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Mitre Geophysics Pty Ltd

Macquarie Harbour Mining Limited

Summary of Regional Geophysical Surveys
MHM Cape Sorell Tenements

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1. INTRODUCTION

MHM tenements EL63/2007, EL62/2007, EL61/2007, EL21/2007, EL22/2007, and EL23/2007 (Sorell Peninsula) cover an area of prospective ground in the southwest of Tasmania. The ground is held under the company Goldstock Pty Ltd, and wholly own subsidiary of Macquarie Harbour Mining (MHM).

The Sorell Peninsula is remote and has been was explored moderately well in the 1980s for base metal mineralisation, but has had little attention since. Access on the ground is often difficult and is subject to some environmental constraints. Further, poor weather reduces the field season to four or five months during the summer period. However, the area contains rock types which are similar to those hosting the world-class tin and base-metal mines 50 to 100kms to the north, and it is considered to be highly prospective.

2. LOCATION

Cape Sorell is very rugged and only really accessible by sea or air. There are no permanent settlements and no roads except for some rough four-wheel-drive tracks. A sheltered boat landing is available at the southern end of Birch's Inlet, giving access to the Low Rocky Point track. There is another fairly sheltered landing at Cowrie Beach on Elliott Bay, and a hut camp is present near Wart Hill. A bulldozed airstrip used to be located at Moores Valley, but the usefulness of this airstrip is unknown.

The landscape of the Macquarie Harbour–Elliott Bay area is dominated by old Tertiary marine surfaces at around 100–200 m above sea level, through which the many streams have cut meagre gorges. The vegetation is light to dense scrub and forest, which requires cut tracks to conduct ground geophysical surveys through. This is usually a very expensive process, so a prospect should be well established to warrant ground geophysical investigation.

3. REGIONAL GEOLOGY

Cape Sorell Peninsula is dominated by fault thrust bounded Mesoproterozoic continental margin sediments and Neoproterozoic-Cambrian volcanic-sedimentary associations of probably Island Arc origin (Brown et al., 1991). The regional geological setting is related to Paleozoic volcanic and sedimentary processes in a linear trough (Dundas trough) along the western margin of the Precambrian Tyennan nucleus composed of metamorphosed siltstones and quartzites.

Cape Sorell has two major distinct geological elements

1. Proterozoic sequence of rocks that includes the southern extension of the Arthur Metamorphic Complex; and
2. A Cambrian sequence that is considered to be the southern extension to the rock package that hosts the Mt Lyell, Henty and other ore bodies

It also includes fault-bounded ultramafic rocks of the Point Hibbs Melange Belt that hosts two of the known osmiridium occurrences in the State at Birch's Inlet and Spero River. It is probable that

nickel is also associated with these rocks. The Alaskan-style nickel-osmiridium occurrences may be analogous.

The Proterozoic sedimentary sequence is divided into an interdigitated northern and southern Zone (Brown et al., 1991) with a central meridional core zone being the southern extension of the Arthur Metamorphic Complex (Brown et al., 1995).

- The northern zone includes interbedded orthoquartzite, mudstone, siltstone and minor conglomerate units and
- The southern zone includes impure dolomite-rich beds, quartz-wacke and mud stone.

The rocks are generally metamorphosed to greenschist facies.
The Cambrian volcanic-sedimentary rocks are grouped into six different associations (Brown et al, 1991).

1. Lucas Creek Volcanics – alkaline to tholeiitic basalt association.
2. Timbertops Volcanics – Boninite association
3. Birch's inlet – Mainwaring River Volcanics – picritic basalt-basalt association
4. Noddy Creek Volcanics – Andesite-rhyolite association. Theses are considered to be a southern extension of the Middle Cambrian pyroxene-plagioclase phyric and andesite rocks of the Linchford and Que River areas
5. Point Hibbs Melange Belt – sheared and serpentinised ultramafics and gabbros including sheared units derived from the boninite and andesite-rhyolite associations.
6. Felsic Volcanic Sequence – correlate of the Tyndall Group of western Tasmania.

Remnant Tertiary gravels are patchily distributed.

