mapping, and rock chip sampling.

Geological mapping - at 29? sites (13 sites)

Rock chip sampling - at 29? sites, analysed for Cu, Pb, Zn, Ag, Au

Geophysics - ground geophysics at 29? sites

M1-Morganite; M2; M3-Magnetite Blow; M4, M5; M6-Belgamba; M7; M8-Trotters Creek; M9; M10, M28; M20; M29-Razorback Mine

M1-Morganite - Windows of Mount Morgan Tonalite and Mine Corridor volcanics crop out in the area. Both intrusives and volcanics exhibit strong silica pyrite alteration in the eastern section of the area. Pyrite and chalcopyrite mineralisation occurs in a linear breccia structure. Au values of rock chip samples (23 samples) are generally low, with one exception of 1.407 g/t.

Ground magnetics (traverses on 50 x 10 m grid) indicate a broad north east trending source to the original airborne fracture, and susceptibility values are considered similar to those estimated for the Mount Morgan Tonalite.

M2 - The anomaly is centred on Dee Volcanics, locally a sequence of andesitic or basic lavas, frequently tuffaceous or agglomeratic. Mount Morgan Tonalite intrudes these volcanics in the north western part of the area examined. Some skarnified horizons, epidote, quartz and garnet are present. Three rock chip samples were analysed, with the best Au value at 0.029 g/t.

Ground magnetometer traverses indicate that the anomalies are due to magnetic portions of the Dee Volcanics, usually a fine grained mafic (basalt?) lava.

M3-Magnetite Blow - No detailed work was conducted at this target. The magnetic anomaly is related to the Magnetite Blow, a small lense like replacement body within Upper Mine Pyroclastics of the Mine Corridor Sequence. The body comprises mainly massive magnetite accompanied by minor amounts of chlorite actinolite and sulphides and probably results from replacement of a limey horizon during tonalite intrusion. Rock chip samples gave values of 50 ppm Cu, 36 ppm Pb, 89 ppm Zn, 3.5 ppm Ag and 0.112 ppm Au.

M4 - The anomaly is centred within fresh to weakly altered (chlorite/epidote) tonalite with some zones of more intense hydrothermal alteration manifested by increasing silica content, clouding feldspars, destruction of crystal boundaries, introduction of epidote and chlorite and loss of mafics. Minor pyrite is present locally. Several small hydrothermal breccia bodies have been recognised, and areas of magnetite and hematite rubble have been delineated.

Results of analysis of rock chip samples are included in appendix 3 of the report.

No discrete magnetic trends or targets were obvious from the ground magnetometer traverses.

M5 - The area consists of the Moongan Rhyolite volcanics which has been intruded by the Mount Morgan Tonalite. The volcanics rhyolitic, as well as basic and intermediate. The basic volcanics have been variably skarnified on selected horizons developing a magnetite, garnet, quartz epidote rock.

Results of analysis of rock chip samples are included in appendix 3 of the report.

The ground magnetometer survey reflects the magnetite rich zones of the skarn.

M6-Belgamba - The area consists of acid volcanic rocks (Moongan Rhyolite) which are folded into a broad anticline in the eastern part of the target area and overlain unconformably by andesitic and dacitic tuffs of the Capella Creek Beds to the west. Localised zones of intense bleaching and silicification are present and north west trending faults have produced a series of graben like structures through the sequence. The area is distant from the Mount Morgan Tonalite body.

Ground magnetometer traverses defined a number of anomalies which reflect different lithologies.

M7 - Basic and intermediate units of the Dee Volcanics crop out on the western section of the target area and are overlain by conglomerates and sediments of the Boulder Creek Grit and Pond Argillite to the east. The Boulder intrusive Complex lies some 2 km to the north.

Rock chip samples returned negligible Au results.

The magnetic anomaly is probably attributed to the moderately to strongly magnetic properties of the mafic units of the Dee Volcanics.

M8-Trotters Creek - Acid and intermediate volcanics of the Moongan Rhyolite crop out to the north and are overlain to the south by an essentially basic sequence of the Dee Volcanics. The target lies between the main Mount Morgan Tonalite and a small separate tonalite body. The presence of the intrusion at shallow depth is attested to by the presence of alteration zones, hydrothermal breccias, and skarnified units.

Rock chip samples returned negligible Au results.

Ground magnetometer traverses indicate an anomaly over an area covered in soil with float of Dee Volcanics and feldspar porphyry lava.

M9 - The target lies wholly within the Mount Morgan Tonalite. The occurrence of abundant intermediate volcanic xenoliths suggests that the present erosion surface is close to the original roof of the intrusion. Weak patchy chlorite and epidote alteration is also present. Younger andesitic dykes cut the tonalite.

Rock chip samples returned negligible Au results.

Ground magnetometer traverses indicate sporadic magnetism within the tonalite, probably due to local variations in primary magnetite.

M10 - The target occurs in Capella Creek Beds some 1000 m east of the contact with the Mount Morgan Tonalite. The rocks consist of aphanitic cherty acidic volcanics, coarser acid volcanics exhibiting both quartz and feldspar phenocrysts; intermediate volcanics which have weak pervasive sericitic alteration and are strongly magnetic; and a pyroclastic unit characterised by patchy feldspathic and siliceous alteration, remnant feldspar phenocrysts and quartz eyes and pervasive chloritic groundmass alteration.

Rock chip samples returned negligible Au results.

No ground magnetics were undertaken, however, the airborne anomaly is attributed to the intermediate volcanic horizon.

M20 - The target area occurs in an area which is the northern extension of that which occurs at M5. The rocks consist of rhyolites and basic volcanics adjacent to the Mount Morgan Tonalite. The basic horizon has been skarnified to and epidote, garnet, magnetite rock.

Rock chip samples returned negligible Au results.

The magnetic anomaly appears to be due to the skarn.

M28 - The target is centred in Capella Creek Beds some 200 m from the Mount Morgan Tonalite contact. The rocks comprise rhyolitic volcanics with patchy epidote/chlorite alteration; strongly magnetic andesitic volcanics; pyritic non-magnetic andesite; quartz eye porphyry and cherty rocks.

Rock chip samples returned negligible Au results.

The magnetic andesite appears to have caused the airborne magnetic anomaly.

M29-Razorback Mine - The target is centred on rocks of the Moongan Rhyolite adjacent to the contact of the Bouldercombe Complex. Although the area is covered by soil two pits have exposed gossanous quartz. The Razorback Mine, which occurs in the area, includes chalcopyrite and pyrite mineralisation in a skarnified conglomerate horizon between rhyolite and basic volcanics.

Rock chip samples from the area and the mine generally returned negligible Au results, with the exception of one at 1.371 g/t and a few at around 0.5 g/t.

Ground magnetics delineated one of the areas of gossanous quartz veins.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Ground inspection of the magnetic anomalies indicated that the anomalies are related to:

- 1) Inherent magnetism in basic and at times intermediate volcanics of the Dee Volcanics and Capella Creek Beds.
- 2) Skarnified (magnetite, epidote, garnet rocks) basic volcanics adjacent to the Mt Morgan tonalite contact.
- 3) Areas of patchy increased primary magnetite in Mt Morgan Tonalite.

Indications that the features investigated reflect sulphide mineralisation similar to the Mt Morgan ore body have not been observed.

RECORDER: Jan Domagala **DATE:** 11/1/94.

COMPANY REPORT SUMMARY SHEET

CR: 15866 **STATUS:** Open

TITLE: Authorities to Prospect 3953M and 4007M, Mt Morgan, Queensland, Six monthly Report to 31st January, 1986

AUTHOR(S): Richards, D. **DATE:** April 1986

ATP/EP No.:3953M and 4007M

COMPANY HOLDING TITLE: Peko Exploration Ltd and joint partner Circular Quay Holdings Pty Ltd
(Division of RGS)

COMPANY SUBMITTING REPORT: Goldfields Exploration Pty Ltd (Division of RGS)

DATE GRANTED: 3953M on 31/1/85, 4007M on 17/8/85 **PERIOD:** 2yrs

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 3953M is NW & SE of Mt Morgan; 4007M is SE of Mt Morgan

MINING DISTRICT:

MINES/PROSPECTS:Morganite, Trotters Creek East, Ajax, Fab, Hill Climb, Short Cut.

EXPLORATION TARGETS/MODELS: Mount Morgan type gold deposits

SUMMARY:

Main activities:

- Initiate or continue re-assessment of Morganite, Trotters Creek East, Ajax, and Fab.
- Continue reconnaissance prospecting of A to P 4007M.
- Further interpretation of airborne magnetic data from the region (includes results in Appendix 1)
- Initiate a comprehensive stream sediment orientation program
- Commence detailed mapping of the area North of Mt Morgan (Bundaleer)

REASON FOR ACQUISITION OF TITLE - A to P 4007M was aquired to extend the adjoining 3953M. Reasons for acquisition are covered in summary of CR 14825.

GEOLOGY -

Regional - See CR 14825

Local -As a result of the drilling, the geology of the Morganite prospect was partly reviewed. The prospect appears to lie within a variably altered roof pendant underlain by tonalitic intrusives and partly by Jurassic sandstone.

Mineralisation/alteration - See CR 14825

EXPLORATION -

A to P 4007 - A reconnaissance investigation was carried out over this A to P to locate altered rock 'float' which commonly occurs downstream of outcrops

A stream sediment sampling orientation program was undertaken with about 400 samples collected over an area of about 50km² (area not defined but appears to be mainly over 3953M).

Further interpretation of airborn magnetic data indicated that the Mt Morgan deposit is located within a magmetic phase of the Mt Morgan tonalite.

1) MORGANITE PROSPECT -

DRILLING - 16 hole percussion holes were drilled in the Morganite (M1) prospect because it has similar geological features to the Mt Morgan deposit. These holes were drilled to delineate any patterns in alteration or geochemical anomalies. Another hole was drilled at the Mt Morgan mine to compare trace element data.

GEOCHEMISTRY - Samples were analysed for Au, Ni, Cu, Pb, Zn, Ba, As, with several for Ag & S. Hole 1 recorded the only persistant gold values of up to 0.1 g/t, with background values of 0.015-0.192 g/t. One isolated Au value of 0.63 g/t with elevated Zn values was recorded in silicified, pyritic ?volcanic rocks in Hole 11.

Trace element data suggests a depletion in values away from the ore-zone

2) BUNDALEER AREA -

Detailed geological mapping was of the Bundaleer area north of Mt Morgan

3) AJAX PROSPECT -

GEOPHYSICS - an IP survey was carried out over the prospect and results are forthcoming.

4) FAB PROSPECT -

GEOCHEMISTRY - 100 rock chip samples were collected from the main zones of pyritic alteration in this prospect; only one sample returned significant Au values (Appendix 5 of the report).

5) TROTTERS CREEK EAST -

The area had been worked on earlier by Geopeko Ltd when it was designated as 'Discoverer 60' (reported on by Frets, 1974; Taub, 1976; Delaney, 1985). During this survey the area was grided, mapped, and sampled but assay results were disappointing. It was recommended that no further work be done on the area, but mapping and sampling be carried out in the altered intrusives in the adjacent areas.

GEOPHYSICS - IP and magnetics carried out in the area was rendered useless by the strong masking effect of adjacent transmission lines and numerous earthed fences.

6) HILL CLIMB - Analytical results from this prospect are included in Appendix 5 of this report (21 samples analysed for Ag and Au). No significant results were obtained.

7) SHORT CUT - Analytical results from this prospect are included in Appendix 5 of this report (3 samples were analysed for Ag and Au). No significant values were obtained.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Significant results include:

- an eastern extension of the Mt Morgan tonalite was interpreted from magnetics
- 12 magnetic low anomalies were identified for further inspection of magnetic data
- follow up ground magnetometer surveys be undertaken in selected areas
- none of the 17 drill holes intersected ore-grade Au values; the best was Hole 1 with persistent values of up to 0.1 g/t

RECORDER: Jan Domagala

DATE: 13/1/94

COMPANY REPORT SUMMARY SHEET

CR: 15867A **STATUS:** Open

TITLE: Authorities to Prospect 3953M and 4007M, Mt Morgan, Queensland, Six monthly Report to 31st July, 1986, Volume 1

AUTHOR(S): Richards, D. **DATE:** October 1986

ATP/EP No.:3953M and 4007M

COMPANY HOLDING TITLE: Peko Exploration Ltd and joint partner Circular Quay Holdings Pty Ltd (Division of RGS)

COMPANY SUBMITTING REPORT: Goldfields Exploration Pty Ltd (Division of RGS)

DATE GRANTED: 3953M on 31/1/85, 4007M on 17/8/85 **PERIOD:** 2yrs

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 3953M is NW & SE of Mt Morgan; 4007M is SE of Mt Morgan

MINING DISTRICT:

MINES/PROSPECTS: Morganite (includes prospects previously referred to as Upper Mundic, Forth Wheeler, Morganite, and Great North Lode; eg Taube, 1983), Thomases Gossan, Mt Dick.

EXPLORATION TARGETS/MODELS: Mount Morgan type gold deposits

SUMMARY: In the six month period the following work was carried out:

- continued reconnaissance investigation of A to P 4007M
- a review of the Thomases Gossan area
- stream sediment program (started last reporting period) interpreted and followed up
- additional sampling of the Bundaleer area
- detailed review of the Ajax prospect and environs (in Part B)
- a paleocurrent and facies model study of the Razorback Beds (in Part B)
- report on two holes drilled in 1984 in the Mt Dick prospect (not previously reported)

REASON FOR ACQUISITION OF TITLE - See CR's 15866 & 14825

GEOLOGY -

Regional - See CR 14825

Mineralisation/alteration - See CR 14825

EXPLORATION -

- A to P 4007M - two additional zones of pyritic alteration were located: 1) at **Emu Creek** (Ulam Beds), 2) **Queen of Sheba** (Capella Creek Beds).

1) EMU CREEK - As a result of continued reconnaissance of ATP 4007M, an extensive zone of pyritic alteration was located in this area.

2) QUEEN OF SHEBA - As a result of continued reconnaissance of ATP 4007M, an extensive zone of pyritic alteration was located in this area.

3) MORGANITE PROSPECT -

LOCATION - The prospect is located about 1.5 km north east of Mt Morgan Mine. It covers includes an area of pyritic alteration about 2 km x 800 m in area (believed to be continuous beneath the Razorback Beds); it also includes the prospects previously referred to as **Upper Mundic, Forty Wheeler, Morganite, and Great North Lode**.

MINERALISATION/ALTERATION - Alteration styles range from propylitic to quartz-sericite-pyrite to silica-pyrite. Hydraulic fracturing and weak brecciation is widespread and several true breccias have developed. The

host rocks are medium-grained adamellites and a variety of texturally variable rhyolites ranging from medium-grained to aphanitic, very likely to be part of a sub-volcanic phase of the Mt Morgan Tonalite. Few, if any true volcanics are present, but some may outcrop as roof pendants on the south side of Mills Gully.

PREVIOUS INVESTIGATIONS -

- Rock chip samples of outcrop in creeks returned negligible Au values.
- Percussion drill samples returned generally disappointing results, with the exception of a few isolated Au values to 0.69 g/t.

GEOCHEMISTRY -

- The rock chip sampling was extended to cover the scarp zone beneath the Razorback Beds. Au values were negligible with the exception of one sample from the south side of Mills Gully which returned 0.3 g/t (samples collected during earlier surveys returned similar low values, with isolated values to 0.69 g/t). However, these results should be treated cautiously as the sampled rocks are extensively leached.
- Diamond hole MC-2 (957 m), drilled in 1970 and not previously sampled, was re-examined, sampled, and samples analysed (Cu, Pb, Zn, Ag, Fe, Mn, Ca, Mo, Co, Ni, As, Bi, Hg, Sb, Ge, Te, Ba, Au). The hole passed through pyritic and chloritised granite variants, with the lowermost 300 m strongly hydraulically fractured and locally brecciated. No element zonation was apparent and no significant Au values were returned, with one exception at 670 m which carried 4.5 ppm Au (Au appears to be associated with a 5 cm wide quartz-pyrite vein). Resampling of the core row which contained the quartz-pyrite vein returned 12 ppm Au.
- Drill core from holes drilled into the central part of the Northern Mine Corridor (63/4, 5,6,7,8) was re-examined. Zones of weak to moderate pyritisation were present in three of the holes, none of which had been analysed for Au. None of the samples collected from the pyritised zones were anomalous in Au values.

4) THOMASES GOSSAN -

LOCATION - Thomases Gossan lies about 4 km north of Mt Morgan Mine. It is a small malachite rich gossan lying within highly leached volcanic rocks just beneath the base of the Razorback Beds. The outcrop in the area is extremely poor and consists of intensely supergene leached iron stained rock and includes weathered and intensely silicified, formerly pyritic intermediate lava or tuff (petrographic details are included in CR 15867A). At the turn of the century it was mined for Cu.

Samples collected around the gossan returned negligible Au values (CR 15867A). Earlier drill holes (14 pdh drilled in 1978 by Geopeko) intersected weakly pyritic andesite with geochemically anomalous, but low Cu and Zn (Taub, 1978). During this investigation, percussion chips analysed for Au produced negligible values.

5) WATTLE GULLY DRAINAGE AREA

As part of the stream sediment program initiated during the previous six month period, the <180 micron fraction of samples was analysed for Au, Cu, Pb, Zn, Ag, & Mn. Anomalous areas were identified and the **Wattle Gully** drainage which produced the highest Au values (to 2ppm) was further investigated. However, much of the area has been contaminated by wind-borne Au, Cu, Pb, and probably Ag from the Mt Morgan mine smelter. The Wattle Gully values appear to reflect this contamination.

6) MT DICK - Two holes were drilled at Mt Dick (MD1, MD2) to test beneath outcrops of weakly auriferous gossan, taking into account SIROTEM and IP data. Drill hole samples were analysed for Cu, Pb, Zn, Ag, and Au. No significant values were obtained (Au values <0.01 ppm).

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE -

RECORDER: Jan Domagala **DATE:** 14/1/94

COMPANY REPORT SUMMARY SHEET

CR: 15867B **STATUS:** Open

TITLE: Authorities to Prospect 3953M and 4007M, Mt Morgan, Queensland, Six monthly Report to 31st July, 1986, Volume 2

AUTHOR(S): Richards, D. **DATE:** October 1986

ATP/EP No.:3953M and 4007M

COMPANY HOLDING TITLE: Peko Exploration Ltd and joint partner Circular Quay Holdings Pty Ltd (Division of RGS)

COMPANY SUBMITTING REPORT: Goldfields Exploration Pty Ltd (Division of RGS)

DATE GRANTED: 3953M on 31/1/85, 4007M on 17/8/85 **PERIOD:** 2yrs

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 3953M is NW & SE of Mt Morgan; 4007M is SE of Mt Morgan

MINING DISTRICT:

MINES/PROSPECTS: Ajax; Morganite and Mt Victoria prospects which occur in the Razorback Beds.

EXPLORATION TARGETS/MODELS: Mount Morgan type gold deposits

SUMMARY:

In the six month period the following work was carried out:

- continued reconnaissance investigation of A to P 4007M (in Part A)
- a review of the Thomases Gossan area (in Part A)
- stream sediment program (started last reporting period) interpreted and followed up (in Part A)
- additional sampling of the Bundaleer area (in Part A)
- **detailed review of the Ajax prospect and environs**
- **a paleocurrent and facies model study of the Razorback Beds**
- report on two holes drilled in 1984 in the Mt Dick prospect (not previously reported) [in Part A]

REASON FOR ACQUISITION OF TITLE - See CR's 15866 & 14825

LOCALISED EXPLORATION/PROSPECTS

1) AJAX PROSPECT - A review of the available data on the Ajax Prospect is presented in this company report. Petrological descriptions of core are also included.

LOCATION - The prospect (D47) is located 23 45'N, 150 30'E, approximately 40km south of Rockhampton.

PREVIOUS EXPLORATION - Copper carbonate was discovered at Ajax in 1920. The Prospect yielded about 30 tons of secondary ore in 1921, about 22 tons in 1937, and 49.8 tons averaging 0.02 g/t Au, 53.4 g/t Ag, and 7.67% Cu during the period 1/7/75 to 30/6/76.

From 1972 the area had been explored intermittently by Geopeko and subsequently by Geopeko and Gold Fields Exploration Pty Ltd in Jount Venture. The data includes:

- Regional mapping
- Detailed mapping and supporting petrology (1974, 1978, and 1980)
- Core examination
- B and C horizon geochemistry for Cu, Pb, Zn, and Mn
- Core and rock chip analysis
- Limited IP (1964)
- SP and TEM (1974)
- Resistivity and IP (1974)
- Horizontal loop multifrequency EM (1975)
- Dipole-dipole time domain IP and ground magnetic survey (1986)
- Percussion and diamond drilling (1975-1978, and 1980)

GEOLOGY - The prospect lies within the gently folded (dips average 20-30°, but reaching 60°) middle Devonian felsic volcanics referred to as the Moongan Rhyolite or as Mount Warner Volcanics (Taub, 1984). The unit

consists largely of acid tuffs, with minor flows, clastic sediments, cherts, jaspers, and limestones. The overlying Capella Creek Beds, in contrast, comprise andesitic tuffs, lithic tuffs, and calcareous tuffs with lesser andesitic flows, limestones and clastic sediments. Three main units were identified 1) Footwall Tuffs, 2) Mineralised Horizon, 3) Hanging Wall Tuffs.

The report has a good cartoon cross-section of the deposit (Fig. 4)

CONCLUSIONS - The Ajax deposit is interpreted as a small poorly developed volcanogenic deposit remobilised and dislocated by metamorphism and shearing. The mineralised rock is restricted to a zone extending about 250m long, 50m wide, and 80m deep, and does not appear to be part of larger mineralised system. Based on current knowledge, the Ajax deposit has no economic potential for major companies, however, potential does exist for small high grade mineralisation. The sporadic high Au values will also attract some attention.

2) RAZORBACK BEDS - CR 15867B includes a report on 'Palaeocurrent and Facies in the Razorback Beds'. This study was undertaken with the aim of locating the primary source of the gold.

PREVIOUS EXPLORATION - Dunstan (1901) and Reid (1939) reported the occurrence of gold in the alluvial sediments of the Jurassic Razorback Beds, which unconformably overlie the Palaeozoic ore-bearing rocks in the Mount Morgan area. Gold workings were observed in the Morganite (2km north of Mt Morgan), and Mt Victoria (3.5km southwest of Mt Morgan) prospects.

GEOLOGY - The Jurassic Razorback Beds consist of sequences of extensively cross-stratified quartzitic sandstones with interbedded silty claystone and conglomerates. Conglomerate clasts include rocks which are identical to the basement rocks of the Mt Morgan deposit.

CONCLUSIONS

- The non-marine Razorback Beds contain alluvial gold in the pebbly sandstone facies near the base of the sequence.
- The unit was developed in a braidplain or braded river system.
- Palaeoslope direction of the unit dips north.
- The source for the alluvial gold at Morganite is the Mt Morgan deposit.
- The source for the alluvial gold at Mt Victoria appears to be south of Mt Morgan.
- Further basin analysis on the unit may localise, more precisely, the primary source of the gold.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE -

RECORDER: Jan Domagala **DATE:**24/1/94

COMPANY REPORT SUMMARY SHEET

CR: 15934 **STATUS:** Open

TITLE: Authorities to Prospect 3953M and 4007M, Mt Morgan, Queensland, Six Monthly Report to 31st January 1986

AUTHOR(S): D. Richards **DATE:** April 1986

ATP/EP No.: 3953M and 4007M

COMPANY HOLDING TITLE: Peko Exploration Ltd and joint partner Circular Quay Holdings Pty Ltd
(Division of RGS)

COMPANY SUBMITTING REPORT: Gold Fields Exploration Pty Ltd (Division of RGS)

DATE GRANTED: 3953 on 31/1/85, 4007 on 17/5/85 **PERIOD:** 5 yrs

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 3953M is NW & SE of Mt Morgan; 4007M is SE of Mt Morgan

MINING DISTRICT:

MINES/PROSPECTS: Morganite, Trotters Creek East, Ajax, Fab, Bundaleer area

EXPLORATION TARGETS\MODELS: Mt Morgan type gold deposits

SUMMARY:

This CR is identical to CR 15866

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE -

RECORDER: Jan Domagala **DATE:**25/1/94.

COMPANY REPORT SUMMARY SHEET

CR: 17015 **STATUS:** Open

TITLE: Authorities to Prospect 3953M and 4007M, Mt Morgan, Queensland, Six Monthly Report to 31st January 1987

AUTHOR(S): D. Richards **DATE:** April 1987

ATP/EP No.: 3953M and 4007M

COMPANY HOLDING TITLE: Peko Exploration Ltd and joint partner Circular Quay Holdings Pty Ltd (Division of RGS)

COMPANY SUBMITTING REPORT: Gold Fields Exploration Pty Ltd (Division of RGS)

DATE GRANTED: 3953 on 31/1/85, 4007 on 17/5/85 **PERIOD:** 5 yrs

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 3953M is NW & SE of Mt Morgan; 4007M is SE of Mt Morgan

MINING DISTRICT:

MINES/PROSPECTS: Morganite, Thomas (Thomases?) Gossan, Shadow

EXPLORATION TARGETS\MODELS: Mt Morgan type gold deposits

SUMMARY:

Activities during the 6 month period include:

- Follow up of the stream sediment program initiated in the previous 6 months
- Sampling of the previously reported alteration zones in AtoP 4007M
- Gridding and more detailed mapping of the Thomas Gossan area
- Preparation and commencement of a 1 000m drill program at Morganite and Thomas Gossan
- A major familiarisation with, and review of all previous exploration of the area

REASON FOR ACQUISITION OF TITLE - See CR's 15886 & 14825

LOCALISED EXPLORATION/PROSPECTS

1) AREA NE OF MT MORGAN - The area lies entirely within the adamellite phases of the Mt Morgan Tonalite, with several old gold workings sunk on small quartz veins. A zone of pyritic alteration approx 200 x 100m was defined within the pyroclastic volcanics at the contact with the Mt Morgan Tonalite (The Dee River Zone).

GEOCHEMISTRY - Ten rock chip samples from the pyritic alteration zone returned low Au (<0.005 g/t) and Ag (<0.5 g/t) values.

2) AREA W AND NW OF MT MORGAN - The area lies at the base of Razorback Beds

GEOCHEMISTRY - Ten samples of altered, pyritic, fine grained mafic dyke at the base of the Razorback Beds returned low Au (<0.01 g/t) and Ag (<0.5 g/t)

3) CENTRE AND BULL CREEKS AREA - Zones of alteration (seldom exceeding 2 m x 10 m, with largest 50 m x 50 m; pyritic alteration) in acid and intermediate volcanic rocks of the Capella Creek Beds.

LOCATION - Bajool GR 2560 73560

GEOCHEMISTRY - 47 samples of alteration zones returned negligible Au and Ag values.

CR 17015 4) SHADOW PROSPECT - The prospect occurs in altered rhyolitic porphyry dykes (up to 200m x 50m) which have intruded and introduced local alteration into the andesitic volcanics of the Capella Creek Beds.

LOCATION - Bajool GR 2540 73660

GEOCHEMISTRY - sampled and awaiting results

5) THOMAS GOSSAN - The rocks in the area are dominantly andesitic volcanics of the Moongan sequence with intrusions of the adamellite phase of the Bouldercombe Complex as well as two generations of dykes. These rocks are overlain by the essentially flat lying Cretaceous Razorback Beds.

The Thomas Gossan comprises a marginal breccia zone within a 'tuffisite' pipe approx 50 m in diameter. The breccia consists of angular and sedimentary fragments up to 2 m, in a matrix of mostly quartz-bearing tuffisite with local areas of massive sulphides (completely oxidised) which were mined in the 1920s. East of the gossan, but separated by an area of unaltered rocks, is an apparently continuous area of hydrothermal alteration (500 m x 300 m). These altered rocks consist of weathered, intensely silicified, formerly pyritic intermediate lava or tuff with a sugary texture.

LOCATION - 5.5 km north of the Mt Morgan Mine

DRILLING - Three drill holes were proposed to test the altered zone to the east.

6) MORGANITE - The Morganite Prospect comprises a range of medium grained granite variants and sub-volcanic rhyolites adjacent to the tonalite phase of the Mt Morgan Tonalite. These rocks have been hydrothermally altered in a zone which parallels the contact over a distance of at least 2 km and up to 800 m from the contact. Mineralisation is thought to be associated with the intrusive tonalite.

DRILLING - Two holes were proposed to test the alteration zone adjacent to the contact with the tonalite.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE -

Rock chip samples were collected and analysed from several locations including 1) area NE of Mt Morgan, 2) area W and NW of Mt Morgan, 3) Centre and Bull Creek area. These areas produced negligible Au values. The Shadow Prospect was sampled and results are forthcoming. Drilling was proposed for the alteration zones associated with the Thomas and Morganite Prospects.

RECORDER: Jan Domagala **DATE:**27/1/94.

COMPANY REPORT SUMMARY SHEET

CR: 17016 **STATUS:** Open

TITLE: Authorities to Prospect 3953M and 4007M, Mt Morgan, Queensland, Six Monthly Report for the period ending 31st July 1987

AUTHOR(S): D. Richards **DATE:** October 1987

ATP/EP No.: 3953M and 4007M

COMPANY HOLDING TITLE: Peko Exploration Ltd and joint partner Circular Quay Holdings Pty Ltd (Division of RGS)

COMPANY SUBMITTING REPORT: Gold Fields Exploration Pty Ltd (Division of RGS)

DATE GRANTED: 3953 on 31/1/85, 4007 on 17/5/85 **PERIOD:** 5 yrs

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 3953M is NW & SE of Mt Morgan; 4007M is SE of Mt Morgan

MINING DISTRICT:

MINES/PROSPECTS: Morganite, Thomases Gossan, Short Hill, Hill Climb, Shadow.

EXPLORATION TARGETS/MODELS: Mt Morgan type gold deposits

SUMMARY:

Activities during the 6 month period include:

- Diamond drill program at Morganite and Thomases Gossan
- Sampling of Short Cut and Hill Climb areas
- Analytical results from Shadow prospect, unavailable in previous report, are included

REASON FOR ACQUISITION OF TITLE - See CR's 15886 & 14825

LOCALISED EXPLORATION/PROSPECTS

1) - MORGANITE - The Morganite Prospect lies at the northern end of the Mt Morgan Mine Corridor. It comprises a range of medium grained granite variants and sub-volcanic rhyolites adjacent to the tonalite phase of the Mt Morgan Tonalite. These rocks have been hydrothermally altered in a zone which parallels the contact over a distance of at least 2 km and up to 800 m from the contact. Mineralisation is thought to be associated with the intrusive tonalite.

GEOLOGY - Appendix four in this report includes a report and map on the bedrock geology in the Morganite-Great North Lode area (R.H. Stillitoe). The rocks in the area are interpreted as hornfelsed and hydro-thermally altered roof pendant overlying a trondhjemite pluton which, on the west side of the area, is intruded by a younger quartz diorite body. Intrusive breccias were formed in the roof pendant, with the local intrusion of magma and associated mechanical breakage. Hydrothermal breccias are also present and are commonly difficult to distinguish from the intrusive breccias. The roof zone of the trondhjemite pluton was identified as the most prospective zone for gold.

A petrological description of eight core samples is included.

DRILLING - Four diamond drill holes (MM-1, 1A, 2, & 3) were completed.

GEOCHEMISTRY - About 400 drill hole samples were analysed for Ag and Au but the majority returned negligible results.

2) - THOMAS GOSSAN - The rocks in the area are dominantly andesitic volcanics of the Moongan sequence with intrusions of the adamellite phase of the Bouldercombe Complex as well as two generations of dykes. These rocks are overlain by the essentially flat lying Cretaceous Razorback Beds.

The Thomas Gossan comprises a marginal breccia zone within a 'tuffisite' pipe approx 50 m in diameter. The breccia consists of angular and sedimentary fragments up to 2 m, in a matrix of mostly quartz-bearing tuffisite with local areas of massive sulphides (completely oxidised) which were mined in the 1920s. East of the gossan, but separated by an area of unaltered rocks, is an apparently continuous area of hydrothermal alteration (500 m x 300

m). These altered rocks consist of weathered, intensely silicified, formerly pyritic intermediate lava or tuff with a sugary texture.

LOCATION - 5.5 km north of the Mt Morgan Mine

GEOLOGY - Appendix four in this report includes a report based on an inspection of the recently drilled core. The core comprises hornfelsed andesitic volcanic rocks transitional to intrusive breccia. The breccia is essentially identical to the intrusive breccias in the Morganite-Great North Lode Prospect. The Thomases Gossan is also interpreted as a roof pendant overlying a pluton.

A petrological description of two core samples is included.

DRILLING - Three diamond drill holes (TG-2, 3, & 4) were drilled.

GEOCHEMISTRY - About 180 drill hole samples were analysed for Ag and Au but the majority returned negligible results.

3) - SHORT CUT PROSPECT - The rocks in the area consist of a mafic granodiorite phase of the Mt Morgan tonalite which has been intruded by porphyritic rhyolite. Both rock types have been altered over an area of about 250 m x 450 m.

GEOCHEMISTRY - 35 rock samples were collected from an area of about 20 m diameter in the alteration zone. Negligible values for Ag (mostly <0.5 g/t) and Au (mostly <0.005 g/t with minor 0.01 g/t) were returned.

4) - HILL CLIMB - Alteration is confined to linear zones (tens of metres by hundreds of metres) within a medium-grained adamellite phase of the Mt Morgan Tonalite, near the contact with the Dee Volcanics. The alteration comprises pyrite and iron staining but is usually only feldspar destructive, with small amounts of silicification.

GEOCHEMISTRY - 25 rock chip samples were analysed for Ag (<0.5 g/t) and Au (mostly <0.008 g/t with few 0.02 g/t).

5) - SHADOW PROSPECT - See CR 17015 summary for details of geology.

GEOCHEMISTRY - 23 samples analysed for Au and Ag returned generally negligible results.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE -

Four diamond drill holes were drilled at the Morganite Prospect and three at the Thomases Gossan Prospect. Core samples from these holes (about 400 from Morganite and about 180 from Thomases Gossan) were analysed for Au and Ag but returned generally negligible results. Detailed mapping of the bedrock geology was also undertaken over the Morganite Prospect area.

Alteration zones were sampled from the Short Cut prospect (35 samples) and the Hill Climb area (25 samples). Samples were analysed for Ag and Au but returned negligible results. Samples collected in the previous six months from the Shadow prospect returned generally negligible results for Au and Ag.

RECORDER: Jan Domagala **DATE:**27/1/94.

COMPANY REPORT SUMMARY SHEET

CR: 18403 **Status:**

ATP/EP No.: 3953M & 4007M

Mining District:

1:100 000 Sheet name(s):Mount Morgan

1:250 000 Sheet name(s):Rockhampton

Author(s): D. Richards **Date:** March 1988

Title:Authority to Prospect 3953M & 4007M, Mount Morgan Queensland. Six Monthly Report to 31st January, 1988.

Company Name: Gold Fields Exploration Pty Ltd

Exploration targets\models:Gold

Mines\Prospects: The Dee Range, Champion, & Emu Creek

SUMMARY: A to P 3953M consists of one block which includes the 'Dee Range' prospect (approx 1 to 3km N & W of Mount Morgan), and the 'Champion' prospect (approx 2km NE of Mount Morgan). A to P 4007M consists of five blocks, one of which includes the 'Emu Creek' prospect (approx 19km S-SE of Mount Morgan). Most of the work was concentrated on the Dee Range prospect.

1) DEE RANGE PROSPECT: This exploration program was a continuation of the major program conducted by Geopeko from 1979-1983 (A to P 508M).

No geological information over this prospect was included, other than the 1:2 000 geological map.

Work included:

- re-establishment of Geopeko's grid
- soil sampling over the grid
- geological mapping at 1:2 000
- review of previous data

GEOCHEMISTRY - Approx 2 500 soil samples were analysed for Cu, Pb, Zn, Au, Ag, Sb, and As. Analytical results for all elements, other than Ag, are plotted on a grid map (table of results is not included), and values are not readily discernible. No mention was made in the text on the range of values, and no conclusions or recommendations were made.

2) CHAMPION PROSPECT: Information is based substantially on a report by G.W. Morrison for R.G.C. (no other reference given), with addition of data gained subsequently, as well as historical data from QGMJ, Mines Dept Annual Reports, and records at the Mt Morgan Exploration office.

GEOLOGY - The country rock consists of the granodioritic phase ('formation') of the Upper Devonian Mount Morgan Tonalite. It is cut by andesite porphyry dykes (grey or green) and related breccias and veins along joint planes and shear zones. Andesitic breccias are limited to linear zones which parallel the prominent dykes, shears, or vein orientations. They are typically green, matrix supported, with sub-rounded clasts of andesite and granodiorite, up to a few cms in diameter, in a fine medium grained rock-flour matrix. These breccias are interpreted as having formed at shallow to intermediate depths during dyke emplacement through the explosive interaction between andesitic magma and the groundwater occupying the shear zones. Mineralisation appears to be contemporaneous with the shearing, brecciation, and dyke emplacement.

MINERALISATION - Gold workings date back to about 1878. They were put down principally on quartz veins, dykes, shear zones, and any combination of the three. Few exceeded 25 tonnes total output. Workings include: **Retrieve, Champion, (New Champion), South Champion, North Champion, Peuts, Golden Crown, and Welcome.**

Three principal orientations of linear structures were identified, on the basis of distribution of workings, dykes, shear zones, prominent joint sets and cracks. These are:

- NE for the Champion, Golden Crown, Welcome, and Retrieve Reefs, as well as dykes and joints
- ENE for the Peuts, South Champion, and North Champion Reefs, plus shears and joints
- E-ESE for the prominent dykes in the north, south and east central parts of the grid, associated joints, the principal creeks and the chloritic alteration zone

The lodes in the area are combinations of:

- sheared and altered granodiorite porphyry ('formation')
- andesite porphyry dykes
- magnetite and or sulphide-bearing sheared dykes
- breccia
- quartz, quartz-sulphide and quartz-calcite veins

Three main styles of mineralisation were identified:

- Comb quartz-pyrite-chalcopyrite veins up to 10cm thick either single, branching or in sets, hosted in formation as at Champion, North Champion, Golden Crown, and Central Retrieve
- Breccia and sheared dyke with stringy, poddy and locally massive sphalerite-chalcopyrite-arsenopyrite as at Pouts
- Amphibole-chlorite-magnetite-pyrite-chalcopyrite-molybdenite rock after sheared and altered andesite as at South Champion and Pouts

GEOCHEMISTRY - The exploration program was not very successful as results tended to confirm what was known. Quartz vein samples returned Au in excess of 5 g/t with a maximum of 18 g/t (historical records indicated 15-30 g/t and locally up to 120 g/t). Formation samples returned values of detectable gold with about half in excess of 0.5 g/t (historical records indicate 1-2 g/t with one exceptional 15 g/t). High Au is generally associated with elevated Cu and occasionally, elevated to high Ag. Soil samples (approx 300) were analysed for Au and As, similarly with no significant findings.

3) EMU CREEK PROSPECT: Located on Emu Creek at GR 2454 73618 on the edge of the Rockhampton 1:100 000 Sheet.

GEOLOGY - Rocks consist of undifferentiated mid Devonian Ulam Beds which consist of acid-intermediate flows and pyroclastics with undetermined orientations.

MINERALISATION - Exploration target was the linear, NW striking zone of hydrothermal alteration, which can be traced over a distance of about 1km then intermittently for another km (shown on map). Maximum thickness is up to 70m. The zone consists of silica-pyrite alteration (mainly confined to the central part), and white clay (? weathered argillic or quartz-sericite) - pyrite alteration. Propylitic-pyrite alteration is developed erratically up to 200m from the core zone. Two small breccias to several metres were also noted.

GEOCHEMISTRY - A total of 45 rock-chip samples were analysed for Ag and Au but no significant Au values were returned.

Recorder: JAN DOMAGALA **Date:**5/1/94.

COMPANY REPORT SUMMARY SHEET

CR: 18404 **STATUS:** Open

TITLE: Authorities to Prospect 3953M and 4007M, Mt Morgan, Queensland, Six Monthly Report for the period ending 31st January 1988

AUTHOR(S): D. Richards **DATE:** March 1988

ATP/EP No.: 3953M and 4007M

COMPANY HOLDING TITLE: Peko Exploration Ltd and joint partner Circular Quay Holdings Pty Ltd
(Division of RGS)

COMPANY SUBMITTING REPORT: Gold Fields Exploration Pty Ltd (Division of RGS)

DATE GRANTED: 3953 on 31/1/85, 4007 on 17/5/85 **PERIOD:** 5 yrs

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 3953M is NW & SE of Mt Morgan; 4007M is SE of Mt Morgan

MINING DISTRICT:

MINES/PROSPECTS: Champion, The Retrieve, Peuts, Golden Crown, Emu Creek,

EXPLORATION TARGETS\MODELS: Mt Morgan type gold deposits

SUMMARY:

This CR is identical to CR 18403

- **REASON FOR ACQUISITION OF TITLE** - See CR's 15886 & 14825

RECORDER: Jan Domagala **DATE:**31/1/94.

- 1) Additional mapping of area between 8300E and 11200E to resolve the structural complexity.
- 2) Conduct a SIROTEM survey between 9500E and 11000E followed by accurate drilling.
- 3) If successful extend SIROTEM to 12000E and 15000E - 15500E.
- 4) Additional rock chip sampling at Mt Alexander.

2) - CHAMPION PROSPECT - (includes locations of Champion, Champion North, Champion South, Golden Crown, Welcome, Retrieve, and Peuts) see CR 18403

LOCATION - about 3 km north-east of Mt Morgan

GEOLOGY - see CR 18403

DRILLING - A 16 hole RC percussion program totalling 905 m was carried out to test the Champion lodes (include Champion, Golden Crown, Retrieve, and Peuts). All holes passed through chloritic granodiorite with or without andesite dykes. All holes intersected the lodes which comprised sheared, moderately pyritic, sericitised granodiorite with a characteristic green coloration, plus a variable amount of quartz vein. The quartz ranges from 5% to 60% of the total sample volume and averages approx 15%. In many cases, an irregular halo of weak alteration marked by pinking of feldspars and weak pyritisation surrounded the lodes.

GEOCHEMISTRY - Drill hole samples were analysed for Au, Ag, and Cu. Most of the lodes contain geochemically elevated to anomalous Au values, however, only three significant intersections were defined, of which only one could be described as potentially economical (hole 13 at Peuts which returned an average value of 6.1 g/t at interval 43 - 48 m; with a maximum value of 19.5 g/t). The other significant intersections were in holes 7 which returned Au values up to 2.09 g/t but over a very short interval. The highest Au value from the other holes was 0.62 g/t.

CONCLUSION - The lodes in this prospect were considered to be adequately tested, with very limited economic gold mineralisation. The economic potential was deemed low, and of the targets tested, the Peuts and North Champion are the most promising.

3) - MORGANITE - The Morganite Prospect lies at the northern end of the Mt Morgan Mine Corridor. It comprises a range of medium grained granite variants and sub-volcanic rhyolites adjacent to the tonalite phase of the Mt Morgan Tonalite. These rocks have been hydrothermally altered in a zone which parallels the contact over a distance of at least 2 km and up to 800 m from the contact. Mineralisation is thought to be associated with the intrusive tonalite.

LOCATION - About 2 km north of Mt Morgan

GEOLOGY - The following is extracted from the summary report of CR 18403: Appendix four in this report includes a report and map on the bedrock geology in the Morganite-Great North Lode area (R.H. Stillitoe). The rocks in the area are interpreted as hornfelsed and hydro-thermally altered roof pendant overlying a trondhjemite pluton which, on the west side of the area, is intruded by a younger quartz diorite body. Intrusive breccias were formed in the roof pendant, with the local intrusion of magma and associated mechanical breakage. Hydrothermal breccias are also present and are commonly difficult to distinguish from the intrusive breccias. The roof zone of the trondhjemite pluton was identified as the most prospective zone for gold.

DRILLING - Another three diamond drill holes (M4, M5, M6 for a total of 484 m) were drilled as a continuation of the drilling program. MM-1, 1A, 2, & 3 were completed during the previous six months.

GEOCHEMISTRY - About 200 drill hole samples were analysed for Ag, Au, and Cu but the majority returned low results. The background level of gold in the more altered sections is geochemically elevated (ie detectable) in the range of 0.02-0.03 ppm, with a few scattered higher values around 0.1 ppm to a maximum of 0.32 ppm. The higher Au values appear to be a function of pyrite content rather than alteration type and are found in both highly and moderately silicified intersections.

Ag values are almost always below detection levels and Cu, at best, geochemically elevated.

CONCLUSION - Although an economic ore deposit has not been defined in the prospect, the area is still deemed prospective. This is based on the reasonably consistent geochemically elevated to weakly anomalous gold values, as well as the geological setting and proximity to the Mt Morgan deposit. As the target model is a deposit with some similarities to the Mt Morgan deposit, it was recommended that any further work should include a SIROTEM survey to delineate a similar target (a reasonably massive sulphide deposit).

RECORDER: Jan Domagala **DATE:**27/1/94.

COMPANY REPORT SUMMARY SHEET

CR: 19993 **STATUS:** Open

TITLE: Authorities to Prospect 3953M and 4007M, Mt Morgan, Queensland, Six Monthly Report for the period ending 31st January 1989

AUTHOR(S): D. Richards **DATE:** March 1989

ATP/EP No.: 3953M and 4007M

COMPANY HOLDING TITLE: Peko Exploration Ltd and joint partner Circular Quay Holdings Pty Ltd (Division of RGS)

COMPANY SUBMITTING REPORT: Gold Fields Exploration Pty Ltd (Division of RGS)

DATE GRANTED: 3953 on 31/1/85, 4007 on 17/5/85 **PERIOD:** 5 yrs

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 3953M is NW & SE of Mt Morgan; 4007M is SE of Mt Morgan

MINING DISTRICT:

MINES/PROSPECTS: Dee Range, Morganite

EXPLORATION TARGETS\MODELS: Mt Morgan type gold deposits

SUMMARY:

Activities during the 6 month period include:

- **Dee Range** - drilling program (MD-1, MD-3, & MD-4; diamond and percussion) to test co-incident SIROTEM and I.P. anomalies in the Mt Dick area.

- **Morganite** - grid was re-furbished, re-mapped and extended, in preparation for surface geophysics

REASON FOR ACQUISITION OF TITLE - See CR's 15886 & 14825.

LOCALISED EXPLORATION/PROSPECTS

1) - DEE RANGE - Mt Dick area

DRILLING - MD-3 and MD-4 (total 432.9 m) intersected the targets defined by the coincident SIROTEM and I.P. responses. The holes intersected a wide zone of disseminated pyrite with zones of massive and semi-massive pyrite. In addition to pyrite the only other sulphide present is small traces of chalcopyrite. Both holes reflected abundant evidence of faulting and zones of intense shearing.

GEOCHEMISTRY - About 150 rock chip samples were analysed for Au, Ag, Cu, Zn, and Pb but results were disappointing. Detectable (0.01 ppm) to geochemically elevated Au (0.02+ ppm) values were intersected over large intervals. However, only two intervals, one metre each, returned values around 0.17 g/t; both were associated with silica-chlorite-pyrite alteration and some jasper. Ag is low. Increased Cu values (1.15% over 3 m) is associated with more massive pyrite at the top of a zone of intense silicification. Zn is locally elevated and Pb is rarely above background levels.

CONCLUSIONS - Drilling and geophysical data suggest the presence of a large alteration system which is partly coherent and partly disrupted. Although geochemical results are disappointing, the area is still deemed to be prospective due to the presence of elevated Au and Cu values in a large alteration system, and to the probable extensive nature of the mineralised system (the amount of semi-massive sulphide intersected is insufficient to explain the SIROTEM anomalies).

2) - MORGANITE -

GEOPHYSICS - Grid was re-furbished, re-mapped and extended, in preparation for surface geophysics.

RECORDER: Jan Domagala **DATE:** 3/2/94.

COMPANY REPORT SUMMARY SHEET

CR: 21402 **STATUS:** Open

TITLE: Authorities to Prospect 3953M and 4007M, Mt Morgan, Queensland, Six Monthly Report to January 1990

AUTHOR(S): D. Richards **DATE:** February 1990

ATP/EP No.: 3953M and 4007M

COMPANY HOLDING TITLE: Peko Exploration Ltd and joint partner Circular Quay Holdings Pty Ltd
(Division of RGS)

COMPANY SUBMITTING REPORT: Gold Fields Exploration Pty Ltd (Division of RGS)

DATE GRANTED: 3953 on 31/1/85, 4007 on 17/5/85 **PERIOD:** 5 yrs

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 3953M is NW & SE of Mt Morgan; 4007M is SE of Mt Morgan

MINING DISTRICT:

MINES/PROSPECTS: Dee Range (Mt Dick), Morganite

EXPLORATION TARGETS/MODELS: Mt Morgan type gold deposits

SUMMARY:

Activities during the 6 month period include:

- **Dee Range** - drilling program (MD-1, MD-3, & MD-4; diamond and percussion) to test co-incident SIROTEM and I.P. anomalies in the Mt Dick area.

- drilling was completed

- geophysical survey; TEM

- **Morganite** - grid was re-furbished, re-mapped and extended, in preparation for surface geophysics

- drilling was completed

- geophysical survey; TEM

REASON FOR ACQUISITION OF TITLE - See CR's 15886 & 14825.

LOCALISED EXPLORATION/PROSPECTS

1) - DEE RANGE - Mt Dick area

GEOPHYSICS - TEM survey was undertaken over the Mt Dick area. It defined an 'eye' of a fixed-loop TEM anomaly.

DRILLING - The target defined by the 'eye' of a fixed-loop TEM anomaly was drilled (MD-5 which was redrilled due to collapsing - MD-5A).

GEOCHEMISTRY - Au results are patchy (max 0.5 g/t) and usually associated with higher Ag values (max 13 g/t), but appear unrelated to base metal values. A massive sulphide (mainly pyrite) interval over about 4 m contains elevated Cu, Pb, and Zn and locally up to 3.74% Cu.

CONCLUSIONS - The target drilled turned out to be a large alteration halo, however, it did not adequately account for the TEM anomaly. It was proposed that this halo could be peripheral to a massive sulphide deposit, located either laterally or at depth.

2) - MORGANITE -

GEOPHYSICS - A TEM survey was undertaken in the Morganite area. A report on this survey is included as Appendix 1 in CR 21402. Of a large number of anomalies defined by the survey, six targets were recommended for follow up drilling.

DRILLING - Of the six target anomalies defined by geophysics, four were considered to reflect geological contacts, whereas the other two which lay beneath the Dee Volcanics, were considered to have potential and were drilled (one hole per target).

GEOCHEMISTRY - All the Au values are below detection levels, and Ag values are mostly b.d.l. Base metals, at best, are locally geochemically elevated.

CONCLUSIONS - Although the prospect consists of an extensive zone of alteration in a favourable geological setting, the exploration program (16 pdh, 9 ddh, and geophysics) failed to find an economic deposit. Virtually all the mineralisation encountered has been pyrite, with rare base metal sulphides and low sporadic Au and Ag values.

RECORDER: Jan Domagala **DATE:** 4/2/94.

COMPANY REPORT SUMMARY SHEET

CR: 22408 **STATUS:** Open

TITLE: Exploration Permits for Minerals 3953 and 4007 Mt Morgan, Qld. Final Report on Relinquishment

AUTHOR(S): Murray, A.M. **DATE:** October 1990

ATP/EP No.: 3953 & 4007

COMPANY HOLDING TITLE: Circular Quay Holdings

COMPANY SUBMITTING REPORT: Joint reporting by Circular Quay Holdings, Elders Resources/Peko Exploration Ltd, and CRA Exploration Pty Ltd

DATE GRANTED: 3953 on 31/1/85, 4007 on 17/5/85 **PERIOD:** 5yrs

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 3953 two portions N and SE of Mount Morgan.

4007 consists of three sub-blocks adjoining the southern periphery of 3953, SE of Mount Morgan.

MINING DISTRICT:

MINES/PROSPECTS: Morganite and Dee Range prospects

EXPLORATION TARGETS/MODELS: Mount Morgan type gold deposits

SUMMARY:

The work done in the period 1/2/90 to 4/9/90 includes collecting and sending core samples to researches at ANU (results not included), and the preparation of this review report, with the intention of attracting farm-in partners. The report presents a review of the work done and conclusions reached after the various phases of exploration (summarised in the A to P summary sheet).

COMMENTS:

Two discrete areas were being worked during the final phase of exploration: the 'Morganite' prospect and 'The Dee Range Prospect'.

GEOLOGY: The oldest rocks in the area are the middle-Devonian Capella Creek Group which is unconformably overlain by the Upper Devonian and Permo-Carboniferous sequences. The Capella Creek Group is intruded by the Mt Morgan Tonalite and all are folded into a broad anticline, the axis of which coincides with The Dee Range. These units are truncated to the N, E, & S by Permian batholiths and to the W are overlain by the Permian Bowen Basin sediments. Jurassic outliers are present in the north.

Host Rock: The Dee Range mineralisation is hosted in a subdivision of the middle-Devonian Capella Group, informally termed The Mt Warner volcanics. These volcanics are coeval with the Mine Corridor volcanics (informal unit) which hosts the Morganite prospect and the Mount Morgan mineralisation, both of which lie in a volcanic roof pendant within the Mt Morgan Tonalite. These volcanic rocks are strongly deformed in both areas and accommodate extensive shear zones associated with low angle faulting. However, the timing of mineralisation differs in the two prospects, with respect to this shearing deformation. In the Dee Range prospect, the mineralisation pre-dates the deformation, whereas in the Mt Morgan Mine, the mineralisation and alteration post-date and overprint the deformation.

Mineralisation:

- Morganite prospect: The style of mineralisation in this prospect is identical to the Mount Morgan Mine, which is considered by R.G.C. to be a metasomatic replacement deposit within the Mine Corridor

Volcanics, very probably related to a phase of the Mt Morgan Tonalite. The volcanics are pervasively altered with the products of silica-chlorite-pyrite where alteration is intense. Pyrite content is generally 2-10%, probable average of 5%, with an intersection through a 12m breccia zone containing 50% pyrite as cement.

R.G.C. exploration activities undertaken in this prospect include 16 percussion holes, 9 diamond drill holes as well a comprehensive EM - 37 TEM survey

- The Dee Range prospect: The mineralised area, which extends discontinuously over about 8km, displays most of the features of classic volcanogenic deposits. Anomalous geochemistry, with values of Cu, Pb, and Zn exceeding several hundreds of ppm, extends the full length of the Dee Range. Outcropping gossans are generally lensoidal (10 x 2m), massive or semi-massive sulphide or hematite-sulphide gossans derived from pyrite and sphalerite, usually with some chalcopyrite and galena. The lensoidal nature of the mineralised zones may reflect the primary size and distribution of the bodies or, alternatively, they represent structurally dismembered portions of larger mineralised bodies.

CONCLUSIONS: There are several styles of mineralisation in the area including porphyry copper, auriferous quartz veins, however, only the Morganite and Dee Range prospects are considered to have the potential to become economic deposits.

- **The Morganite prospect** is still deemed to have potential, as the alteration and metal values are similar to those of the alteration envelope around the Mount Morgan ore deposit (the Morganite prospect yielded only low Au values, seldom >0.2 g/t, and at best, base metal values are only geochemically elevated).

- **The Dee Range prospect** remains prospective, as a large area of anomalous geochemistry which extends for about 4km remains untested. Further drilling and geophysics was recommended for the mineralisation centred on 10600E.

The tenements were relinquished after several phases of exploration, as farm-in partners were not forthcoming into the project.

REASON FOR ACQUISITION OF TITLE -

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Inability to attract farm-in partners

RECORDER: JAN DOMAGALA **DATE:**10/1/94.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: 4027M

COMPANY HOLDING TITLE: Joint Venture holders Haoma North West N.L. and Freeport of Australia (manager), (joint venture commenced in January 1986)

COMPANY SUBMITTING REPORT: Freeport of Australia Incorporated

DATE GRANTED: 25-6-85 **PERIOD:** Two years

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: approx 15km S of Bajool

MINING DISTRICT:

MINES/PROSPECTS: Austerity

EXPLORATION TARGETS/MODELS: Base metals and gold (VMS)

TRANSFERS, JOINT VENTURES, etc: Joint Venture holders Haoma North West N.L. and Freeport of Australia (manager), (joint venture commenced in January 1986)

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File-* 16131, 16132, 17248, 17249

Confidential-

SUMMARY:

GEOLOGY - 1:5 000 scale mapping was undertaken over most of the ATP, particularly the area west of the Dee Volcanics unconformity. The mapping showed a predominance of limestone, and little development of acid crystal tuffs north of the Ulam Fault system. The sequence differs south of the Ulam Fault where it is dominated by acid tuffs, in part welded, with lesser interbedded limestones and intermediate tuff varieties. The acid lithologies are essentially fine acid tuffs or tuffaceous sediments with restricted areas of acid crystal tuffs. These acid tuffs show the greatest potential for minealisation and are commonly moderately to strongly altered to sericite/chlorite with patchy silica alteration. The strongest and widest (6-700 m) alteration zone occurs in close proximity to the Ulam Fault.

Faulting is evident in the area, and the limestone appears to interfinger with the acid tuffs.

GEOCHEMISTRY -

- **rock chip sampling** - 20 rock chip samples from the A to P (none from the altered zone) produced negligible results.
- **soil sampling** - Soil samples were augered from the B horizon and analysed for Cu, Pb, Zn, Au, and Ba. Results differed from previous surveys, probably because earlier samples were collected from shallower depths. Anomalous values defined an anomalous zone some 600 m long, striking 045° Mag. roughly parallel with the Ulam Fault.

DRILLING - The eastern lobe of the anomaly, defined by the soil geochemistry, was drilled, sampled, and analysed. The second phase of drilling (seven percussion\diamond drillholes with 477.1 m RC and 109.5 m coring) was carried out to test the SIROTEM and geochemical anomalies.

GEOPHYSICS - After completion of the drilling, the holes were cased and a SIROTEM down hole program was carried out (report included results on three holes). No geophysical anomalies were detected (based on three holes).

GEOCHEMISTRY - Results of the initial drilling program include: 40-50 m interval: Au 0.08 g/t, Zn 0.72%, Cu 900ppm; 62-68 m interval: Au 0.46 g/t, Zn 1.91%, Cu 0.26%, Ag 3.0 g/t; 76-88 m interval: Au 0.24 g/t, Zn 0.35%, Cu 0.14%.

During the second phase of drilling 260 drill cuttings and 28 core samples were analysed for Au, Ag, Cu, Pb, and Zn. Results were disappointing with the best intersections from DDH7 with values of: 3 m of 1.4% Zn, and 2 m of 0.88 g/t Au. This mineralisation occurs as veins, disseminations and aggregates (dominated by sphalerite, lesser chalcopyrite, and minor galena) in an area of strong sericite silica alteration. It is likened to stringer mineralisation associated with a mineralising vent in and acid volcanic pile. The closely associated limestone may have been emplaced structurally by faulting or it may represent a primary relationship.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE -

The drilling determined the presence of base metal mineralisation with associated gold, at depth. The area is still considered to have potential to contain an economic VMS deposit. Further work was recommended:

- extension of SIROTEM coverage
- detailed mapping to determine lithologic distribution and relationships

RECORDER: J. Domagala **DATE:** 14/2/94.

COMPANY REPORT SUMMARY SHEET

CR: 16131 **STATUS:** Open

TITLE: Authority to Prospect no 4027M, Austerity - East Queensland, Report for the six months ended 25th June, 1986

AUTHOR(S): Young, D. **DATE:**

ATP/EP No.: 4027M

COMPANY HOLDING TITLE: Joint Venture holders Haoma North West N.L. and Freeport of Australia (manager), (joint venture commenced in January 1986)

COMPANY SUBMITTING REPORT: Freeport of Australia Incorporated

DATE GRANTED: 25-6-85 **PERIOD:** Two years

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: approx 15km S of Bajool

MINING DISTRICT:

MINES/PROSPECTS: Austerity

EXPLORATION TARGETS/MODELS: Base metal and gold

SUMMARY: The area was later taken up as EPM 8445

GEOLOGY - The prospect occurs in the Mount Holly Beds which include acid to intermediate tuffs, siltstones, mudstones, conglomerate and limestones.

(See EPM 8445 for more details)

LOCALISED EXPLORATION/PROSPECTS

GEOLOGY - 1:5 000 scale mapping was undertaken over most of the ATP, particularly the area west of the Dee Volcanics unconformity. The mapping showed a predominance of limestone, and little development of acid crystal tuffs north of the Ulam Fault system. The sequence differs south of the Ulam Fault where it is dominated by acid tuffs, in part welded, with lesser interbedded limestones and intermediate tuff varieties. The acid lithologies are essentially fine acid tuffs or tuffaceous sediments with restricted areas of acid crystal tuffs. These acid tuffs show the greatest potential for minealisation and are commonly moderately to strongly altered to sericite/chlorite with patchy silica alteration. The strongest and widest (6-700 m) alteration zone occurs in close proximity to the Ulam Fault.

Faulting is evident in the area, and the limestone appears to interfinger with the acid tuffs.

GEOCHEMISTRY -

- **rock chip sampling** - 20 rock chip samples from the A to P (none from the altered zone) produced negligible results.
- **soil sampling** - Soil samples were augered from the B horizon and analysed for Cu, Pb, Zn, Au, and Ba. Results differed from previous surveys, probably because earlier samples were collected from shallower depths. Anomalous values defined an anomalous zone some 600 m long, striking 045° Mag. roughly parallel with the Ulam Fault.

DRILLING - The eastern lobe of the anomaly was drilled, sampled, and analysed (40-50 m interval: Au 0.08 g/t, Zn 0.72%, Cu 900ppm; 62-68 m interval: Au 0.46 g/t, Zn 1.91%, Cu 0.26%, Ag 3.0 g/t; 76-88 m interval: Au 0.24 g/t, Zn 0.35%, Cu 0.14%)

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE -

- Defined anomalous zone on basis of soil sampling
- Eastern part of lobe was drilled, samples gave elevated Au and base metal results

Recommend that:

- the western lobe of the anomaly be drilled
- EM survey be conducted over the anomaly (previous survey by Billiton gave partial coverage over the area but lines read were parallel to the anomalous zone)

RECORDER: Jan Domagala **DATE:**10/2/94.

COMPANY REPORT SUMMARY SHEET

CR: 16132 **STATUS:** Open

TITLE: Authority to Prospect no 4027M, Austerity - East Queensland, Report on area relinquishment 25th June, 1986

AUTHOR(S): Young, D. **DATE:**

ATP/EP No.: 4027M

COMPANY HOLDING TITLE: Joint Venture holders Haoma North West N.L. and Freeport of Australia (manager), (joint venture commenced in January 1986)

COMPANY SUBMITTING REPORT: Freeport of Australia Incorporated

DATE GRANTED: 25-6-85 **PERIOD:** Two years

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: approx 15km S of Bajool

MINING DISTRICT:

MINES/PROSPECTS: Austerity

EXPLORATION TARGETS/MODELS: Base metal and gold

SUMMARY:

This is a report on the relinquishment of the 'non prospective' part of ATP 4027. The area, which contains an anomalous mineralised zone in an altered tuff horizon, was retained as ATP 4027.

RECORDER: Jan Domagala **DATE:** 11/2/94.

COMPANY REPORT SUMMARY SHEET

CR: 17248 **STATUS:** Open

TITLE: Authority to Prospect no 4027M, Austerity - East Queensland, Report for the six months ended 25th December, 1986

AUTHOR(S): Hackman, D.H., & Young, D. **DATE:**

ATP/EP No.: 4027M

COMPANY HOLDING TITLE: Joint Venture holders Haoma North West N.L. and Freeport of Australia (manager), (joint venture commenced in January 1986)

COMPANY SUBMITTING REPORT: Freeport of Australia Incorporated

DATE GRANTED: 25-6-85 **PERIOD:** Two years

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: approx 15km S of Bajool

MINING DISTRICT:

MINES/PROSPECTS: Austerity

EXPLORATION TARGETS/MODELS: Base metal and gold

SUMMARY:

Exploration activity during the six month period was limited to a SIROTEM geophysical survey.

GEOLOGY - The prospect occurs in the Mount Holly Beds which include acid to intermediate tuffs, siltstones, mudstones, conglomerate and limestones.

(See EPM 8445 for more details)

LOCALISED EXPLORATION/PROSPECTS

GEOLOGY - 1:5 000 scale mapping (CR 16131) was undertaken over most of the ATP, particularly the area west of the Dee Volcanics unconformity. The mapping showed a predominance of limestone, and little development of acid crystal tuffs north of the Ulam Fault system. The sequence differs south of the Ulam Fault where it is dominated by acid tuffs, in part welded, with lesser interbedded limestones and intermediate tuff varieties. The acid lithologies are essentially fine acid tuffs or tuffaceous sediments with restricted areas of acid crystal tuffs. These acid tuffs show the greatest potential for minealisation and are commonly moderately to strongly altered to sericite/chlorite with patchy silica alteration. The strongest and widest (6-700 m) alteration zone occurs in close proximity to the Ulam Fault.

Faulting is evident in the area, and the limestone appears to interfinger with the acid tuffs.

GEOPHYSICS - The SIROTEM survey (report included) was designed to follow up the geochemical anomaly and alteration zone defined by the earlier soil survey and mapping. An earlier SIROTEM survey by Billiton proved to be inferior.

Two anomalous were defined and recommended for drilling. One occurs in a limestone where no geochemical sampling was carried out, the other is a zone closely coincident with the previously defined geochemically anomalous altered zone.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE -

- On basis of SIROTEM survey, two targets were defined and recommended for drilling

RECORDER: Jan Domagala **DATE:** 11/2/94.

COMPANY REPORT SUMMARY SHEET

CR: 17249 **STATUS:** Open

TITLE: Authority to Prospect no 4027M, Austerity - East Queensland, Report for the six months ended 25th June, 1987

AUTHOR(S): Stallman, M.N., & Young, D. **DATE:**

ATP/EP No.: 4027M

COMPANY HOLDING TITLE: Joint Venture holders Haoma North West N.L. and Freeport of Australia (manager), (joint venture commenced in January 1986)

COMPANY SUBMITTING REPORT: Freeport of Australia Incorporated

DATE GRANTED: 25-6-85 **PERIOD:** Two years

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: approx 15km S of Bajool

MINING DISTRICT:

MINES/PROSPECTS: Austerity

EXPLORATION TARGETS/MODELS: Base metal and gold

SUMMARY:

Exploration activity during the six month period was limited drilling to follow-up the SIROTEM geophysical survey and geochemical survey.

GEOLOGY - The prospect occurs in the Mount Holly Beds which include acid to intermediate tuffs, siltstones, mudstones, conglomerate and limestones.

(See EPM 8445 for more details)

LOCALISED EXPLORATION/PROSPECTS

GEOLOGY - 1:5 000 scale mapping (CR 16131) was undertaken over most of the ATP, particularly the area west of the Dee Volcanics unconformity. The mapping showed a predominance of limestone, and little development of acid crystal tuffs north of the Ulam Fault system. The sequence differs south of the Ulam Fault where it is dominated by acid tuffs, in part welded, with lesser interbedded limestones and intermediate tuff varieties. The acid lithologies are essentially fine acid tuffs or tuffaceous sediments with restricted areas of acid crystal tuffs. These acid tuffs show the greatest potential for mineralisation and are commonly moderately to strongly altered to sericite/chlorite with patchy silica alteration. The strongest and widest (6-700 m) alteration zone occurs in close proximity to the Ulam Fault.

Faulting is evident in the area, and the limestone appears to interfinger with the acid tuffs.

The drilling indicated that the acid volcanic pile grades into limestone to the north, with the intermediate lithology represented by a limy acid tuff.

GEOFYSICS - After completion of the drilling, the holes were cased and a SIROTEM down hole program was carried out (report included results on three holes). No geophysical anomalies were detected (based on three holes).

DRILLING - Drilling (seven percussion\diamond drillholes with 477.1 m RC and 109.5 m coring) was undertaken to test the anomalies defined by the SIROTEM and geochemical surveys.

GEOCHEMISTRY - 260 drill cuttings and 28 core samples were analysed for Au, Ag, Cu, Pb, and Zn. Results were disappointing with the best intersections from DDH7 with values of: 3 m of 1.4% Zn, and 2 m of 0.88 g/t Au. This mineralisation occurs as veins, disseminations and aggregates (dominated by sphalerite, lesser chalcopyrite, and minor galena) in an area of strong sericite silica alteration. It is likened to stringer mineralisation associated with a mineralising vent in and acid volcanic pile. The closely associated limestone may have been emplaced structurally by faulting or it may represent a primary relationship.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE -

The drilling determined the presence of base metal mineralisation, with associated gold, at depth. The area is still considered to have potential to contain an economic VMS deposit. Further work was recommended:

- extension of SIROTEM coverage
- detailed mapping to determine lithologic distribution and relationships

RECORDER: Jan Domagala **DATE:**11/2/94.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 4087

COMPANY HOLDING TITLE: Haoma North West N.L. (on behalf of joint venture; partner Freeport of Australia Inc)

COMPANY SUBMITTING REPORT: Freeport McMoRan Australia Limited

DATE GRANTED: 13-9-85 **PERIOD:** 2 yrs

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: approx 20-40 km south of Bajool

MINING DISTRICT:

MINES/PROSPECTS: Upper Don River, Fern Hills Prospects, Alma Creek, Bullock Creek, Stockyard Creek, Top of Kangaroo Creek, Queen of Sheeba Mine, Mount Isobel, Shadow, North Mount Helen, Limestone Creek, Diggers Dive Mine, Riverhead, Marble Mountain, Jim's Claim Mine, King Solomon Mines.

EXPLORATION TARGETS/MODELS: Mt Morgan style Au-Cu mineralisation

TRANSFERS, JOINT VENTURES, etc: Haoma North West N.L. with joint venture partner Freeport of Australia Inc

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File-* 16816, 16817, 16818, 16819, 16820, 18944, 18784

Confidential-

SUMMARY:

GEOLOGY

- As a result of regional mapping over the whole area (1:10 000 with map presented at 1:25 000) the stratigraphic relationships of the units is better understood. Seven units were identified in the area.

Mount Holly Beds - This unit is limited to confined fault bounded blocks in the vicinity of Ayrdrrie Homestead and as small inliers overlying the Capella Creek Beds in the Fern Hills area. It consists of a series of pyroclastics, volcanoclastics, and minor limestone (detailed description of lithologies is in CR 16819). Although a clear subdivision of the unit is not obvious, the upper part consists of tuffaceous sediments and limestone, whereas the lower part consists essentially of intermediate massive tuffs which contain occasional lenses of limestone in association with tuffaceous sediments.

The Mount Holly Beds exhibit a north to north-west trending, steeply dipping foliation which is locally represented by a slaty cleavage, and elsewhere by flattened pebbles. Bedding and folds are not readily discernable.

The contacts with the Capella Creek Beds is generally faulted, however, in the Fern Hills-Shadow area the contact may be an angular unconformity. Although a primary contact between the two units has not been observed, it is inferred to be unconformable, as the degree of deformation in the Mount Holly Beds is considered to be higher than that which occurs in the younger Capella Creek Beds. The Mount Holly Beds appear to be preferentially intruded by the Permian Stockyard Creek Granodiorite, with skarns (apparently barren of significant base metals) developed at the metamorphosed contacts.

Mineralisation in the unit is represented by weakly gossanous veinworks and strongly iron stained zones through out the formation. Background gold values are higher than the younger formations. Quartz-sericite alteration is widespread within some members of the formation and some associated malachite has been observed in the Fern Hills area. Weak propylitic alteration is less common.

Capella Creek Beds - Two fairly well defined units occur in this widespread formation, the lower unit consisting of pyroclastics and volcanoclastics (massive tuff suite) and the upper unit of volcanoclastics and sediments (bedded tuff suite). A detailed description of the lithologies is included in the report (CR 16819); a measured section is also included (Fig.10).

The beds strike approximately N-NW and dip 30°-60° to the west. Open broad folds are apparent and a very weak bedding parallel foliation is locally developed.

The contact with the underlying Mount Holly Beds is commonly faulted, but at Fern Hills it may be an angular unconformity. The Dee Volcanics and the younger Boulder Creek Grits unconformably overlie or are faulted against the Capella Creek Beds.

The unit is weakly metamorphosed and weak propylitic alteration is common throughout, with minor occurrences of albite-silica ovoid alteration.

Fragmental zinc mineralisation occurs at the Upper Don River and Fern Hills prospects. Small pyrite mineralised quartz veins, some of which were worked for gold in the past, occur locally in the unit. The gossanous skarn at Marble Mountain was sampled by Geopeko and Freeport was found to be weakly anomalous in base, precious metals and tungsten.

Dee Volcanics - The Dee Volcanics consist of a series of partly sub-aerial pyroclastics and volcanoclastics composed mainly of intermediate crystal and crystal lithic tuffs, with lesser tuffaceous sediments. The base of the unit is marked by a boulder conglomerate (see measured section, Fig.9 in CR 16819).

Bedding in the unit is well defined, dips are generally shallow to the south-west and striking north-west. The unit unconformably overlies or is faulted against the older Capella Creek Beds and in turn is overlain, unconformably or partly conformably, by the younger Boulder Creek Grits.

Mineralisation is mainly restricted to minor quartz veins carrying gold. High Cu geochemical backgrounds are often associated with the intermediate volcanics but are of no economic significance.

Boulder Creek Grits - The Boulder Creek Grits consist of a volcanoclastic sequence made up of coarse pebble conglomerate, volcanic lithic arenite and conglomerate, volcanic sandstone, volcanic siltstone, and minor slightly reworked lithic tuff. The base of the unit is marked by a volcanic pebble conglomerate with sub-angular to sub-rounded clasts. Bedding is generally sub-horizontal. The contact with the underlying Dee Volcanics appears to be conformable, the contact with the overlying Pond Formation is either conformable or unconformable. Numerous fossil beds with diagnostic fossils occur within the sequence. No mineralisation was observed in the unit.

Pond Formation - This unit occurs in the Manton Creek area where only the lower part is represented. It consists of volcanic lithic arenite to pebbly conglomerate, feldspar crystal lithic tuff and minor silty andesite?. Fossil beds are common and indicate a Carboniferous, Tournasian age. The beds dip shallowly to the west and appear to unconformably overlie the Boulder Creek Grits.

Stockyard Creek Granodiorite - The unit is essentially a biotite hornblende granodiorite, with minor adamellite and a weakly pegmatitic phase. The contact metamorphic effect in the adjacent rocks is fairly narrow and variable in width (up to 300 m thick). This suggests a steep contact. The absence of quartz veining associated with the intrusion suggests a dry melt.

No significant mineralisation was observed, however, skarns associated with limy lithologies are weakly anomalous in base and precious metals.

Undifferentiated Diorite - A number of small diorite stocks intrude the Devonian lithologies at King Solomon, Grasstree Creek yards, Riverhead, and Mt Cedric. These stocks, which may be related to the Stockyard Creek Granodiorite, appear to be emplaced along zones of tectonic weaknesses defined by fault zones.

The weakly mineralised (anomalous gold) quartz veins at King Solomon and Queen of Sheba Mines appear to be associated with the diorite stock. Skarns associated with the diorites carry no mineralisation of economic significance.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Six areas have been prospected in the early 1900's (King Solomon North, King Solomon Mines, Queen of Sheba, Diggers Drive, Upper Don Alluvials, and Jim's Claim). Gold at the Upper Don Alluvials are fairly restricted in area, and appear to be derived from the basal units of the Dee Volcanics closely associated with the unconformity with the Capella Creek Beds. The other deposits are generally small in size with mulloch dumps indicating less than 100 tonnes of material removed. These deposits are developed on narrow quartz veins which in part carry sulphides.

Modern exploration had been carried out under five previous ATP's (146M, 508M, 667M, 2552M, and 3526M). No work was reported under ATP 146M & 2552M, and no work was carried out in the current area under ATP 667M.

508M was the focus of the most intense exploration carried out by Geopeko and later Renison Goldfields. They undertook:

- stream sampling (15-30 samples per square kilometre) with assays for Cu, Zn, and some Pb,
- aerial surveys including aeromagnetic and Input (EM) surveys
- geological mapping at 1:25 000

Follow-up work included:

- geological mapping at 1:10 000
- ridge and spur soil sampling
- ground magnetics
- ground SP and TEM traversing
- limited rock chip sampling and costeaning of Queen of Sheba prospect

Geopeko identified six anomalous zones for follow-up work, however, the joint venture relinquished the ATP in May 1984.

ATP3526, which surrounded ATP508, was held by Electrolyte Zinc. From cursory inspection and compilation of available data they concluded that most of the volcanics and sediments were too shallow to be prospective. They attributed the stream sediment anomalies defined by Geopeko to be derived from coarse intermediate tuffs and agglomerates which were leached of their base metal values.

CURRENT EXPLORATION

GEOCHEMISTRY - Limited **rock chip sampling** by Haoma and Freeport of the known gold localities suggest that the gold occurrence is patchy in nature. Best gold values were obtained from Queen of Sheba 145 g/t, 17 g/t, and 8.3 g/t, and King Solomon 6.8 g/t, and 5.3 g/t, which appeared to be associated with sulphides. Diggers Creek and Jim's Claim returned poor results.

- **stream sediment sampling** - 86 samples (of 5 kg) were analysed for Au by bulk cyanide leach techniques. Low values were returned. This was attributed to the method used, however, pan concentration samples collected at the same sites returned similar results.

Results of an earlier stream sediment program by Geopeko was re-evaluated by Freeport who determined threshold, anomalous, and highly anomalous cutoff values.

	THRESHOLD	ANOMALOUS	HIGHLY ANOMALOUS
Cu	80 ppm	120 ppm	500 ppm
Pb	50 ppm	90 ppm	-
Zn	95ppm	170 ppm	500 ppm

PREVIOUS EXPLORATION - See CR 16816

LOCALISED EXPLORATION/PROSPECTS

On the basis of geochemistry, geophysics, or mineralisation significance, a number of areas within the prospect were examined in detail. These include: **Alma Creek, Bullock Creek, Stockyard Creek, Top of Kangaroo Creek, Queen of Sheeba Mine, Mount Isobel, Shadow, North Mount Helen, Limestone Creek, Diggers Dive Mine, Riverhead, Marble Mountain, Jim's Claim Mine, King Solomon Mines.**

Details of the anomalies, host rock, and style of mineralisation of these areas are given in the text (CR 16819). In summary, the mineralisation in these areas is associated mainly with quartz veins which are, for the most part, structurally controlled. Mineralisation associated with dyke and granitoid intrusions is less common. The host rock is dominantly the Capella Creek Beds, less commonly the Mount Holly Beds, one occurrence in each of the Dee Volcanics and the Boulder Creek Grits.

Fragmental sphalerite mineralisation occurs in the **lower Capella Creek Beds** in the **Upper Don River** and **Fern Hills** areas. Similar mineralisation occurs in the **Mount Holly Beds** at **Ajax** and **Austerity**. The occurrence of this style of mineralisation in both units suggests that this mineralising event spans the Mount Holly-Capella Creek contact. It was therefore recommended that anomalies in close proximity to the contact should be investigated.

Included in the report (CR 16819) is a record of the 68 rock chip samples and their analysis results (Cu, Pb, Zn, Ag, and Au)

LOCALISED EXPLORATION/PROSPECTS

- Previous exploration at the **Fern Hills** and **Upper Don River Prospects** has revealed the presence of anomalous zinc-rich base metal mineralisation with associated soil geochemistry anomalies. Highly altered lithologies with associated pyrite mineralisation and anomalous SIROTEM responses also occur at the Fern Hills Prospects.

The mineralisation at both prospects occurs as fracture related veinworks and as detrital clasts. Minor stratiform pyrite mineralisation with possible associated fine sphalerite also occurs.

CONCLUSIONS:

Drilling results in both the **Fern Hills** and **Upper Don River Prospects** was disappointing with the mineralisation intersected being lower grade and less extensive than expected (**Fern Hills:** Cu 10-4550 ppm, Pb <5-1750 ppm, Zn 10 ppm-2.34%, Ag 2-7 ppm, Au <0.01-0.09 ppm; **Upper Don River:** Cu5-440 ppm, Pb <5-1500 ppm, Zn 50 ppm-1.4%, Ag 1-3 ppm, Au up to 0.11 ppm). Minor veinwork sphalerite mineralisation with rare galena and chalcopyrite was intersected at both prospects.

There appear to be two interpretations for the mineralisation:

- 1) that the mineralising event took place during the time of deposition of the Mount Holly Beds and the lower part of the Capella Creek Beds. The erratic occurrence of the mineralisation suggests that it was diluted and scattered throughout both formations.
- 2) given the evidence of occurrence of the detrital clasts of massive sulphide, it is possible that the mineralisation is derived from a massive sulphide body at depth.

The veinwork sphalerite may have been re-mobilised from these clasts, or possibly from the deeper weakly zinciferous units, into open space fractures. An underlying heat source may have aided in the re-mobilising process.

No further work was recommended on the prospect as it was considered that the targets were adequately tested.

RECORDER: Jan Domagala **DATE:** 24/2/94.

COMPANY REPORT SUMMARY SHEET

CR: 16816 **STATUS:** Open

TITLE: Authority to Prospect No 4087M, Ulam Range - East Queensland, Report for the six months ended 13th March, 1986

AUTHOR(S): Young, D. **DATE:**

ATP/EP No.: ATP 4087

COMPANY HOLDING TITLE: Haoma North West N.L. (on behalf of joint venture; partner Freeport of Australia Inc)

COMPANY SUBMITTING REPORT: Freeport of Australia Incorporated

DATE GRANTED: 13-9-85 **PERIOD:** 2 yrs

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: approx 20-40 km south of Bajool

MINING DISTRICT:

MINES/PROSPECTS: Area includes: King Solomon North, King Solomon Mines, Queen of Sheba, Diggers Drive, Upper Don Alluvials, and Jim's Claim

EXPLORATION TARGETS\MODELS: Mt Morgan style Au-Cu mineralisation

SUMMARY:

Work during the six month period includes:

- evaluation and reinterpretation of previous exploration data
- stream sediment sampling for Au
- eight areas were defined as targets for ground checking

REASON FOR ACQUISITION OF TITLE -

GEOLOGY -

REGIONAL - The area lies in the Calliope Block which is interpreted as a remnant of an Island Arc (Capella Creek Beds) formed in the Late Silurian to Mid Devonian. These rocks were folded along a north-north-west axis at the end of the Middle Devonian, and the Mt Morgan Tonalite was emplaced at about the same time. They are unconformably overlain by rocks of the Yarrol Shelf (Dee Volcanics, Pond Formation etc) which were dominated by volcanoclastic sediments with lesser calc-alkaline volcanics.

A Mid to Late Permian deformation event produced open folds along a north-north-west axis, as well as high angle reverse faults. Post deformation granitoids of Late Permian to early Triassic age (Stockyard Creek granodiorite) were subsequently intruded into a then stable cratonic continental margin crust.

LOCAL - Four main units occur in the area:

- 1) Capella Creek Beds -** These rocks outcrop over 70% of the area. They consist of acid lithic and crystal tuffs, feldspathic tuffs, chert, quartz feldspar porphyry, and abundant limestone. Bedding is moderate to steep and defines a major NNW trending antiform known as the Gracemere Anticline at the northern end of the range.
- 2) Dee Volcanics -** The Dee Volcanics overlie and are faulted against the Capella Creek Beds and flank the Capella Creek antiform. They consist of intermediate lithic tuffs, andesitic lavas and feldspar porphyries, with minor sediments particularly greywackes and argillites. Dips are generally less than 45°.
- 3) Pond Formation -** This unit, which consists of acid lithic tuffs, feldspar porphyry, quartz feldspar porphyry and tuffaceous sandstone, either unconformably overlie the Capella Creek Beds or conformably overlie the Dee Volcanics.
- 4) Stockyard Creek Granodiorite -** This Permian to Early Triassic intrusive unit consists generally of granodiorite or adamellite. Although the unit has not been subdivided, magnetic patterns suggest that differentiates of more mafic lithologies are present.

MINERALISATION/ALTERATION -

Gold - Gold is known from six localities: King Solomon North, King Solomon Mine, Queen of Sheba, Diggers Dive, and Jim's Claim. The gold was recovered from quartz veins. At King Solomons Mine and Queen of Sheba, sulphides are associated with the quartz veining, whereas at King Solomon North skarns are associated with the veining.

Limited rock chip sampling by Haoma and Freeport of the known gold localities suggest that the gold occurrence is patchy in nature. Best gold values were obtained from Queen of Sheba 145 g/t, 17 g/t, and 8.3 g/t, and King Solomon 6.8 g/t, and 5.3 g/t, which appeared to be associated with sulphides. Diggers Creek and Jim's Claim returned poor results.

Base Metals - Zinc is known from the Fern Hills and Upper Don River Prospects where it occurs as coarse grained fragmental sphalerite associated with dark highly siliceous lithic lapilli tuff probably of acid composition, which shows patchy white silicification.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Six areas have been prospected in the early 1900's (King Solomon North, King Solomon Mines, Queen of Sheba, Diggers Drive, Upper Don Alluvials, and Jim's Claim). Gold at the Upper Don Alluvials are fairly restricted in area, and appear to be derived from the basal units of the Dee Volcanics closely associated with the unconformity with the Capella Creek Beds. The other deposits are generally small in size with mulloch dumps indicating less than 100 tonnes of material removed. These deposits are developed on narrow quartz veins which in part carry sulphides.

Modern exploration had been carried out under five previous ATP's (146M, 508M, 667M, 2552M, and 3526M). No work was reported under ATP 146M & 2552M, and no work was carried out in the current area under ATP 667M.