The 1:50,000 scale Macquarie Harbour geological map provides a good summary of the geology.

Hibbs Belt

A narrow band of Cambrian ultrabasic rocks up to 600 meters wide extends along a zone of thrusting from south of Hibbs Lagoon to Asbestos Point on the shore of Macquarie Harbour. It consists largely of highly sheared serpentinite with minor pyroxenite, gabbro and harzburgite. Asbestos, chrome, nickel, and copper occurrences have been recorded, associated with the ultrabasic rocks.

Ordovician to Devonian sediments occur in the Timbertops Syncline and as possible obducted slices within the ultrabasic thrust zone. They consist of quartz sandstones, grits, and minor conglomerates and siltstones and limestone. Reworked Permian tillite and siltstone occur at Point Hibbs and are faulted against Jurassic dolerite to the west.

4. EXLORATION HISTORY

1960's LEE helicopter EM and magnetic survey EL1/59 & 3/59

The first exploration of the Sorell Peninsula was carried out by the Mt Lyell-EZ Exploration (LEE) joint venture in from 1956 to 1962. A helicopter born EM and magnetic survey was flown over a region including the Sorell Peninsula and found a series of anomalies mainly associated with the Point Hibbs Melange Belt. The anomalies were field checked with negative results. Although the results from that survey were re-evaluated, they are now of little relevance: The magnetics has been replaced by the WTRMP survey and the EM system was very insensitive. LEE also drilled six holes

testing gossanous hematite outcrop at Pelias Cove. There were inconclusive results with poor recoveries (averaging 7%). The best intercept 5ft @ 2.59% Cu.

1968 BHP Airborne Scintillometer Survey EL1/64 & 13/65

The area was held by BHP from the mid 1960's to early 1970's (E.L. 13/65). In 1968, an airborne scintillometer survey was flown over selected areas to test the Ordovician and Precambrian sediments for uranium. One response was found to coincide with anomaly 129 (potassic alteration), others were interpreted as being of no interest.

Regionally, BHP carried out some stream sediment sampling (which did not include gold), and locally they looked at magnetic anomalies 128 and 129 (defined by the LEE survey) in some detail, as well as the ultrabasic belt running through the northern part of the licence. Drilling at '129' intersected massive pyrite (1m @ 70% pyrite and 30% hematite), and a significant resource of asbestos was found to be associated with the ultrabasics. Limited soil sampling at Pelias Cove confirmed the LEE Cu anomaly.

1981 Geopeko DigHEM Survey

There is a mention of a 1981 Geopeko conducted DigHEM over parts of the Cape Sorell area.

1984 Amoco JV Aeromagnetics

BHP exploration ceased in early 1984. Under a joint venture agreement between Amoco, Poseidon and Placer an aeromagnetic survey was flown covering all three of their Sorell E.L.'s to assist geological mapping as well as to locate directly any tin replacement (i.e. Renison-style) deposits. The survey was detailed with 150m line spacing and the magnetic intensity recorded as gammas. The aeromagnetic survey shows a good correlation with the areas of fact geology and some significant changes to the geological interpretation maps were suggested. The survey coverage is outlined in figure 1.

1984-Amoco JV DigHEM

At the same time, Dighem was flown over the northern end of the Lucas Creek Belt (E.L. 35/83, Amoco Area 1) and Mainwairing volcanics at Cypress Creek (E.L. 37/83). Five lines of the Lucas Creek area were extended to the east over the area of BHP Anomaly 128 and an extra two lines were flown over BHP anomaly 129 at Deep Creek. The Dighem system was borne by an Aerospatiale 'Squirrel' helicopter operated by Hookway Aviation. A total of 570 line km were flown at an average bird height of 70m meters and a line spacing on 150 meters. The DigHEM survey was primarily carried out to located base-metal conductors within the volcanics. Bishop (1984) provides a list of targets arising from the aeromagnetic and Dighem surveys (Table 1).

Four sub-areas within the Lucas Creek DigHEM survey area were selected for followed. Ground traverses were conducted using a Scintrex magnetometer and a Phoenix VLF-EM unit to assist location of the airborne anomalies.