508M was the focus of the most intense exploration carried out by Geopeko and later Renison Goldfields. They undertook:

- stream sampling (15-30 samples per square kilometre) with assays for Cu, Zn, and some Pb,
- aerial surveys including aeromagnetic and Input (EM) surveys
- geological mapping at 1:25 000

Follow-up work included:

- geological mapping at 1:10 000
- ridge and spur soil sampling
- ground magnetics
- ground SP and TEM traversing
- limited rock chip sampling and costeaning of Queen of Sheba prospect

Geopeko identified six anomalous zones for follow-up work, however, the joint venture relinquished the ATP in May 1984.

ATP3526, which surrounded ATP508, was held by Electrolyte Zinc. From cursory inspection and compilation of available data they concluded that most of the volcanidcs were sub-aerial adn sediments were too shallow to be prospective. They attributed the stream sediment anomalies defined by Geopeko to be derived from coarse intermediate tuffs and agglomerates which were leached of their base metal values.

CURRENT EXPLORATION

GEOCHEMISTRY - Limited **rock chip sampling** by Haoma and Freeport of the known gold localities suggest that the gold occurrence is patchy in nature. Best gold values were obtained from Queen of Sheba 145 g/t, 17 g/t, and 8.3 g/t, and King Solomon 6.8 g/t, and 5.3 g/t, which appeared to be associated with sulphides. Diggers Creek and Jim's Claim returned poor results.

- **stream sediment sampling** - 86 samples (of 5 kg) were analysed for Au by bulk cynide leach techniques. Low values were returned. This was attributed to the method used, however, pan concentration samples collected at the same sites returned similar results.

Results of an earlier stream sediment program by Geopeko was re-evaluated by Freeport who determined threshold, anomalous, and highly anomalous cutoff values.

	THRESHOL D	ANOMALOUS	HIGHLY ANOMALOUS
Cu	80 ppm	120 ppm	500 ppm
Pb	50 ppm	90 ppm	-

Zn	95ppm	170 ppm	500 ppm
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Several targets were identified and prioritised as follows:

- **First priority** targets were the **Fern Hills and Upper Don - Upper Manton Creek** areas where base metal stream sediment anomalies coincide with zinc rich acid fragmentals.
- **Second priority** targets were the altered acid lithologies associated with the **King Solomon - Queen of Sheba** area, which show significant gold mineralisation in quartz veins. Other secondary priority targets are the **Alma Creek** lead anomalous zone and the **Shadow** magnetic anomaly with adjacent weak Input anomaly.
- **Third priority** targets were Input anomalies at **Stockyard Creek** and **Branch Creek**.

GEOPHYSICS - Existing geophysics was reviewed.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE -

RECORDER: Jan Domagala **DATE:**15/2/94.

COMPANY REPORT SUMMARY SHEET

CR: 16817 **STATUS:** Open

TITLE: Authority to Prospect No 4087M, Ulam Range - East Queensland, Report for the six months ended 13th September, 1986

AUTHOR(S): Hackman, D.H., Stallman, M.N., & Young, D.I. **DATE:**

ATP/EP No.: ATP 4087

COMPANY HOLDING TITLE: Haoma North West N.L. (on behalf of joint venture; partner Freeport of Australia Inc)

COMPANY SUBMITTING REPORT: Freeport of Australia Incorporated

DATE GRANTED: 13-9-85 **PERIOD:** 2 yrs

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: approx 20-40 km south of Bajool

MINING DISTRICT:

MINES/PROSPECTS: Upper Don River, Manton Creek, Fern Hills Prospects; Area includes: King Solomon North, King Solomon Mines, Queen of Sheba, Diggers Drive, Upper Don Alluvials, and Jim's Claim

EXPLORATION TARGETS/MODELS: Mt Morgan style Au-Cu mineralisation

SUMMARY:

Work during the six month period concentrated on three areas: the Upper Don River, Manton Creek, Fern Hills Prospects.

REASON FOR ACQUISITION OF TITLE -

GEOLOGY - See CR 16816

MINERALISATION/ALTERATION - See CR 16816

REGIONAL EXPLORATION See CR 16816

PREVIOUS EXPLORATION - See CR 16816

LOCALISED EXPLORATION/PROSPECTS

1) - **FERN HILLS PROSPECT** - Exploration of this prospect was mainly limited to compilation and review of soil geochemical results generated by previous explorers. Petrography of one rock sample shows detrital clasts of massive and semi-massive sulphides possibly derived from the erosion of a massive sulphide body.

2) - **UPPER DON RIVER AND MANTON CREEK PROSPECT** - Grids were re-established, soil samples (B horizon; if not present C horizon was sampled) were collected and analysed for Cu, Pb, Zn, Au, Hg, Se, Te, As, and Sb. Detailed mapping at 1:1 000 was carried out over the gridded prospect area; rock chip, petrological, and palaeontological samples were collected for analysis and identification.

GEOLOGY - Two major formations were recognised in the prospect area: a **lower unit** which is tentatively correlated with the **Capella Creek Beds**; the **upper unit** of upper Devonian age, which appears to correlate with the **Dee Volcanics**. This upper unit either unconformably overlies or is faulted against the lower unit.

The **Capella Creek Beds** in the area were subdivided into a lower? **massive tuff suite** (Dma1 to Dma9) and an **upper bedded tuff suite** (Dma10 to Dma14) possibly separated by an unconformity. This upper unit was not recognised in the Manton Creek prospect area. Most of these subdivisions are described on the map and in the text in CR 16817.

The unit which has been equated with the **Dee Volcanics** was also subdivided (Dud1 to Dud8) and most are described in the text and on a map in CR 16817.

In the Manton Creek area the **Pond Formation** unconformably overlies the Dee Volcanics, although there is a partial conformity in other areas.

The report also includes a petrological report on samples from the Manton Creek, Upper Don River and Fern Hills Prospects.

GEOCHEMISTRY - Poor geochemical results from the **Manton Creek area** suggests that no further work be undertaken in that area.

At the **Upper Don area** significant Cu-Zn mineralisation is scattered within the **massive tuff suite** of the **Capella Creek Beds**. This disseminated mineralisation is hosted by intermediate pyroclastics of probable marine deposition with lesser input from an acid source. Alteration associated in part with the mineralisation was most likely due to a hornfelsing event which occurred later than and remobilised the mineralisation.

The mineralisation is copper zinc rich and is associated with sericitization and local silicification and would appear to extend for at least 2.4 km. The propylitic alteration which also occurs in the area does not appear to have influenced the mineralisation.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE -

Further work for the both the **Upper Don** and **Fern Hills prospects** was recommended as follows:

- extend geological mapping and sampling
- electrical geophysics (SIROTEM or similar method) be undertaken

No further work was recommended for the Manton Creek prospect area.

RECORDER: Jan Domagala **DATE:** 16/2/94.

COMPANY REPORT SUMMARY SHEET

CR: 16818 **STATUS:** Open

TITLE: Authority to Prospect No 4087M, Ulam Range - East Queensland, Report for the six months ended 13th March, 1987

AUTHOR(S): Stallman, M.N., & Young, D.I. **DATE:**

ATP/EP No.: ATP 4087

COMPANY HOLDING TITLE: Haoma North West N.L. (on behalf of joint venture; partner Freeport of Australia Inc)

COMPANY SUBMITTING REPORT: Freeport of Australia Incorporated

DATE GRANTED: 13-9-85 **PERIOD:** 2 yrs

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: approx 20-40 km south of Bajool

MINING DISTRICT:

MINES/PROSPECTS: Upper Don River, Manton Creek, Fern Hills Prospects; Area includes: King Solomon North, King Solomon Mines, Queen of Sheba, Diggers Drive, Upper Don Alluvials, and Jim's Claim

EXPLORATION TARGETS/MODELS: Mt Morgan style Au-Cu mineralisation

SUMMARY:

Work during the six month period involved unsuccessful attempts at two SIROTEM surveys in the Upper Don River prospect, and evaluation of previous data.

Work could not proceed on the Fern Hills prospect, as permission to enter the area was not gained till late in the period.

A petrographic report on samples from the Upper Don River Prospect is included, as well as a report on fossils from the Upper Don River and Manton Creek areas.

REASON FOR ACQUISITION OF TITLE -

GEOLOGY - See CR 16816

MINERALISATION/ALTERATION - See CR 16816

REGIONAL EXPLORATION See CR 16816

PREVIOUS EXPLORATION - See CR 16816

LOCALISED EXPLORATION/PROSPECTS

1) - FERN HILLS PROSPECT - Work could not proceed on this prospect, as permission to enter the area was not gained till late in the period.

2) - UPPER DON RIVER PROSPECT - Attempts to carry out two SIROTEM surveys in this prospect proved unsuccessful due to low signal strengths caused by the extremely highly resistive conditions. The program was rescheduled to the winter months.

As a result of evaluation of previous data, lithologies previously assigned to the Dee Volcanics (Dud4 to Dud8) have been reassigned to the **Boulder Creek Grit** (a unit not previously recognised in the area).

Fossil identifications have confirmed the lower units to be most likely Capella Creek equivalents.

The oldest rocks in the area appear to be Givetian whereas the Mount Morgan Corridor sequence are older, Emsian - Eifelian. On the basis of these ages the exploration program was reappraised to include a regional mapping program in the area to try and identify rocks similar in age to the Mt Morgan Corridor sequence.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE -

The recommendations of the previous report (CR 16817) still apply to this report. In addition, mapping is to be undertaken in the area to try to identify rocks of similar age to the Mount Morgan sequence.

RECORDER: Jan Domagala **DATE:**16/2/94.

COMPANY REPORT SUMMARY SHEET

CR: 16819 **STATUS:** Open

TITLE: Authority to Prospect No 4087M, Ulam Range - East Queensland, Report for the six months ended 15th September, 1987

AUTHOR(S): Stallman, M.N., & Young, D.I. **DATE:**

ATP/EP No.: ATP 4087

COMPANY HOLDING TITLE: Haoma North West N.L. (on behalf of joint venture; partner Freeport of Australia Inc)

COMPANY SUBMITTING REPORT: Freeport of Australia Incorporated

DATE GRANTED: 13-9-85 **PERIOD:** 2 yrs

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: approx 20-40 km south of Bajool

MINING DISTRICT:

MINES/PROSPECTS: Upper Don River, Fern Hills Prospects;

Area examined includes: Alma Creek, Bullock Creek, Stockyard Creek, Top of Kangaroo Creek, Queen of Sheeba Mine, Mount Isobel, Shadow, North Mount Helen, Limestone Creek, Diggers Dive Mine, Riverhead, Marble Mountain, Jim's Claim Mine, King Solomon Mines.

EXPLORATION TARGETS\MODELS: Mt Morgan style Au-Cu mineralisation

SUMMARY:

Work during this period consisted of regional mapping program over the whole area to improve the understanding of the geology, particularly to identify the alteration, lithologies, and mineralisation similar to that which occurs in the Mt Morgan area.

68 rock chip samples were collected and analysed from selected areas.

Work over the **Fern Hills prospect** involved: completion of the grid, soil sampling and analysis, geological mapping, and SIROTEM survey.

Old workings of interest were sketch mapped and figures presented.

REASON FOR ACQUISITION OF TITLE -

GEOLOGY - See CR 16816

MINERALISATION/ALTERATION - See CR 16816

REGIONAL EXPLORATION

GEOLOGY

- As a result of regional mapping over the whole area (1:10 000 with map presented at 1:25 000) the stratigraphic relationships of the units is better understood. Seven units were identified in the area.

Mount Holly Beds - This unit is limited to confined fault bounded blocks in the vicinity of Ayrdrrie Homestead and as small inliers overlying the Capella Creek Beds in the Fern Hills area. It consists of a series of pyroclastics, volcanoclastics, and minor limestone (detailed description of lithologies is in CR 16819). Although a clear subdivision of the unit is not obvious, the upper part consists of tuffaceous sediments and limestone, whereas the lower part consists essentially of intermediate massive tuffs which contain occasional lenses of limestone in association with tuffaceous sediments.

The Mount Holly Beds exhibit a north to north-west trending, steeply dipping foliation which is locally represented by a slaty cleavage, and elsewhere by flattened pebbles. Bedding and folds are not readily discernable.

The contacts with the Capella Creek Beds is generally faulted, however, in the Fern Hills-Shadow area the contact may be an angular unconformity. Although a primary contact between the two units has not been observed, it is inferred to be unconformable, as the degree of deformation in the Mount Holly Beds is considered to be higher than that which occurs in the younger Capella Creek Beds. The Mount Holly Beds appear to be preferentially intruded by the Permian Stockyard Creek Granodiorite, with skarns (apparently barren of significant base metals) developed at the metamorphosed contacts.

Mineralisation in the unit is represented by weakly gossanous veinworks and strongly iron stained zones through out the formation. Background gold values are higher than the younger formations. Quartz-sericite alteration is widespread within some members of the formation and some associated malachite has been observed in the Fern Hills area. Weak propylitic alteration is less common.

Capella Creek Beds - Two fairly well defined units occur in this widespread formation, the lower unit consisting of pyroclastics and volcanoclastics (massive tuff suite) and the upper unit of volcanoclastics and sediments (bedded tuff suite). A detailed description of the lithologies is included in the report (CR 16819); a measured section is also included (Fig.10).

The beds strike approximately N-NW and dip 30°-60° to the west. Open broad folds are apparent and a very weak bedding parallel foliation is locally developed.

The contact with the underlying Mount Holly Beds is commonly faulted, but at Fern Hills it may be an angular unconformity. The Dee Volcanics and the younger Boulder Creek Grits unconformably overly or are faulted against the Capella Creek Beds.

The unit is weakly metamorphosed and weak propylitic alteration is common throughout, with minor occurrences of albite-silica ovoid alteration.

Fragmental zinc mineralisation occurs at the Upper Don River and Fern Hills prospects. Small pyrite mineralised quartz veins, some of which were worked for gold in the past, occur locally in the unit. The gossanous skarn at Marble Mountain was sampled by Geopeko and Freeport was found to be weakly anomalous in base, precious metals and tungsten.

Dee Volcanics - The Dee Volcanics consist of a series of partly sub-aerial pyroclastics and volcanoclastics composed mainly of intermediate crystal and crystal lithic tuffs, with lesser tuffaceous sediments. The base of the unit is marked by a boulder conglomerate (see measured section, Fig.9 in CR 16819).

Bedding in the unit is well defined, dips are generally shallow to the south-west and striking north-west. The unit unconformably overlies of is faulted against the older Capella Creek Beds and in turn is overlain, unconformably or partly conformably, by the younger Boulder Creek Grits.

Mineralisation is mainly restricted to minor quartz veins carrying gold. High Cu geochemical backgrounds are often associated with the intermediate volcanics but are of no economic significance.

Boulder Creek Grits - The Boulder Creek Grits consist of a volcanoclastic sequence made up of coarse pebble conglomerate, volcanic lithic arenite and conglomerate, volcanic sandstone, volcanic siltstone, and minor slightly reworked lithic tuff. The base of the unit is marked by a volcanic pebble conglomerate with sub-angular to sub-rounded clasts. Bedding is generally sub-horizontal. The contact with the underlying Dee Volcanics appears to be conformable, the contact with the overlying Pond Formation is either conformable or unconformable. Numerous fossil beds with diagnostic fossils occur within the sequence. No mineralisation was observed in the unit.

Pond Formation - This unit occurs in the Manton Creek area where only the lower part is represented. It consists of volcanic lithic arenite to pebbly conglomerate, feldspar crystal lithic tuff and minor silty andesite?. Fossil beds are common and indicate a Carboniferous, Tournasian age. The beds dip shallowly to the west and appear to unconformably overly the Boulder Creek Grits.

Stockyard Creek Granodiorite - The unit is essentially a biotite hornblende granodiorite, with minor adamellite and a weakly pegmatitic phase. The contact metamorphic effect in the adjacent rocks is fairly narrow and variable in width (up to 300 m thick). This suggests a steep contact. The absence of quartz veining associated with the intrusion suggests a dry melt.

No significant mineralisation was observed, however, skarns associated with limy lithologies are weakly anomalous in base and precious metals.

Undifferentiated Diorite - A number of small diorite stocks intrude the Devonian lithologies at King Solomon, Grasstree Creek yards, Riverhead, and Mt Cedric. These stocks, which may be related to the Stockyard Creek Granodiorite, appear to be emplaced along zones of tectonic weaknesses defined by fault zones.

The weakly mineralised (anomalous gold) quartz veins at King Solomon and Queen of Sheba Mines appear to be associated with the diorite stock. Skarns associated with the diorites carry no mineralisation of economic significance.

Structure -

PREVIOUS EXPLORATION - See CR 16816

LOCALISED EXPLORATION/PROSPECTS

On the basis of geochemistry, geophysics, or mineralisation significance, a number of areas within the prospect were examined in detail. These include: **Alma Creek, Bullock Creek, Stockyard Creek, Top of Kangaroo Creek, Queen of Sheeba Mine, Mount Isobel, Shadow, North Mount Helen, Limestone Creek, Diggers Dive Mine, Riverhead, Marble Mountain, Jim's Claim Mine, King Solomon Mines.**

Details of the anomalies, host rock, and style of mineralisation of these areas are given in the text (CR 16819). In summary, the mineralisation in these areas is associated mainly with quartz veins which are, for the most part, structurally controlled. Mineralisation associated with dyke and granotoid intrusions is less common. The host rock is dominantly the Capella Creek Beds, less commonly the Mount Holly Beds, one occurrence in each of the Dee Volcanics and the Boulder Creek Grits.

Fragmental sphalerite mineralisation occurs in the **lower Capella Creek Beds** in the **Upper Don River** and **Fern Hills** areas. Similar mineralisation occurs in the **Mount Holly Beds** at **Ajax** and **Austerity**. The occurrence of this style of mineralisation in both units suggests that this mineralising event spans the Mount Holly-Capella Creek contact. It was therefore recommended that anomalies in close proximity to the contact should be investigated.

Included in the report (CR 16819) is a record of the 68 rock chip samples and their analysis results (Cu, Pb, Zn, Ag, and Au)

RECORDER: Jan Domagala **DATE:**21/2/94.

COMPANY REPORT SUMMARY SHEET

CR: 16820 **STATUS:** Open

TITLE: Authority to Prospect No 4087M, Ulam Range - East Queensland, Report on area relinquished 15th September, 1987

AUTHOR(S): Stallman, M.N., & Young, D.I. **DATE:**

ATP/EP No.: ATP 4087

COMPANY HOLDING TITLE: Haoma North West N.L. (on behalf of joint venture; partner Freeport of Australia Inc)

COMPANY SUBMITTING REPORT: Freeport of Australia Incorporated

DATE GRANTED: 13-9-85 **PERIOD:** 2 yrs

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: approx 20-40 km south of Bajool

MINING DISTRICT:

MINES/PROSPECTS: Upper Don River, Fern Hills Prospects;

Area examined includes: Alma Creek, Bullock Creek, Stockyard Creek, Top of Kangaroo Creek, Queen of Sheeba Mine, Mount Isobel, Shadow, North Mount Helen, Limestone Creek, Diggers Dive Mine, Riverhead, Marble Mountain, Jim's Claim Mine, King Solomon Mines.

EXPLORATION TARGETS\MODELS: Mt Morgan style Au-Cu mineralisation

SUMMARY:

This is a relinquishment report defining the blocks relinquished. The geological information is identical to that which is in CR16819

RECORDER: Jan Domagala **DATE:**22/2/94.

COMPANY REPORT SUMMARY SHEET

CR: 18784 **STATUS:** Open

TITLE: Authority to Prospect No 4087M, Ulam Range - East Queensland, Final Report, 13th September, 1988

AUTHOR(S): **DATE:**

ATP/EP No.: ATP 4087

COMPANY HOLDING TITLE: Haoma North West N.L. (on behalf of joint venture; partner Freeport of Australia Inc)

COMPANY SUBMITTING REPORT: Freeport McMoRan Australia Limited

DATE GRANTED: 13-9-85 **PERIOD:** 2 yrs

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: approx 20-40 km south of Bajool

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: Mt Morgan style Au-Cu mineralisation

SUMMARY:

The only work carried out in the six month period was a review of the potential of the area. The ATP was relinquished at the end of the period.

RECORDER: Jan Domagala **DATE:**23/2/94.

COMPANY REPORT SUMMARY SHEET

CR: 18944 **STATUS:** Open

TITLE: Authority to Prospect No 4087M, Ulam Range - East Queensland, Report on for Six Months ended 13th March, 1988

AUTHOR(S): Stallman, M.N., & Young, D.I. **DATE:**

ATP/EP No.: ATP 4087

COMPANY HOLDING TITLE: Haoma North West N.L. (on behalf of joint venture; partner Freeport of Australia Inc)

COMPANY SUBMITTING REPORT: Freeport McMoRan Australia Limited

DATE GRANTED: 13-9-85 **PERIOD:** 2 yrs

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: approx 20-40 km south of Bajool

MINING DISTRICT:

MINES/PROSPECTS: Upper Don River, Fern Hills Prospects;

EXPLORATION TARGETS\MODELS: Mt Morgan style Au-Cu mineralisation

SUMMARY:

During the six month period a diamond and percussion drilling program was carried out in the Fern Hills and Upper Don River Prospects. About 486 percussion chip samples and 136 core samples were analysed Cu, Pb, Zn, Ag, and Au.

LOCALISED EXPLORATION/PROSPECTS

- Previous exploration at the **Fern Hills** and **Upper Don River Prospects** has revealed the presence of anomalous zinc-rich base metal mineralisation with associated soil geochemistry anomalies. Highly altered lithologies with associated pyrite mineralisation and anomalous SIROTEM responses also occur at the Fern Hills Prospects.

The mineralisation at both prospects occurs as fracture related veinworks and as detrital clasts. Minor stratiform pyrite mineralisation with possible associated fine sphalerite also occurs.

1) FERN HILLS PROSPECT -

Drilling - Three of the holes were drilled specifically to test zones of anomalous SIROTEM responses.

These responses appear to be due to the pyrite content of the host rock.

Geochemistry - Results are as follows:

Drill Hole	Analytical Results (ppm)				
	Cu	Pb	Zn	Ag (Max)	Au (Max)
DDH FH-1	10-490	<5-1750	40-2000	3	0.06
PDH-1	60-155	<5-350	10-525	3	0.06
PHD-2	30-200	15-20	15-890	2	<0.01
PHD-3	10-350	<5-10	15-250	3	0.07
PHD-4	70-105	<5-325	10-425	2	0.06
PHD5	35-4550	15-420	165-2.34%	7	0.09

2) UPPER DON RIVER PROSPECT -

Drilling - Three holes were drilled

Geochemistry - Results are as follows:

Drill Hole	Analytical Results (ppm)				
	Cu	Pb	Zn	Ag	Au
DDH-UD1	5-440	<5-1500	50-1.4%	3	0.03
DDH-UD2	5-340	<5-650	90-1.4%	3	0.11
DDH-UD3	15-20	20-50	55-90	1	-

CONCLUSIONS:

Drilling results in both the **Fern Hills** and **Upper Don River Prospects** was disappointing with the mineralisation intersected being lower grade and less extensive than expected. Minor veinwork sphalerite mineralisation with rare galena and chalcopyrite was intersected at both prospects.

There appear to be two interpretations for the mineralisation:

- 1) that the mineralising event took place during the time of deposition of the Mount Holly Beds and the lower part of the Capella Creek Beds. The erratic occurrence of the mineralisation suggests that it was diluted and scattered throughout both formations.
- 2) given the evidence of occurrence of the detrital clasts of massive sulphide, it is possible that the mineralisation is derived from a massive sulphide body at depth.

The veinwork sphalerite may have been re-mobilised from these clasts, or possibly from the deeper weakly zinciferous units, into open space fractures. An underlying heat source may have aided in the re-mobilising process.

No further work was recommended on the prospect as it was considered that the targets were adequately tested.

RECORDER: Jan Domagala **DATE:**23/2/94.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP/EPM's 4189, 4191, and 5580

COMPANY HOLDING TITLE: Jointly held by Central Pacific Minerals N.L. & Southern Pacific Petroleum N.L.

COMPANY SUBMITTING REPORT: Central Pacific Minerals N.L.

DATE GRANTED: 15/01/1986 (4189 & 4191) **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 20 km SW of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Westwood Gold Mine, Dee Copper Mine, Besch's Copper Pits, IMI Grid, The "K3 Anomaly" area, Kyle Mohr Anomaly, and Southward Joint Venture area

EXPLORATION TARGETS/MODELS: precious metals, copper and iron

TRANSFERS, JOINT VENTURES, etc: JV between Central Pacific Minerals N.L. (operator) and Southern Pacific Petroleum for the whole area. Also a JV (Top Rock Joint Venture) between the previous two companies

and Millaroo Mines N.L. in the Westwood Gold Mine area (ended November 1988). Also JV (the Southward Joint Venture) formed between the title holders (Central Pacific Mineral N.L. & Southern Pacific Petroleum) and Lewis Watkins and Associates to explore the iron-ore deposits in the magnetite-rich rocks within the Eulogie Park Gabbro.

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File-* 16954, 16955, 17529, 18672, 18809, 20342, 20382, 20584, 21398, 22219, 22314, 22411, 22423, 22424, 22425, 22426, 22694, 23186, 23339, 23845, 24355

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To check the potential of ATP's 4189M (Middleward) and 4191M (Southward) for precious metals associated with the layered basic intrusions and mineralisation at the Westwood Gold Mine and Dee Copper Mine. Later, the Eulogie Park Gabbro was investigated in ATP's 4191M & 5580M for iron mineralisation.

GEOLOGY -

REGIONAL - Geology summary is from the explanation notes on the Rockhampton 1:250 000 geology sheet. Of particular interest are the five basic intrusions, shown with the symbols Pub and Pui. The Eulogie Park Gabbro (Pui) is a layered gabbroic sequence that has been intruded by diorite. Little is known about the other three intrusions NW and NNE of Dululu, and these are mapped as undifferentiated Permian gabbro/diorite. The rocks within the area are dominantly a sequence of Palaeozoic sediments and volcanics with basic and acidic intrusions. The Permian granodiorite complex of the Kyle Mohr Granodiorite intrudes the Carboniferous and Permian sediments in the N-central part of the area. The SW edge of the area, to SE of Dululu, is mapped predominantly as undifferentiated Tertiary sediments. Quaternary sediments cover the floodplains of the Dee River.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Geopeko Ltd (ATP 302M, 352M, 402M); BHP (ATP 532M); Getty Oil (ATP 2581M); Alcoa of Australia (ATP 3045M); Eastmet Ltd. (ATP 3123M); and CRA Exploration (ATP 3700M).

GEOCHEMISTRY

- **stream sediment sampling** - A comprehensive stream sediment sampling program was conducted over ATP's 4189M & 4191M. In general, gold anomalies were scattered with the following exceptions; (1) a group of gold anomalies over part of the Kyle Mohr Granodiorite; (2) a group of anomalous gold values in the area NE of the Black Range which is underlain by the Pond Formation and the Youlambie Conglomerate (coincident with Alcoa's "K3" radiometric anomaly); (3) exceptionally high gold geochemical results reported from samples collected from three short tributaries which drain the alluvium of the Dee River (back wash from the Dee River is a possible cause of these elevated values); (4) the group of anomalies near the N boundary of ATP 4189M (Middleward) which drain from several elevated outliers of the Jurassic Razorback beds.

GEOPHYSICS

- **ground surveys** - A ground gravity survey was undertaken to detect subsurface massive sulphide orebody, the size and density of the Mt Morgan and Sugarloaf orebodies. Two significant Bouger Anomalies were identified, both on or near the edge of the Kyle Mohr Granodiorite and associated with distinctive aeromagnetic features. The IMI grid was set up over one anomaly, and the Howling Dog Grid was set up over the other.

LOCALISED EXPLORATION/PROSPECTS

1) Besch's Copper Pits - These are old copper gold workings in the southernmost part of ATP 4191M. A number of anomalous stream sediment samples from the area indicate that the mineralisation is more widespread than suggested by the old workings, but no further surface indications of mineralisation were found.

2) Dee Copper Mine

GEOLOGY - The mineralisation is in the sediments of the Capella Creek beds adjacent to the Kyle Mohr Granodiorite.

GEOCHEMISTRY - 36 rock chip samples were collected returning <0.005 to 5.9 ppm Au, <0.002 to 0.004 ppm Pd, <0.002 ppm Pt, <1 to 28 ppm Ag, and 23 ppm to 2.72% Cu. Selected intervals of core from 4 holes drilled by Geopeko were re-assayed. Hole DEE 1, interval 36.58-39.62 m returned 0.48% Cu, 995 ppm

Zn, and 0.03 ppm Au. Hole DEE 2, interval 57.91-59.44 m & 62.79-67.06 m returned 0.99% & 0.65% Cu, 1.55% & 0.163% Zn, and 0.03 & 0.03 ppm Au respectively. Hole DEE 3 interval 87.93 to 92.35 m returned 1.46% Cu, and <0.02 ppm Au. Hole DEE 5 returned no interesting results.

GEOPHYSICS - A gravity survey was carried out over this area but nothing of interest was indicated.

3) Westwood Gold Mine - This area was subject to a joint venture (the Top Rock Joint Venture) with Millaroo Mines N.L. (operator).

GEOLOGY - The area comprises fine grained shales and sandstone with some (?interbedded) spherulitic rhyolite, intruded by porphyritic diorite dykes and quartz veins (limonitic and haematitic in places).

GEOCHEMISTRY - Rock chip samples were collected from the mine area, but no anomalous values were returned. A soil survey was conducted over the area with 113 samples collected, also 17 grab and rock chip samples were collected. 592 samples from the drilling were analysed but no significant gold mineralisation was intersected. Only 4 samples assayed above 0.1 ppm Au, the maximum being 2.1 g/t.

GEOPHYSICS - A ground magnetic and radiometric survey was conducted. The ground magnetic survey revealed a series of small magnetic highs and lows about the old mine workings. It is concluded that these features may reflect magnetic depletion by fluids associated with the mine sequence. An IP survey was conducted in the area but there was no IP gradient associated with the old mine workings. A gravity survey was carried out over the area with the results showing a gentler linear increase in gravity from E to W. A localised gravity survey was also done in the area, identifying a small positive residual anomaly N of the fault contact of the Pond Formation and the Youlambie Conglomerate.

DRILLING - 17 drillholes, totalling 750 m, were drilled.

4) Miscellaneous Old Workings - During the stream sediment sampling program, several old mine workings and/or prospecting pits were found, generally associated with rocks showing secondary copper mineralisation. The most substantial of the workings found are at the headwaters of Harry Creek where an adit, a shallow shaft, and several small prospecting pits/costean have been excavated on bornite-bearing quartz veins in the Pond Formation. Also several small prospecting pits with obvious copper carbonate mineralisation were found near the SE border of ATP 4191M and in the central SE portion of ATP 4191M.

GEOCHEMISTRY - One rock chip sample was collected from the workings in the headwaters of Harry Creek returning 0.01 ppm Au, 15 ppm Ag, and 1.02% Cu.

5) Howling Dog Grid

GEOPHYSICS - A detailed gravity survey was carried out. The gravity increases linearly from S to N onto the Kyle Mohr granodiorite. Therefore, no features of interest were identified.

6) IMI Grid

GEOLOGY - This area lies over the W edge of the Kyle Mohr Granodiorite which has intruded and hornfelsed predominantly fine-grained sediments of the Youlambie Conglomerate. The area of the main Bouger Anomaly is a brecciated tonalite/diorite body (TDX) partly enclosed by similar unbrecciated rocks. The TDX rock appears as a massive, fine to medium grained diorite with connecting web-like veins, less than 10 cm wide, of fine grained leucocratic diorite/tonalite, containing massive or finely disseminated epidote. The scale of the veining is variable, dividing the diorite host rock into angular blocks from ten centimetres to several metres in dimension. No "rock flour" was observed and the TDX body is interpreted as a collapse breccia. Only traces of fine pyrite was observed in surface rocks.

GEOCHEMISTRY - 11 half-sawn core samples were submitted for geochemical analysis, but none returned any anomalous values.

GEOPHYSICS - Detailed ground gravity and magnetic survey was conducted over the area. The gravity survey identified a large positive anomaly, and a smaller positive anomaly to the S of it. The ENE-WSW striking negative gravity feature separating the two positive features represents a structural lineament. The magnetic data support this interpretation. The southern of the two gravity anomalies coincides with a positive magnetic anomaly which correlates with a shallow diorite breccia. The larger positive gravity anomaly is located primarily in a magnetic low. It is evident that the source of the gravity anomaly is the tonalite/diorite breccia. A Controlled Source Audio-Magnetotelluric (CSAMT) survey was conducted in the grid area. The data is interpreted to show a higher resistive body corresponding with the TDX and a vertically dipping fault. No significant low resistivity bodies, corresponding to a mineralised target were identified.

DRILLING - One Percussion-Diamond hole was drilled into the centre of the main Bouger Anomaly and drilled vertically for 400 m. No mineralisation was intersected. 7 half-sawn core samples were submitted for petrographic description.

7) The "K3 Anomaly" area

GEOLOGY - This area is mostly underlain by the Youlambie Conglomerate which, further N hosts the Westwood Gold Mine. A number of vuggy, iron-stained, white quartz blows were found during follow-up.

GEOCHEMISTRY - 3 rock chip samples of the quartz blows returned only 0.012, <0.002, and 0.033 ppm gold. A soil survey was carried out over the area, but the results were low which is not consistent with the elevated values reported in the adjacent streams.

GEOPHYSICS - In 1982, Alcoa of Australia located a potassium channel radiometric anomaly (designated "K3"), but no ground follow-up was apparently carried out. This area apparently partly coincides with an area N of Black Range where many of the stream sediment samples are anomalous for gold.

8) Kyle Mohr Anomaly

GEOLOGY - A variety of granitoid lithologies were noted and 8 samples were collected for petrological descriptions. The most apparent physical feature of this area is the jointing and in places, intense weathering, which together produce a thick scree cover on the steep slopes and ridges.

GEOCHEMISTRY - A rock chip sample of deeply weathered granodiorite gave less than 5 ppb Au. An A-horizon ridge and spur soil sampling program was undertaken with a total of 456 samples collected. Of these samples, 32 returned more than 99 ppb Au, identifying 3 main areas of high gold-in-soil. Two were selected for follow-up work (identified as KM-1 Anomaly grid and KM-2 Anomaly grid). B-horizon soil sampling was carried out in both grids with KM-1 returning 5 to 140 ppb Au, and KM-2 returning <2 to 42 ppb Au. These results were much less than the original ridge and spur soil values. The apparent contrast between the A-horizon results (average 113 ppb Au) and the B-horizon results (average 23 ppb Au) highlighted the need for an orientation study of the soils in the area, particularly since no alteration, veining, exotic lithology of obvious structure had been observed in the area of A-horizon soil sampling. Six sites were selected, and at each site a hole was dug and the soil profile examined. Bulk samples of each soil horizon collected. In addition a sample of rock chipped material from beneath the B-horizon was collected. The more organic-rich A-horizon soil was found to contain significantly more (2 to 3 times) gold and copper than the B-horizon in the study area.

GEOPHYSICS - Alcoa of Australia conducted aerial magnetic and radiometric surveys over all of the Kyle Mohr Granodiorite. The area of anomalous gold-in-stream geochemical results coincides with a distinctive, elongate, NW trending zone of low total magnetic field and the "high potassium anomaly" area.

9) Piebald Mountain Area - This area occurs to the E of Piebald Mountain and was explored to follow-up anomalous gold in stream sediment samples in ATP 4191M.

GEOLOGY - Epidote-calcite veining, with wall-rock epidote alteration of the andesite was found in the area.

GEOCHEMISTRY - 5 rock chip samples were collected, but all samples assayed less than 0.02 ppm Au.

10) Southward Joint Venture area

GEOLOGY - Detailed mapping (1:5000 scale) was carried out over a 5 km zone of the Eulogie Park Gabbro. There are four major ferriggabbro zones mapped, numbered upwards from the stratigraphically lowest in the E. Zone No. 3 contains the main titanomagnetite band. Zone No. 4, investigated only in the S, also contains a thin titanomagnetite band. Zone No. 2 is probably the thickest zone at about 100 m thick and also contains minor magnetite-rich bands. Zones Nos. 2 & 1 appear to coalesce in the SE. The titanomagnetite band capping ferriggabbro Zone No.3 forms strong arcuate continuous ridge outcrop some 5 to 6 km long. The ore reserves are estimated at 75 Mt to a depth of 50 m. The outcropping gabbroic units of the Eulogie Park Gabbro were examined in a preliminary assessment of the dimension stone potential of the area. None of the three areas examined contained outcrop that could be classed as having the potential for marketable dimension stone. Although areas of sufficient outcrop size possessing a marketable black colour were found, the rock was invariably too fractured, altered, and strongly stained from weathering of sulphides and biotite.

GEOCHEMISTRY - From samples of core and chips, the ore grade should average 15% Fe and 2% Ti. The vanadium content is low and very variable, thus difficult to estimate.

GEOPHYSICS - A magnetic susceptibility meter was used as a field aid to assess magnetite concentration. No ferriggabbro was detected in ATP 5580M and the tenement was relinquished.

DRILLING - 29 drillholes were completed with a total of 1222 m depth. 1090.58 m was rotary percussion, and the rest was core.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Follow-up of stream sediment anomalies failed to produce any significant mineralisation; mineralisation at the Dee Mine is not worthy of follow-up work; and the reconnaissance gravity survey over the area failed to determine a significant target. Also the evaluation of the results of the ferrigabbro in the Eulogie Park Gabbro showed that the proposal is not economically feasible at present. Therefore the EPMs were relinquished.

RECORDER: Paul Blake **DATE:** 07/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 16954 **STATUS:** Open

TITLE: Authorities to Prospect 4189M & 4191M. Six-monthly report for the period 15th January 1987 to 14th July 1987.

AUTHOR(S): J.A. Carrigg **DATE:** October 1987

ATP/EP No.: ATP 4189M & 4191M

COMPANY HOLDING TITLE: Jointly held by Central Pacific Minerals N.L. & Southern Pacific Petroleum N.L.

COMPANY SUBMITTING REPORT: Central Pacific Minerals N.L.

DATE GRANTED: 15/01/1986 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 20 km SW of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Westwood Gold Mine, Dee Copper Mine

EXPLORATION TARGETS/MODELS: precious metals and copper

SUMMARY:

REGIONAL EXPLORATION

GEOCHEMISTRY

- **stream sediment sampling** - A further 752 -200 mesh stream sediment samples were collected.

LOCALISED EXPLORATION/PROSPECTS

1) Westwood Gold Mine - a grid was established over the area.

GEOCHEMISTRY - A soil survey was conducted over the area with 113 samples collected, also 17 grab and rock chip samples were collected.

GEOPHYSICS - A ground magnetic and radiometric survey was conducted.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Evaluation of the work is in progress, and final results are not available. Results given in CR 18672.

RECORDER: Paul Blake **DATE:** 02/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 16955 **STATUS:** Open

TITLE: Authorities to Prospect 4189M & 4191M. Six monthly report for the period July 15, 1986 to January 14, 1987.

AUTHOR(S): R.G. McIver **DATE:** July 1987

ATP/EP No.: ATP 4189M & 4191M

COMPANY HOLDING TITLE: Jointly held by Central Pacific Minerals N.L. & Southern Pacific Petroleum N.L.

COMPANY SUBMITTING REPORT: Central Pacific Minerals N.L.

DATE GRANTED: 15/01/1986 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 20 km SW of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Westwood Gold Mine, Dee Copper Mine

EXPLORATION TARGETS\MODELS: precious metals and copper

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To check the potential of ATP's 4189M (Middleward) and 4191M (Southward) for precious metals associated with the layered basic intrusions and mineralisation at the Westwood Gold Mine and Dee Copper Mine.

GEOLOGY -

REGIONAL - Geology summary is from the explanation notes on the Rockhampton 1:250 000 geology sheet. Of particular interest are the five basic intrusions, shown with the symbols Pub and Pui. The Eulogie Park Gabbro (Pui) is a layered gabbroic sequence that has been intruded by diorite. Little is known about the other three intrusions NW and NNE of Dululu, and these are mapped as undifferentiated Permian gabbro/diorite. The rocks within the area are dominantly a sequence of Palaeozoic sediments and volcanics with basic and acidic intrusions. The Permian granodiorite complex of the Kyle Mohr Granodiorite intrudes the Carboniferous and Permian sediments in the N-central part of the area. The SW edge of the area, to SE of Dululu, is mapped predominantly as undifferentiated Tertiary sediments. Quaternary sediments cover the floodplains of the Dee River.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Geopeko Ltd (ATP 302M, 352M, 402M); BHP (ATP 532M); Getty Oil (ATP 2581M); Alcoa of Australia (ATP 3045M); Eastmet Ltd. (ATP 3123M); and CRA Exploration (ATP 3700M).

GEOCHEMISTRY

- **stream sediment sampling** - A comprehensive stream sediment sampling program was conducted in the vicinity of three basic intrusions (Halton, Boogargan, & Eulogie Park Gabbros) and two old mining centres (Dee Copper and Westwood Gold Mines). A total of 1436 -200 mesh samples were collected. Around the Gabbros, gold ranged from <2 to 1250 ppb with 94% of the samples plotting within <2 to 29 ppb Au; Platinum ranged from <1 to 43 ppb with 95% plotting within <1 to 1 ppb Pt; and palladium ranged from <1 to 13 ppb with 94% plotting within <1 to 1 ppb Pd. In the Westwood Gold Mine area, gold ranged from <2 to 110 ppb Au with 90% plotting within the <2 to 22 ppb Au; platinum ranged from <1 to <5 ppb with 95% plotting within the <1 to 1 ppb Pt; palladium ranged from <1 to 11 ppb Pd; arsenic ranged from <1 to 72 ppb with 56% plotting within the <1 to 18 ppm and 28% plotting within 19 to 36 ppm As; and all silver plotted <1 ppm Ag. At the Dee Copper Mine, gold ranged from <2 to 60 ppb with 71% plotting within <2 to 20 ppb Au; platinum ranged from <2 to 2 ppb; palladium ranged from <2 to 4 ppb; silver ranged from <1 to 2 ppm; and copper ranged from <2 to 4660 ppm with 65% plotting within <2 to 110 ppm and 19% within 111 to 600 ppm Cu.

LOCALISED EXPLORATION/PROSPECTS

1) Westwood Palladium Mine and Westwood Gold Mine

GEOLOGY - The above two mines represent different styles and associations of mineralisation. The Westwood gold mine has predominantly an Au-As mineralogical association related to a diorite dyke intruding the sediments of the Youlambie Conglomerate. The mineralisation at the Westwood Palladium Mine is Pd-Cu-Au-Pt-Ag, possibly associated with a sheared zone in a layered gabbroic sequence.

GEOCHEMISTRY - An orientation geochemical survey was done in these two areas to determine the geochemical parameters to use in prospecting ATP's 4189M & 4191M. Rock chip, stream sediment (and at Westwood Palladium also soil) samples were collected. In the stream sediment survey, the -200 mesh fraction gave the highest results for Au, Pd, Pt, and generally Cu. At the Westwood Gold Mine, arsenic is a reliable indicator of gold mineralisation, but a similar pathfinder relationship between the precious metals and any other elements determined was not found, though Cu & Ni could be of limited use.

2) Westwood Gold Mine

GEOLOGY - The area comprises fine grained shales and sandstone with some (?interbedded) spherulitic rhyolite, intruded by porphyritic diorite dykes and quartz veins (limonitic and haematitic in places).

GEOCHEMISTRY - 6 rock chip samples were collected, returning <0.005 to 1.0 ppm Au, <0.005 ppm Pd, <0.005 ppm Pt, <1 ppm Ag, and <2 to 670 ppm Cu.

3) Dee Copper Mine

GEOLOGY - The mineralisation is in the sediments of the Capella Creek beds adjacent to the Kyle Mohr Granodiorite.

GEOCHEMISTRY - 36 rock chip samples were collected returning <0.005 to 5.9 ppm Au, <0.002 to 0.004 ppm Pd, <0.002 ppm Pt, <1 to 28 ppm Ag, and 23 ppm to 2.72% Cu.

4) Miscellaneous Old Workings - During the stream sediment sampling program, several old mine workings and/or prospecting pits were found, generally associated with rocks showing secondary copper mineralisation. The most substantial of the workings found are at the headwaters of Harry Creek where an adit, a shallow shaft, and several small prospecting pits/costean have been excavated on bornite-bearing quartz veins in the Pond Formation. Also several small prospecting pits with obvious copper carbonate mineralisation were found near the SE border of ATP 4191M and in the central SE portion of ATP 4191M.

GEOCHEMISTRY - One rock chip sample was collected from the workings in the headwaters of Harry Creek returning 0.01 ppm Au, 15 ppm Ag, and 1.02% Cu.

RECORDER: Paul Blake **DATE:** 02/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 17529 **STATUS:** Open

TITLE: Middleward & Southward, Authorities to Prospect 4189M & 4191M. Report on the area relinquished on 14th January 1988.

AUTHOR(S): J.A. Carrigg **DATE:** July 1988

ATP/EP No.: ATP 4189M & 4191M

COMPANY HOLDING TITLE: Jointly held by Central Pacific Minerals N.L. & Southern Pacific Petroleum N.L.

COMPANY SUBMITTING REPORT: Central Pacific Minerals N.L.

DATE GRANTED: 15/01/1986 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 20 km SW of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Westwood Gold Mine, Dee Copper Mine

EXPLORATION TARGETS/MODELS: precious metals and copper

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The areas relinquished had been tested by stream sediment sampling but no anomalies were identified. Also two rock chip samples had been collected but neither sample contained detectable quantities of precious metals.

RECORDER: Paul Blake **DATE:** 03/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 18672 **STATUS:** Open

TITLE: Authorities to Prospect 4189M & 4191M. Six monthly report for the period 15 July 1987 to 14 January 1988.

AUTHOR(S): J.A. Carrigg **DATE:**

ATP/EP No.: ATP 4189M & 4191M

COMPANY HOLDING TITLE: Jointly held by Central Pacific Minerals N.L. & Southern Pacific Petroleum N.L.

COMPANY SUBMITTING REPORT: Central Pacific Minerals N.L.

DATE GRANTED: 15/01/1986 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 20 km SW of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Westwood Gold Mine, Dee Copper Mine The "K3 Anomaly" area, Kyle Mohr Anomaly.

EXPLORATION TARGETS\MODELS: precious metals and copper

SUMMARY:

REGIONAL EXPLORATION

GEOCHEMISTRY

- **stream sediment sampling** - A further 1750 stream sediment samples were collected from the ATP's. A total of 3938 stream sediment samples have been collected. None of the samples are considered anomalous in palladium, all returning less than 30 ppb Pd. In general gold anomalies were scattered with the following exceptions; (1) a group of gold anomalies over part of the Kyle Mohr Granodiorite; (2) a group of anomalous gold values in the area NE of the Black Range which is underlain by the Pond Formation and the Youlambie Conglomerate (coincident with Alcoa's "K3" radiometric anomaly); (3) exceptionally high gold geochemical results reported from samples collected from three short tributaries which drain the alluvium of the Dee River (back wash from the Dee River is a possible cause of these elevated values; (4) the group of anomalies near the N boundary of ATP 4189M (Middleward) which drain from several elevated outliers of the Jurassic Razorback beds. The first two anomalous areas were investigated and the results are given below.

GEOPHYSICS

- **ground surveys** - A gravity survey was undertaken over the area, and the results of this work are being evaluated in conjunction with other further follow-up work in progress.

LOCALISED EXPLORATION/PROSPECTS

1) Kyle Mohr Anomaly

GEOLOGY - A variety of granitoid lithologies were noted and 8 samples were collected for petrological descriptions. The most apparent physical feature of this area is the jointing and in places, intense weathering, which together produce a thick scree cover on the steep slopes and ridges.

GEOCHEMISTRY - A rock chip sample of deeply weathered granodiorite gave less than 5 ppb Au. A ridge and spur soil sampling program was undertaken with a total of 456 samples collected. Of these samples, 32 returned more than 99 ppb Au.

GEOPHYSICS - Alcoa of Australia conducted aerial magnetic and radiometric surveys over all of the Kyle Mohr Granodiorite. The area of anomalous gold-in-stream geochemical results coincides with a distinctive, elongate, NW trending zone of low total magnetic field and the "high potassium anomaly" area.

2) The "K3 Anomaly" area

GEOLOGY - This area is mostly underlain by the Youlambie Conglomerate which, further N hosts the Westwood Gold Mine. A number of vuggy, iron-stained, white quartz blows were found during follow-up.

GEOCHEMISTRY - 3 rock chip samples of the quartz blows returned only 0.012, <0.002, and 0.033 ppm gold. A soil survey was carried out over the area, but the results were low which is not consistent with the elevated values reported in the adjacent streams.

GEOPHYSICS - In 1982, Alcoa of Australia located a potassium channel radiometric anomaly (designated "K3"), but no ground follow-up was apparently carried out. This area apparently partly coincides with an area N of Black Range where many of the stream sediment samples are anomalous for gold.

3) Westwood Gold Mine - This area is subject to a joint venture (the Top Rock Joint Venture) with Millaroo Mines N.L. (operator).

GEOCHEMISTRY - 592 samples from the drilling were analysed but no significant gold mineralisation was intersected. Only 4 samples assayed above 0.1 ppm Au, the maximum being 2.1 g/t.

GEOPHYSICS - The ground magnetic survey in the area was extended revealing a series of small magnetic highs and lows about the old mine workings. It is concluded that these features may reflect magnetic depletion by fluids associated with the mine sequence. An IP survey was conducted in the area but there was no IP gradient associated with the old mine workings.

DRILLING - 17 drillholes, totalling 750 m, were drilled.

RECORDER: Paul Blake **DATE:** 03/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 18809 **STATUS:** Open

TITLE: Authorities to Prospect 4189M & 4191M, Middleward & Southward. Six monthly report for the period 15th January 1988 to 14th July 1988.

AUTHOR(S): J.A. Carrigg **DATE:** October 1988

ATP/EP No.: ATP 4189M & 4191M

COMPANY HOLDING TITLE: Jointly held by Central Pacific Minerals N.L. & Southern Pacific Petroleum N.L.

COMPANY SUBMITTING REPORT: Central Pacific Minerals N.L.

DATE GRANTED: 15/01/1986 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 20 km SW of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Westwood Gold Mine, Dee Copper Mine, IMI Grid, The "K3 Anomaly" area, Kyle Mohr Anomaly

EXPLORATION TARGETS/MODELS: precious metals and copper

SUMMARY:

REGIONAL EXPLORATION

GEOPHYSICS

- **ground surveys** - A ground gravity survey was undertaken to detect subsurface massive sulphide orebody, the size and density of the Mt Morgan and Sugarloaf orebodies. Two significant Bouger Anomalies were identified, both on or near the edge of the Kyle Mohr Granodiorite and associated with distinctive aeromagnetic features. The IMI grid was set up over one anomaly, and the Howling Dog Grid was set up over the other.

LOCALISED EXPLORATION/PROSPECTS

1) IMI Grid

GEOLOGY - This area lies over the W edge of the Kyle Mohr Granodiorite which has intruded and hornfelsed predominantly fine-grained sediments of the Youlambie Conglomerate. The area of the main Bouger Anomaly is a brecciated tonalite/diorite body (TDX) partly enclosed by similar unbrecciated rocks. The TDX rock appears as a massive, fine to medium grained diorite with connecting web-like veins, less than 10 cm wide, of fine grained leucocratic diorite/tonalite, containing massive or finely disseminated epidote. The scale of the veining is variable, dividing the diorite host rock into angular blocks from ten centimetres to several metres in dimension. No "rock flour" was observed and the TDX body is interpreted as a collapse breccia. Only traces of fine pyrite was observed in surface rocks.

GEOCHEMISTRY - 11 half-sawn core samples were submitted for geochemical analysis, but none returned any anomalous values.

GEOPHYSICS - Detailed ground gravity and magnetic survey was conducted over the area. The gravity survey identified a large positive anomaly, and a smaller positive anomaly to the S of it. The ENE-WSW striking negative gravity feature separating the two positive features represents a structural lineament. The magnetic data support this interpretation. The southern of the two gravity anomalies coincides with a positive magnetic anomaly which correlates with a shallow diorite breccia. The larger positive gravity anomaly is located primarily in a magnetic low. It is evident that the source of the gravity anomaly is the tonalite/diorite breccia. A Controlled Source Audio-Magnetotelluric (CSAMT) survey was conducted in the grid area. The data is interpreted to show a higher resistive body corresponding with the TDX and a vertically dipping fault. No significant low resistivity bodies, corresponding to a mineralised target were identified.

DRILLING - One Percussion-Diamond hole was drilled into the centre of the main Bouger Anomaly and drilled vertically for 400 m. No mineralisation was intersected. 7 half-sawn core samples were submitted for petrographic description.

2) Howling Dog Grid

GEOPHYSICS - A detailed gravity survey was carried out. The gravity increases linearly from S to N onto the Kyle Mohr granodiorite. Therefore, no features of interest were identified.

3 Dee Copper Mine

GEOPHYSICS - A gravity survey was carried out over this area but nothing of interest was indicated.

4) Top Rock Grid (Westwood Gold Mine area)

GEOCHEMISTRY - 10 rock chip samples were collected to test for platinum and palladium, but no anomalous results were recorded.

GEOPHYSICS - A gravity survey was carried out over the area with the results showing a gentler linear increase in gravity from E to W.

RECORDER: Paul Blake **DATE:** 03/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 20342 **STATUS:** Open

TITLE: Authorities to Prospect 4189M & 4191M, Middleward & Southward. Six monthly report for the period 15th July 1988 to 14th January 1989.

AUTHOR(S): J.A. Carrigg **DATE:**

ATP/EP No.: ATP 4189M & 4191M

COMPANY HOLDING TITLE: Jointly held by Central Pacific Minerals N.L. & Southern Pacific Petroleum N.L.

COMPANY SUBMITTING REPORT: Central Pacific Minerals N.L.

DATE GRANTED: 15/01/1986 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 20 km SW of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Westwood Gold Mine, Dee Copper Mine, IMI Grid, The "K3 Anomaly" area, Kyle Mohr Anomaly, and Southward Joint Venture area

EXPLORATION TARGETS\MODELS: precious metals, copper, and iron

SUMMARY:

LOCALISED EXPLORATION/PROSPECTS

1) Kyle Mohr Anomaly

GEOCHEMISTRY - The original ridge and spur soil sampling (CR 18672) identified 3 main areas of high gold-in-soil results. Two were selected for follow-up work (identified as KM-1 Anomaly grid and KM-2 Anomaly grid). B-horizon soil sampling was carried out in both grids with KM-1 returning 5 to 140 ppb Au, and KM-2 returning <2 to 42 ppb Au

2) Southward Joint Venture area

GEOLOGY - Detailed mapping (1:5000 scale) was carried out over a 5 km zone of the Eulogie Park Gabbro. There are four major ferrigabbro zones mapped, numbered upwards from the stratigraphically lowest in the E. Zone No. 3 contains the main titanomagnetite band. Zone No. 4, investigated only in the S, also contains a thin titanomagnetite band. Zone No. 2 is probably the thickest zone at about 100 m thick and also contains minor magnetite-rich bands. Zones Nos. 2 & 1 appear to coalesce in the SE. The titanomagnetite band capping ferrigabbro Zone No.3 forms strong arcuate continuous ridge outcrop some 5 to 6 km long. The ore reserves are estimated at 75 Mt to a depth of 50 m.

GEOCHEMISTRY - From samples of core and chips, the ore grade should average 15% Fe and 2% Ti. The vanadium content is low and very variable, thus difficult to estimate.

GEOPHYSICS - A magnetic susceptibility meter was used as a field aid to assess magnetite concentration.

DRILLING - 29 drillholes were completed with a total of 1222 m depth. 1090.58 m was rotary percussion, and the rest was core.

3) Top Rock Grid

GEOPHYSICS - A localised gravity survey was done in the area identifying a small positive residual anomaly N of the fault contact of the Pond Formation and the Youlambie Conglomerate.

RECORDER: Paul Blake **DATE:** 03/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 20382 **STATUS:** Open

TITLE: Middleward, Authority to Prospect 4189M. Report on the area relinquished on 13th December, 1988

AUTHOR(S): J.A. Carrigg **DATE:** August 1989

ATP/EP No.: ATP 4189M & 4191M

COMPANY HOLDING TITLE: Jointly held by Central Pacific Minerals N.L. & Southern Pacific Petroleum N.L.

COMPANY SUBMITTING REPORT: Central Pacific Minerals N.L.

DATE GRANTED: 15/01/1986 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 20 km SW of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Westwood Gold Mine, Dee Copper Mine, IMI Grid, The "K3 Anomaly" area, Kyle Mohr Anomaly, and Southward Joint Venture area

EXPLORATION TARGETS\MODELS: precious metals, copper and iron

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The area relinquished in this report had been covered by the comprehensive stream sediment sampling program over the area, with 403 samples collected in the relinquished area. No anomalous areas were identified for platinum or palladium. Seven of the gold results are above background threshold but field inspection of some of these areas has not revealed a particular source of mineralisation.

RECORDER: Paul Blake **DATE:** 04/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 20584 **STATUS:** Open

TITLE: A.P.s 4191 M 5580 M exploration progress report for period ended 7 May 1989 (AP5580M) 15 July 1989 (AP4191M).

AUTHOR(S): Thiess Contractors Pty. Ltd. **DATE:** July 1989

ATP/EP No.: ATP 4191M & 5580M

COMPANY HOLDING TITLE: 4191M held by Central Pacific Minerals NL and Southern Pacific Petroleum. 5580M held by South Pacific Steel Pty. Ltd.

COMPANY SUBMITTING REPORT: Thiess Contractors Pty. Ltd.

DATE GRANTED: 06/11/1990 (5580M) **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 20 km S of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Dee Copper Mine, IMI Grid, The "K3 Anomaly" area, Kyle Mohr Anomaly, and Southward Joint Venture area

EXPLORATION TARGETS/MODELS: Iron and Titanium in Ferrigabbro

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To investigate iron ore resources in primary titanomagnetite enriched gabbro, in the Eulogie Park Gabbro, to be used as a source of raw feed for the proposed special steel plant at Gladstone.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - L.C. Ball (1904 - Publ.Geol.Surv.Qld. 194, 1-66). Geopeko Limited's subsidiary, Morgan Mining and Industrial Company Pty. Limited (ATP 352M).

LOCALISED EXPLORATION/PROSPECTS

1) Southward Joint Venture

GEOLOGY -The Eulogie Park Gabbro is layered, basic igneous rock which, in the NE along the Gelobera Range, evidently intrudes the Lower Carboniferous Pond Formation (metasedimentary and metavolcanic mica-feldspar quartz hornfels). The Pond Formation dips around 40° SW in conformity with the arcuate strike and the dip of the layered gabbro-ferrigabbro. The gabbro is in turn intruded by a medium grained diorite. The diorite consists predominantly of andesine plagioclase and green hornblende with minor pyroxene, quartz and rare mica, ilmenite, iron oxide, apatite and zircon. The diorite is intruded by two small basalt plugs and by a NW trending diorite dyke. The gabbro outcrops in the NE, along the margin of the Gelobera Range, included the richest of the titanomagnetite bearing ferrigabbro zones with the prominent main titanomagnetite band which cropped out along its arcuate strike for some 5 to 6 km. The exploration has concentrated in this area. Large masses of layered gabbro-ferrigabbro occur to the S and SW on the SW side of the diorite and a universally typical lopolithic intrusion has been postulated. However, in the NE, the sequence dips generally WSW, but there are indications of synclinal structure N and SE of the gabbro exposures. If this synclinal axis is projected through the area of gabbro, there is reasonable correlation with the "bedding" structure indicated by crystal lamination within the gabbro outcrops. The semicircular structure of the gabbro in the NE is also conformable with the structure of the surrounding rocks. Therefore the approximately circular structure of the gabbro in plan may be partly, if not mainly, due to regional folding which might explain the "funnel" shape of the gabbroic intrusion. The W margin of the gabbro is brecciated in places. The surrounding strata W of the gabbro are stratigraphically lower than those which surround it to the E, and given the regional WSW dip, the W margin may be faulted, indicating that the gabbro predates the NW-SE faulting. The ore occurs in 4 zones which were intersected by the drilling: Zone 1 ranges from 84 to 35 m thick, Zone 2 ranges from 26 to 137 m thick, Zone 3 has a fairly constant thickness at about 33 to 39 m, and Zone 4 is some 45 m thick.

GEOCHEMISTRY - Analysis of the core and chip samples from the drilling gave an average Fe plus Ti content of 15.4% Fe + 1.9% Ti.

GEOPHYSICS - A magnetometer was used to take magnetic readings while doing traverses for geological mapping. It has not proved feasible to precisely identify individual ferrigabbro bands when reading at 30 m intervals. However, the interlayered gabbro-ferrigabbro bands do generally cause a response with fluctuations of high magnitude when compared with areas of homogeneous rock type. There is also a strong anomaly across the boundary between basement metamorphics and the gabbro complex.

DRILLING - Percussion drilling was carried out, with cuttings taken every metre. Core drilling was also undertaken with the core tested on site for magnetic susceptibility. Samples from the core and chips were also subjected to tests including rock relative density, full chemical analysis, titanomagnetite liberation tests, and determine autogeneous grindability, impact crushing, rock and ball grindability.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Ore reserves have been calculated for the selected mine area. The total quantity of ferrigabbro ore in Zones 1, 2, and 3 amounts to some 32 Mm³ or 103 Mt which is sufficient for 54 years of mining.

RECORDER: Paul Blake **DATE:** 02/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 21398 **STATUS:** Open

TITLE: Authorities to Prospect 4189M & 4191M Middleward and Southward. Annual report for the period ended 14 January 1990.

AUTHOR(S): **DATE:** April 1990

ATP/EP No.: ATP 4189M & 4191M

COMPANY HOLDING TITLE: Jointly held by Central Pacific Minerals N.L. & Southern Pacific Petroleum N.L.

COMPANY SUBMITTING REPORT: Central Pacific Minerals N.L.

DATE GRANTED: 15/01/1986

PERIOD: 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 20 km SW of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Westwood Gold Mine, Dee Copper Mine, Besch's Copper Pits, IMI Grid, The "K3 Anomaly" area, Kyle Mohr Anomaly, and Southward Joint Venture area

EXPLORATION TARGETS\MODELS: precious metals, copper, and iron

SUMMARY:

LOCALISED EXPLORATION/PROSPECTS

1) Piebald Mountain Area - This area occurs to the E of Piebald Mountain and was explored to follow-up anomalous gold in stream sediment samples in ATP 4191M.

GEOLOGY - Epidote-calcite veining, with wall-rock epidote alteration of the host andesite was found in the area.

GEOCHEMISTRY - 5 rock chip samples were collected, but all samples assayed less than 0.02 ppm Au.

2) Besch's Copper Pits - These are old copper gold workings in the southernmost part of ATP 4191M. A number of anomalous stream sediment samples from the area indicate that the mineralisation is more widespread than suggested by the old workings, but no further surface indications of mineralisation were found.

3) Kyle Mohr Anomaly

GEOCHEMISTRY - The apparent contrast between the A-horizon results (average 113 ppb Au) and the B-horizon results (average 23 ppb Au) highlighted the need for an orientation study of the soils in the area, particularly since no alteration, veining, exotic lithology of obvious structure had been observed in the area of A-horizon soil sampling. Six sites were selected, and at each site a hole was dug and the soil profile examined. The soil profile comprises a mixture of soil, unsorted weathered granitic rock fragments and rock scree, and is poorly stratified. Bulk samples of each soil horizon were excavated and screened with the -2 mm material retained for subsequent screening. In addition a sample of rock chipped material from beneath the B-horizon was collected. Ideally this material would represent the weathered bedrock, however at most sites the sample is suspected of representing transported rock scree. The more organic-rich A-horizon soil was found to contain significantly more (2 to 3 times) gold and copper than the B-horizon in the study area.

RECORDER: Paul Blake

DATE: 04/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 22219 **STATUS:** Open

TITLE: Middleward & Southward, Exploration Permit for Minerals 4189 & 4191. Report on the area relinquished 29th August 1990.

AUTHOR(S): G.J. Pope **DATE:** September 1990

ATP/EP No.: EPM 4189 & 4191

COMPANY HOLDING TITLE: Jointly held by Central Pacific Minerals N.L. & Southern Pacific Petroleum N.L.

COMPANY SUBMITTING REPORT: Central Pacific Minerals N.L.

DATE GRANTED: 15/01/1986 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 20 km SW of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Westwood Gold Mine, Dee Copper Mine, Besch's Copper Pits, IMI Grid, The "K3 Anomaly" area, Kyle Mohr Anomaly, and Southward Joint Venture area

EXPLORATION TARGETS\MODELS: precious metals, copper, and iron

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The area relinquished in this report were covered by the comprehensive stream sediment survey. No anomalous platinum or palladium values were received. The K3 gold anomaly located iron-stained quartz blows, but returned only up to 0.05 ppm gold.

RECORDER: Paul Blake **DATE:** 04/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 22314 **STATUS:** Open

TITLE: Exploration Permit (Minerals) 4191, Southward. Annual report for the period 15th January 1990 to 14th January 1991.

AUTHOR(S): G.J. Pope **DATE:** February 1991

ATP/EP No.: EPM 4191

COMPANY HOLDING TITLE: Jointly held by Central Pacific Minerals N.L. & Southern Pacific Petroleum N.L.

COMPANY SUBMITTING REPORT: Central Pacific Minerals N.L.

DATE GRANTED: 15/01/1986 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 20 km SW of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Dee Copper Mine, Besch's Copper Pits, and Southward Joint Venture area

EXPLORATION TARGETS/MODELS: precious metals, copper, iron, and facing stone

SUMMARY:

LOCALISED EXPLORATION/PROSPECTS

1) Dee Copper Mines

GEOCHEMISTRY - Selected intervals of core from 4 holes drilled by Geopeko were re-assayed. Hole DEE 1, interval 36.58-39.62 m returned 0.48% Cu, 995 ppm Zn, and 0.03 ppm Au. Hole DEE 2, interval 57.91-59.44 m & 62.79-67.06 m returned 0.99% & 0.65% Cu, 1.55% & 0.163% Zn, and 0.03 & 0.03 ppm Au respectively. Hole DEE 3 interval 87.93 to 92.35 m returned 1.46% Cu, and <0.02 ppm Au. Hole DEE 5 returned no interesting results.

2) Southward Joint Venture area

GEOLOGY - Outcropping gabbroic units of the Eulogie Park Gabbro were examined in a preliminary assessment of the dimension stone potential of the area. None of the three areas examined contained outcrop that could be classed as having the potential for marketable dimension stone. Although areas of sufficient outcrop size possessing a marketable black colour were found, the rock was invariably too fractured, altered and strongly stained from weathering of sulphides and biotite.

RECORDER: Paul Blake **DATE:** 04/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 22411 **STATUS:** Open

TITLE: EPM 5580 Eulogie. Report on geological-geophysical reconnaissance of the western crop zone of the Eulogie Gabbro Complex, Mount Morgan mining district, central Queensland

AUTHOR(S): D. Svenson **DATE:**

ATP/EP No.: EPM 5580

COMPANY HOLDING TITLE: South Pacific Steel Pty. Ltd.

COMPANY SUBMITTING REPORT: Thiess Contractors Pty. Ltd.

DATE GRANTED: 06/11/1990 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 20 km SW of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Southward Joint Venture area

EXPLORATION TARGETS\MODELS: Magnetite

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To explore the Eulogie Park Gabbro for ferrigabbro mineralisation similar to within EPM 4191.

REGIONAL EXPLORATION

GEOLOGICAL MAPPING - Due to the failure to locate any ferrigabbro layers with geophysics, no attempt was made to do controlled geological mapping. However, the following observations were made: **(1)** to the S & W, on the lower slopes of Mount Alma, there are strong outcrops of medium grained leucocratic granite (granodiorite or adamellite); **(2)** strong shearing was noted in outcrops of andesitic tuff in the bed of Oaky Creek at the road crossing W of the gabbro. This shearing is aligned with the W boundary of the gabbro complex and could well have displaced any magnetite-rich layering on the W margin of the gabbro complex; **(3)** in the major valley tributary of Alma Creek, below Ulogie North - Mt Alma, the valley floor broadens significantly upstream of the above mentioned granitic outcrops. This broad floor section is apparently underlain by less erosion resistant gabbro which appears to dip steeply E. The valley floor is here mantled by bouldery colluvium-alluvium of mostly gabbro, showing no visual or measurable signs of magnetite enrichment; **(4)** around the basalt capped peaks of Ulogie North - Mt Alma, diorite forms the higher ground, evidently having intruded the gabbro complex. The curving strike of the gabbro complex is well reflected in curving photo lineaments aligned with the sharp bends in Alma Creek, S of Mt Alma and the curvilinear trend of the major valley which encompasses much of the western outcrop of the gabbro complex.

GEOPHYSICS

- **ground surveys** - Geophysical reconnaissance was done in the western crop zone of the "Eulogie Park" Gabbro Complex, immediately west of the prominent peaks - Ulogie North & Mount Alma. A magnetic susceptibility meter was used to detect magnetite rich occurrences in the gabbro complex. No occurrences were found, therefore no surveyed traversing was attempted. A maximum magnetic susceptibility reading of only 2500×10^{-5} units was obtained.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - In view of the disappointing results of this reconnaissance, the relatively uneconomic grade of the ferrigabbro in the area to the E, and the lack of extensive areas of and the low grade of the ferrigabbro in the S of the complex, it is recommended that the EPM be relinquished.

RECORDER: Paul Blake **DATE:** 03/12/1993.

COMPANY REPORT SUMMARY SHEET

CR: 22423 **STATUS:** Open

TITLE: Authority to Prospect 4189M, Middleward. Six monthly report for the period 15th July 1988 to 14th January 1989

AUTHOR(S): J.A. Carrigg **DATE:**

ATP/EP No.: ATP 4189M

COMPANY HOLDING TITLE: Jointly held by Central Pacific Minerals N.L. & Southern Pacific Petroleum N.L.

COMPANY SUBMITTING REPORT: Central Pacific Minerals N.L.

DATE GRANTED: 15/01/1986 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 20 km SW of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Westwood Gold Mine

EXPLORATION TARGETS\MODELS: precious metals

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - This report is a reproduction of CR 20342 except that only the information relating to ATP 4189M is given in this report. This was done because ATP 4189M was relinquished in August 1990 and an open file report on this ATP was needed but the still confidential data on ATP 4191M had to be removed.

RECORDER: Paul Blake **DATE:** 04/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 22424 **STATUS:** Open

TITLE: Authority to Prospect 4189M, Middleward. Annual Report for the period ending 14th January 1990

AUTHOR(S): **DATE:** April 1990

ATP/EP No.: ATP 4189M

COMPANY HOLDING TITLE: Jointly held by Central Pacific Minerals N.L. & Southern Pacific Petroleum N.L.

COMPANY SUBMITTING REPORT: Central Pacific Minerals N.L.

DATE GRANTED: 15/01/1986 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 20 km SW of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Westwood Gold Mine

EXPLORATION TARGETS\MODELS: precious metals

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - This report is a reproduction of CR 21398 except that only the information relating to ATP 4189M is given in this report. This was done because ATP 4189M was relinquished in August 1990 and an open file report on this ATP was needed but the still confidential data on ATP 4191M had to be removed.

RECORDER: Paul Blake **DATE:** 04/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 22425 **STATUS:** Open

TITLE: Authorities to Prospect 4189M. Six monthly report for the period July 15, 1986 to January 14 1987

AUTHOR(S): R.G. McIver **DATE:** July 1987

ATP/EP No.: ATP 4189M

COMPANY HOLDING TITLE: Jointly held by Central Pacific Minerals N.L. & Southern Pacific Petroleum N.L.

COMPANY SUBMITTING REPORT: Central Pacific Minerals N.L.

DATE GRANTED: 15/01/1986 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 20 km SW of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Westwood Gold Mine

EXPLORATION TARGETS\MODELS: precious metals

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - This report is a reproduction of CR 16955 except that only the information relating to ATP 4189M is given in this report. This was done because ATP 4189M was relinquished in August 1990 and an open file report on this ATP was needed but the still confidential data on ATP 4191M had to be removed.

RECORDER: Paul Blake **DATE:** 04/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 22426 **STATUS:** Open

TITLE: Authorities to Prospect 4189M. Six monthly report for the period 15 July 1987 to 14 January 1988.

AUTHOR(S): J.A. Carrigg **DATE:**

ATP/EP No.: ATP 4189M

COMPANY HOLDING TITLE: Jointly held by Central Pacific Minerals N.L. & Southern Pacific Petroleum N.L.

COMPANY SUBMITTING REPORT: Central Pacific Minerals N.L.

DATE GRANTED: 15/01/1986 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 20 km SW of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Westwood Gold Mine

EXPLORATION TARGETS\MODELS: precious metals

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - This report is a reproduction of CR 18672 except that only the information relating to ATP 4189M is given in this report. This was done because ATP 4189M was relinquished in August 1990 and an open file report on this ATP was needed but the still confidential data on ATP 4191M had to be removed.

RECORDER: Paul Blake **DATE:** 04/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 22694 **STATUS:** Open

TITLE: Exploration Permit (Minerals) 4189, Middleward. Six monthly and final report for the period 15th January 1986 to 24th December 1990.

AUTHOR(S): G.J. Pope **DATE:** February 1991

ATP/EP No.: EPM 4189

COMPANY HOLDING TITLE: Jointly held by Central Pacific Minerals N.L. & Southern Pacific Petroleum N.L.

COMPANY SUBMITTING REPORT: Central Pacific Minerals N.L.

DATE GRANTED: 15/01/1986 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 20 km SW of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Westwood Gold Mine

EXPLORATION TARGETS\MODELS: precious metals

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Work in this EPM included the regional stream sediment survey, as well as soil and rock geochemistry in the prospects. Drilling was also carried out in several areas. No areas of major interest were found, and the EPM was relinquished in August 1990.

RECORDER: Paul Blake **DATE:** 02/04/1994.

COMPANY REPORT SUMMARY SHEET

CR: 23186 **STATUS:** Open

TITLE: Exploration Permit (Minerals) 4191, Southward. Annual report for the period 15th January 1991 to 14th January 1992.

AUTHOR(S): G.J. Pope **DATE:** February 1992

ATP/EP No.: EPM 4191

COMPANY HOLDING TITLE: Jointly held by Central Pacific Minerals N.L. & Southern Pacific Petroleum N.L.

COMPANY SUBMITTING REPORT: Central Pacific Minerals N.L.

DATE GRANTED: 15/01/1986 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 20 km SSW of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Dee Copper Mine, Besch's Copper Pits, and Southward Joint Venture area.

EXPLORATION TARGETS/MODELS: precious metals, copper and iron ore

SUMMARY:

LOCALISED EXPLORATION/PROSPECTS

1) Southward Joint Venture area - A review of the work completed by Thiess Contractors on the Eulogie Park Gabbro

GEOCHEMISTRY - A total of 103 core and cutting samples were sent for assay to compare with the results recorded by Thiess Contractors. The majority of the samples were at or below detection limits for gold, palladium and platinum. There was no appreciable grade variation from that previously recorded for iron, vanadium and titanium.

RECORDER: Paul Blake **DATE:** 04/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 23339 **STATUS:** Open

TITLE: Exploration Permit (Minerals) 4191, Southward. Report on the area relinquished 16th May 1991

AUTHOR(S): G.J. Pope **DATE:** July 1991

ATP/EP No.: EPM 4191

COMPANY HOLDING TITLE: Jointly held by Central Pacific Minerals N.L. & Southern Pacific Petroleum N.L.

COMPANY SUBMITTING REPORT: Central Pacific Minerals N.L.

DATE GRANTED: 15/01/1986 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 20 km SSW of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Dee Copper Mine, Besch's Copper Pits, and Southward Joint Venture area.

EXPLORATION TARGETS\MODELS: precious metals, copper and iron ore

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Work in the relinquished areas included the detailed stream sediment survey of the EPM. The survey returned no anomalous results for platinum or palladium. The gold-in-stream sediment anomalies were followed-up with rock chip and soil geochemistry, but no significant gold mineralisation was discovered. Also no Bouger anomalies indicative of massive sulphide mineralisation were discovered from the regional gravity survey in the relinquished area.

RECORDER: Paul Blake **DATE:** 04/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 23845 **STATUS:** Open

TITLE: Exploration Permit (Minerals) 4191, Southward. Report on the area relinquished 24th April 1992

AUTHOR(S): F.M. Scerri **DATE:** May 1992

ATP/EP No.: EPM 4191

COMPANY HOLDING TITLE: Jointly held by Central Pacific Minerals N.L. & Southern Pacific Petroleum N.L.

COMPANY SUBMITTING REPORT: Central Pacific Minerals N.L.

DATE GRANTED: 15/01/1986 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 20 km SSW of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Dee Copper Mine, Besch's Copper Pits, and Southward Joint Venture area.

EXPLORATION TARGETS\MODELS: precious metals, copper and iron ore

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Work completed in the relinquished areas included the detailed stream sediment survey. No anomalous values of platinum or palladium were returned. Rock chip sampling and soil geochemistry surveys of gold-in-stream anomalies did not discover any significant gold mineralisation. No Bouger anomalies indicative of massive sulphide mineralisation were discovered from the regional gravity survey in the relinquished area.

RECORDER: Paul Blake **DATE:** 04/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 24355 **STATUS:** Open

TITLE: Exploration Permit (Minerals) 4191, Southward. Final and annual report for the period 15th January 1992 to 14th January 1993.

AUTHOR(S): R.G. McIver & F.M. Scerri **DATE:** March 1993

ATP/EP No.: EPM 4191

COMPANY HOLDING TITLE: Jointly held by Central Pacific Minerals N.L. & Southern Pacific Petroleum N.L.

COMPANY SUBMITTING REPORT: Central Pacific Minerals N.L.

DATE GRANTED: 15/01/1986 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 20 km SSW of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Dee Copper Mine, Besch's Copper Pits, and Southward Joint Venture area.

EXPLORATION TARGETS/MODELS: precious metals, copper and iron ore

SUMMARY:

LOCALISED EXPLORATION/PROSPECTS

1) Southward Joint Venture area

GEOCHEMISTRY - Metallurgical testwork results highlighted the possibility of producing a concentrate of 20% of the material mined with an average grade of 58-64% Fe, 2.5% Ti, and 0.5% V.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Follow-up of stream sediment anomalies failed to produce any significant mineralisation; mineralisation at the Dee Mine is not worthy of follow-up work; and the reconnaissance gravity survey over the area failed to determine a significant target. Also the evaluation of the results of the ferrigabbro in the Eulogie Park Gabbro showed that the proposal is not economically feasible at present. Therefore EPM 4191 is relinquished.

RECORDER: Paul Blake **DATE:** 04/02/2994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP/EPM 4190

COMPANY HOLDING TITLE: Central Pacific Minerals NL (operator), Southern Pacific Petroleum NL, and Messrs Mackenzie-Forbes and Clark.

COMPANY SUBMITTING REPORT: Central Pacific Minerals NL

DATE GRANTED: 15/01/1986 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 50 km SW of Rockhampton

MINING DISTRICT:

MINES/PROSPECTS: Westwood Palladium Mine

EXPLORATION TARGETS/MODELS: Precious and base metals

TRANSFERS, JOINT VENTURES, etc: JV between Central Pacific Minerals NL (operator), Southern Pacific Petroleum NL, and Messrs Mackenzie-Forbes and Clark.

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File-* 17539, 20383, 21724, 23300

Confidential- C

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To prospect for precious and base metals associated with basic intrusions in the area.

GEOLOGY -

LOCAL - Most of the area is covered (to the SW) by the Permian Rookwood Volcanics or to the NE by undifferentiated Cretaceous basalt. These rocks are intruded by several Late Cretaceous rhyolite and trachyte plugs. The central NW-trending zone consists of the Permian sediments and intrusives of the Moah Creek beds and the Bouldercombe Complex respectively. Of particular interest are the three Late Permian basic intrusions in the Fred Creek, Westwood and Windah areas. The intrusion at Westwood is known to be a layered gabbroic sequence.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - BHP (ATP 532M); and Nord (ATP 3150M and 3356M).

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The area was initially explored by a stream sediment survey. Areas that did not return anomalies were relinquished first. During further exploration, anomalous areas were investigated and some were considered to have no economic mineralisation, and these areas were relinquished. At the end of the final year of the tenement, areas were applied for as Mining Leases, and the rest of the ATP was relinquished.

RECORDER: Paul Blake **DATE:** 09/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 17539 **STATUS:** Open

TITLE: Westwood, Authority to Prospect 4190M. Report on the area relinquished on January 14th, 1988.

AUTHOR(S): J.A. Carrigg **DATE:** July 1988

ATP/EP No.: ATP 4190M

COMPANY HOLDING TITLE: Central Pacific Minerals NL (operator), Southern Pacific Petroleum NL, and Messrs Mackenzie-Forbes and Clark.

COMPANY SUBMITTING REPORT: Central Pacific Minerals NL

DATE GRANTED: 15/01/1986 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 50 km SW of Rockhampton

MINING DISTRICT:

MINES/PROSPECTS: Westwood Palladium Mine

EXPLORATION TARGETS\MODELS: Precious and base metals

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The area relinquished was covered by the stream sediment survey but none of the results were considered to be significantly anomalous.

RECORDER: Paul Blake **DATE:** 09/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 20383 **STATUS:** Open

TITLE: Westwood, Authority to Prospect 4190M. Report on the area relinquished on 13th December, 1988.

AUTHOR(S): J.A. Carrigg **DATE:** August 1989

ATP/EP No.: ATP 4190M

COMPANY HOLDING TITLE: Central Pacific Minerals NL (operator), Southern Pacific Petroleum NL, and Messrs Mackenzie-Forbes and Clark.

COMPANY SUBMITTING REPORT: Central Pacific Minerals NL

DATE GRANTED: 15/01/1986 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 50 km SW of Rockhampton

MINING DISTRICT:

MINES/PROSPECTS: Westwood Palladium Mine

EXPLORATION TARGETS\MODELS: Precious and base metals

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The area relinquished had been covered by the stream sediment program. Only 5 results from this area were considered anomalous, but no indication of mineralisation was evident in the follow-up reconnaissance.

RECORDER: Paul Blake **DATE:** 09/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 21724 **STATUS:** Open

TITLE: Westwood, Authority to Prospect 4190M. Report on the area relinquished on 26th February 1990

AUTHOR(S): F. Scerri **DATE:** August 1990

ATP/EP No.: ATP 4190M

COMPANY HOLDING TITLE: Central Pacific Minerals NL (operator), Southern Pacific Petroleum NL, and Messrs Mackenzie-Forbes and Clark.

COMPANY SUBMITTING REPORT: Central Pacific Minerals NL

DATE GRANTED: 15/01/1986 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 50 km SW of Rockhampton

MINING DISTRICT:

MINES/PROSPECTS: Westwood Palladium Mine

EXPLORATION TARGETS\MODELS: Precious and base metals

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The stream sediment survey covered the area being relinquished. 13 of the results were considered anomalous. No indication of mineralisation could be found during follow-up work.

RECORDER: Paul Blake **DATE:** 09/02/1994.

COMPANY REPORT SUMMARY SHEET

CR: 23300 **STATUS:** Open

TITLE: Exploration Permit (Minerals) 4190, Westwood. Final Report.

AUTHOR(S): G.J. Pope **DATE:** November 1991

ATP/EP No.: EPM 4190

COMPANY HOLDING TITLE: Central Pacific Minerals NL (operator), Southern Pacific Petroleum NL, and Messrs Mackenzie-Forbes and Clark.

COMPANY SUBMITTING REPORT: Central Pacific Minerals NL

DATE GRANTED: 15/01/1986 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 50 km SW of Rockhampton

MINING DISTRICT:

MINES/PROSPECTS: Westwood Palladium Mine

EXPLORATION TARGETS\MODELS: Precious and base metals

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Areas were applied for as Mining Leases and the rest of the tenement was relinquished.

RECORDER: Paul Blake **DATE:** 09/02/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 4231M

COMPANY HOLDING TITLE: Haoma North West N.L.

COMPANY SUBMITTING REPORT: Freeport of Australia Inc

DATE GRANTED: 04/03/1986 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 3 km S of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Gavial Creek (Crocodile Creek) alluvials, Clanricarde Mine, Great Northern Lode, Mount Victoria Group, and Dee (Adolphus William) Copper Mine.

EXPLORATION TARGETS/MODELS: Mount Morgan style deposits.

TRANSFERS, JOINT VENTURES, etc: Freeport of Australia Inc. carried out and managed the exploration program for Haoma North West N.L.

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File-* 16210, 17228, 18270, 18759, 18938, 20369, 20430

Confidential-

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To search for gold-copper mineralisation of the Mount Morgan style.

GEOLOGY -

REGIONAL - As given in the report on the "Geology of the Rockhampton and Port Clinton 1:250 000 Sheet areas".

LOCAL - Interpretations have been based on 1:25 000 mapping by Geopeko from 1968 to 1972 with minor follow-up work by B.H.P. in 1984-5. Unit descriptions appear to be the same as from the report on the geology of the Rockhampton 1:250 000 Sheet. The Mine Corridor area was mapped from the Mount Morgan Mine, S to Trotters Creek. The Mine Corridor Sequence is the oldest unit and was divided into four units; **Dmc1** - Intermediate crystal and crystal lithic tuff with lesser quartz feldspar crystal tuff. This unit appears to underlie the Banded Mine sequence in the Hamilton Creek area, and may equate with the Lower Mine Pyroclastics (LMP) of Taube. **Dmc2** - Fine quartz feldspar crystal tuff, chert, limestone, intermediate lithic to lithic lapilli tuff, minor jasper and andesite. This suite is equated with the Banded Mine Sequence (BMS) of Taube. This unit underlies conformably the main Mine Corridor unit **Dmc3**. **Dmc3** - Quartz feldspar crystal tuff, feldspar crystal tuff and lesser lithic varieties, minor andesite and

Pods of limestone form the best represented unit in the Mine Corridor. This unit is equated with the Upper Mine Pyroclastics (UMP). **Dmc4** - Intermediate lithic lapilli tuff, minor feldspar crystal tuff and fine intermediate tuff occurs above Dmc3 although this contact may be faulted. These may be equivalent of the Baree and Arnolds Ridge Felsite of Taube. Unconformably overlying the Mine Corridor Sequence lies a reworked intermediate lithic lapilli tuff with distinctive jasper and chert clasts. This unit was mapped as Dee Volcanics by Geopeko whereas Taube called it the Capella Creek beds. This unit is consistently W dipping, whereas the Mine Corridor is predominantly S dipping. It is also distinctive for its lack of granitoid clasts which suggests that it may be older than the Mount Morgan Tonalite. In the area W of the Mine it is altered (prehnite and epidote mineralogy) in the vicinity of the intrusives. These features lead to the interpretation that this unit is Capella Creek equivalent. The Dee Volcanics unconformably overlie the Capella Creek beds. The unconformity is shown by the coarse block breccia at the base and the occasional absence of the Capella Creek beds. The Dee volcanics are divided into two units; **Dud1** - The basal unit is the coarse block breccia. This unit is equated with the Dee Volcanics on the presence of granitoid clasts in the basal unit. **Dud2** - Purple feldspar crystal tuff and intermediate lithic lapilli tuff, minor volcanic breccia. This unit occurs immediately W of the mine, and is equated with the Dee Volcanics as red beds occur higher in the Dee sequence and similar lithologies occur south of Trotters Creek, which have been dated by Frasnian fossils. The final unit mapped in the area is the Mount Morgan Tonalite.

MINERALISATION/ALTERATION - Styles of mineralisation recognised are: (1) Fracture controlled copper at the Dee Copper and Oaky Creek mines. (2) Quartz vein associated gold mineralisation at the Clanricarde and Great Northern lodes. (3) Gold derived from fossil placers at the Mount Victoria group. (4) Sulphide copper mineralisation in granitic boulders in the basal units of the Dee Volcanics at Bullbound Grid. (5) Minor copper occurrences in the SW of the area at Clydes Pit. (6) Traces of tungsten in Hamilton Creek area.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Conzinc (ATP 161M, 162M & 219M); M.E.P.L. (ATP 265M); Walmul Copper Company (ATP 279M); ATP 301M; Geopeko (ATP 302M, 352M, 508M, 2751M); Cominco and North Broken Hill Ltd (ATP 439M); Getty Oil (ATP 2518M); Alcoa (ATP 3045M); and B.H.P. Exploration (ATP 3293M & 3539M).

GEOCHEMISTRY

- **stream sediment sampling** - The -80 sieved stream sediment surveys for copper, lead, and zinc by Geopeko, and copper, lead, zinc, gold, and arsenic by B.H.P. were compiled. Freeport of Australia also collected and panned concentrated samples for gold. The results are as follows: **Base metals:** (a) Copper showed an anomalous area (145 to 230 ppm Cu) S of Mt Battery, and a small highly anomalous area (>230 ppm Cu) in the Nine Mile Creek area. (b) Lead showed only one anomalous zone (>74 ppm Pb) on Hamilton Creek. (c) Zinc results showed significant anomalous areas at Upper Nine Mile Creek through to upper Raspberry Creek. A large anomalous area also covers the Hamilton Creek through to S of Mt Battery area. **Gold:** Panned concentrate gold assays were converted to mg/m³ and treated statistically. >0.77 mg/m³ was considered anomalous, >2 mg/m³ considered moderately anomalous, and >5.2 mg/m³ considered highly anomalous. The anomalous areas do not appear to show any relationship to the base metal anomalies. Significant anomalies occur in the NW area where visible gold was seen in the pan, but no base metal coverage is available here. Anomalous areas also occur in the area S of Mount Victoria group mines. Both the above areas drain opposite sides of the Razorback beds. Significant anomalies occur in the Dee River and this may be attributed to contamination from Mount Morgan Mine, but alluvial gold was derived from parts of this river before mining commenced at Mount Morgan. Other anomalous results occur in the Oaky Creek area, south Hamilton Creek area, and lower Raspberry Creek area. 97 follow-up pan concentrated stream sediment samples were collected. The results were calculated to g/m³ for statistical comparison with four populations defined, three of which are considered anomalous. Four areas of anomalous gold geochemistry were defined. (1) A wide zone of anomalous gold in the Spill Creek area drains the Turner Creek Conglomerate and Neils Creek clastics and residuals of the Razorback beds. This anomalous area covers 18 km². (2) The upper reaches of the Quarry Creek which drains Razorback beds and Capella Creek beds (1.5 km²). (3) The higher parts of Golden Gully

which drains the Razorback beds in the vicinity of the Mount Victoria Mine (2 km²). (4) Part of Boulder Creek, SW of Mount Battery which drains Razorback beds and Boulder Creek Grits (1.5 km²).

- **rock chip sampling** - 11 rock chip samples were collected from the ATP with ranges of 0.05 to 0.08 ppm Au, 15 to 820 ppm Cu, 15 to 40 ppm Pb, and <2 to 85 ppm Zn.

GEOPHYSICS

- **airborne surveys** - A structural study was carried out at Mount Morgan using aeromagnetics and TM landsat imagery. The aeromagnetics indicate that the Mount Morgan Mine is associated with a discrete magnetic low within a magnetic high zone. Three structural directions are indicated by the aeromagnetic pattern. The Mount Battery - Slide fault direction bearing 045°, the Mine Corridor fault bearing 135°, and the dyke set bearing 115°. The interpretation of the Thematic Mapper landsat defined 6 main linears. (1) (2) and (3) were the same trends as the three identified by the magnetics. (4) 025° Razorback scarp. (5) 061° Ironbark or Trough fault. (6) 165° NW suture, deep seated suture suggested as contains Cretaceous plugs in the Mount Lion area, correlates well with magnetic linear. It is proposed that three structural directions are important in the control of the Mount Morgan ore body. These are the Slide (045°) and Ironbark fault (061°) and the Mine Corridor direction (135°). Several structure intersections have been investigated on the ground with nothing anomalous being found.

LOCALISED EXPLORATION/PROSPECTS

1) Clanricarde and Midas Mines

GEOLOGY - These mines worked a narrow reef known as the Clanricarde Reef. The gold occurs in spotty concentrations, in association with pyrite and chalcopyrite, in a series of fault controlled quartz veins, the largest of which is 10-15 cm wide. The quartz veins occur in a sequence of ?Dee Volcanics intruded by phases of the ?Mount Morgan Tonalite. No alteration zone is discernible.

GEOCHEMISTRY - 29 rock chip samples were collected from the Clanricarde Mine area. The range of values are 0.03 to 46.2 ppm Au, 85 ppm to 8.44% Cu, <5 to 55 ppm Pb, 20 to 2500 ppm Zn, and <1 to 84 ppm Ag. A further 33 rock chip samples were collected with some samples being taken from the underground workings. The results were encouraging with a maximum value of 87.6 g/t Au being recorded, and the average being 36.1 g/t Au. The sampling has shown that the gold is confined almost exclusively to the quartz veins with the wall rock being unmineralised. High copper and silver assays of up to 6.48% Cu and 80 g/t Ag respectively were also recorded from samples of mineralised quartz

2) Dee Copper Mine - This mine occurs immediately outside the ATP.

GEOLOGY - It was found that copper with lesser zinc and weak gold and silver occurs in a structural zone some 1300 m long, and is wholly confined to rocks considered to be part of the Carboniferous Pond Formation (volcanic lithic arenites, tuffaceous sediments and acid to intermediate tuffs). Aplitic intrusives probably related to the Kyle Mohr Complex also occur in the area. The gangue mineralogy is quartz and calcite with some epidote rich rock. The ore minerals are malachite, azurite, and chalcopyrite with lesser sphalerite, arsenopyrite and galena. A gossanous cap is well developed in part. No alteration zone is discernible about the structural zone. No further work is recommended.

GEOCHEMISTRY - 26 rock chip samples were collected from the Dee Mine and surrounding area with results ranging from 0.02 to 0.94 ppm Au, 1 to 36 ppm Ag, 260 ppm to 2.3% Cu, <5 to 500 ppm Pb, and 40 to 1.62% Zn.

3) The Great Northern Lode

GEOCHEMISTRY - 11 rock chip samples were collected and the assays ranged from 0.01 to 0.38 ppm Au, with one sample returning 15.2 ppm Au.

4) Mount Victoria Group - workings occur throughout this area.

GEOLOGY - The gold is derived from a coarse grained angular ferruginous conglomerate within a sequence of conglomerates and siltstones. This unit is interpreted to have been deposited in a multi-channel braided stream system. Periodic flooding resulted in the alternating conglomerate, sandstone and mudstone beds. Three main conglomerate beds (A,B, & C) have been identified and sampled. A fourth, previously undetected and unexploited layer (D) was also located and sampled. Most clasts in the conglomerate are of quartz, chert, and volcanic lithics.

GEOCHEMISTRY - 30 rock chip samples were collected from the conglomerate horizon in the area of the old workings. Results range from 0 to 12.8 g/t Au, which highlights inhomogeneity of grade distribution. Given the limited sampling that has been carried out to date, and assuming a mining width of 3 m, the weighted average gold content is 0.54 g/t Au. There appears to be a crude correlation of gold content and abundance of quartz clasts. Bed C contains the greatest percentage of quartz and generally has the highest and most consistent gold assays, however, direct assay of quartz pebbles indicate only 0.02 ppm Au. A large boulder of boxworked jasperous material assayed 0.69 ppm Au and may indicate a different source for the gold mineralisation. 55 grab samples were also collected from the mine area. These rocks were taken from the surface exposures where they had been worked in the past. A further 75 continuous channel chip samples were taken from various underground sites in the three main adits at Mount Victoria. The sampling above and below ground has defined a variably anomalous ferricrete horizon which assays up to 26.8 g/t Au over its width which varies from 20 cm to 1.5 m, averaging 0.78 m. 40% of samples from this horizon assay over 1 g/t Au, and most are distinctly anomalous.

5) Hamilton & Horse Creek areas - this area contains the Hamilton Creek Prospect which will be dealt with separately.

GEOLOGY - Traversing the area to the W of the Hamilton Creek Prospect revealed no alteration or anomalous features, being a monotonous sequence of intermediate lithic tuffs to volcanic breccia. Alteration in the Horse Creek section of the Mine corridor is more pervasive than in the Hamilton Creek Prospect and this probably indicates the shallow nature of the rafts of sediment and volcanics.

GEOCHEMISTRY - 26 bulk cyanide leach stream sediment samples were collected to cover the whole of the Hamilton and Horse Creek areas. Only three samples were anomalous, all draining a restricted area W of the Hamilton Creek Prospect (the area that was found to be an monotonous sequence of tuff and breccia).

6) Hamilton Creek Prospect

GEOLOGY - Three major rock units have been identified within the grid area, the Mine Corridor Sequence, the Capella Creek beds and the Mine Granite phase of the Mount Morgan Tonalite. The Mine Corridor Sequence has been divided into 6 units in this area. Unit 1 which is dominantly acid quartz crystal tuff is equated with the Upper Mine Pyroclastics; Units 2 (cherty tuffaceous mudstone) & 3 (limestone and fine limy sediments which have been skarnised in many places) are equivalent to the Banded Mine Sequence; Units 4, 5, and 6 which are intermediate lithic and crystal tuffs are equivalent to the Lower Mine Pyroclastic. The Capella Creek beds consist of intermediate lithic lapilli tuff. Minor block faulting appears to have occurred within the area, and this has controlled many of the present day streams. The fault that follows the N-S running creek in the centre of the area is of most importance as the clay and silica alteration in the area only occurs to the W of this fault. Two main types of alteration of economic significance occur at the Hamilton Creek Prospect. These are weak to moderate clay alteration + silica, and skarn alteration. These alterations are mostly restricted to the units Dmc3 and Dmc4 although Dmc1 and Dmc2 show intense skarnisation related to the intrusions. The clay alteration is confined to the SW of the grid area whilst the skarn alteration occurs in the E half of the grid.

GEOCHEMISTRY - A grid was set up over the clay alteration and skarn zones, and soil sampling was undertaken. A high background for copper occurs within the skarn altered units in the E of the area whereas copper, lead, and zinc appears to have been leached from the clay altered zones in the W of the area. The highest copper values are associated with an intermediate dyke in the S. Lead and zinc values are generally low throughout, although zinc values of up to 2200 ppm were recorded near an old limestone quarry in the E of the area. Gold is low throughout the grid area. Occasional spot highs of gold

occur but probably represent a lithological rather than mineralising effect. 15 rock chip samples were also collected from the grided area. Values ranged from 0.02 to 0.26 ppm Au, <1 to 12 ppm Ag, 5 ppm to 2.91% Cu, <5 to 75 ppm Pb, and <2 to 4500 ppm Zn. No further work is recommended on this prospect.

7) Quarry Creek prospect - The prospect occurs 6 km NNW of the Mount Morgan Mine.

GEOLOGY - The rocks cropping out at Quarry Creek are interpreted as Capella Creek beds and are mainly intermediate lithic tuffs. N of the creek (outside of the ATP) are silicified limestones and acid crystal tuffs, and these are interpreted as equivalents of the Mine Corridor Sequence although they are probably strike extensions of the Moongan Corridor lithologies. The Mine Corridor Sequence lies in faulted contact with the Quarry Creek intermediate tuffs but to the W underlie the Capella Creek beds probably unconformably. The Quarry Creek prospect contains an area of disseminated pyrite located in intermediate lithic tuffs and minor fine banded cherts. Localised alteration zones occur in the area, and can be divided into two styles, silicification and pyritisation, and clay alteration.

GEOCHEMISTRY - 25 rock chip samples were collected but no gold or anomalous base metals were detected. Strongly anomalous panned concentrate samples are probably related to nearby outcrops of the Jurassic Razorback beds which sheds gold from its basal units.

GEOPHYSICS - The Quarry Creek prospect was defined by North Broken Hill Ltd as a zone of anomalous IP effects within the Capella Creek unit. These effects are associated with the disseminated pyrite.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The discussion at the end of the final report (CR 20430) recommended further work in the Clanricarde and Midas Mines area, however, this report is listed as the final report. Therefore the company must have decided to relinquish the ATP after writing the report but before beginning the next six months of exploration.

RECORDER: Paul Blake

DATE: 31/01/1994.

COMPANY REPORT SUMMARY SHEET

CR: 16210 **STATUS:** Open

TITLE: Authority to Prospect no 4231M, Gelobera Range - East Queensland. Report for the six months ended 4th September 1986

AUTHOR(S): D. Young **DATE:**

ATP/EP No.: ATP 4231M

COMPANY HOLDING TITLE: Haoma North West N.L.

COMPANY SUBMITTING REPORT: Freeport of Australia Inc

DATE GRANTED: 04/03/1986 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 3 km S of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Gavial Creek (Crocodile Creek) alluvials, Clanricarde Mine, Great Northern Lode, Mount Victoria Group, and Dee (Adolphus William) Copper Mine.

EXPLORATION TARGETS/MODELS: Mount Morgan style deposits.

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To search for gold-copper mineralisation of the Mount Morgan style.

GEOLOGY -

REGIONAL - As given in the report on the "Geology of the Rockhampton and Port Clinton 1:250 000 Sheet areas".

LOCAL - Interpretations have been based on 1:25 000 mapping by Geopeko from 1968 to 1972 with minor follow-up work by B.H.P. in 1984-5. Unit descriptions appear to be the same as from the report on the geology of the Rockhampton 1:250 000 Sheet.

MINERALISATION/ALTERATION - Styles of mineralisation recognised are: (1) Fracture controlled copper at the Dee Copper and Oaky Creek mines. (2) Quartz vein associated gold mineralisation at the Clanricarde and Great Northern lodes. (3) Gold derived from fossil placers at the Mount Victoria group. (4) Sulphide copper mineralisation in granitic boulders in the basal units of the Dee Volcanics at Bullbound Grid. (5) Minor copper occurrences in the SW of the area at Clydes Pit. (6) Traces of tungsten in Hamilton Creek area.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Conzinc (ATP 161M, 162M & 219M); M.E.P.L. (ATP 265M); Walmul Copper Company (ATP 279M); ATP 301M; Gepeko (ATP 302M, 352M, 508M, 2751M); Cominco and North Broken Hill Ltd (ATP 439M); Getty Oil (ATP 2518M); Alcoa (ATP 3045M); and B.H.P. Exploration (ATP 3293M & 3539M).

GEOCHEMISTRY

- **stream sediment sampling** - The -80 sieved stream sediment surveys for copper, lead, and zinc by Geopeko, and copper, lead, zinc, gold, and arsenic by B.H.P. were compiled. Freeport of Australia also collected and panned concentrated samples for gold. The results are as follows: **Base metals:** (a) Copper showed an anomalous area (145 to 230 ppm Cu) S of Mt Battery, and a small highly anomalous area (>230 ppm Cu) in the Nine Mile Creek area. (b) Lead showed only one anomalous zone (>74 ppm Pb) on Hamilton Creek. (c) Zinc results showed significant anomalous areas at Upper Nine Mile Creek through to upper Raspberry Creek. A large anomalous area also covers the Hamilton Creek through to S of Mt Battery area. **Gold:** Panned concentrate gold assays were converted to mg/m³ and treated statistically. >0.77 mg/m³ was considered anomalous, >2 mg/m³ considered moderately anomalous, and >5.2 mg/m³ considered highly anomalous. The anomalous areas do not appear to show any relationship to the base metal anomalies. Significant anomalies occur in the NW area where visible gold was seen in the pan, but no base metal coverage is available here. Anomalous areas also occur in the area S of Mount Victoria group mines. Both the above areas drain opposite sides of the Razorback beds. Significant anomalies occur in the Dee River and this may be attributed to contamination from Mount Morgan Mine, but alluvial gold was derived from parts of this river before mining commenced at Mount Morgan. Other anomalous results occur in the Oaky Creek area, south Hamilton Creek area, and lower Raspberry Creek area.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - First priority targets are the detailed appraisal of the anomalous areas defined, namely; upper Nine Mile Creek to Raspberry Creek area, Clanricarde gold area, Mount Victoria to Oaky Creek area, and lower Raspberry Creek area. It is also recommended that a detailed appraisal of the Hamilton Creek and Horse Creek areas be undertaken.

RECORDER: Paul Blake

DATE: 28/01/1994.

COMPANY REPORT SUMMARY SHEET

CR: 17228 **STATUS:** Open

TITLE: Authority to Prospect no. 4231M. Gelobera Range - East Queensland. Report for the six months ended 4th March 1987.

AUTHOR(S): G.P. Rogers & D.I. Young **DATE:**

ATP/EP No.: ATP 4231M

COMPANY HOLDING TITLE: Haoma North West N.L.

COMPANY SUBMITTING REPORT: Freeport of Australia Inc

DATE GRANTED: 04/03/1986 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 3 km S of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Gavial Creek (Crocodile Creek) alluvials, Clanricarde Mine, Great Northern Lode, Mount Victoria Group, and Dee (Adolphus William) Copper Mine.

EXPLORATION TARGETS\MODELS: Mount Morgan style deposits.

SUMMARY:

REGIONAL EXPLORATION

GEOCHEMISTRY

- **stream sediment sampling** - 97 follow-up pan concentrated stream sediment samples were collected and fire assayed for gold. The results were calculated to g/m³ for statistical comparison with four populations defined, three of which are considered anomalous. Four areas of anomalous gold geochemistry were defined. (1) A wide zone of anomalous gold in the Spill Creek area drains the Turner Creek Conglomerate and Neils Creek clastics and residuals of the Razorback beds. This anomalous area covers 18 km². (2) The upper reaches of the Quarry Creek which drains Razorback beds and Capella Creek beds (1.5 km²). (3) The higher parts of Golden Gully which drains the Razorback beds in the vicinity of the Mount Victoria Mine (2 km²). (4) Part of Boulder Creek, SW of Mount Battery which drains Razorback beds and Boulder Creek Grits (1.5 km²).

- **rock chip sampling** - 11 rock chip samples were collected from the ATP with ranges of 0.05 to 0.08 ppm Au, 15 to 820 ppm Cu, 15 to 40 ppm Pb, and <2 to 85 ppm Zn.

LOCALISED EXPLORATION/PROSPECTS

1) Dee Copper Mine - This mine occurs immediately outside the ATP.

GEOLOGY - It was found that copper with lesser zinc and weak gold and silver occurs in a structural zone some 1300 m long, and is wholly confined to rocks considered to be part of the Carboniferous Pond Formation (volcanic lithic arenites, tuffaceous sediments and acid to intermediate tuffs). Aplitic intrusives probably related to the Kyle Mohr Complex also occur in the area. The gangue mineralogy is quartz and calcite with some epidote rich rock. The ore minerals are malachite, azurite, and chalcopyrite with lesser sphalerite, arsenopyrite and galena. A gossanous cap is well developed in part. No alteration zone is discernible about the structural zone. No further work is recommended.

GEOCHEMISTRY - 26 rock chip samples were collected from the Dee Mine and surrounding area with results ranging from 0.02 to 0.94 ppm Au, 1 to 36 ppm Ag, 260 ppm to 2.3% Cu, <5 to 500 ppm Pb, and 40 to 1.62% Zn.

2) Clanricarde Mine

GEOLOGY - This deposit consists of a series of quartz veins carrying gold in spotty concentrations. This gold is in part associated with copper sulphides, including possible enargite. The quartz veins occur in a sequence of ?Dee Volcanics intruded by phases of the ?Mount Morgan Tonalite. No alteration zone is discernible.

GEOCHEMISTRY - 29 rock chip samples were collected from the Clanricarde Mine area. The range of values are 0.03 to 46.2 ppm Au, 85 ppm to 8.44% Cu, <5 to 55 ppm Pb, 20 to 2500 ppm Zn, and <1 to 84 ppm Ag.

3) Mount Victoria Group

GEOLOGY - The gold is derived from a coarse grained angular ferruginous conglomerate within a sequence of conglomerates and siltstones. This sequence has been traced over an area of 300 m by 500 m and workings occur on this unit throughout this area.

RECORDER: Paul Blake **DATE:** 28/01/1994.

COMPANY REPORT SUMMARY SHEET

CR: 18270 **STATUS:** Open

TITLE: Authority to Prospect no. 4231M. Gelobera Range - East Queensland. Report for the six month period ended 3rd September 1988.

AUTHOR(S): M.N. Stallman & D.I. Young **DATE:**

ATP/EP No.: ATP 4231M

COMPANY HOLDING TITLE: Haoma North West N.L.

COMPANY SUBMITTING REPORT: Freeport of Australia Inc

DATE GRANTED: 04/03/1986 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 3 km S of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Gavial Creek (Crocodile Creek) alluvials, Clanricarde Mine, Great Northern Lode, Mount Victoria Group, Dee (Adolphus William) Copper Mine, Quarry Creek prospect.

EXPLORATION TARGETS\MODELS: Mount Morgan style deposits.

SUMMARY:

REGIONAL EXPLORATION

GEOPHYSICS

- **airborne surveys** - A structural study was carried out at Mount Morgan using aeromagnetics and TM landsat imagery. The aeromagnetics indicate that the Mount Morgan Mine is associated with a discrete magnetic low within a magnetic high zone. Three structural directions are indicated by the aeromagnetic pattern. The Mount Battery - Slide fault direction bearing 045°, the Mine Corridor fault bearing 135°, and the dyke set bearing 115°. The interpretation of the Thematic Mapper landsat defined 6 main linears. (1) 045° Mt Battery or Slide fault direction, controls shape of ore body, this linear correlates with the mapped faults and magnetic interpreted faults. (2) 135° Mine Corridor fault zone, controls disposition of mine corridor stratigraphy, correlates well with magnetic interpreted faults and is second axis of the ore body. (3) 115° dyke swarm, shows good correlation with the magnetic interpreted faults in the Horse Creek area. (4) 025° Razorback scarp. (5) 061° Ironbark or Trough fault. (6) 165° NW suture, deep seated suture suggested as contains Cretaceous plugs in the Mount Lion area, correlates well with magnetic linear. It is proposed that three structural directions are important in the control of the Mount Morgan ore body. These are the Slide and Ironbark fault and the Mine Corridor direction. Several structure intersections have been investigated on the ground with nothing anomalous being found.

LOCALISED EXPLORATION/PROSPECTS

1) Quarry Creek prospect - The prospect occurs 6 km NNW of the Mount Morgan Mine.

GEOLOGY - The rocks cropping out at Quarry Creek are interpreted as Capella Creek beds and are mainly intermediate lithic tuffs. N of the creek (outside of the ATP) are silicified limestones and acid crystal tuffs, and these are interpreted as equivalents of the Mine Corridor Sequence although they are probably strike extensions of the Moongan Corridor lithologies. The Mine Corridor Sequence lies in faulted contact with the Quarry Creek intermediate tuffs but to the W underlie the Capella Creek beds probably unconformably. The Quarry Creek prospect contains an area of disseminated pyrite located in intermediate lithic tuffs and minor fine banded cherts. Localised alteration zones occur in the area, and can be divided into two styles, silicification and pyritisation, and clay alteration.

GEOCHEMISTRY - 25 rock chip samples were collected but no gold or anomalous base metals were detected. Strongly anomalous panned concentrate samples are probably related to nearby outcrops of the Jurassic Razorback beds which sheds gold from its basal units.

GEOPHYSICS - The Quarry Creek prospect was defined by North Broken Hill Ltd as a zone of anomalous IP effects within the Capella Creek unit. These effects are associated with the disseminated pyrite.

2) Hamilton & Horse Creek areas

GEOLOGY - Traversing the area to the W of the Hamilton Creek Prospect revealed no alteration or anomalous features, being a monotonous sequence of intermediate lithic tuffs to volcanic breccia size.

GEOCHEMISTRY - 26 bulk cyanide leach stream sediment samples were collected to cover the whole of the Hamilton and Horse Creek areas. Only three samples were anomalous, all draining a restricted area W of the Hamilton Creek Prospect.

3) Mount Victoria prospect

GEOLOGY - The gold is interpreted to have been deposited in a multi-channel braided stream system. Periodic flooding resulted in the alternating conglomerate, sandstone and mudstone beds. Three main conglomerate beds (A,B, & C) have been identified and sampled. A fourth, previously undetected and unexploited layer (D) was also located and sampled. Most clasts in the conglomerate are of quartz, chert, and volcanic lithics.

GEOCHEMISTRY - 30 rock chip samples were collected from the conglomerate horizon in the area of the old workings. Results range from 0 to 12.8 g/t Au, which highlights inhomogeneity of grade distribution. Given the limited sampling that has been carried out to date, and assuming a mining width of 3 m, the weighted average gold content is 0.54 g/t Au. There appears to be a crude correlation of gold content and abundance of quartz clasts. Bed C contains the greatest percentage of quartz and generally has the highest and most consistent gold assays, however, direct assay of quartz pebbles indicate only 0.02 ppm Au. A large boulder of boxworked jasperous material assayed 0.69 ppm Au and may indicate a different source for the gold mineralisation.

RECORDER: Paul Blake

DATE: 28/01/1994.

COMPANY REPORT SUMMARY SHEET

CR: 18759 **STATUS:** Open

TITLE: Authority to Prospect no. 4231M. Gelobera Range - East Queensland. Report for the six months ended 4th September 1987

AUTHOR(S): D.I. Young **DATE:**

ATP/EP No.: ATP 4231M

COMPANY HOLDING TITLE: Haoma North West N.L.

COMPANY SUBMITTING REPORT: Freeport of Australia Inc

DATE GRANTED: 04/03/1986 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 3 km S of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Gavial Creek (Crocodile Creek) alluvials, Clanricarde Mine, Great Northern Lode, Mount Victoria Group, and Dee (Adolphus William) Copper Mine.

EXPLORATION TARGETS\MODELS: Mount Morgan style deposits.

SUMMARY:

REGIONAL EXPLORATION

GEOCHEMISTRY

- **stream sediment sampling** - A further 49 pan concentrated stream sediment samples were taken from the three main anomalous areas (Spill Creek area, upper reaches of the Quarry Creek, and the higher parts of Golden Gully). The results further defined these anomalous zones, and has more accurately defined the anomalous drainages within the basins.

LOCALISED EXPLORATION/PROSPECTS

1) Mount Victoria Mines

GEOCHEMISTRY - 55 grab samples were collected from the mine area. These rocks were taken from the surface exposures where they had been worked in the past. A further 75 continuous channel chip samples were taken from various underground sites in the three main adits at Mount Victoria. The sampling above and below ground has defined a variably anomalous ferricrete horizon which assays up to 26.8 g/t Au over its width which varies from 20 cm to 1.5 m, averaging 0.78 m. 40% of samples from this horizon assay over 1 g/t Au, and most are distinctly anomalous.

2) The Great Northern Lode

GEOCHEMISTRY - 11 rock chip samples were collected and the assays ranged from 0.01 to 0.38 ppm Au, with one sample returning 15.2 ppm Au.

RECORDER: Paul Blake **DATE:** 28/01/1994.

COMPANY REPORT SUMMARY SHEET

CR: 18938 **STATUS:** Open

TITLE: Authority to Prospect no. 4231M. Gelobera Range - East Queensland. Report for the six months ended 4th March 1988.

AUTHOR(S): D.I. Young **DATE:**

ATP/EP No.: ATP 4231M

COMPANY HOLDING TITLE: Haoma North West N.L.

COMPANY SUBMITTING REPORT: Freeport of Australia Inc

DATE GRANTED: 04/03/1986 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 3 km S of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Gavial Creek (Crocodile Creek) alluvials, Clanricarde Mine, Midas Mine, Great Northern Lode, Mount Victoria Group, and Dee (Adolphus William) Copper Mine.

EXPLORATION TARGETS\MODELS: Mount Morgan style deposits.

SUMMARY:

GEOLOGY -

LOCAL - The Mine Corridor area was mapped from the Mount Morgan Mine, S to Trotters Creek. The Mine Corridor Sequence is the oldest unit and was divided into four units; **Dmc1** - Intermediate crystal and crystal lithic tuff with lesser quartz feldspar crystal tuff. This unit appears to underlie the Banded Mine sequence in the Hamilton Creek area, and may equate with the Lower Mine Pyroclastics (LMP) of Taube. **Dmc2** - Fine quartz feldspar crystal tuff, chert, limestone, intermediate lithic to lithic lapilli tuff, minor jasper and andesite which may be intrusive and/or extrusive in origin. This suite is equated with the Banded Mine Sequence (BMS) of Taube. This unit underlies conformably the main Mine Corridor unit Dmc3. **Dmc3** - Quartz feldspar crystal tuff, feldspar crystal tuff and lesser lithic varieties, minor andesite and pods of limestone form the best represented unit in the Mine Corridor. This unit is equated with the Upper Mine Pyroclastics (UMP). **Dmc4** - Intermediate lithic lapilli tuff, minor feldspar crystal tuff and fine intermediate tuff occurs above Dmc3 although this contact may be faulted. These may be equivalent of the Baree and Arnolds Ridge Felsite of Taube. Unconformably overlying the Mine Corridor Sequence lies a reworked intermediate lithic lapilli tuff with distinctive jasper and chert clasts. This unit was mapped as Dee Volcanics by Geopeko whereas Taube called it the Capella Creek beds. This unit is consistently W dipping, whereas the Mine Corridor is predominantly S dipping. It is also distinctive for its lack of granitoid clasts which suggests that it may be older than the Mount Morgan Tonalite. In the area W of the Mine it is altered (prehnite and epidote mineralogy) in the vicinity of the intrusives. These features lead to the interpretation that this unit is Capella Creek equivalent. The Dee Volcanics unconformably overlie the Capella Creek beds. The unconformity is shown by the coarse block breccia at the base and the occasional absence of the Capella Creek beds. The Dee volcanics are divided into two units; **Dud1** - The basal unit is the coarse block breccia. This unit is equated with the Dee Volcanics on the presence of granitoid clasts in the basal unit. **Dud2** - Purple feldspar crystal tuff and intermediate lithic lapilli tuff, minor volcanic breccia. This unit occurs immediately W of the mine, and is equated with the Dee Volcanics as red beds occur higher in the Dee sequence and similar lithologies occur south of Trotters Creek, which have been dated by Frasnian fossils. The final unit mapped in the area is the Mount Morgan Tonalite.

LOCALISED EXPLORATION/PROSPECTS

1) Hamilton Creek Prospect

GEOLOGY - The main area of alteration in the ATP is in the Hamilton Creek area where clay alteration with lesser silicification and silica alteration with lesser clay alteration occur. The alteration in this area is restricted to the units Dmc3 and Dmc4 in the Hamilton Creek area, although Dmc1 and Dmc2 show intense skarnisation related to the intrusions.

2) Horse Creek area

GEOLOGY - Alteration in the Horse Creek section of the Mine corridor is more pervasive than at Hamilton Creek area. This probably indicates the shallow nature of the rafts of sediment and volcanics.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The size of the ATP was reduced. The only work done in the relinquished areas was pan concentrated stream sediment sampling. One anomalous area was found, but on resampling the anomaly could not be repeated. The area was considered to be unmineralised.

RECORDER: Paul Blake

DATE: 28/01/1994.

COMPANY REPORT SUMMARY SHEET

CR: 20369 **STATUS:** Open

TITLE: Authority to Prospect no. 4231M, Gelobera Range - east Queensland. Report on area relinquished 4th March, 1989.

AUTHOR(S): M.N. Stallman **DATE:** August 1989

ATP/EP No.: ATP 4231M

COMPANY HOLDING TITLE: Haoma North West N.L.

COMPANY SUBMITTING REPORT: Freeport of Australia Inc

DATE GRANTED: 04/03/1986 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 3 km S of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Gavial Creek (Crocodile Creek) alluvials, Clanricarde Mine, Midas Mine, Great Northern Lode, Mount Victoria Group, and Dee (Adolphus William) Copper Mine.

EXPLORATION TARGETS\MODELS: Mount Morgan style deposits.

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - On the 4th of March 1989, ATP 4231M was reduced from 32 to 20 sub-blocks.

RECORDER: Paul Blake **DATE:** 31/01/1994.

COMPANY REPORT SUMMARY SHEET

CR: 20430 **STATUS:** Open

TITLE: Authority to Prospect no. 4231M, Gelobera Range. Report for the six months ended 4/3/89 and final report.

AUTHOR(S): M.N. Stallman **DATE:** July 1989

ATP/EP No.: ATP 4231M

COMPANY HOLDING TITLE: Haoma North West N.L.

COMPANY SUBMITTING REPORT: Freeport of Australia Inc

DATE GRANTED: 04/03/1986 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 3 km S of Mount Morgan

MINING DISTRICT:

MINES/PROSPECTS: Gavial Creek (Crocodile Creek) alluvials, Clanricarde Mine, Midas Mine, Great Northern Lode, Mount Victoria Group, and Dee (Adolphus William) Copper Mine.

EXPLORATION TARGETS\MODELS: Mount Morgan style deposits.

SUMMARY:

LOCALISED EXPLORATION/PROSPECTS

1) Hamilton Creek Prospect

GEOLOGY - Three major rock units have been identified within the grid area, the Mine Corridor Sequence, the Capella Creek beds and the Mine Granite phase of the Mount Morgan Tonalite. The Mine Corridor Sequence has been divided into 6 units in this area. Unit 1 which is dominantly acid quartz crystal tuff is equated with the Upper Mine Pyroclastics; Units 2 (cherty tuffaceous mudstone) & 3 (limestone and fine limey sediments which have been skarnised in many places) are equivalent to the Banded Mine Sequence; Units 4, 5, and 6 which are intermediate lithic and crystal tuffs are equivalent to the Lower Mine Pyroclastic. The Capella Creek beds consist of intermediate lithic lapilli tuff. Minor block faulting appears to have occurred within the area, and this has controlled many of the present day streams. The fault that follows the N-S running creek in the centre of the area is of most importance as the clay and silica alteration in the area only occurs to the W of this fault. Two main types of alteration of economic significance occur at the Hamilton Creek Prospect. These are weak to moderate clay alteration + silica, and skarn alteration. The clay alteration is confined to the SW of the grid area whilst the skarn alteration occurs in the E half of the grid.

GEOCHEMISTRY - A grid was set up over the clay alteration and skarn zones, and soil sampling was undertaken. A high background for copper occurs within the skarn altered units in the E of the area whereas copper, lead, and zinc appears to have been leached from the clay altered zones in the W of the area. The highest copper values are associated with an intermediate dyke in the S. Lead and zinc values are generally low throughout, although zinc values of up to 2200 ppm were recorded near an old limestone quarry in the E of the area. Gold is low throughout the grid area. Occasional spot highs of gold occur but probably represent a lithological rather than mineralising effect. 15 rock chip samples were also collected from the grided area. Values ranged from 0.02 to 0.26 ppm Au, <1 to 12 ppm Ag, 5 ppm to 2.91% Cu, <5 to 75 ppm Pb, and <2 to 4500 ppm Zn. No further work is recommended on this prospect.

2) Clanricarde and Midas Mines

GEOLOGY - These mines worked a narrow reef known as the Clanricarde Reef. The gold occurs in spotty concentrations, in association with pyrite and chalcopyrite, in a series of fault controlled quartz veins, the largest of which is 10-15 cm wide.

GEOCHEMISTRY - 33 rock chip samples were collected with some samples being taken from the underground workings. The results were encouraging with a maximum value of 87.6 g/t Au being recorded, and the average being 36.1 g/t Au. The sampling has shown that the gold is confined almost exclusively to the quartz veins with the wall rock being unmineralised. High copper and silver assays of up to 6.48% Cu and 80 g/t Ag respectively were also recorded from samples of mineralised quartz.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The discussion at the end of this report recommended further work in the Clanricarde and Midas Mines area, however, this report is listed as the final report. Therefore the company must have decided to relinquish the ATP after writing this report but before beginning the next six months of exploration.

RECORDER: Paul Blake **DATE:** 31/01/1994.

COMPANY REPORT SUMMARY SHEET (AND ATP SUMMARY)

CR: 15562 **STATUS:** Open

TITLE: Authority to Prospect 4235M. First and final report on exploration activities.

AUTHOR(S): N.F. Stuart **DATE:** June 1986

ATP/EP No.: ATP 4235M

COMPANY HOLDING TITLE: B. Mackenzie-Forbes and D. Clarke

COMPANY SUBMITTING REPORT: N.F Stuart & Associates

DATE GRANTED: 14/03/1986 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 20 km W of Rockhampton

MINING DISTRICT:

MINES/PROSPECTS:

EXPLORATION TARGETS\MODELS: Gold/platinoid alluvial deposits.

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File- 15562*

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To test for the possible extension of platinoid bearing ultra-mafics and the potential for alluvial gold/platinoid deposits.

GEOLOGY -

LOCAL - The oldest geological unit in the ATP is a medium to coarse grained granodiorite phase of the Permian Bouldercombe Complex. Remnants of the Jurassic Razorback beds (flat lying sandstones, siltstones and conglomerate) occur in the E half of the ATP. The N and central parts of the ATP are covered by a Cretaceous, dark, aphyric basalt. A considerable amount of Quaternary alluvium has developed along the course of Sebastopol Creek. The alluvium can be up to five metres thick and consists mostly of fine silts. At the base however, pebble and gravel deposits are common.

REGIONAL EXPLORATION

GEOLOGICAL MAPPING - Reconnaissance field work was undertaken to confirm the basic geological character of the area. Sebastopol Creek was found to drain areas of basalt, granite and sandstone and not the Eulogie Park Gabbro which is the prime postulated source for alluvial gold/platinoids.

GEOCHEMISTRY

- **stream sediment sampling** - Panning of the basal alluvial gravels and pebble beds "wash" from Sebastopol Creek revealed large quantities of heavy mineral concentrations (ilmenite & magnetite) but no gold. A panned concentrate sample was assayed for gold, platinum and palladium with very low results for gold (11 ppb Au).

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Given that Sebastopol Creek does not drain the Eulogie Park Gabbro, and the poor assay results, it is recommended that the ATP be relinquished.

RECORDER: Paul Blake **DATE:** 27/01/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 4236M, 4237M & 4035M

COMPANY HOLDING TITLE: Burmine Pty Ltd

COMPANY SUBMITTING REPORT: Placer Pacific Ltd

DATE GRANTED: 14/03/1986 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan & Banana

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: 40 km NW of Biloela

MINING DISTRICT:

MINES/PROSPECTS: Hengge's Lease, Eather's Anomaly, Location D, Location F, Location F South, Location G, Location H, Target 2, Target 5, and Target 6.

EXPLORATION TARGETS\MODELS: Gold & Silver

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File-* 16341, 16538, 17115, 17116, 19366, 19367,

19942

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To follow up mineralised areas defined by Noranda and Serem.

GEOLOGY -

LOCAL - The Camboon andesite is the major rock unit in the ATP. It crops out in the cores of broad anticlines and forms two NW striking belts. Underlying the Camboon Andesite are the Carboniferous Torsdale beds. Conformably overlying and interfingering with the Camboon Andesite are the Rannes beds (similar lithologically to the Camboon Andesite but have a greater proportion of sediments than volcanics). In the E of the northern ATP's the Rookwood Volcanics unconformably overlie the Rannes Beds. The Late Permian Back Creek Group crops out along the W border and in the N of the ATP's, and unconformably overlie the Camboon Andesite and Rannes beds. This volcanic and sedimentary pile has been subjected to greenschist facies regional metamorphism producing steeply dipping NNE to NW bedding. NW striking faults are common. Cretaceous rhyolite bodies (e.g. Mt. Cooper) intrude the volcanics and sediments. Extensive Tertiary age sandstone and siltstone lie to the E & W of the ATP's.

MINERALISATION/ALTERATION - Sericitisation, silicification, and minor epidotisation.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Noranda Australia (ATP 404M); Serem Australia Pty. Ltd (ATP 999M).

GEOLOGICAL MAPPING - An airphoto study at 1:25000 scale defined major NW trending structural corridors. They are typically 1 km wide and most of the known mineralisation in the area appear to lie within them. The airphoto, magnetic and radiometric anomalies were followed by ground traversing.

GEOCHEMISTRY

- **stream sediment sampling** - 89 stream sediment samples were collected from the ATP's (including ATP 4035M). Assays over 500 ppt Au are considered anomalous, and samples that exceeded the threshold can be divided into four areas. (1) Draining MLA 398 ("Hengge's Lease") approximately 17 km NW of Wowan. Mullock heaps in the MLA were sampled but no anomalous gold assays were received indicating that the gold was shedding from elsewhere. (2) Drainage from the Gogango Ranges between Mount Spencer and Mount Macdonald, 13 km WSW of Wowan. (3) Three adjacent samples collected 20 km S of Rannes returned anomalous gold. (4) A fourth anomaly returning 0.704 ppb Au is recorded 10 km S of Rannes. These anomalous areas were followed-up with 58 change of energy (C.O.E.) samples collected. Four samples were above the detection limits. Two of the samples had grades of 0.04 & 0.06 ppm Au and were collected from a known mineralised area (Location F). The possibility remains that the samples reflect a lithological rather than mineralisation anomaly.

- **rock chip sampling** - 16 rock chip samples were collected from the area with only one sample, one of the most intense alteration samples found in the intrusives at Mount Cooper, returning 0.12 ppm Au, 1.12 ppm Ag, and 139 ppm As.

GEOPHYSICS

- **airborne surveys** - A magnetic and radiometric survey was flown by Geotrex Pty. Ltd. The magnetics and radiometrics tie in closely with the regional geology and the boundaries between the different rock units show up clearly. Re-evaluation of the radiometric data identified a number of secondary radiometric anomalies. The majority of these anomalies were investigated, but none were of economic significance. One anomaly coincided with a major airphoto lineament and contained small areas of quartz veined and brecciated andesites, however there was no associated alteration. A predawn TIR survey was also carried out over the ATP's. Locations D, F, G, & H appear as hot areas. This is possibly due to silicification and/or vegetation. Both linear, near linear and circular structures were inferable. Two sets of linear structures were prevalent in the S half of the survey. These were orientated roughly 310-320° and 30-50°. In the N part of the survey, the structures were more complicated with possibly three or four sets of structural directions. The NE portion of the survey was too thickly covered with soil to lend any structural or lithological information.

- **ground surveys** - Previous airborne and radiometric interpretation work had defined a prominent trend connecting Locations D - G. This trend is approximately 6 km long and orientated about 270°. A gradient IP/Resistivity survey was performed over this area and an area NE of Location G, to cover a possible trend from

Location H. From this survey, 6 targets were located and investigated, but no mineralisation was found (see below).

LOCALISED EXPLORATION/PROSPECTS

1) Armstrong's Anomaly - This area was located following up an original bulk leach drainage value of 0.81 ppb Au. It occurs to the N of Hengge's Lease in ATP 4236M. The area has strong lineament trends and unusual drainage patterns.

GEOLOGY - The lithologies include siltstone and highly sheared chloritic andesites. Quartz veining is common with quartz blows in the area. The area appears to be located over the (faulted?) contact between the Camboon Andesite and Rannes beds.

GEOCHEMISTRY - An E-W soil sample line was sampled over the area, but the values were below the detection limit for gold. Three -200 mesh stream sediment samples were also collected, and two were highly anomalous at 1.15 and 1.07 ppm Au. Follow-up work involved soil sampling to the E of the previous line. All of the assays were below detection limit for gold. Also andesites in the area show no sign of alteration. Therefore, no source for the gold detected in the highly anomalous -200 mesh stream sediment samples could be located. The source of the gold is likely to be thin quartz-carbonate veins similar to those found on Hengge's Lease. No further work is recommended.

2) Armstrong's Property - A stream sediment sample taken immediately to the N of Bulk Leach Anomaly 1 drainage area assayed 0.07 ppm Au. No alluvial workings were observed in this creek.

GEOLOGY - The dominant lithology is a chlorite altered intermediate volcanic. Extensive large quartz veins cut the volcanics. One such vein crops out for over 100 m and strikes E-W. The anomaly is probably related to low levels of gold in quartz veins.

3) Bonnie Brae - The Bonnie Brae is a property to the E of the Banana to Biloela highway located in the S portion of ATP 4035M. It was explored to investigate an airborne potassium anomaly. Also stream samples taken from this area returned a weakly anomalous value of 0.32 ppb Au.

GEOLOGY - Iron stained and silicified sandstone with vuggy quartz veins were located in the area. The sandstones are part of the Back Creek Group.

GEOCHEMISTRY - Nine rock chip samples were collected of the sandstones. All samples assayed below the gold detection limit of 0.02 ppm Au. No further work is recommended in this area.

4) Eather's Anomaly - This area occurs within ATP 4035M, is a small silicified outcrop with a coincident airborne potassium anomaly, and is located at 037203 on the Banana 1:100 000. Rock chip samples collected in 1986 contained highly anomalous gold values up to 20 ppm. This anomaly has considerable potential as a low tonnage, narrow, but higher grade deposit.

GEOLOGY - The outcrop consists of a narrow strip of weakly brecciated cherty volcanics. The outcrop strikes at 290°, and the strike length is 130 m.

GEOCHEMISTRY - 9 rock chip samples were collected, and assayed 0.25 to 9.76 with an average of 3.96 ppm Au. Silver averaged 16.13 ppm and reached a maximum of 45 ppm Ag, arsenic are lower than for Location G and reach a maximum of 503 ppm As. Gold values correlate very strongly with copper but relatively weakly with silver and lead, and negatively with arsenic. A soil grid was also set up. The zinc soil grades are not significantly anomalous; copper and lead show weak highs but do not well define the mineralised outcrop; higher gold soil values of up to 0.26 ppm are not coincident with the gold mineralised outcrops; and silver and arsenic values of 1 ppm & 40 ppm respectively define the outcrop well and both anomalies are open to the N.

GEOPHYSICS - A Controlled Source Audio Magneto-Telluric (CSAMT) survey was carried out over the Eather's Anomaly area. Preliminary interpretation detected a broad anomaly between Location F South and Eather's Anomaly.

5) Hobson's Anomaly - This anomaly is located in the S of ATP 4035M and was located by COE stream sediment sampling.

GEOLOGY - The predominant lithology is a purple "andesitic" tuff frequently quartz veined.

GEOCHEMISTRY - A soil survey was conducted over the area, but gold grades were generally low with only five samples above the detection limit of 0.04 ppm, and the highest at 0.16 ppm Au. Two rock chip samples of the vein material returned below detection limit values.

6) Mt Benn area - This area is immediately S of Mt Benn and Mt Bertha and was investigated because bulk leach samples had returned up to 0.34 ppb gold.

GEOLOGY - a small moderately sheared area with quartz breccia veins was located in the area.

GEOCHEMISTRY - Four rock chip samples were collected from the sheared area but the assays returned values less than 0.02 ppm Au. No further work is recommended in this area.

7) Quartz Mountain - This area was located by following-up an airborne potassium anomaly immediately N of Bulk Leach Anomaly area 3.

GEOLOGY - An extensive area of quartz veining 800 m long by 400 m wide, striking NW was located.

GEOCHEMISTRY - A sample taken from the stream draining this area was weakly anomalous with 0.32 ppb Au. A soil sampling grid was centred over quartz breccia veining. All the soil samples were below the detection limit. 10 rock chip samples of quartz veins were collected from the soil grid in the N portion of ATP 4035M. The gold assay results were below detection. No further work is recommended.

GEOPHYSICS - A ground radiometric traverse was carried out across the strike of the veins. The potassium response identified the zone of surface quartz veining. It appears related to sericitic alteration, however, local anomalies are not necessarily related to the density of quartz veining.

8) Torsdale - This area occurs in the S portion of ATP 4035M. Two bulk leach samples assaying 0.79 ppb Au were previously collected.

GEOLOGY - "Andesitic" lavas and fragmentals, greywackes, conglomerates, and siltstones.

GEOCHEMISTRY - 13 change of energy stream sediment samples were collected but assayed less than 0.02 ppm Au. Original low level gold anomalies reflect a higher background lithological gold occurrence, and therefore no further work is warranted in this area.

9) Bulk Leach Anomaly 1 (Hengge's Lease) - Hengge's Lease has been extensively worked in the past with shallow shafts and an adit sunk on the quartz veins. The initial bulk leach program recorded low levels of gold.

GEOLOGY - Thin N-trending quartz-carbonate (-epidote) veins occur in the Hengge's Lease. The veins are commonly zoned or have vugs filled with calcite crystals. Occasional brassy sulphide blebs (possibly pyrrhotite) were noted in the intermediate volcanic host rocks.

GEOCHEMISTRY - Follow-up change of energy samples were collected but did not return anomalous results. The original anomaly is likely to be caused by thin quartz veins previously mined of very low grade zones of alteration. No further work is recommended.

8) Bulk Leach Anomaly 2 - Bulk leach anomaly 2 and an airborne potassium anomaly occurs on R.J. Saunder's property.

GEOLOGY - The potassium anomaly is coincident with a sheared quartz feldspar porphyry. The porphyry has chlorite and white mica alteration assemblages with thin quartz veins perpendicular to the main fabric. Also within the area is a ridge of grey pyritic chert and sheared acid volcanics crops out. The volcanics are cut by a stockwork of quartz veinlets and the chert is probably a result of intense silicification. Haematite staining is common on fracture surfaces and siliceous bladed textures may indicate carbonate replacement. In the south of Bulk Leach Anomaly 2 are interbedded andesites and shales, with common quartz blows and thin quartz veins in the phyllitic shales.

GEOCHEMISTRY - Stream sediments samples draining the granite showed no anomalous values of Au. Two stream samples taken from trap sites in creek draining the volcanics did not show any gold when panned. Seven rock chip samples taken of the volcanics were all below detection limit. Nine stream sediment samples were collected from the south of the anomaly area. The gold was below detection limit but two samples recorded elevated Mn, Mo, Pb, and Zn values. No further work is recommended.

9) Bulk Leach Anomaly 3 - This area contained the most anomalous sample (2.83 ppb Au) from the bulk leach program, and also a airborne potassium anomaly was located. The area occurs in the N portion of ATP 4035M, immediately S of Quartz Mountain.

GEOLOGY - The area comprises green/purple andesites which are occasionally tuffaceous. Quartz blows are abundant, one such occurrence containing pseudomorphs after pyrite. The andesites are also sheared and weakly brecciated. The breccias frequently have jasperoidal infilling and the sheared zones contain abundant carbonate

veins. Float showing copper carbonate staining was also found. The anomalous hill located by the soil survey is predominantly weakly sericite/epidote altered andesite with abundant thin quartz veining.

GEOCHEMISTRY - A further 10 stream sediment samples were collected in the area, but all samples assayed below the detection limit. A widely spaced soil survey was conducted in this area. An anomalous line of soil samples with gold grades up to 0.4 ppm indicate a hill in the N of the drainage system may be significantly mineralised. 3 rock chip samples were collected of the quartz veins on the hill but assayed below detection limits for gold. The higher grade soil locations were resampled and two further detailed soil lines were sampled. The original soil sampling grades were not repeated, with all but one sample assaying below the detection limit for gold. No further work is recommended.

10) Location D - This area occurs 17 km S of Rannes.

GEOLOGY - The geology at depth is more complex than was apparent at the surface. A steep fault subparallel to the layering in the andesitic volcanics has localised the mineralisation. A zone of puggy shears and breccias, across which there was a change in rock type, was intersected in all the drill holes. Quartz and pyrite has been periodically precipitated in the open spaces, often as concentric bands around breccia fragments. Gold grades are closely related to the proportion of pyrite in the core.

GEOCHEMISTRY - Assay of the core from the drilling indicate that only 2 holes intersected significant mineralisation; one hole averages 1.945 ppm gold from 28 to 36 m; and the other averages 2.345 ppm gold from 88 to 104 m. All other drill holes intersected mineralisation with anomalous but significantly lower gold values.

GEOPHYSICS - A Controlled Source Audio Magneto-Telluric (CSAMT) survey was carried out over Location D. Preliminary interpretation located a significant vertical conductive anomaly. An IP/Resistivity test was conducted over the area. The observed low resistivities over the known mineralisation was pronounced.

DRILLING - 7 holes were drilled to test grades of gold and the continuity near surface over a strike length of 525 m.

11) Location E - This area is located at 079208 on the Banana 1:100 000 sheet. One deep pit occurs on a shear zone.

GEOLOGY - The dominant lithologies are dark grey highly silicified breccia and chert. Unlike Locations D, F, & G, there is little evidence of rebrecciation of rocks. In addition, the pyrite grains are smaller, jarosite veins were not observed, and quartz veining is much less common. Scorodite staining is present but sericite alteration is less intense than other locations. To the SE the alteration assemblage is quartz-epidote-carbonate (-albite) which is similar to the along strike extension at Location F.

GEOPHYSICS - An IP/Resistivity test was conducted over the area. The outcropping altered zone coincided with a relatively conductive zone which was open to the N and S

12) Location F - This area returned two anomalous values (0.34 & 0.83 ppb) for gold, and previous mining was noted in the area in the form of shallow pits, costeans and shafts. This prospect is located 10 km S of Rannes rail siding on the Banana to Dululu road. A grid was set up over the area.

GEOLOGY - Mineralisation consists of several silicified and brecciated lenses within sericitically altered andesite fragmentals. The major mineralised zone was called the main stockyard outcrop, the central portion of which is highly silicified, minor zones of mineralisation are the Stockyard Dam area, and the Shafts area. The dominant lithology is a chloritised fragmental rock, probably andesitic in composition, and typical of the Camboon Andesites. Interbedded with the fragmentals are pale green or purple, massive intermediate volcanics. A large feldspar porphyry crops out in the NE part of the grid. A small chert outcrop lies within the porphyry and is highly pyritic. On the extreme E edge of the grided area, a conglomerate crops out. Thin, elongate, weakly pyritic, chert bodies crop out in the S parts of the mineralised zones.

GEOCHEMISTRY - 7 C.O.E. stream sediment samples were collected but contained gold values below detection limits. A total of 236 rock chip, grab, and channel samples were collected. The mean value for gold was 1.41 ppm and the maximum value was 28.6 ppm Au. Lead and silver correlated positively with higher gold grades. The soil survey gold results defined the main stockyard outcrop, and drop to below the limit of detection in the surrounding area. A minor gold anomaly corresponds with areas of old workings. The stockyard outcrop was also anomalously high in arsenic and gave weak silver and lead, with no response from the zinc values. To the east of the stockyard outcrop, a strong gold, lead, zinc and copper soil anomaly coincides with outcrops that have significant gold values in rock chip. Unlike the stockyard outcrop, however, there was little arsenic or silver response. The Shafts area has a strong geochemical response. The gold anomaly covers the resistant outcrop but is also displaced down-slope towards the creek. As & Ag anomalies are also coincident with this area, and lead closely defines the area of high gold rock chip values. Copper values over the large N porphyry are higher than in any other rock type.

GEOPHYSICS - Magnetic, radiometric and IP/resistivity surveys were carried out over the grided area. The magnetics increase to the S of the grid, and this can be inferred as a decrease in alteration. Measurements on outcropping silicification/alteration in the N section of the grid show no signs of magnetisation. A very weak negative response occurs over known alteration. Magnetic anomalies appear related to magnetic dykes, and surface haematite veining. Anomalies in the radiometric survey appears to be related to the sericite and epidote alteration halos. The IP/Resistivity survey defined one major conductive zone which is coincident with some of the radiometric anomalies

13) Location F South - An area of old workings was located at 065198 on the Banana Sheet. These are thought to be a S extension of alteration/mineralisation at Location F.

GEOLOGY - The alteration is restricted to a narrow zone of quartz veined sericite altered volcanics.

GEOCHEMISTRY - Two pits and two costeans were sampled, with six rock chip samples collected. The pit float contained 2.59, 0.68, 0.69 ppm Au in the samples collected. A line of soil samples was collected across the strike of the veins. The results showed very weakly anomalous gold values with the highest grade of only 0.07 ppm. It is unlikely that this area contains significant mineralisation.

GEOPHYSICS - A Controlled Source Audio Magneto-Telluric (CSAMT) survey was carried out over the Location F South area. Preliminary interpretation detected a broad anomaly between Location F South and Eather's Anomaly.

14) Location G - This area occurs within ATP 4035M at 033196 on the Banana 1:100 000 sheet, and was located by investigating vegetation anomalies similar in appearance to Location D.

GEOLOGY - This area is a zone of sericitic alteration and brecciation. The predominant lithologies are sericitically altered fine grained sediments and acid volcanics with sulphide rich/siliceous breccia veins. Thin quartz and jarosite veining scorodite staining are common features but alunite and tremolite were not detected. The majority of the outcrop is less silicified than either of Locations D & F, but the style of mineralisation is similar.

GEOCHEMISTRY - 56 rock chip samples were collected, with 15 assaying above 1 ppm Au, with the highest at 4.86 ppm Au, and the average being 0.70 ppm Au. The samples contained high values of silver averaging 80.9 ppm, and arsenic averaged 0.48%. Gold correlated positively with silver and lead but negatively with arsenic. A soil grid was sampled. High values for arsenic, silver, and gold in soil coincide with higher values in rock chip sampling. Maximum values in soil sampling are 0.45 ppm Au, 2219 ppm As, 18.9 ppm Ag. Unlike rock chip samples, gold in soil values also correlate strongly with arsenic values. Chips from the auger drilling were assayed. Gold assay results were significantly lower than for adjacent rock chip samples, possibly due to the limited sample material available. Assays above the detection limit of 0.02 ppm Au appear to indicate mineralised areas. The highest grade of 2.16 ppm Au was recovered from an auger sample immediately S of the highest rock chip grades. Silver assays up to 182 ppm correlated with the higher gold values. Arsenic values averaging over 1000 ppm compare well with similar figures in rock chip sampling. In the NW of Location G seven of the auger holes all assaying below detection limits for gold define a sharp cut off in grades to the N of the prospect. The grade cutoff as indicated by auger drilling does not extend far beyond the vegetation anomaly or outcropping area. Assay of the rock chips from the two later auger drill holes in the high resistivity zone are considered to be equivalent to soil sampling values. The assay values of 0.06 and 0.10 ppm Au in the two holes indicate further subsurface evaluation is warranted.

GEOPHYSICS - Radiometric traverses were carried out over the soil grid. Strong responses occur in the W & S parts of the grid due to strong response to the fine grained sediments, and relatively low K counts in the E and N due to the weak response to the volcanic units. An IP/Resistivity test was conducted over the area. The results show a large high resistivity anomaly associated, in part, with surface outcropping silicification and alteration. The resistivities are also low around this high suggesting a conductive alteration "halo". The N edge of the "halo" also contains a high resistivity anomaly with an inferred N dip.

DRILLING - 28 shallow auger holes were drilled in the area. Holes were terminated at bedrock or maximum possible depth (12 m). A further 2 shallow auger holes were drilled in the high resistivity area after the IP/Resistivity survey.

15) Location H - This area is has potential mineralisation below soil cover in ATP 4035M (near 042199 on the Banana 1:100 000 Sheet). It occurs on a boundary fence between the Cooper Downs (N property) and Mr. R. Eather's Property (S property).

GEOCHEMISTRY - Assays on the drilling material within Location H defined a 200 m strike length weakly anomalous values of greater than 0.05 ppm Au associated with the presence of quartz in samples. Low gold values (maximum of 0.02 ppm Au) were recovered from the drill chips from the holes to the E of Location H. Only two samples from the holes to the S of Location H returned assays over 0.02 ppm Au, with the highest at 0.08 ppm Au.

These results show that there is no significant extension to the mineralisation at Location H as indicated by the apparent resistivities.

GEOPHYSICS - An IP/Resistivity test was conducted over the area. The surface altered zone is coincident with a conductive anomaly which is open ended in the N and trends approximately 135°. The eastern boundary of another conductive anomaly was also defined. The host rock resistivities were moderately resistive and associated with unaltered andesite.

DRILLING - 25 auger drill holes with a total meterage of 55.5 m was drilled in the area. Maximum depth of 4.6 m was achieved. Drill sites were targeted to test between outcrops on the mineralised zone and the width of the zone. Drill chips recovered indicate that the silicification zone is narrow, less than 10 m wide. It strikes at 290° and possibly occurs on the contact between siltstones and andesitic volcanics. Three holes were drilled to the E of Location H to test the anomaly adjacent to Cooper Down's boundary fence with fine grained sediments were recovered in drill chips. Seven auger holes were drilled south from Location H, and the majority of holes were drilled in fine grained sediments and contained silicified fragments.

16) Target 1 - located at 045195 on the Banana 1:100 000 Sheet. This area is located at the termination of a resistivity trend, and has a very low resistivity. Two K/Th anomalies are also associated with it.

GEOLOGY - The area crops out strongly and the dominant lithology is an unaltered andesite with very minor bleached and sericite altered zones.

GEOCHEMISTRY - Two soil lines were sampled and the assays reported very low gold, but up to 880 ppm As. 7 rock chip samples were collected and assayed with a maximum of 0.22 ppm Au.

17) Target 2 - located at 037201 on the Banana 1:100 000 Sheet. This area is located on the N termination of the resistivity trend aligned with Location H. The target is located to the SE of Location H in a ploughed field.

GEOLOGY - The area is covered with soil.

GEOCHEMISTRY - Samples from all holes were below detection limits for gold.

DRILLING - 3 auger holes were drilled in an attempt to penetrate the soil cover. Silicified fragments recovered from each hole, were of caliche rather than epithermally altered fragments.

18) Target 3 - located at 043183 on the Banana 1:100 000 Sheet. This area is a discontinuous section of the Location D - G trend which has associated K/Th anomalies.

GEOLOGY - Unaltered andesite and shale float is abundant in this area.

GEOCHEMISTRY - Two lines of soil samples were collected, but no gold values above 0.02 ppm were recorded. One rock chip sample was also taken.

19) Target 4 - located at 038186 on the banana 1:100 000 Sheet. This target is similar to Target 3, and is also associated with a K/Th anomaly.

GEOLOGY - Quartz-epidote altered andesite float is abundant in this area.

GEOCHEMISTRY - 1 soil line through the centre of the anomaly was sampled, and all samples were below detection limit for gold.

20) Target 5 - located 058167 on the Banana 1:100 000 Sheet. The area is a small "indentation" of the Location D - G resistivity trend associated with a K/Th anomaly.

GEOLOGY - The anomaly is on a long ridge, and outcrop availability is poor. Lithologies seen in float were sericite altered and brecciated with quartz veins in a style similar to other mineralised locations

GEOCHEMISTRY - 2 soil lines were sampled, 2 rock chip samples were collected, and drill chip samples were collected from the auger drilling. All samples contained below detection limits of gold.

DRILLING - Two auger holes were drilled, and the chips recovered were fine grained sediments.

21) Target 6 - located at 052178 on the Banana 1:100 000 Sheet. This area is a faulted section of the trend to the NE of the Location D - G trend.

GEOLOGY - Float and subcrop of bleached and silicified volcanics.

GEOCHEMISTRY - One soil line was sampled, 5 rock chip samples were collected, drill chip samples were collected from the auger drilling, and a BLEG stream sediment sample was collected from the anomalous area. All samples contained very low values of gold.

DRILLING - 3 auger hole were drilled

22) Un-named - This area was a stream in the N part of ATP 4236M at 961688 on the Mount Morgan 1:100 000 sheet.

GEOLOGY - Rannes beds sediments that are strongly deformed being tightly folded and exhibiting crenulation cleavage in places. Minor quartz veining occurs in outcrop and bucky quartz float is common in the stream. Mineralisation is likely similar to the style on MLA 398 (Hengge's Lease), to the S.

GEOCHEMISTRY - A -200 mesh sample representing the drainage area returned 0.45 ppm Au. Three BLEG stream sediment samples returned 0.65 to 1.05 ppb Au. Chips of the quartz veins contain anomalous gold values.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - A regional exploration program was carried out over all accessible parts of the tenement. Several bulk stream sediment and radiometric anomalies were followed-up with detailed soil and rock chip sampling. Results from these samples indicated only low values for gold. As there was no encouragement for continued work it was recommended that both ATP's be relinquished in full.

RECORDER: Paul Blake

DATE: 24/01/1994.

COMPANY REPORT SUMMARY SHEET

CR: 16341 **STATUS:** Open

TITLE: Six monthly report for the period 14 March to 13 September, 1986. Authorities to Prospect 4236M and 4237M, Cooper Range.

AUTHOR(S): H. Mustard **DATE:** December 1986

ATP/EP No.: EPM 4236 & 4237

COMPANY HOLDING TITLE: Burmine Pty Ltd

COMPANY SUBMITTING REPORT: Placer Pacific Ltd

DATE GRANTED: 14/03/1986 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan & Banana

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: 40 km NW of Biloela

MINING DISTRICT:

MINES/PROSPECTS: Hengge's Lease, Location F, and Location D

EXPLORATION TARGETS\MODELS: Gold & Silver

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To follow up mineralised areas defined by Noranda and Serem.

GEOLOGY -

LOCAL - The Camboon andesite (andesitic, basaltic and trachytic lava, tuff and agglomerate, and lesser slate, tuffaceous sandstone siltstone, limestone and chert) is the major rock unit in the ATP. It crops out in the cores of broad anticlines and forms two NW striking belts. Underlying the Camboon Andesite are the Carboniferous Torsdale beds (acid to intermediate flows and pyroclastics, conglomerate, sandstone and siltstone). Conformably overlying and interfingering with the Camboon Andesite are the Rannes beds (similar lithologically to the Camboon Andesite but have a greater proportion of sediments than volcanics). In the E of the northern ATP's the Rookwood Volcanics (pillow lavas, tuff, agglomerate, siltstone and chert) unconformably overlie the Rannes Beds. The Late Permian Back Creek Group (fine terrigenous sediments and minor volcanics) crops out along the W border and in the N of the ATP's, and unconformably overlie the Camboon Andesite and Rannes beds. This volcanic and sedimentary pile has been subjected to greenschist facies regional metamorphism producing steeply dipping NNE to NW bedding. NW striking faults are common. Cretaceous rhyolite bodies (e.g. Mt. Cooper) intrude the volcanics and sediments. Extensive Tertiary age sandstone and siltstone lie to the E & W of the ATP's.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Noranda Australia (ATP 404M); Serem Australia Pty. Ltd (ATP 999M).

GEOLOGICAL MAPPING - An airphoto study at 1:25000 scale defined major NW trending structural corridors. They are typically 1 km wide and most of the known mineralisation in the area appear to lie within them. The airphoto, magnetic and radiometric anomalies were followed by ground traversing.

GEOCHEMISTRY

- **stream sediment sampling** - 89 stream sediment samples were collected from the ATP's (including ATP 4035M). Assays over 500 ppt Au are considered anomalous, and samples that exceeded the threshold can be divided into three areas. (1) Draining MLA 398 ("Hengge's Lease") approximately 17 km NW of Wowan. Mullock heaps in the MLA were sampled but no anomalous gold assays were received indicating that the gold was shedding from elsewhere. (2) Drainage from the Gogango Ranges between Mount Spencer and Mount Macdonald, 13 km WSW of Wowan. (3) Three adjacent samples collected 20 km S of Rannes returned anomalous gold.

- **rock chip sampling** - 16 rock chip samples were collected from the area with only one sample, one of the most intense alteration samples found in the intrusives at Mount Cooper, which returned 0.12 ppm Au, 1.12 ppm Ag, and 139 ppm As.

GEOPHYSICS

- **airborne surveys** - An magnetic and radiometric survey was flown by Geoterrex Pty. Ltd. The magnetics and radiometrics tie in closely with the regional geology and the boundaries between the different rock units show up clearly.

RECORDER: Paul Blake

DATE: 17/01/1994.

COMPANY REPORT SUMMARY SHEET

CR: 16538 **STATUS:** Open

TITLE: Six monthly report for the period 8th July 1986 to 7 January 1987. Authorities to Prospect 4035M, 4236M, 4237M, Cooper Range Joint Venture.

AUTHOR(S): H. Mustard **DATE:** January 1987

ATP/EP No.: EPM 4236, 4237 & 4035

COMPANY HOLDING TITLE: Burmine Pty Ltd

COMPANY SUBMITTING REPORT: Placer Pacific Ltd

DATE GRANTED: 14/03/1986 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan & Banana

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: 40 km NW of Biloela

MINING DISTRICT:

MINES/PROSPECTS: Hengge's Lease, Location F, and Location D

EXPLORATION TARGETS\MODELS: Gold & Silver

SUMMARY:

REGIONAL EXPLORATION

GEOCHEMISTRY

- **stream sediment sampling** - The data from CR 16341 is discussed again, but a fourth anomaly returning 0.704 ppb Au is recorded 10 km S of Rannes.

- **rock chip sampling** - Four rock chip samples collected from 15 km SSE of Rannes are anomalous in gold and will be followed up.

LOCALISED EXPLORATION\PROSPECTS

1) Location D - This area occurs 17 km S of Rannes.

GEOLOGY - The geology at depth is more complex than was apparent at the surface. A steep fault subparallel to the layering in the andesitic volcanics has localised the mineralisation. A zone of puggy shears and breccias, across which there was a change in rock type, was intersected in all the drill holes. Most of the mineralisation post-dates the faulting. Quartz and pyrite has been periodically precipitated in the open spaces, often as concentric bands around breccia fragments. Gold grades are closely related to the proportion of pyrite in the core.

GEOCHEMISTRY - Assay of the core from the drilling indicate that only 2 holes intersected significant mineralisation; one hole averages 1.945 ppm gold from 28 to 36 m; and the other averages 2.345 ppm gold from 88 to 104 m. All other drill holes intersected mineralisation with anomalous but significantly lower gold values.

DRILLING - 7 holes were drilled to test grades of gold and the continuity near surface over a strike length of 525 m.

RECORDER: Paul Blake **DATE:** 18/01/1994.

COMPANY REPORT SUMMARY SHEET

CR: 17115 **STATUS:** Open

TITLE: Cooper Range, Queensland. Report on the areas relinquished from Authorities to Prospect 4236M and 4237M, 13.3.87 and Authority to Prospect 4035M, 7.7.87.

AUTHOR(S): S. Taylor **DATE:** October 1987

ATP/EP No.: EPM 4236, 4237 & 4035

COMPANY HOLDING TITLE: Burmine Pty Ltd

COMPANY SUBMITTING REPORT: Placer Pacific Ltd

DATE GRANTED: 14/03/1986 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan & Banana

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: 40 km NW of Biloela

MINING DISTRICT:

MINES/PROSPECTS: Hengge's Lease, Location F, and Location D

EXPLORATION TARGETS\MODELS: Gold & Silver

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Parts of the tenements were relinquished. The areas relinquished in ATP's 4236M & 4237M returned no significant gold anomalies from the bulk leach stream sediment survey. The S portion of ATP 4035M, which contains the Mt Benn area, "Bonnie Brae", and "Torsdale", was also relinquished due to poor geochemical results.

RECORDER: Paul Blake **DATE:** 20/01/1994.

COMPANY REPORT SUMMARY SHEET

CR: 17116 **STATUS:** Open

TITLE: Six monthly report for the period 8.1.87 to 7.7.87. Authorities to Prospect 4035M, 4236M, 4237M, Cooper Range Joint Venture, Queensland.

AUTHOR(S): S. Taylor **DATE:** October 1987

ATP/EP No.: EPM 4236, 4237 & 4035

COMPANY HOLDING TITLE: Burmine Pty Ltd

COMPANY SUBMITTING REPORT: Placer Pacific Ltd

DATE GRANTED: 14/03/1986 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan & Banana

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: 40 km NW of Biloela

MINING DISTRICT:

MINES/PROSPECTS: Hengge's Lease, Location F, and Location D

EXPLORATION TARGETS\MODELS: Gold & Silver

SUMMARY:

REGIONAL EXPLORATION -

GEOCHEMISTRY

- **stream sediment sampling** - Anomalies located in the bulk leach survey carried out in 1986 were followed-up with 58 change of energy (C.O.E.) samples collected. Four samples were above the detection limits. Two of the samples had grades of 0.04 & 0.06 ppm Au and were collected from a known mineralised area (Location F). The two other samples require further investigation, and the possibility remains that the samples reflect a lithological rather than mineralisation anomaly.

LOCALISED EXPLORATION/PROSPECTS

1) Armstrong's Property - A stream sediment sample taken immediately to the N of Bulk Leach Anomaly 1 drainage area assayed 0.07 ppm Au. No alluvial workings were observed in this creek.

GEOLOGY - The dominant lithology is a chlorite altered intermediate volcanic. Extensive large quartz veins cut the volcanics. One such vein crops out for over 100 m and strikes E-W. The anomaly is probably related to low levels of gold in quartz veins.

2) Bonnie Brae - The Bonnie Brae is a property to the E of the Banana to Biloela highway located in the S portion of ATP 4035M. It was explored to investigate an airborne potassium anomaly. Also stream samples taken from this area returned a weakly anomalous value of 0.32 ppb Au.

GEOLOGY - Iron stained and silicified sandstone with vuggy quartz veins were located in the area. The sandstones are part of the Back Creek Group.

GEOCHEMISTRY - Nine rock chip samples were collected of the sandstones. All samples assayed below the gold detection limit of 0.02 ppm Au. No further work is recommended in this area.

3) Mt Benn area - This area is immediately S of Mt Benn and Mt Bertha and was investigated because bulk leach samples had returned up to 0.34 ppb gold.

GEOLOGY - a small moderately sheared area with quartz breccia veins was located in the area.

GEOCHEMISTRY - Four rock chip samples were collected from the sheared area but the assays returned values less than 0.02 ppm Au. No further work is recommended in this area.

4) Quartz Mountain - This area was located by following-up an airborne potassium anomaly immediately N of Bulk Leach Anomaly area 3.

GEOLOGY - An extensive area of quartz veining 800 m long by 400 m wide, striking NW was located.

GEOCHEMISTRY - A sample taken from the stream draining this area was weakly anomalous with 0.32 ppb Au. A soil sampling grid was centred over quartz breccia veining. All the soil samples were below the detection limit. 10 rock chip samples of quartz veins were collected from the soil grid in the N portion of ATP 4035M. The gold assay results were below detection. No further work is recommended.

GEOPHYSICS - A ground radiometric traverse was carried out across the strike of the veins. The potassium response identified the zone of surface quartz veining. It appears related to sericitic alteration, however, local anomalies are not necessarily related to the density of quartz veining.

5) Torsdale - This area occurs in the S portion of ATP 4035M. Two bulk leach samples assaying 0.79 ppb Au were previously collected.

GEOLOGY - "Andesitic" lavas and fragmentals, greywackes, conglomerates, and siltstones.

GEOCHEMISTRY - 13 change of energy stream sediment samples were collected but assayed less than 0.02 ppm Au. Original low level gold anomalies reflect a higher background lithological gold occurrence, and therefore no further work is warranted in this area.

6) Bulk Leach Anomaly 1 (Hengge's Lease) - Hengge's Lease has been extensively worked in the past with shallow shafts and an adit sunk on the quartz veins. The initial bulk leach program recorded low levels of gold.

GEOLOGY - Thin N-trending quartz-carbonate (-epidote) veins occur in the Hengge's Lease. The veins are commonly zoned or have vugs filled with calcite crystals. Occasional brassy sulphide blebs (possibly pyrrhotite) were noted in the intermediate volcanic host rocks.

GEOCHEMISTRY - Follow-up change of energy samples were collected but did not return anomalous results. The original anomaly is likely to be caused by thin quartz veins previously mined of very low grade zones of alteration. No further work is recommended.

7) Bulk Leach Anomaly 2 - Bulk leach anomaly 2 and an airborne potassium anomaly occurs on R.J. Saunder's property.

GEOLOGY - The potassium anomaly is coincident with a sheared quartz feldspar porphyry. The porphyry has chlorite and white mica alteration assemblages with thin quartz veins perpendicular to the main fabric. Also within the area is a ridge of grey pyritic chert and sheared acid volcanics crops out. The volcanics are cut by a stockwork of quartz veinlets and the chert is probably a result of intense silicification. Haematite staining is common on fracture surfaces and siliceous bladed textures may indicate carbonate replacement. In the south of Bulk Leach Anomaly 2 are interbedded andesites and shales, with common quartz blows and thin quartz veins in the phyllitic shales.

GEOCHEMISTRY - Stream sediments samples draining the granite showed no anomalous values of Au. Two stream samples taken from trap sites in creek draining the volcanics did not show any gold when panned. Seven rock chip samples taken of the volcanics were all below detection limit. Nine stream sediment samples were collected from the south of the anomaly area. The gold was below detection limit but two samples recorded elevated Mn, Mo, Pb, and Zn values. No further work is recommended.

8) Bulk Leach Anomaly 3 - This area contained the most anomalous sample (2.83 ppb Au) from the bulk leach program, and also a airborne potassium anomaly was located. The area occurs in the N portion of ATP 4035M, immediately S of Quartz Mountain.

GEOLOGY - The area comprises green/purple andesites which are occasionally tuffaceous. Quartz blows are abundant, one such occurrence containing pseudomorphs after pyrite. The andesites are also sheared and weakly brecciated. The breccias frequently have jasperoidal infilling and the sheared zones contain abundant carbonate veins. Float showing copper carbonate staining was also found.

GEOCHEMISTRY - A further 10 stream sediment samples were collected in the area, but all samples assayed below the detection limit.

9) Location F - This area returned two anomalous values (0.34 & 0.83 ppb) for gold, and previous mining was noted in the area in the form of shallow pits, costeans and shafts. This prospect is located 10 km S of Rannes rail siding on the Banana to Dululu road. A grid was set up over the area.

GEOLOGY - Mineralisation consists of several silicified and brecciated lenses within sericitically altered andesite fragmentals. The major mineralised zone was called the main stock yard outcrop, the central portion of which is highly silicified, minor zones of mineralisation are the Stockyard Dam area, and the Shafts area. The dominant lithology is a chloritised fragmental rock, probably andesitic in composition, and typical of the Camboon Andesites. Interbedded with the fragmentals are pale green or purple, massive intermediate volcanics. A large feldspar porphyry crops out in the NE part of the grid. A small chert outcrop lies within the porphyry and is highly pyritic. On the extreme E edge of the grided area, a conglomerate crops out. Thin, elongate, weakly pyritic, chert bodies crop out in the S parts of the mineralised zones.

GEOCHEMISTRY - 7 C.O.E. stream sediment samples were collected but contained gold values below detection limits. A total of 236 rock chip, grab, and channel samples were collected. The mean value for gold was 1.41 ppm and the maximum value was 28.6 ppm Au. Lead and silver correlated positively with higher gold grades. The soil survey gold results defined the main stockyard outcrop, and drop to below the limit of detection in the surrounding area. A minor gold anomaly corresponds with areas of old workings. The stockyard outcrop was also anomalously high in arsenic and gave weak silver and lead, with no response from the zinc values. To the east of the stockyard outcrop, a strong gold, lead, zinc and copper soil anomaly coincides with outcrops that have significant gold values in rock chip. Unlike the stockyard outcrop, however, there was little arsenic or silver response. The Shafts area has a strong geochemical response. The gold anomaly covers the resistant outcrop but is also displaced down-slope towards the creek. As & Ag anomalies are also coincident with this area, and lead closely defines the area of high gold rock chip values. Copper values over the large N porphyry are higher than in any other rock type.

GEOPHYSICS - Magnetic, radiometric and IP/resistivity surveys were carried out over the grided area. The magnetics increase to the S of the grid, and this can be inferred as a decrease in alteration. Measurements on outcropping silicification/alteration in the N section of the grid show no signs of magnetisation. A very weak negative response occurs over known alteration. Magnetic anomalies appear related to magnetic dykes, and surface haematite veining. Anomalies in the radiometric survey appear to be related to the sericite and epidote alteration halos. The IP/Resistivity survey defined one major conductive zone which is coincident with some of the radiometric anomalies

RECORDER: Paul Blake

DATE: 20/01/1994.

COMPANY REPORT SUMMARY SHEET

CR: 19366 **STATUS:** Open

TITLE: Six monthly report for the period 8 July 1987 to 7 January 1988. Authorities to Prospect 4035M, 4236M and 4237M, Cooper Range Joint Venture, Queensland.

AUTHOR(S): S. Taylor **DATE:** March 1988

ATP/EP No.: EPM 4236, 4237 & 4035

COMPANY HOLDING TITLE: Burmine Pty Ltd

COMPANY SUBMITTING REPORT: Placer Pacific Ltd

DATE GRANTED: 14/03/1986 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan & Banana

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: 40 km NW of Biloela

MINING DISTRICT:

MINES/PROSPECTS: Hengge's Lease, Eather's Anomaly, Location D, Location F, Location F South, Location G, and Location H

EXPLORATION TARGETS/MODELS: Gold & Silver

SUMMARY:

GEOLOGY -

MINERALISATION/ALTERATION - Sericitisation, silicification, and minor epidotisation.

REGIONAL EXPLORATION

GEOLOGICAL MAPPING - Following the identification of the alteration zone of Location G, an air photo interpretation was carried out over ATP's 4236M & 4035M. The alteration zones also are commonly associated with vegetation zones of dense clumps of trees. The known mineralised areas gave resistive outcrops that occur on slightly elevated ground. Follow-up of vegetation anomalies to date has not located any further zones of alteration, however, it is hoped that the combined use of air photography and lineament trends will indicate further areas of mineralisation.

GEOCHEMISTRY

- **stream sediment sampling** - 43 stream sediment samples were collected to test areas not covered by the original bulk cyanide leach program on all three ATP's. Follow-up collection of fine samples (-200 mesh) of originally anomalous drainages during 1987 has revealed zones of alteration and silicification without significant mineralisation. Results from Armstrong's "Basin" and Hobson's property have assay values consistent with the original sampling but show enhanced gold grades. Samples collected on Bulk Leach Anomaly 3 contained up to 0.45 ppm Au where previous assays from -80 mesh samples returned below detection limit. A sample collected at 126303 Banana 1:100 000 is representative of an area of 75 km² assayed 0.13 ppm Au and requires further follow-up. A further 3 anomalous sample sites draining ATP 4236M require follow-up.

GEOPHYSICS

- **airborne surveys** - The radiometric data was re-evaluated and identified a number of secondary radiometric anomalies. The majority of these anomalies were investigated, but none were of economic significance. One anomaly coincided with a major airphoto lineament and contained small areas of quartz veined and brecciated andesites, however there was no associated alteration.

LOCALISED EXPLORATION/PROSPECTS

1) Armstrong's Anomaly - This area was located following up an original bulk leach drainage value of 0.81 ppb Au. It occurs to the N of Hengge's Lease in ATP 4236M. The area has strong lineament trends and unusual drainage patterns.

GEOLOGY - The lithologies include siltstone and highly sheared chloritic andesites. Quartz veining is common with quartz blows in the area. The area appears to be located over the (faulted?) contact between the Camboon Andesite and Rannes beds.

GEOCHEMISTRY - An E-W soil sample line was sampled over the area, but the values were below the detection limit for gold. Three -200 mesh stream sediment samples were also collected, and two were highly anomalous at 1.15 and 1.07 ppm Au.

2) Eather's Anomaly - This area occurs within ATP 4035M, is a small silicified outcrop with a coincident airborne potassium anomaly, and is located at 037203 on the Banana 1:100 000. Rock chip samples collected in 1986 contained highly anomalous gold values up to 20 ppm. This anomaly has considerable potential as a low tonnage, narrow, but higher grade deposit.

GEOLOGY - The outcrop consists of a narrow strip of weakly brecciated cherty volcanics. The outcrop strikes at 290°, and the strike length is 130 m.

GEOCHEMISTRY - 9 rock chip samples were collected, and assayed 0.25 to 9.76 with an average of 3.96 ppm Au. Silver averaged 16.13 ppm and reached a maximum of 45 ppm Ag, arsenic are lower than for Location G and reach a maximum of 503 ppm As. Gold values correlate very strongly with copper but relatively weakly with silver and lead, and negatively with arsenic. A soil grid was also set up. The zinc soil grades are not significantly anomalous; copper and lead show weak highs but do not well define the mineralised outcrop; higher gold soil values of up to 0.26 ppm are not coincident with the gold mineralised outcrops; and silver and arsenic values of 1 ppm & 40 ppm respectively define the outcrop well and both anomalies are open to the N.

GEOFYSICS - A Controlled Source Audio Magneto-Telluric (CSAMT) survey was carried out over the Eather's Anomaly area. Preliminary interpretation detected a broad anomaly between Location F South and Eather's Anomaly.

3) Hobson's Anomaly - This anomaly is located in the S of ATP 4035M and was located by COE stream sediment sampling.

GEOLOGY - The predominant lithology is a purple "andesitic" tuff frequently quartz veined.

GEOCHEMISTRY - A soil survey was conducted over the area, but gold grades were generally low with only five samples above the detection limit of 0.04 ppm, and the highest at 0.16 ppm Au. Two rock chip samples of the vein material returned below detection limit values.

4) Bulk Leach Anomaly 3

GEOCHEMISTRY - A widely spaced soil survey was conducted in this area. An anomalous line of soil samples with gold grades up to 0.4 ppm indicate a hill in the N of the drainage system may be significantly mineralised.

5) Location D

GEOFYSICS - A Controlled Source Audio Magneto-Telluric (CSAMT) survey was carried out over Location D. Preliminary interpretation located a significant vertical conductive anomaly.

6) Location E - This area is located at 079 208 on the Banana 1:100 000 sheet. One deep pit occurs on a shear zone.

GEOLOGY - The dominant lithologies are dark grey highly silicified breccia and chert. Unlike Locations D, F, & G, there is little evidence of rebrecciation of rocks. In addition, the pyrite grains are smaller, jarosite veins were not observed, and quartz veining is much less common. Scorodite staining is present but sericite alteration is less intense than other locations. To the SE the alteration assemblage is quartz-epidote-carbonate (-albite) which is similar to the along strike extension at Location F.

7) Location F South - An area of old workings was located at 065198 on the Banana 1:100 000 Sheet. These are thought to be a S extension of alteration/mineralisation at Location F.

GEOLOGY - The alteration is restricted to a narrow zone of quartz veined sericite altered volcanics.

GEOCHEMISTRY - Two pits and two costeans were sampled, with six rock chip samples collected. The pit float contained 2.59, 0.68, 0.69 ppm Au in the samples collected. A line of soil samples was collected across the strike of the veins. The results showed very weakly anomalous gold values with the highest grade of only 0.07 ppm. It is unlikely that this area contains significant mineralisation.

GEOPHYSICS - A Controlled Source Audio Magneto-Telluric (CSAMT) survey was carried out over the Location F South area. Preliminary interpretation detected a broad anomaly between Location F South and Eather's Anomaly.

8) Location G - This area occurs within ATP 4035M at 033196 on the Banana 1:100 000 sheet, and was located by investigating vegetation anomalies similar in appearance to Location D.

GEOLOGY - This area is a zone of sericitic alteration and brecciation. The predominant lithologies are sericitically altered fine grained sediments and acid volcanics with sulphide rich/siliceous breccia veins. Chert and brecciated felsic porphyry have also been mapped. Thin quartz and jarosite veining, and scorodite staining are common features but alunite and tremolite were not detected. The majority of the outcrop is less silicified than either of Locations D & F, but the style of mineralisation is similar.

GEOCHEMISTRY - 56 rock chip samples were collected, with 15 assaying above 1 ppm Au, with the highest at 4.86 ppm Au, and the average being 0.70 ppm Au. The samples contained high values of silver averaging 80.9 ppm, and arsenic averaged 0.48%. Gold correlated positively with silver and lead but negatively with arsenic. A soil grid was set up and samples were collected from the B-horizon. High values for arsenic, silver, and gold in soil sampling coincide with higher values in rock chip sampling. Maximum values in soil sampling are 0.45 ppm Au, 2219 ppm As, 18.9 ppm Ag. Unlike rock chip samples, gold in soil values also correlate strongly with arsenic values.

GEOPHYSICS - Radiometric traverses were carried out over the soil grid. Strong responses occur in the W & S parts of the grid due to strong response to the fine grained sediments, and relatively low K counts in the E and N due to the weak response to the volcanic units.

RECORDER: Paul Blake **DATE:** 20/01/1994.

COMPANY REPORT SUMMARY SHEET

CR: 19367 **STATUS:** Open

TITLE: Six monthly report for the period 8 January 1988 to 7 July 1988. Authorities to Prospect 4035M, 4236M and 4237M, Cooper Range Joint Venture, Queensland.

AUTHOR(S): S. Taylor & K. Logan **DATE:** September 1988

ATP/EP No.: EPM 4236, 4237 & 4035

COMPANY HOLDING TITLE: Burmine Pty Ltd

COMPANY SUBMITTING REPORT: Placer Pacific Ltd

DATE GRANTED: 14/03/1986 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan & Banana

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: 40 km NW of Biloela

MINING DISTRICT:

MINES/PROSPECTS: Hengge's Lease, Eather's Anomaly, Location D, Location F, Location F South, Location G, and Location H

EXPLORATION TARGETS/MODELS: Gold & Silver

SUMMARY:

REGIONAL EXPLORATION

GEOCHEMISTRY

- **stream sediment sampling** - Four -200 mesh stream sediment samples were collected to determine the source of the gold in the stream sediment sample assaying 0.85 ppm Au at location 955693 (Mt Morgan 1:100 000).

GEOPHYSICS

- **airborne surveys** - A predawn TIR survey was carried out over the ATP's. Locations D, F, G, & H appear as hot areas. This is possibly due to both silicification and/or vegetation. Both linear, near linear and circular structures were inferable. Two sets of linear structures were prevalent in the S half of the survey. These were orientated roughly 310-320° and 30-50°. In the N part of the survey, the structures were more complicated with possibly three or four sets of structural directions. The NE portion of the survey was too thickly covered with soil to lend any structural or lithological information.

- **ground surveys** - Previous airborne and radiometric interpretation work had defined a prominent trend connecting Locations D - G. This trend is approximately 6 km long and orientated about 270°. A gradient IP/Resistivity survey was performed over this area and an area NE of Location G, to cover a possible trend from Location H. From this survey, 6 targets were located and are investigated in CR 19942.

LOCALISED EXPLORATION/PROSPECTS

1) Armstrong's Anomaly

GEOCHEMISTRY - Follow-up work involved soil sampling to the E of the previous line. All of the assays were below detection limit for gold. Also andesites in the area show no sign of alteration. Therefore, no source for the gold detected in the highly anomalous -200 mesh stream sediment samples could be located. The source of the gold is likely to be thin quartz-carbonate veins similar to those found on Hengge's Lease. No further work is recommended.

2) Bulk Leach Anomaly 3

GEOLOGY - The hill located by the soil survey in the previous exploration period is predominantly weakly sericite/epidote altered andesite with abundant thin quartz veining.

GEOCHEMISTRY - 3 rock chip samples were collected of the quartz veins on the hill. The rock chip samples assayed below detection limits for gold. The higher grade soil locations were resampled and two further detailed soil lines were sampled. The original soil sampling grades were not repeated, with all but one sample assaying below the detection limit for gold. No further work is recommended.

3) Location D

GEOPHYSICS - An IP/Resistivity test was conducted over the area. The observed low resistivities over the known mineralisation was pronounced.

4) Location E

GEOPHYSICS - An IP/Resistivity test was conducted over the area. The outcropping altered zone coincided with a relatively conductive zone which was open to the N and S

5) Location G

GEOCHEMISTRY - The saprolite horizon material from the auger drilling was assayed. Gold assay results were significantly lower than for adjacent rock chip samples, possibly due to the limited sample material available. Assays above the detection limit of 0.02 ppm Au appear to indicate mineralised areas. The highest grade of 2.16 ppm Au was recovered from an auger sample immediately S of the highest rock chip grades. Silver assays up to 182 ppm correlated with the higher gold values. Arsenic values averaging over 1000 ppm compare well with similar figures in rock chip sampling. In the NW of Location G seven of the auger holes all assaying below detection limits for gold define a sharp cut off in grades to the N of the prospect. The grade cutoff as indicated by auger drilling does not extend far beyond the vegetation anomaly or outcropping area.

DRILLING - 28 shallow auger holes were drilled in the area. Holes were terminated at bedrock or maximum possible depth (12 m).

GEOPHYSICS - An IP/Resistivity test was conducted over the area. The results show a large high resistivity anomaly associated, in part, with surface outcropping silicification and alteration. The resistivities are also low around this high suggesting a conductive alteration "halo". The N edge of the "halo" also contains a high resistivity anomaly with an inferred N dip.

6) Location H - This area is has potential mineralisation below soil cover in ATP 4035M (near 042199 on the Banana 1:100 000 Sheet). It occurs on a boundary fence between the Cooper Downs (N property) and Mr. R. Eather's Property (S property).

GEOCHEMISTRY - Assays on the drilling material defined a 200 m strike length weakly anomalous values of greater than 0.05 ppm Au associated with the presence of quartz in samples.

DRILLING - 25 auger drill holes with a total meterage of 55.5 m was drilled in the area. Maximum depth of 4.6 m was achieved. Drill sites were targeted to test between outcrops on the mineralised zone and the width of the zone. Drill chips recovered indicate that the silicification zone is narrow, less than 10 m wide. It strikes at 290° and possibly occurs on the contact between siltstones and andesitic volcanics.

GEOPHYSICS - An IP/Resistivity test was conducted over the area. The surface altered zone is coincident with a conductive anomaly which is open ended in the N and trends approximately 135°. The eastern boundary of another conductive anomaly was also defined. The host rock resistivities were moderately resistive and associated with unaltered andesite.

RECORDER: Paul Blake

DATE: 20/01/1994.

COMPANY REPORT SUMMARY SHEET

CR: 19942 **STATUS:** Open

TITLE: Six monthly report for the period 8 July 1988 to 7 January 1989. Authorities to Prospect 4035M, 4236M and 4237M, Cooper Range Joint Venture, Queensland.

AUTHOR(S): S. Taylor **DATE:** April 1989

ATP/EP No.: EPM 4236, 4237 & 4035

COMPANY HOLDING TITLE: Burmine Pty Ltd

COMPANY SUBMITTING REPORT: Placer Pacific Ltd

DATE GRANTED: 14/03/1986 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan & Banana

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: 40 km NW of Biloela

MINING DISTRICT:

MINES/PROSPECTS: Hengge's Lease, Eather's Anomaly, Location D, Location F, Location F South, Location G, Location H, Target 2, Target 5, and Target 6.

EXPLORATION TARGETS\MODELS: Gold & Silver

SUMMARY:

REGIONAL EXPLORATION

GEOPHYSICS

- **airborne surveys** - Reinterpretation of an airborne radiometrics survey carried out over the entire Cooper Range ATP's defined 7 anomalies that require further investigation. Two of the anomalies lie within ATP 4035M. A further anomaly is located in ATP 4236M.

LOCALISED EXPLORATION/PROSPECTS

1) Location G

GEOCHEMISTRY - Assay of the rock chips from the auger drilling are considered to be equivalent to soil sampling values. The assay values of 0.06 and 0.10 ppm Au in the two holes indicate further subsurface evaluation is warranted.

DRILLING - 2 shallow auger holes were drilled in the high resistivity area.

2) Location H

GEOCHEMISTRY - Low gold values (maximum of 0.02 ppm Au) were recovered from the drill chips from the holes to the E of Location H. Only two samples from the holes to the S of Location H returned assays over 0.02 ppm Au, with the highest at 0.08 ppm Au. These results show that there is no significant extension to the mineralisation at Location H as indicated by the apparent resistivities.

DRILLING - The two anomalies identified in CR 10367 were followed-up with auger drilling. Three holes were drilled to the E of Location H to test the anomaly adjacent to Cooper Down's boundary fence with fine grained sediments recovered in drill chips. Seven auger holes were drilled south from Location H, and the majority of holes were drilled in fine grained sediments and contained silicified fragments.

3) Target 1 - located at 045195 on the Banana 1:100 000 Sheet. This area is located at the termination of a resistivity trend, and has a very low resistivity. Two K/Th anomalies are also associated with it.

GEOLOGY - The area crops out strongly and the dominant lithology is an unaltered andesite with very minor bleached and sericite altered zones.

GEOCHEMISTRY - Two soil lines were sampled and the assays reported very low gold, but up to 880 ppm Au. 7 rock chip samples were collected and assayed with a maximum of 0.22 ppm Au.

4) Target 2 - located at 037201 on the Banana 1:100 000 Sheet. This area is located on the N termination of the resistivity trend aligned with Location H. The target is located to the SE of Location H in a ploughed field.

GEOLOGY - The area is covered with soil.

GEOCHEMISTRY - Samples from all holes were below detection limits for gold.

DRILLING - 3 auger holes were drilled in an attempt to penetrate the soil cover. Silicified fragments recovered from each hole, were of caliche rather than epithermally altered fragments.

5) Target 3 - located at 043183 on the Banana 1:100 000 Sheet. This area is a discontinuous section of the Location D - G trend which has associated K/Th anomalies.

GEOLOGY - Unaltered andesite and shale float is abundant in this area.

GEOCHEMISTRY - Two lines of soil samples were collected, but no gold values above 0.02 ppm were recorded. One rock chip sample was also taken.

6) Target 4 - located at 038186 on the banana 1:100 000 Sheet. This target is similar to Target 3, and is also associated with a K/Th anomaly.

GEOLOGY - Quartz-epidote altered andesite float is abundant in this area.

GEOCHEMISTRY - 1 soil line through the centre of the anomaly was sampled, and all samples were below detection limit for gold.

7) Target 5 - located 058167 on the Banana 1:100 000 Sheet. The area is a small "indentation" of the Location D - G resistivity trend associated with a K/Th anomaly.

GEOLOGY - The anomaly is on a long ridge, and outcrop availability is poor. Lithologies seen in float were sericite altered and brecciated with quartz veins in a style similar to other mineralised locations

GEOCHEMISTRY - 2 soil lines were sampled, 2 rock chip samples were collected, and drill chip samples were collected from the auger drilling. All samples contained below detection limits of gold.

DRILLING - Two auger holes were drilled, and the chips recovered were fine grained sediments.

8) Target 6 - located at 052178 on the Banana 1:100 000 Sheet. This area is a faulted section of the trend to the NE of the Location D - G trend.

GEOLOGY - Float and subcrop of bleached and silicified volcanics.

GEOCHEMISTRY - One soil line was sampled, 5 rock chip samples were collected, drill chip samples were collected from the auger drilling, and a BLEG stream sediment sample was collected from the anomalous area. All samples contained very low values of gold.

DRILLING - 3 auger hole were drilled

9) Un-named - This area was a stream in the N part of ATP 4236M at 961688 on the Mount Morgan 1:100 000 sheet.

GEOLOGY - Rannes beds sediments that are strongly deformed being tightly folded and exhibiting crenulation cleavage in places. Minor quartz veining occurs in outcrop and bucky quartz float is common in the stream. Mineralisation is likely similar to the style on MLA 398 (Hengge's Lease), to the S.

GEOCHEMISTRY - A -200 mesh sample representing the drainage area returned 0.45 ppm Au. Three BLEG stream sediment samples returned 0.65 to 1.05 ppb Au. Chips of the quartz veins contain anomalous gold values.

RECORDER: Paul Blake

DATE: 24/01/1994.

COMPANY REPORT SUMMARY SHEET

CR: 22155 **STATUS:** Open

TITLE: Final report as at 27 July 1989. Authorities to Prospect 4236M and 4237M, Cooper Range Joint Venture, Queensland.

AUTHOR(S): S. Taylor **DATE:** July 1989

ATP/EP No.: EPM 4236 & 4237

COMPANY HOLDING TITLE: Burmine Pty Ltd

COMPANY SUBMITTING REPORT: Placer Pacific Ltd

DATE GRANTED: 14/03/1986 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan & Banana

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: 40 km NW of Biloela

MINING DISTRICT:

MINES/PROSPECTS: Hengge's Lease, Eather's Anomaly, Location D, Location F, Location F South, Location G, Location H, Target 2, Target 5, and Target 6.

EXPLORATION TARGETS\MODELS: Gold & Silver

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - A regional exploration program was carried out over all accessible parts of the tenement. Several bulk stream sediment and radiometric anomalies were followed-up with detailed soil and rock chip sampling. Results from these samples indicated only low values for gold. As there was no encouragement for continued work it was recommended that both ATP's be relinquished in full.

RECORDER: Paul Blake **DATE:** 24/01/1994.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 4320M

COMPANY HOLDING TITLE: Stevenson Enterprises Pty Ltd

COMPANY SUBMITTING REPORT: Stevenson Enterprises Pty Ltd

DATE GRANTED: 04/07/1986 **PERIOD:** 1 year

1:100 000 SHEET NAME(S): Mount Morgan, Bajool, and Rockhampton

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 15 km NE of Mount Morgan

MINING DISTRICT:

MINES\PROSPECTS: Gavial Creek workings, Hidden Star Gold Mine, Lucky Hit Mine, Hector Mine, Elca Mine, Hit & Miss Mine, and Saint Gothard Mine.

EXPLORATION TARGETS\MODELS: Gold

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File-* 17577, 19115, 19996, 20022, 22364

Confidential-

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To investigate the potential for gold in the Gavial Creek alluvials near Bouldercombe as well as a number of small previously worked gold mines and prospects.

GEOLOGY -

LOCAL - The oldest rocks in the ATP are the 'Moongan Rhyolite' which is equivalent to the Middle Devonian 'Mine Corridor Volcanics' which host the Mount Morgan Mine. These rocks are in the SW corner of the ATP and consist mainly of quartz-feldspar crystal tuff and crystal-lithic tuff with some fine ash tuffs and sediments. They form a faulted anticline and are overlain (?) unconformably by andesitic rocks of the (?) Dee Volcanics to the south and are bounded on the N & E by the Bouldercombe Complex producing high grade hornfels within a hundred metres of the contact. The (?) Late Devonian Dee Volcanics occur in the SW of the ATP and to the E of Mt Usher. They consist mainly of andesitic lapilli tuff with minor derived sediments and limestone. The Boulder Creek Grit sequence is rather poorly defined as it resembles the Dee Volcanics in that the rocks are largely of andesitic composition, but are generally more sedimentary in character, specifically comprising reworked tuffaceous sandstone and grit with less lapilli tuff. The Early Carboniferous Pond Formation is characterised by a number of argillite beds, however, the formation also contains andesitic and acid volcanics and sediments, and small limestone beds. The Rockhampton Group Sequence occurs in the area to the E & NE of Bouldercombe and consists mainly of reworked calcareous sandstone of tuffaceous origin, but is characterised by oolitic limestones. The limestones form skarns near the

contact with the Bouldercombe Complex. The Permian Bouldercombe Complex consists mainly of granodiorite but also varies locally to gabbro and diorite. The Complex intrudes all the above rocks in the N & W of the ATP. Alluvium in Gavial Creek occurs in substantial amounts from S of Bouldercombe to the N end of the ATP.

MINERALISATION/ALTERATION - The major groupings of mine shafts are in or adjacent to the Moongan Rhyolite in the SW corner of the ATP, in the Pond Formation, and associated with the intrusive Bouldercombe Complex in the Hidden Star/Hector Mine area within the N portion of the area.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Previous work in the area by small scale hard rock gold mining and prospecting on many quartz veins and small skarn deposits from the latter part of the last century to the early part of this century (i.e. Hidden Star Mine). Alluvial dredging operations had previously been carried out on the Gavial Creek alluvials near Bouldercombe yielding a total of 3,991 oz of gold. Also exploration by Consolidated Zinc Pty. Ltd. (ATP 161M); Mines Exploration Pty. Ltd. (ATP 265M); Geopeko Limited (ATP 508M); B.H.P. (ATP 532M); and Haoma North West (ATP 3546M).

REGIONAL EXPLORATION

GEOCHEMISTRY

- **rock chip sampling** - Some rock chip sampling was done in parts of the Authority. The most notable results were 3.62 g/t Au from a sample taken from near a shaft on the SE flank of the hill on which the Lucky Hit Mine occurs, and 1.3 g/t Au from ferruginous granite SE of the Hector Mine.

LOCALISED EXPLORATION/PROSPECTS

1) Hidden Star Gold Mine

GEOLOGY - The mine consisted of a small cherty quartz vein occurring within mainly pelitic sediments of the Lower Carboniferous Rockhampton Group. These rocks have been hornfelsed by the adjacent Bouldercombe Complex and now consist of hornfelsed siltstones and slates with minor skarnified carbonate rocks. The mine occurs closely associated with the carbonate rocks and may be related to skarnification. Geochemical work by previous companies show sharp anomalies in Au, As, & Zn around old workings. However, all these anomalous values are due to contamination.

GEOCHEMISTRY - Rock chip samples of epidote/skarn were assayed with the best results being 0.89 g/t Au and 2.0 g/t Ag. Core from a MEPL drill hole which was stored in metal trays near the collar position of the hole was sampled and assayed. No significant values were returned.

2) Gavial Creek

GEOCHEMISTRY - From 56 pits, 177 pan samples were taken. The grades were spotty reflecting the generally coarse sizing of the gold particles. The highest grade was 10.5 g/m³. The highest grades were generally near the upstream portion of the area tested and this section showed signs of intensive prior hand mining. Not insignificant values of gold were also found in samples down stream in an area which is currently being mined under extractive industry permit for gravel. A large bulk testing program was carried out on the alluvials of Gavial Creek to the N of Bouldercombe. Grades fluctuate widely between pits, in what may be classified as the 'higher grade' section of the creek, with the lowest grade being 0.03 g/m³ and the highest being 0.45 g/m³. Test pits in the higher grade section showed a colour change at a depth of approximately 5 m with a reddish clay/soil matrix binding the wash above 5 m and a yellow clay below 5 m. The 'low grade' area occurs on the outskirts of Bouldercombe and covers an area of 3x2 km approximately with an average of 3 m of clay covering 4 m of wash. Recovered grades ranged from 0.03 g/m³ to 0.01 g/m³. Mining operations on leases immediately upstream from the high grade area of alluvial wash are reported to recover gold grades in the range of

0.6 to 1.0 g/m³. The pit that returned 0.45 g/m³ was the closest pit to these workings. Two other pits yielded grades better than 0.3 g/m³. It would be unusual for these grades to suddenly cut out without the usual tailing off normally found with greater distance below the source. The alternate paleochannel inferred from bore hole drilling and aerial photography interpretation warrants investigation to verify its existence and grade. The interpretation is that Gavial Creek may at one time have passed in front of the site of the Bouldercombe hotel and run further to the W, before turning N in its course and ultimately running into the Fitzroy River at the back of Yeppen Lagoon.

3) Hector Mine

GEOLOGY - A shaft occurs within the grid, and a iron-rich material with significant levels of carbonate/silicate copper mineralisation crops out near the shaft.

GEOCHEMISTRY - Bed-rock geochemistry sampling was carried out around Hector Mine. A small copper anomaly is shown to occur in the grid area.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Five claims were applied for over wash in the S part of the ATP but were subsequently withdrawn when negotiations with the property owner failed to arrive at a settlement that could be sustained by the values in the ground. While it was assessed that an economic alluvial gold resource does exist, it has limited extent. This, combined with the advent of gold tax and a hostile attitude on the part of the residents of Bouldercombe and Council has led to a decision to relinquish the ATP and quit the area.

RECORDER: Paul Blake **DATE:** 23/12/1993.

COMPANY REPORT SUMMARY SHEET

CR:17577 **STATUS:** Open

TITLE: Authority to Prospect 4320 M - report on areas relinquished on 4/7/87.

AUTHOR(S): A. Taube **DATE:** May 1988

ATP/EP No.: ATP 4320M

COMPANY HOLDING TITLE: Stevenson Enterprises Pty Ltd

COMPANY SUBMITTING REPORT: Stevenson Enterprises Pty Ltd

DATE GRANTED: 04/07/1986 **PERIOD:** 1 year

1:100 000 SHEET NAME(S): Mount Morgan, Bajool, and Rockhampton

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 15 km NE of Mount Morgan

MINING DISTRICT:

MINES\PROSPECTS: Gavial Creek workings, Hidden Star Gold Mine, Lucky Hit Mine, Hector Mine, Elca Mine, Hit & Miss Mine, and Saint Gothard Mine.

EXPLORATION TARGETS\MODELS: Gold

SUMMARY:

GEOLOGY -

LOCAL - The oldest rocks in the ATP are the 'Moongan Rhyolite' which is equivalent to the Middle Devonian 'Mine Corridor Volcanics' which host the Mount Morgan Mine. These rocks are in the SW corner of the ATP and consist mainly of quartz-feldspar crystal tuff and crystal-lithic tuff with some fine ash tuffs and sediments. They form a faulted anticline and are overlain (?) unconformably by andesitic rocks of the (?) Dee Volcanics to the south and are bounded on the N & E by the Bouldercombe Complex producing high grade hornfels within a hundred metres of the contact. The (?) Late Devonian Dee Volcanics occur in the SW of the ATP and to the E of Mt Usher. They consist mainly of andesitic lapilli tuff with minor derived sediments and limestone. The Boulder Creek Grit sequence is rather poorly defined as it resembles the Dee Volcanics in that the rocks are largely of andesitic composition, but are generally more sedimentary in character, specifically comprising reworked tuffaceous sandstone and grit with less lapilli tuff. The Early Carboniferous Pond Formation is characterised by a number of argillite beds, however, the formation also contains andesitic and acid volcanics and sediments, and small limestone beds. The Rockhampton Group Sequence occurs in the area to the E & NE of Bouldercombe and consists mainly of reworked calcareous sandstone of tuffaceous origin, but is characterised by oolitic limestones. The limestones form skarns near the contact with the Bouldercombe Complex. The Permian Bouldercombe Complex consists mainly of granodiorite but also varies locally to gabbro and diorite. The Complex intrudes all the above rocks in the N & W of the ATP. Alluvium in Gavial Creek occurs in substantial amounts from S of Bouldercombe to the N end of the ATP.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Previous work in the area by small scale hard rock gold mining and prospecting on many quartz veins and small skarn deposits from the latter part of the last century to the early part of this century (i.e. Hidden Star Mine). Alluvial dredging operations had previously been carried out on the Gavial Creek alluvials near Bouldercombe yielding a total of 3,991 oz of gold. Also

exploration by Consolidated Zinc Pty. Ltd. (ATP 161M); Mines Exploration Pty. Ltd. (ATP 265M); Geopeko Limited (ATP 508M); B.H.P. (ATP 532M); and Haoma North West (ATP 3546M).

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The ATP was reduced from 35 to 17 sub-blocks on 4/7/87. The only mineralisation of any significance in the area relinquished is the old St. Gothard Mine.

RECORDER: Paul Blake

DATE: 22/12/1993.

COMPANY REPORT SUMMARY SHEET

CR: 19115 **Status:** Open

TITLE: Authority to Prospect 4320 M. Combined report for six month periods from 4/1/87 to 3/7/87 and 4/7/87 to 3/1/88.

AUTHOR(S): A. Taube & J. Macaulay **DATE:** April 1988

ATP/EP No.: ATP 4320M

COMPANY HOLDING TITLE: Stevenson Enterprises Pty Ltd

COMPANY SUBMITTING REPORT: Stevenson Enterprises Pty Ltd

DATE GRANTED: 04/07/1986 **PERIOD:** 1 year

1:100 000 SHEET NAME(S): Mount Morgan, Bajool, and Rockhampton

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 15 km NE of Mount Morgan

MINING DISTRICT:

MINES\PROSPECTS: Gavial Creek workings, Hidden Star Gold Mine, Lucky Hit Mine, Hector Mine, Elca Mine, Hit & Miss Mine, and Saint Gothard Mine.

EXPLORATION TARGETS\MODELS: Gold

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To investigate the potential for gold in the Gavial Creek alluvials near Bouldercombe as well as a number of small previously worked gold mines and prospects.

GEOLOGY -

MINERALISATION/ALTERATION - The major groupings of mine shafts are in or adjacent to the Moongan Rhyolite in the SW corner of the ATP, in the Pond Formation, and associated with the intrusive Bouldercombe Complex in the Hidden Star/Hector Mine area within the N portion of the area.

REGIONAL EXPLORATION

GEOCHEMISTRY

- **rock chip sampling** - Some rock chip sampling was done in parts of the Authority. The most notable results were 3.62 g/t Au from a sample taken from near a shaft on the SE flank of the hill on which the Lucky Hit Mine occurs, and 1.3 g/t Au from ferruginous granite SE of the Hector Mine.

LOCALISED EXPLORATION/PROSPECTS

1) Hidden Star Gold Mine

GEOLOGY - The mine consisted of a small cherty quartz vein occurring within mainly pelitic sediments of the Lower Carboniferous Rockhampton Group. These rocks have been hornfelsed by the adjacent Bouldercombe Complex and now consist of hornfelsed siltstones and slates with minor skarnified carbonate rocks. The mine occurs closely associated with the carbonate rocks and may be related to skarnification. Geochemical work by previous companies show sharp anomalies in Au, As, & Zn around old workings. However, all these anomalous values are due to contamination.

GEOCHEMISTRY - Rock chip samples of epidote/skarn were assayed with the best results being 0.89 g/t Au and 2.0 g/t Ag. Core from a MEPL drill hole which was stored in metal trays near the collar position of the hole was sampled and assayed. No significant values were returned.

2) Gavial Creek

GEOCHEMISTRY - From 56 pits, 177 pan samples were taken. The grades were spotty reflecting the generally coarse sizing of the gold particles. The highest grade was 10.5 g/m³. The highest grades were generally near the upstream portion of the area tested and this section showed signs of intensive prior hand mining. Not insignificant values of gold were also found in samples down stream in an area which is currently being mined under extractive industry permit for gravel.

RECORDER: Paul Blake

DATE: 22/12/1993.

COMPANY REPORT SUMMARY SHEET

CR: 19996 **STATUS:** Open

TITLE: Authority to Prospect 4320M - combined report of exploration for the two six month periods ending 3/7/88 and 3/1/89.

AUTHOR(S): J. Macaulay **DATE:** June 1989

ATP/EP No.: ATP 4320M

COMPANY HOLDING TITLE: Stevenson Enterprises Pty Ltd

COMPANY SUBMITTING REPORT: Stevenson Enterprises Pty Ltd

DATE GRANTED: 04/07/1986 **PERIOD:** 1 year

1:100 000 SHEET NAME(S): Mount Morgan, Bajool, and Rockhampton

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 15 km NE of Mount Morgan

MINING DISTRICT:

MINES\PROSPECTS: Gavial Creek workings, Hidden Star Gold Mine, Lucky Hit Mine, Hector Mine, Elca Mine, Hit & Miss Mine, and Saint Gothard Mine.

EXPLORATION TARGETS\MODELS: Gold

SUMMARY:

LOCALISED EXPLORATION/PROSPECTS

1) Hector Mine

GEOLOGY - A shaft occurs within the grid, and a iron-rich material with significant levels of carbonate/silicate copper mineralisation crops out near the shaft.

GEOCHEMISTRY - Bed-rock geochemistry sampling was carried out around Hector Mine. A small copper anomaly is shown to occur in the grid area.

2) Gavial Creek

GEOCHEMISTRY - A large bulk testing program was carried out on the alluvials of Gavial Creek to the N of Bouldercombe. Grades fluctuate widely between pits, in what may be classified as the 'higher grade' section of the creek, with the lowest grade being 0.03 g/m³ and the highest being 0.45 g/m³. Test pits in the higher grade section showed a colour change at a depth of approximately 5 m with a reddish clay/soil matrix binding the wash above 5 m and a yellow clay below 5 m. The 'low grade' area occurs on the outskirts of Bouldercombe and covers an area of 3x2 km approximately with an average of 3 m of clay covering 4 m of wash. Recovered grades ranged from 0.03 g/m³ to 0.01 g/m³. Mining operations on leases immediately upstream from the high grade area of alluvial wash are reported to recover gold grades in the range of 0.6 to 1.0 g/m³. The pit that returned 0.45 g/m³ was the closest pit to these workings. Two other pits yielded grades better than 0.3 g/m³. It would be unusual for these grades to suddenly cut out without the usual tailing off normally found with greater distance below the source. The alternate paleochannel inferred from bore hole drilling and aerial photography interpretation warrants investigation to verify its existence and grade. The interpretation is that Gavial Creek may at one time have passed in front of the site of the Bouldercombe hotel and run further to the

W, before turning N in its course and ultimately running into the Fitzroy River at the back of Yeppen Lagoon.

RECORDER: Paul Blake

DATE: 22/12/1993.

COMPANY REPORT SUMMARY SHEET

CR: 20022 **STATUS:** Open

TITLE: Authority to Prospect 4320 M - report on areas relinquished on 17/8/88.

AUTHOR(S): J. Macaulay **DATE:** May 1989

ATP/EP No.: ATP 4320M

COMPANY HOLDING TITLE: Stevenson Enterprises Pty Ltd

COMPANY SUBMITTING REPORT: Stevenson Enterprises Pty Ltd

DATE GRANTED: 04/07/1986 **PERIOD:** 1 year

1:100 000 SHEET NAME(S): Mount Morgan, Bajool, and Rockhampton

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 15 km NE of Mount Morgan

MINING DISTRICT:

MINES\PROSPECTS: Gavial Creek workings, Hidden Star Gold Mine, Lucky Hit Mine, Hector Mine, Elca Mine, Hit & Miss Mine, and Saint Gothard Mine.

EXPLORATION TARGETS\MODELS: Gold

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - A further 2 sub-blocks were relinquished on the 4/7/87. In the E, the sub-block relinquished covers rocks of the Rockhampton Group. The sub-block in the W part of the ATP covers rocks of the Moongan Rhyolite and Dee Volcanics. No mineralisation was found in the relinquished sub-block to the E, but in the relinquished sub-block in the W, two mine shafts of reasonable size were noted to the N of the Bouldercombe/Mount Morgan highway. Positive identification of these has not been made, but they are thought to be the 'Elca' & the 'Hit and Miss' mines. Two smaller diggings to the S of the highway in this vicinity were also noted. Mineralisation appears to be confined to narrow quartz reefs in andesitic tuffs of the Moongan Rhyolite formation. Previous rock chip sampling returned 3 to 5 g/t Ag, and 0.01 to 0.19 g/t Au from the Moongan Rhyolite Formation in this vicinity.

RECORDER: Paul Blake **DATE:** 22/12/1993.

COMPANY REPORT SUMMARY SHEET

CR: 22364 **Status:** Open

TITLE: Authority to Prospect 4320 M - Final Report and report of exploration for the period 4/1/89 to 12/6/90.

AUTHOR(S): J. Macaulay **DATE:** January 1991

ATP/EP No.: ATP 4320M

COMPANY HOLDING TITLE: Stevenson Enterprises Pty Ltd

COMPANY SUBMITTING REPORT: Stevenson Enterprises Pty Ltd

DATE GRANTED: 04/07/1986 **PERIOD:** 1 year

1:100 000 SHEET NAME(S): Mount Morgan, Bajool, and Rockhampton

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 15 km NE of Mount Morgan

MINING DISTRICT:

MINES\PROSPECTS: Gavial Creek workings, Hidden Star Gold Mine, Lucky Hit Mine, Hector Mine, Elca Mine, Hit & Miss Mine, and Saint Gothard Mine.

EXPLORATION TARGETS\MODELS: Gold

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Five claims were applied for over wash in the S part of the ATP but were subsequently withdrawn when negotiations with the property owner failed to arrive at a settlement that could be sustained by the values in the ground. While it was assessed that an economic alluvial gold resource does exist, it has limited extent. This, combined with the advent of gold tax and a hostile attitude on the part of the residents of Bouldercombe and Council has led to a decision to relinquish the ATP and quit the area.

RECORDER: Paul Blake **DATE:** 23/12/1993.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 4340M

COMPANY HOLDING TITLE: Sunstate Cement Limited

COMPANY SUBMITTING REPORT: Sunstate Cement Limited

DATE GRANTED: **PERIOD:**

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 16 km SE of Bajool

MINING DISTRICT:

MINES\PROSPECTS:

EXPLORATION TARGETS\MODELS: Limestone

TRANSFERS, JOINT VENTURES, etc: Sunstate Cement Limited is a subsidiary of Mainland Cement Limited, a company jointly owned by Blue Circle Southern Cement Limited and Adelaide Brighton Cement Limited.

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File-* 17159, 17160, 17161, 21323

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To identify a limestone source suitable for use in a proposed cement manufacturing facility.

GEOLOGY -

LOCAL - The outcropping rock strata in the area is believed to belong to the Lower Devonian Mt Holly beds. The sequence present includes acid to intermediate ash flow tuffs and ash fall tuffs, tuffaceous arenites and lutites, conglomerates and limestones.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Previous exploration by the Geological Survey of Queensland in 1970 who were surveying limestone deposits in the Rockhampton area. Also BHP (ATP 1416M); and EZ Co. Limited (ATP 3001M).

GEOLOGICAL MAPPING - Mapping gave little of no indication of structure or the nature of the limestone contacts. Intervening areas contain shale, mudstone, siltstone and chert float with occasional small limestone outcrops. Areas downstrike of known limestone bodies were found to contain occasional limestone pods. The main eastern limestone bodies were mapped in detail and are massive with only minor beds of shale and andesitic tuff. The limestone is generally crystalline but shows remnant coralline and reef breccia structures. The limestone belts thin to the SE and become discontinuous. Three outcropping limestone bodies in the E part of the area were proven to contain high grade limestone essentially free of magnesia and other contaminants with the exception of near surface clay. In the W of the area a potentially major limestone resource occurs. The limestone is however at least partly magnesian.

GEOCHEMISTRY

- **rock chip sampling** - Rock chip samples were taken in an attempt to determine the quality and quantity of economically recoverable limestone in the W deposit. The analysis of rock chip samples taken highlighted problems with magnesia content in the limestone.

- **drilling** - A total of 23 boreholes were drilled comprising 194 m of percussion drilling & 552 m of diamond core drilling.

GEOPHYSICS

- **ground surveys** - A seismic survey was undertaken in an attempt to indicate the existence of limestone at shallow depth in unexposed areas, but proved to be ineffective technique.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The ATP was dropped because of the insufficient overall recoverable reserves of limestone of the desired grade; high content and irregular distribution of magnesia in the W deposits; and likely drainage problems in quarry development.

RECORDER: Paul Blake

DATE: 21/12/1993.

COMPANY REPORT SUMMARY SHEET

CR: 17159 **STATUS:** Open

TITLE: Authority to Prospect no. 4340M, Horrigan Creek. Six monthly report for period 4th August 1986 to 4th February 1987.

AUTHOR(S): M.J. Robinson **DATE:** May 1987

ATP/EP No.: ATP 4340M

COMPANY HOLDING TITLE: Sunstate Cement Limited

COMPANY SUBMITTING REPORT: Sunstate Cement Limited

DATE GRANTED: **PERIOD:**

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 16 km SE of Bajool

MINING DISTRICT:

MINES\PROSPECTS:

EXPLORATION TARGETS\MODELS: Limestone

SUMMARY:

REASON FOR ACQUISITION OF TITLE - To identify a limestone source suitable for use in a new cement manufacturing facility proposed to be established in Queensland.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Previous exploration by the Geological Survey of Queensland in 1970 who were surveying limestone deposits in the Rockhampton area. This involved mapping of the extent of outcropping limestone and the drilling of 2 boreholes in the largest deposit. Also work by BHP (ATP 1416M); and EZ Co. Limited (ATP 3001M).

GEOLOGICAL MAPPING - Reconnaissance traverses were undertaken using the GSQ mapping as a guide to determine the possible extent of limestone into generally unexposed areas between the main outcropping limestone bodies. Mapping gave little of no indication of structure or the nature of the limestone contacts. Intervening areas contain shale, mudstone, siltstone and chert float with occasional small limestone outcrops.

GEOPHYSICS

- **ground surveys** - A seismic survey was undertaken in an attempt to indicate the existence of limestone at shallow depth in unexposed areas, but proved to be ineffective technique.

RECORDER: Paul Blake **DATE:** 21/12/1993.

COMPANY REPORT SUMMARY SHEET

CR: 17160 **STATUS:** Open

TITLE: ATP 4340M - Horrigan Creek, retained area. Six monthly report - 4th February 1987 to 4th August 1987.

AUTHOR(S): **DATE:** October 1987

ATP/EP No.: ATP 4340M

COMPANY HOLDING TITLE: Sunstate Cement Limited

COMPANY SUBMITTING REPORT: Sunstate Cement Limited

DATE GRANTED: **PERIOD:**

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 16 km SE of Bajool

MINING DISTRICT:

MINES\PROSPECTS:

EXPLORATION TARGETS\MODELS: Limestone

SUMMARY:

GEOLOGY -

LOCAL - The outcropping rock strata in the area is believed to belong to the Lower Devonian Mt Holly beds. The beds dip at 25 to 30° to the SW and strike at 130 to 140°. The sequence present includes acid to intermediate ash flow tuffs and ash fall tuffs, tuffaceous arenites and lutites, conglomerates and limestones.

REGIONAL EXPLORATION

GEOLOGICAL MAPPING - Reconnaissance mapping was undertaken to locate limestone outcrops. Areas downstrike of known limestone bodies were also searched and found to contain occasional limestone pods. The main eastern limestone bodies were mapped in detail and are massive with only minor beds of shale and andesitic tuff. The limestone is generally crystalline but shows remnant coralline and reef breccia structures. The limestone belts thin to the SE and become discontinuous. Three outcropping limestone bodies in the E part of the area were proven to contain high grade limestone essentially free of magnesia and other contaminants with the exception of near surface clay. In the W of the area a potentially major limestone resource occurs. The limestone is however at least partly magnesian.

GEOCHEMISTRY

- **rock chip sampling** - The W and S limestone bodies and two shale quarries were chip sampled.
- **drilling** - A total of 23 boreholes were drilled comprising 194 m of percussion drilling & 552 m of diamond core drilling.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The extreme S, SE, and SW of the ATP do not contain limestone of economic value and have been surrendered.

RECORDER: Paul Blake

DATE: 21/12/1993.

COMPANY REPORT SUMMARY SHEET

CR: 17161 **STATUS:** Open

TITLE: Authority to Prospect no. 4340M, Horrigan Creek - relinquished area. Six monthly report for period 4th February 1987 to 4th August 1987.

AUTHOR(S): W.A. Marshall & M.J. Robinson **DATE:** October 1987

ATP/EP No.: ATP 4340M

COMPANY HOLDING TITLE: Sunstate Cement Limited

COMPANY SUBMITTING REPORT: Sunstate Cement Limited

DATE GRANTED: **PERIOD:**

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 16 km SE of Bajool

MINING DISTRICT:

MINES\PROSPECTS:

EXPLORATION TARGETS\MODELS: Limestone

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The areas identified in CR 17160 as possessing no large bodies of limestone were relinquished

RECORDER: Paul Blake **DATE:** 21/12/1993.

COMPANY REPORT SUMMARY SHEET

CR: 21323 **STATUS:** Open

TITLE: Authority to Prospect no. 4340M - Horrigan Creek retained area. Six monthly report - 4th February to 4th August 1988.

AUTHOR(S): I. Wallace **DATE:** October 1988

ATP/EP No.: ATP 4340M

COMPANY HOLDING TITLE: Sunstate Cement Limited

COMPANY SUBMITTING REPORT: Sunstate Cement Limited

DATE GRANTED: **PERIOD:**

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 16 km SE of Bajool

MINING DISTRICT:

MINES\PROSPECTS:

EXPLORATION TARGETS\MODELS: Limestone

SUMMARY:

REGIONAL EXPLORATION

GEOCHEMISTRY

- **rock chip sampling** - Rock chip samples were taken in an attempt to determine the quality and quantity of economically recoverable limestone in the W deposit which could augment demonstrated reserves in the E deposits. The analysis of rock chip samples taken highlighted problems with magnesia content in the limestone.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - It was decided to relinquish the ATP because of the insufficient overall recoverable reserves of limestone of the desired grade; high content and irregular distribution of magnesia in the W deposits; and likely drainage problems in quarry development.

RECORDER: Paul Blake **DATE:** 21/12/1993.

AUTHORITY TO PROSPECT SUMMARY SHEET

CR: 16316 **STATUS:** Open

TITLE: Authority to Prospect no. 4466M ,Raglan', Gladstone Mining District, Queensland. First six monthly and final report.

AUTHOR(S): N.F. Rutherford **DATE:** May 1987

ATP/EP No.: ATP 4466M

COMPANY HOLDING TITLE: Electrolytic Zinc Company of Australasia Limited

COMPANY SUBMITTING REPORT: Electrolytic Zinc Company of Australasia Limited

DATE GRANTED: 27/10/1986 **PERIOD:**

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 30 km SE of Bajool

MINING DISTRICT:

MINES\PROSPECTS: Mount Raglan/Mount Turrett prospect

EXPLORATION TARGETS\MODELS: Gold

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File- 16316*

Confidential-

SUMMARY:

GEOLOGY -

LOCAL - The ATP is situated in the N part of the Yarrol Province. It includes the Lower to Middle Devonian Mount Holly beds which consist of acid and intermediate tuffs with minor fine grained sediments. Limestone units crop out in the NE corner of the area and at Mt Raglan, and to the S a number of chert (jasper) and silicified mudstone and tuff beds are found within a sequence of acid tuffs (crystal, lapilli) and fine grained tuffaceous sediments. The siliceous and cherty units which can be traced for over 500 m of strike are often cut by a narrow 'stockwork' of thin quartz veins. The gold mineralisation is associated with the cherts and jaspers. At Mt Turret thin quartz vein stringers cut andesitic lava.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Previous exploration by Kennecott Exploration (ATP 667M); Esso Australia Ltd (ATP 1087M); and Australian Anglo American Prospecting Ltd (ATP 1950M, 1951M & 2079M). The area was also previously explored by Electrolytic Zinc Company of Australasia Ltd (ATP 2607M & 3001M). This earlier work concluded that some limited potential for gold may exist in the vicinity of the old workings of Mount Raglan & Mount Turrett and S along a zone of shearing to Spring Hill and Cedervale. Carpentaria Exploration Company (ATP 3858M) explored and drilled the area and adequately assessed the potential of the main Mt Raglan/Mt Turrett prospect.

LOCALISED EXPLORATION/PROSPECTS

1) Mt Raglan - Mt Turrett area

GEOCHEMISTRY - The area was investigated using rock chip sampling, bulk leach stream sediment sampling, ridge & spur soil sampling, samples of battery tailings, and soil samples downslope from battery tailings. The only anomalous samples determined were those contaminated by battery tails or from material from old workings.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The results of exploration effectively preclude any potential for large tonnage low grade or moderate tonnage of higher grade mineralisation occurring in the area. Therefore the ATP was relinquished.

RECORDER: Paul Blake **DATE:** 21/12/1993.

AUTHORITY TO PROSPECT SUMMARY SHEET

CR: 17641 **STATUS:** Open

TITLE: Final report - Mt Grim. Authority to Prospect 4697M.

AUTHOR(S): N.P. Stevens-Hoare **DATE:** May 1988

ATP/EP No.: ATP 4697M

COMPANY HOLDING TITLE: Gold Fields Exploration Pty Ltd

COMPANY SUBMITTING REPORT: Gold Fields Exploration Pty Ltd

DATE GRANTED: **PERIOD:**

1:100 000 SHEET NAME(S): Bajool & Biloela

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 40 km SSE of Bajool

MINING DISTRICT:

MINES\PROSPECTS: Mount Grim Skarn Zone

EXPLORATION TARGETS\MODELS: Gold in skarns

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File- 17641*

Confidential-

SUMMARY:

GEOLOGY -

LOCAL - In the Mt Alma-Mannersley-Mt Grim area, siltstone, sandstone, conglomerate and limestone of the Devonian Mount Holly beds are intruded by the Permo-Triassic Galloway Plains Tonalite, and by Triassic? feldspar porphyry plugs and dykes. Copper-bearing skarns are developed in roof pendants of sediment in and adjacent to the tonalite and feldspar porphyries. Also vein copper is reported from dyke-filled shear zones in porphyritic granodiorite SE of Mt Grim and from sheared tonalite S of Alarm Creek Homestead.

LOCALISED EXPLORATION/PROSPECTS

1) Mount Grim Skarn Zone

GEOLOGY - Detailed mapping in the vicinity of Mt Grim suggests the limestone and skarn there is a series of small roof pendants essentially isolated on a ridge of quartz and hornblende feldspar porphyry dykes and plugs. The margins of the pendants consist of brecciated porphyry and polymict breccia with porphyry, microgranodiorite and sediment fragments in a matrix of flow banded porphyry or epidote-quartz-calcite-hematite. The zonation from shattered and brecciated porphyry to monomictic porphyry breccia to polymict breccia with increasing amounts of epidote matrix going towards skarn and limestone suggest the breccia is intrusive at shallow porphyry level and has a hydrothermal component derived from magma-limestone interaction. It nowhere appears to be mineralised in itself. The skarns predominantly consist of granular red-brown and green garnet with local cavities of epidote, quartz, carbonate, specular hematite or platy magnetite, pyrite and chalcopryite. Massive granular to platy magnetite with quartz, calcite, epidote, pyrite and chalcopryite occurs locally between the garnet skarn and limestone. Previous sampling demonstrated the magnetite skarn is anomalous in Cu (to 1450 ppm), W (to 26 ppm) and Au (to 0.77 ppm). On the basis of the limited distribution of limestone, the narrow

selvage of skarn, the somewhat unfavourable composition of the skarn and the lack of well developed porphyry-style alteration and mineralisation in the porphyry it is difficult to see a potential for a gold skarn in the immediate Mt Grim area.

2) Mannersley-Mt Alma area

GEOLOGY - There are at least four occurrences of skarn that appear to form roof pendants on a tonalite body that may be an offshoot of the Galloway Plains tonalite. From general reconnaissance, these skarns and those at Mt Grim appear restricted to the SW side of a NW trending boundary between carbonate-bearing and carbonate-barren sedimentary sequences. The skarn occurrences are either isolated erosional remnants on the tonalite or shallow dipping pendants that may be open away from the exposed areas of tonalite and skarn. The overall interpretation is similar to Mt Grim in that the skarn has limited distribution, is erosional remnants on a shallowly underlying intrusion, and has a compositional and zoning pattern more typical of Cu-W skarn. Given that mineralisation appears best developed in magnetite and garnet skarns, the simplest test for extension of such skarns would be a ground magnetometer survey.

GEOCHEMISTRY - Assayed samples of the skarn returned anomalous Cu (up to 1300 ppm), W (to 1000 ppm), Mo (to 25 ppm), As (to 92 ppm) and Au (to 0.11 ppm).

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The conclusions are that there is limited potential for a major gold skarn occurrence in the Mt Grim area. Small bodies of copper-tungsten skarn with precious metal credits may be present and could be tested initially by a ground magnetometer survey. However, it was decided that the potential to discover a mineable resource was low and the ATP was relinquished.

RECORDER: Paul Blake **DATE:** 17/12/1993.

AUTHORITY TO PROSPECT SUMMARY SHEET

CR: 19024 **STATUS:** Open

TITLE: Authority to Prospect 4802M in the name of Gulf Gold NL. First six monthly report for the period 1st July 1987 to 1st January 1988 & final report.

AUTHOR(S): V. Webster Pty Limited **DATE:**

ATP/EP No.: ATP 4802M

COMPANY HOLDING TITLE: Gulf Gold NL

COMPANY SUBMITTING REPORT: Veronica Webster Pty Limited

DATE GRANTED: 01/07/1987 **PERIOD:** 1 year

1:100 000 SHEET NAME(S): Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 25 km SE of Bajool

MINING DISTRICT:

MINES\PROSPECTS: Mount Bennet Gold Mine, Two Mile Diggings; Langmorn Gold and Mineral Field & Raglan Goldfield.

EXPLORATION TARGETS\MODELS: Gold

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File- 19024*

Confidential-

SUMMARY:

GEOLOGY -

LOCAL - The tenement is underlain by the Lower to Middle Devonian Mount Holly beds (calc-alkaline volcanic suite ranging from basalt to rhyolite but dominantly andesitic flows and pyroclastics containing interbedded sediments).

MINERALISATION/ALTERATION - No primary widespread hydrothermal alteration has been identified. It is interpreted that most of the gold in the area is present in small veins which erodes to give the alluvials.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - The Raglan field was discovered in 1867. Modern exploration has been carried out by Kennecott Exploration, Esso Australia Ltd, Geopeko, Australian Anglo American Prospecting Ltd (ATP 1950M, 1951M & 2079M); and Electrolytic Zinc Co of Australasia Ltd (EZ) (ATP 3001M).

LOCALISED EXPLORATION/PROSPECTS

1) Mount Bennet Mine

GEOLOGY - Mount Bennet Mine worked a quartz vein in a dense crystal tuff or lava of andesitic composition. The quartz vein is seen in only a few trenches, and is generally white, opaque with occasional vugs. It has some banding parallel with the vein walls, and there is minor pyrite and rare malachite.

GEOCHEMISTRY - Rock samples of the quartz vein returned 0.02 to 3.90 g/t gold, and rock samples from the country rock returned 0.05 to 0.15 g/t.

2) Old Diggings

GEOLOGY - The Old Diggings were found to be sunk into shaly sediments except for a few places where coarse tuffaceous and pyroclastic sediments are found. Only very minor amounts of quartz fragments are found amongst the spoil surrounding the pits. A felsic dyke was also seen in a place disturbed by bulldozers.

GEOCHEMISTRY - Rock chip samples of quartz returned 0.05 to 1.38 g/t gold, and tuff with quartz stockwork returned <0.01 to 0.03 g/t Au. Rock chip samples of the felsic dyke returned only 0.06 g/t.

3) Two Mile Diggings

GEOLOGY - The Two Mile Diggings are small alluvial workings in a small tributary on the W side of the upper reaches of Fire Creek. No source or potential source of mineralisation could be found.

4) Mount Larcom Scrub

GEOLOGY - The main rock type is shale with conglomerate and gritty pyroclastic sediments of andesitic composition. There are minor alluvial diggings on a small section of Two Mile Creek and a line of workings which diagonally traverse a small valley on the E side of the creek. There are also a few pits on a ridge on the N side of this valley. Only a few chips of quartz were found in the spoil of

these pits. There is no surface evidence of any mineralisation or structures on which the pits have been dug.

GEOCHEMISTRY - Rock chip samples were taken of the quartz and returned 0.02 to 0.08 g/t Au.

5) Area 4 - a ridge E of Four Mile Creek was investigated because it was identified as anomalous by previous exploration.

GEOLOGY - Mainly coarse gritty pyroclastic sediments were found and scattered quartz float with a vughy or gossanous appearance. Otherwise there is no surface indication of any vein or structure which might be mineralised.

GEOCHEMISTRY - Rock chip samples were collected and returned 0.02 to 0.03 g/t Au.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Gulf Gold NL commissioned Veronica Webster Pty Limited (Consultants to the mining industry) to carry out initial studies and reconnaissance geology and sampling.

RECORDER: Paul Blake **DATE:** 17/12/1993.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 4905M

COMPANY HOLDING TITLE: Freeport Australian Minerals Ltd.

COMPANY SUBMITTING REPORT: Freeport Australian Minerals Ltd./Haoma North West N.L.

DATE GRANTED: 02/09/1987 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan & Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 20 km SSW of Bajool

MINING DISTRICT:

MINES\PROSPECTS:

EXPLORATION TARGETS\MODELS: Gold-copper mineralisation

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File-* 17971, 18789

SUMMARY:

GEOLOGY -

REGIONAL - The tenement lies within the Calliope Block which is interpreted as an island arc (Mount Holly beds and Capella Creek beds) developed in the Late Silurian to Middle Devonian. The rocks of the Calliope Island Arc were folded along NNW axes during the Middle Devonian and a variably slaty cleavage was developed. Further deformation occurred in the Mid to Late Permian time, with open folding along NNW axes and reverse faulting. Post deformational granitoids of Late Permian to Early Triassic age were subsequently intruded.

LOCAL - The tenement appears to predominantly overlie the Capella Creek beds and Dee Volcanics. The sequences are mainly intermediate pyroclastics and their reworked equivalents. Some of the Mount Holly beds may outcrop in the E part of the area. No mineralisation is known to occur in the area.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Previous exploration by Conzinc (ATP 161M); Geosite Associates (ATP 301M); Geopeko (ATP 352M); and EZ Industries (ATP 2552M & 3526M).

GEOCHEMISTRY

- **stream sediment sampling** - Literature review revealed that drainages in the Raspberry Creek area are anomalous in copper and possibly zinc, and a second order anomaly occurs N of Capella Creek. Several other anomalous catchments are indicated but these are low order and of limited extent. It is recommended that ground checking of the highest priority anomalies be carried out in conjunction with brief regional geological check mapping.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Results of drilling in ATP 4087M downgraded ATP 4905M significantly. The zones of geochemical interest in ATP 4905M are of low tenor and inferior to those tested in the adjacent ATP. Exploration has revealed that the most interesting mineralisation is hosted by the Mount Holly beds. This unit is not represented in this tenement. The lack of positive indications of mineralisation and the absence of prospective stratigraphy have down graded this area and it was relinquished.

RECORDER: Paul Blake

DATE: 16/12/1993.

COMPANY REPORT SUMMARY SHEET

CR: 17971 **STATUS:** Open

TITLE: Authority to Prospect no. 4905M. Capella Creek - East Queensland. Report for the six months ended 1st March 1988.

AUTHOR(S): D.I. Young **DATE:**

ATP/EP No.: ATP 4905M

COMPANY HOLDING TITLE: Freeport Australian Minerals Ltd.

COMPANY SUBMITTING REPORT: Freeport Australian Minerals Ltd.

DATE GRANTED: 02/09/1987 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan & Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 20 km SSW of Bajool

MINING DISTRICT:

MINES\PROSPECTS:

EXPLORATION TARGETS\MODELS: Gold-copper mineralisation

SUMMARY:

GEOLOGY -

REGIONAL - The tenement lies within the Calliope Block which is interpreted as an island arc (Mount Holly beds and Capella Creek beds) developed in the Late Silurian to Middle Devonian. The rocks of the Calliope Island Arc were folded along NNW axes during the Middle Devonian and a variably slaty cleavage was developed. Further deformation occurred in the Mid to Late Permian time, with open folding along NNW axes and reverse faulting. Post deformational granitoids of Late Permian to Early Triassic age were subsequently intruded.

LOCAL - The tenement appears to predominantly overlie the Capella Creek beds and Dee Volcanics. The sequences are mainly intermediate pyroclastics and their reworked equivalents. Some of the Mount Holly beds may outcrop in the E part of the area. No mineralisation is known to occur in the area.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Previous exploration by Conzinc (ATP 161M); Geosite Associates (ATP 301M); Geopeko (ATP 352M); and EZ Industries (ATP's 2552M & 3526M).

GEOCHEMISTRY

- **stream sediment sampling** - Literature review revealed that drainages in the Raspberry Creek area are anomalous in copper and possibly zinc, and a second order anomaly occurs N of Capella Creek. Several other anomalous catchments are indicated but these are low order and of limited extent. It is recommended that ground checking of the highest priority anomalies be carried out in conjunction with brief regional geological check mapping.

RECORDER: Paul Blake **DATE:** 16/12/1993.

COMPANY REPORT SUMMARY SHEET

CR: 18789 **Status:** Open

TITLE: Authority to Prospect no. 4905M. Capella Creek - East Queensland. Report for the six months ended 1st September 1988 & final report.

AUTHOR(S): Doug Young & Assocs. **DATE:**

ATP/EP No.: ATP 4905M

COMPANY HOLDING TITLE: Freeport Australian Minerals Ltd.

COMPANY SUBMITTING REPORT: Haoma North West N.L.

DATE GRANTED: 02/09/1987 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan & Bajool

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: 20 km SSW of Bajool

MINING DISTRICT:

MINES\PROSPECTS:

EXPLORATION TARGETS\MODELS: Gold-copper mineralisation

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Activities in this area were restricted to exploration of the adjacent ATP 4087M. Results of drilling in ATP 4087M downgraded ATP 4905M significantly. The zones of geochemical interest in ATP 4905M are of low tenor and inferior to those tested in the adjacent ATP. Exploration has revealed that the most interesting mineralisation is hosted by the Mount Holly beds. This unit is not represented in this tenement. The lack of positive indications of mineralisation and the absence of prospective stratigraphy have down graded this area and it will be relinquished.

RECORDER: Paul Blake **DATE:** 16/12/1993.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 4936M

COMPANY HOLDING TITLE: Freeport Australia Minerals Ltd./Poseidon Exploration Limited

COMPANY SUBMITTING REPORT: Freeport Australia Minerals Ltd./Poseidon Exploration Limited

DATE GRANTED: 13/09/1987 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: NW of Mount Morgan

MINING DISTRICT:

MINES\PROSPECTS: Moonmera Prospect

EXPLORATION TARGETS\MODELS: Gold-copper mineralisation

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

Confidential-

SUMMARY:

GEOLOGY -

LOCAL - Mapping has shown that the lithologies can be divided into 10 formations. **(1)** Capella Creek beds, **(2)** Pond Formation, **(3)** Neil's Creek Clastics, **(4)** Turner Creek Conglomerate, **(5)** Neerkol Formation, **(6)** Youlambie Conglomerate, **(7)** Bouldercombe Complex, **(8)** Razorback beds, **(9)** basalt flows, and **(10)** sandy recent alluvium.

MINERALISATION/ALTERATION - Gold and base metal mineralisation exists in a number of settings within the area and many old workings were noted during mapping. Of the most significant is the skarn hosted copper-gold mineralisation (disseminated chalcopyrite, bornite, pyrite, and rare sphalerite) that occurs in the Capella Creek beds in the NE of the area. This mineralisation is confined to the higher grade skarn zones along the contact with the Bouldercombe Complex. Weakly developed skarns occur within the Capella Creek beds in the SE of the area, and they contain very low base and precious metal values. A number of small pits have been put down on small quartz veins in the Capella Creek beds and Neil's Creek Clastics. Most contain only low base and precious metal values. A number of small excavations were noted at the base of the Razorback beds at various locations throughout the area. Possible alluvial workings were noted along a small stream draining the Razorback beds in the SE of the area.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Previous exploration by Conzinc (ATP 161M); Mines Exploration P/L; Geolosite Associates (ATP 301M); Cominco, North Broken Hill & Sumitomo; Gepeko (ATP 508M); BHP Ltd (ATP 532M); and Mineral Deposits Ltd (ATP 1585M). An extensive literature review was done for the area with the following conclusion: **(1)** The Moonmera prospect has been evaluated by several previous explorers. This prospect should be reviewed with emphasis on potential for undetected gold mineralisation. **(2)** The Quarry Creek & Table Mountain areas have lithologies of interest and scattered mineralisation. **(3)** The occurrence of gold mineralisation in the basal Jurassic sediments as noted in ATP 4231M should be explored, and exploration should be in line with the 4231M work.

GEOLOGICAL MAPPING - A structural study of the area was carried out using 1:25000 scale aerial photographs. A number of photolinears were detected and these were field checked.

GEOCHEMISTRY

- **stream sediment sampling** - 50 panned concentrate and 50 bulk leach stream sediment samples collected. The maximum from the panned concentrate samples was 299 ppm Au attained in Quarry Creek. This sample was one of the 12 that contained visible gold, and the gold generally had a waterworn appearance and probably had been shed from the Razorback beds. The bulk cyanide leach samples were collected from the same sample sites as the panned concentrate samples and were analysed for gold. A highly significant value of 13.9 ppb was obtained in a sample from Stony Creek. The results of the two surveys were statistically analysed using cumulative frequency plots. Four populations were defined and three are considered anomalous. These are the Stony Creek, Quarry Creek and Centre Creek. These creeks all drain, in part, the Jurassic Razorback beds, of which some basal units are known to host fossil placer gold deposits. Hence, gold shedding from these deposits may have a masking effect on any gold being liberated from basement, making interpretation of the results difficult.

- **rock chip sampling** - 24 rock chip samples were collected from copper bearing skarns detected by previous workers in the NE of the ATP. Mine dump material and mineralised/altered lithologies were also sampled. Some significant results were returned with maximum values of 5.63% Cu, 4900 ppm Pb, 5.67% Zn, 75 ppm Ag, and 2.78 ppm Au. The samples containing these values were of malachite stained

quartz veined epidote-garnet skarn. Also rock chip samples were collected from both known and previously undetected areas of mineralisation and/or alteration. The best gold values were from quartz veins in old pits (0.34 to 3.99 ppm); and the best copper is from granodiorite and syenite with disseminated copper mineralisation (2100 to 5300 ppm). Rock chip samples from the conglomerates at the base of the Razorback beds all returned low base and precious metal values.

LOCALISED EXPLORATION/PROSPECTS

1) Skarn Zone

GEOLOGY - This area is a skarnised roof pendant of the Capella Creek beds within the Bouldercombe Complex. Mapping indicated that there would be only limited tonnage in the area, and this combined with the low gold values has downgraded the prospectivity of this zone. A larger roof pendant exists to the NE, but only limited skarnised zones have been encountered. Traversing of the contact between the larger Capella Creek beds roof pendant and the Bouldercombe Complex would uncover any further areas of skarn alteration, but is unlikely that economic grades exist.

GEOCHEMISTRY - A 600 m long and 200 to 350 m wide grid was constructed over the roof pendant. 144x B-C horizon soil samples were collected. Elevated gold occurs with both Mn & Cu anomalies. Statistical methods identified an anomalous Au threshold of 10 ppb, and only four samples were recorded above this level. Copper was mainly associated with quartz diorite, along the contact with the Capella Creek beds roof pendant, and along a fault within the pendant. The association of copper with the quartz diorite has been noted elsewhere particularly at the Moonmera Porphyry Copper Prospect.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The discouraging results from the Skarn Zone has reduced the prospectivity of the Authority as a whole. Therefore the tenement was surrendered.

RECORDER: Paul Blake **DATE:** 15/12/1993.

COMPANY REPORT SUMMARY SHEET

CR: 17970 **STATUS:** Open

TITLE: Authority to Prospect no. 4936M. Mt. Gordon - East Queensland. Report for the six months ended 13th March 1988.

AUTHOR(S): D.I. Young **DATE:**

ATP/EP No.: ATP 4936M

COMPANY HOLDING TITLE: Freeport Australia Minerals Ltd.

COMPANY SUBMITTING REPORT: Freeport Australia Minerals Ltd.

DATE GRANTED: 13/09/1987 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: NW of Mount Morgan

MINING DISTRICT:

MINES\PROSPECTS: Moonmera Prospect

EXPLORATION TARGETS\MODELS: Gold-copper mineralisation

SUMMARY:

GEOLOGY -

LOCAL - The tenement area is made up of outliers of Jurassic sandstone of the Razorback beds. This sequence is flat lying and lies on a basement of Devonian through to Permian and younger rocks. The Devonian sequence is thought to be Dee Volcanics and Capella Creek equivalents, with a large outcrop of limestone at the base of the Dee Volcanics. However, steep attitudes have been recorded in the area and therefore these rocks may be older. Where the limestones are intruded by the Bouldercombe Complex they are skarnised with associated minor indications of base metal mineralisation. The Bouldercombe Complex of Permian age is deeply weathered, giving poor outcrop. Some Permian volcanics and sediments and Cretaceous volcanics are also present in the N part of the area.

REGIONAL EXPLORATION

PREVIOUS EXPLORATION - Previous exploration by Conzinc (ATP 161M); Mines Exploration P/L; Geolosite Associates (ATP 301M); Cominco, North Broken Hill & Sumitomo; Gepeko (ATP 508M); BHP Ltd (ATP 532M); and Mineral Deposits Ltd (ATP 1585M). An extensive literature review was done for the area with the following conclusion: (1) The Moonmera prospect has been evaluated by several previous explorers. This prospect should be briefly reviewed with emphasis placed on the potential for undetected gold mineralisation. (2) The Quarry Creek & Table Mountain areas show lithologies of interest and scattered mineralisation. (3) The occurrence of gold mineralisation in the basal Jurassic sediments as noted in ATP 4231M should be explored, and exploration should be in line with the 4231M work.

RECORDER: Paul Blake **DATE:** 13/12/1993.

COMPANY REPORT SUMMARY SHEET

CR: 18651 **STATUS:** Open

TITLE: Authority to Prospect no. 4936M. Mt. Gordon - Eastern Queensland. Report on the area relinquished 13th September 1988.

AUTHOR(S): M.N. Stallman **DATE:**

ATP/EP No.: ATP 4936M

COMPANY HOLDING TITLE: Freeport Australia Minerals Ltd.

COMPANY SUBMITTING REPORT: Freeport Australia Minerals Ltd.

DATE GRANTED: 13/09/1987 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: NW of Mount Morgan

MINING DISTRICT:

MINES\PROSPECTS: Moonmera Prospect

EXPLORATION TARGETS\MODELS: Gold-copper mineralisation

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The area initially was made up of 24 sub-blocks, but was reduced to 16 after the first year of tenure. The three sub-blocks relinquished in the NW returned low values from both the panned concentrate and bulk leach samples. The streams in this area mainly drained alluvial flats with little or no outcrop. The five sub-blocks relinquished in the E of the ATP returned some weak to moderately anomalous values from both the panned concentrate and bulk cyanide leach samples. However, old records indicate that the creeks in this area, particularly Four Mile Creek, Deep Creek, and Poison Creek, were worked in the past for alluvial gold. This gold is presumed to have been shed from the Razorback beds. The areas within these sub-blocks appear to be of no further interest and have therefore been relinquished.

RECORDER: Paul Blake **DATE:** 13/12/1993.

COMPANY REPORT SUMMARY SHEET

CR: 19255 **STATUS:** Open

TITLE: Authority to Prospect no. 4936M. Mt. Gordon - East Queensland. Report for the six months ended 13th September 1988.

AUTHOR(S): M.N. Stallman **DATE:**

ATP/EP No.: ATP 4936M

COMPANY HOLDING TITLE: Freeport Australia Minerals Ltd.

COMPANY SUBMITTING REPORT: Freeport Australia Minerals Ltd.

DATE GRANTED: 13/09/1987 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: NW of Mount Morgan

MINING DISTRICT:

MINES\PROSPECTS: Moonmera Prospect

EXPLORATION TARGETS\MODELS: Gold-copper mineralisation

SUMMARY:

REGIONAL EXPLORATION

GEOCHEMISTRY

- **stream sediment sampling** - 50 panned concentrate and 50 bulk leach stream sediment samples collected. The panned concentrate samples were collected from trapsites as -4 mesh, 10 kg samples. These were then panned down to roughly 50 g. This concentrate was then assayed for Cu, Pb, Zn, & Ag. A maximum value of 299 ppm Au was attained in Quarry Creek. This sample was one of the 12 that contained visible gold, and the gold generally had a waterworn appearance and most probably had been shed from the Razorback beds. The bulk cyanide leach samples were collected from the same sample sites as the panned concentrate samples and were analysed for gold. A highly significant value of 13.9 ppb was obtained in a sample from Stony Creek. The results of the two surveys were statistically analysed using cumulative frequency plots. Four populations were defined and three are considered anomalous. These are the Stony Creek, Quarry Creek and Centre Creek. These creeks all drain, in part, the Jurassic Razorback beds, of which some basal units are known to host fossil placer gold deposits. Hence, gold shedding from these deposits may have a masking effect on any gold being liberated from the basement rocks, making interpretation of these results difficult.

- **rock chip sampling** - 24 rock chip samples were collected from copper bearing skarns, detected by previous workers, in the NE of the ATP. Mine dump material and mineralised/altered lithologies were also sampled. Some significant results were returned with maximum values of 5.63% Cu, 4900 ppm Pb, 5.67% Zn, 75 ppm Ag, and 2.78 ppm Au. The samples containing these values were of malachite stained quartz veined epidote-garnet skarn.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - Future work will involve follow-up the anomalous drainages, coupled with mapping and rock chip sampling of any mineralised/altered lithologies to determine the source of the gold. The fossil placer gold deposits in the Jurassic may warrant further attention if they are confirmed as the source of the gold. Also further rock chipping of the skarns should be carried out.

Recorder: Paul Blake

Date: 13/12/1993.

COMPANY REPORT SUMMARY SHEET

CR: 20598 **STATUS:** Open

TITLE: Authority to Prospect no. 4936M. Mt. Gordon - East Queensland. Report for the six months ended 13th March, 1989.

AUTHOR(S): M.N. Stallman **DATE:**

ATP/EP No.: ATP 4936M

COMPANY HOLDING TITLE: Freeport Australia Minerals Ltd.

COMPANY SUBMITTING REPORT: Freeport Australia Minerals Ltd.

DATE GRANTED: 13/09/1987 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: NW of Mount Morgan

MINING DISTRICT:

MINES\PROSPECTS: Moonmera Prospect

EXPLORATION TARGETS\MODELS: Gold-copper mineralisation

SUMMARY:

GEOLOGY -

LOCAL - Mapping has shown that the lithologies can be divided into 10 formations. **(1)** Capella Creek beds consisting predominantly of intermediate lithic crystal tuffs, volcanoclastic sediments, and interbedded limestones. Minor acid crystal tuffs also occur. They strike NW and dip moderately W. The Capella Creek beds have been skarnised by the Bouldercombe Complex. Minor base metal and precious metal mineralisation occurs in some of the higher grade skarns. Very weak silica-sericite-pyrite alteration, probably as a result of hornfelsing rather than hydrothermal processes, occurs in a number of places, but is devoid of significant mineralisation. **(2)** Pond Formation in the SW corner of the ATP is composed essentially of volcanoclastic sediments with minor intermediate lithic tuff. Rare limy beds also occur. It strikes NW and dips shallowly SW, and unconformably overlies the Capella Creek beds. **(3)** The Neil's Creek Clastics are exposed along the W margin of the ATP, and are composed predominantly of mudstone and fine sandstone with minor tuffaceous limestone. Some of the limestones have been altered to magnetite skarns in places. The unit strikes NNW and dips shallowly to moderately W, and conformably overlies the Pond Formation. **(4)** The Turner Creek Conglomerate crops out in the central W of the area, and is composed of dark grey, indurated, cobble to boulder conglomerate, in which approximately 80% of the clasts are of dioritic or tonalitic composition. Minor interbeds of mudstone occur. The unit strikes NW and dips to the SW, and conformably overlies the Neil's Creek Clastics. (This unit has been included into the basal part of the Carboniferous Neerkol Formation and the Permian Youlambie Conglomerate at various times in the past. The author of this report feels it should be acknowledged as a separate entity, but indicates it could be the basal unit of the Neerkol Formation). **(5)** The Neerkol Formation crops out along the W margin of the ATP, and consists mostly of mudstone and siltstone. The unit strikes NW to N and dips shallowly W. It appears to unconformably overlies the Turner Creek Conglomerate. **(6)** A possible outcrop of Youlambie Conglomerate occurs as a residual capping in the central N of the area, and is composed of volcanoclastic conglomerate. It has been weakly hornfelsed by the intrusion of the Bouldercombe Complex. **(7)** The Bouldercombe Complex occupies the low-lying areas in the E and SE of the ATP. It is a multiphased intrusion composed predominantly of granodiorite, adamellite and diorite with minor gabbroic and pegmatitic phases. Outcrop is generally poor as it is deeply weathered. The

Bouldercombe Complex is host to the Moonmera Porphyry Copper Prospect. (8) The Razorback beds cover approximately half of the area of the ATP, particularly in the W & S. They consist predominantly of sandstone with lesser conglomerate, siltstone and claystone interbeds. The Razorback beds unconformably overlie all the older units in the area, strike between W & N, and are flat lying or dipping shallowly to the SW. In the N of the area, the relationship between the Razorback beds and the Cretaceous Stanwell Coal Measures is unclear due to poor outcrop. Hence, along the N boundary of the area some of what has been mapped as Razorback beds may in fact be Stanwell Coal Measures. (9) Remnants of basalt flows may be seen in the W of the area. (10) Areas of sandy recent alluvium occur along the lower reaches of creeks within the area, particularly Stony Creek & Quarry Creek.

MINERALISATION/ALTERATION - Gold and base metal mineralisation exists in a number of settings within the area and many old workings were noted during mapping. Of the most significant is the skarn hosted copper-gold mineralisation (disseminated chalcopyrite, bornite, pyrite, and rare sphalerite) that occurs in the Capella Creek beds in the NE of the area. This mineralisation is confined to the higher grade skarn zones along the contact with the Bouldercombe Complex. Weakly developed skarns occur within the Capella Creek beds in the SE of the area, and they contain very low base and precious metal values. A number of small pits have been put down on small quartz veins in the Capella Creek beds and Neil's Creek Clastics. Most contain only low base and precious metal values. A number of small excavations were noted at the base of the Razorback beds at various locations throughout the area. Possible alluvial workings were noted along a small stream draining the Razorback beds in the SE of the area.

REGIONAL EXPLORATION

GEOLOGICAL MAPPING - A structural study of the area was carried out using 1:25000 scale aerial photographs. A number of photolinears were detected and these were field checked.

GEOCHEMISTRY

- **rock chip sampling** - Rock chip samples were collected from both known and previously undetected areas of mineralisation and/or alteration. The best gold values were from quartz veins in old pits (0.34 to 3.99 ppm); and the best copper is from granodiorite and syenite with disseminated copper mineralisation (2100 to 5300 ppm). Rock chip samples from the conglomerates at the base of the Razorback beds all returned low base and precious metal values.

LOCALISED EXPLORATION/PROSPECTS

1) Skarn Zone

GEOLOGY - This area is a skarnised roof pendant of the Capella Creek beds within the Bouldercombe Complex. Mapping indicated that there would be only limited tonnage in the area, and this combined with the low gold values has downgraded the prospectivity of this zone. A larger roof pendant exists to the NE, but only limited skarnised zones have been encountered. Traversing of the contact between the larger Capella Creek beds roof pendant and the Bouldercombe Complex would uncover any further areas of skarn alteration, but is unlikely that economic grades exist.

GEOCHEMISTRY - A 600 m long and 200 to 350 m wide grid was constructed over the roof pendant. 144x B-C horizon soil samples were collected. Elevated gold occurs with both Mn & Cu anomalies. Statistical methods identified an anomalous Au threshold of 10 ppb, and only four samples were recorded above this level. Copper was mainly associated with quartz diorite, along the contact with the Capella Creek beds roof pendant, and along a fault within the pendant. The association of copper with the quartz diorite has been noted elsewhere particularly at the Moonmera Porphyry Copper Prospect.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The potential of the gold-bearing conglomerates within the Razorback beds and possible extensions of the Moonmera Porphyry Copper may warrant further attention, but are a low priority.

RECORDER: Paul Blake

DATE: 14/12/1993.

COMPANY REPORT SUMMARY SHEET

CR: 20874 **STATUS:** Open

TITLE: Authority to Prospect 4936M. Mt. Gordon, Queensland. The final report for the period 13 September 1987 to 05 July 1989.

AUTHOR(S): D.H. Hackman **DATE:**

ATP/EP No.: ATP 4936M

COMPANY HOLDING TITLE: Poseidon Exploration Limited

COMPANY SUBMITTING REPORT: Poseidon Exploration Limited

DATE GRANTED: 13/09/1987 **PERIOD:** 2 years

1:100 000 SHEET NAME(S): Mount Morgan

1:250 000 SHEET NAME(S): Rockhampton

LOCATION: NW of Mount Morgan

MINING DISTRICT:

MINES\PROSPECTS: Moonmera Prospect

EXPLORATION TARGETS\MODELS: Gold-copper mineralisation

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The discouraging results from the Skarn Zone has reduced the prospectivity of the Authority as a whole. Therefore the tenement was surrendered.

RECORDER: Paul Blake **DATE:** 15/12/1993.

AUTHORITY TO PROSPECT SUMMARY SHEET

ATP/EP No.: ATP 4937M

COMPANY HOLDING TITLE: Felstone Investments Pty Ltd

COMPANY SUBMITTING REPORT: Felstone Investments Pty Ltd

DATE GRANTED: 16/09/1987 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan, Bajool, Biloela, Banana

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: 35 km SSE of Mount Morgan

MINING DISTRICT:

MINES\PROSPECTS: Don & Manton Creek workings

EXPLORATION TARGETS\MODELS: Alluvial gold

TRANSFERS, JOINT VENTURES, etc:

LEASES TAKEN OUT:

COMPANY REPORT Nos: *Open File-* 17916, 21114

Confidential-

SUMMARY:

GEOLOGY -

LOCAL - The Authority lies within the Gracemere portion of the Rockhampton Block which is predominantly Upper Devonian to Permian in age. Immediately to the E of the area are the Middle Devonian Capella Creek beds (acid to intermediate tuffs and flows, ash-flow tuffs and pyroclastics, conglomerates and lesser mudstone and limestones), and these rocks host the copper/gold mineralisation of the Mount Morgan area. These rocks possibly provide a source of gold to the Don River and tributaries. During the Cainozoic the area was uplifted and streams at the head of the Don River were rejuvenated. As a consequence, extensive Tertiary deposits occur in the central and W part of the ATP. Some of this has been incised and reworked by the recent Don River and tributaries producing recent alluvium.

MINERALISATION/ALTERATION - Gold has been mined from alluvium in the upper tributaries of the Don River, particularly Manton Creek.

REGIONAL EXPLORATION

GEOLOGICAL MAPPING - The central and W portion of the ATP were examined by photogeological interpretation, and a possible ancestral course of the Don River was located, 9 km to the S of its present course.

GEOCHEMISTRY

- **stream sediment sampling** - Panning was carried out on recent alluvium from the Don River and tributaries. No colours were obtained.

- **drilling** - 24 percussion holes were drilled in the general vicinity of old workings. Samples were collected at one or two metre intervals depending on the anticipated prospectivity of the sample. Several anomalous results were obtained.

GEOPHYSICS

- **ground surveys** - A resistivity survey was carried out in an attempt to define alluvial channels within the area drilled, and, by extrapolation, outside the area drilled, so as to better target further drilling. Channels were located but not well defined and a low degree of confidence is attached to the likelihood of their presence.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The channel system delineated by the resistivity survey was poorly defined resulting in a low degree of confidence as to their actual existence, and drilling has produced only scattered mildly anomalous results. Therefore, it was decided to surrender the ATP

RECORDER: Paul Blake

DATE: 13/12/1993.

COMPANY REPORT SUMMARY SHEET

CR: 17916 **STATUS:** Open

TITLE: Authority to Prospect 4937M, Don River, Final Report.

AUTHOR(S): J.D Hankin **DATE:** September 1988

ATP/EP No.: ATP 4937M

COMPANY HOLDING TITLE: Felstone Investments Pty Ltd

COMPANY SUBMITTING REPORT: Felstone Investments Pty Ltd

DATE GRANTED: 16/09/1987 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan, Bajool, Biloela, Banana

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: 35 km SSE of Mount Morgan

MINING DISTRICT:

MINES\PROSPECTS: Don & Manton Creek workings

EXPLORATION TARGETS\MODELS: Alluvial gold

SUMMARY:

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - A poorly defined channel system was delineated by the resistivity survey in the previous period. As the channels were poorly defined and there was a low degree of confidence as to their actual existence, and drilling has produced only scattered mildly anomalous results it was decided to surrender the ATP

RECORDER: Paul Blake **DATE:** 13/12/1993.

COMPANY REPORT SUMMARY SHEET

CR: 21114 **STATUS:** Open

TITLE: Authority to Prospect 4937M, Don River. Six monthly report to 16th March, 1988.

AUTHOR(S): J.D. Hankin **DATE:** June 1988

ATP/EP No.: ATP 4937M

COMPANY HOLDING TITLE: Felstone Investments Pty Ltd

COMPANY SUBMITTING REPORT: Felstone Investments Pty Ltd

DATE GRANTED: 16/09/1987 **PERIOD:**

1:100 000 SHEET NAME(S): Mount Morgan, Bajool, Biloela, Banana

1:250 000 SHEET NAME(S): Rockhampton & Monto

LOCATION: 35 km SSE of Mount Morgan

MINING DISTRICT:

MINES\PROSPECTS: Don & Manton Creek workings

EXPLORATION TARGETS\MODELS: Alluvial gold

SUMMARY:

GEOLOGY -

LOCAL - The Authority lies within the Gracemere portion of the Rockhampton Block which is predominantly Upper Devonian to Permian in age. Immediately to the E of the area are the Middle Devonian Capella Creek beds (acid to intermediate tuffs and flows, ash-flow tuffs and pyroclastics, conglomerates and lesser mudstone and limestones), and these rocks host the copper/gold mineralisation of the Mount Morgan area. These rocks possibly provide a source of gold to the Don River and tributaries. During the Cainozoic the area was uplifted and streams at the head of the Don River were rejuvenated. As a consequence, extensive Tertiary deposits occur in the central and W part of the ATP. Some of this has been incised and reworked by the recent Don River and tributaries producing recent alluvium.

MINERALISATION/ALTERATION - Gold has been mined from alluvium in the upper tributaries of the Don River, particularly Manton Creek.

REGIONAL EXPLORATION

GEOLOGICAL MAPPING - The central and W portion of the ATP were examined by photogeological interpretation, and a possible ancestral course of the Don River was located, 9 km to the S of its present course.

GEOCHEMISTRY

- **stream sediment sampling** - Panning was carried out on recent alluvium from the Don River and tributaries. No colours were obtained.

- **drilling** - 24 percussion holes were drilled in the general vicinity of old workings. Samples were collected at one or two metre intervals depending on the anticipated prospectivity of the sample. Several anomalous results were obtained.

GEOPHYSICS

- **ground surveys** - A resistivity survey was carried out in an attempt to define alluvial channels within the area drilled, and, by extrapolation, outside the area drilled, so as to better target further drilling. Channels were located but not well defined and a low degree of confidence is attached to the likelihood of their presence.

FINAL COMMENTS/REASON FOR RELINQUISHMENT OF TITLE - The next stage of exploration, should it be considered warranted is to carry out further drilling, possibly cable-tool, in the channels outlined by the resistivity survey, to follow up the anomalous results obtained in the earlier drilling.

RECORDER: Paul Blake

DATE: 13/12/1993.