Prospect		norAMG	easAMG	Description	Target	
Muddy Cove		5295000	368000	Unexplored best of (more acidic volcanics)	VMS	Tested with DIGhem986
Muddy Cove		5306000	371000			
Double Cove		5310500	361500	Two Dighem anomalies (8G&9E) (high grad but ?culture) close to BHP Pb anomaly in stream bank.	VMS	Dighem not located by Genie (false?), but geochem not repeatable. No further interest
Urquhart (north)		5264500	373000	Bedrock dighem anomalies (105C and 106C) on adjacent lines (grade 1), with assoc. high stream sed. Cu anomaly (500m to the east)	VMS	Dighem over graphitic shales. Geochem over minor chalco veins, no further interest
Thomas Ck		5285500	369500	High soil Cu/Au in ?volcanics overlying diorite intrusive	gold	Gold values not repeatable
Albina (south)		5305000	357500	Anomalous magnetic charcter over limonitic silsts. Au in rk chip.	gold	Gold values not repeatable
Anomaly 128		5303500	362000	Magnetic anomaly at Precamb-camb contact. Interpreted by BHP as gabbro, but area to be checked for ironstones	gold	Ironstones found, but low in gold
Anomaly 129		5300000	358500	magnetic anomaly drilled by BHP: ironstones with 0.7m of pyrite/hematite	gold	Core assayed for gold, no significant values
Hibbs River		5280000	368000	Largely unexplored area of intermediate of mafic volcanics	VMS	Not tested:Dighem
Hibbs River		5295500	366500			
Karnebunyer Ck		5287000	374000	Largely unexplored area of intermediate of mafic volcanics	"	Not tested:Dighem
Karnebunyer Ck		5298000	370000			
Wanderer River		5263500	378000	Previously reported Pb/Zn min. in veins	VMS	Not tested:geol/geochem
Thomas Ck (west)		5287500	367000	Convergence trends on magnetic map	gold	
Birthday Bay		5301000	356500	Magnetic anomaly + carbonates	tin	No encour.from geochem but EM survey required to test thoroughly.
Timbertops		5295500	368000	Weak Pb/Ag in soils adj to diorite intrusive	?	Not tested: dependant on results of Dighem
Butler Ck		5306000	364000	Possible ironstone formations similar to 128&129	gold	No sig gold over mag highs
Urquhart (south)		5361000	375000	Dighem anomalies (125D to 129F & 125E to 128Xc) in Mainwiaring volcs (source likely to be formational).	VMS	Genie did not locate zones, no geochem, no further interest
Urquhart(east)		5263500	375500	Isolate Dighem anomaly (112E) possibly bedrock in Mainwaring volcanics	VMS	"
Commandant Ck		5295500	372000	Deep-seated magnetic anomaly beneath seds (diorite intrusive likely source)	VMS	Not tested:mag+geochem
Gaps (south)		5291000	368000	magnetics high over diorite	?	"
Dunes Ck		5311500	355000	magnetic anomalies within Pre-cambrian sediments	?tin	"
		5313000	357000			
Albina (north)		5306500	357500	Possible southern extension of Lucas Ck volcanics	VMS	Shown ot be seds, of no further interest
Hibbs Lagoon		5284500	362000	Area mapped seds with similar magnetic character volcanics	VMS	No tested: geol/geochem
Lowren Hill		5278000	364000	A thick plug of serpentinite	Ni&Plat	"

McCarthy Ck		5280000	369000	A series of offset magnetic highes within Cambrian Seds	geol	Not tested: mag+VLF
Gaps (west)		5292000	365500	Linear amgnetics highs within Camb seds	geol	Not tested: mag+VLF
Mainwaring (south)		5251000	374000	Weak, ?formational Dighem and magnetics highs in Camb. Seds	geol	Not tested: mag,genie+VLF
Warourim		5274000	367000	Complex magnetic anomalies suggesting a fold structure	geol	Not tested:mag+VLF

Double Cove. VLF was used to successfully locate the DigHEM anomalies, however there was no encouragement from the soil sampling along the traverses. Interest in the area immediately to the south east of the Double Cove grid was generated by the proximity of two high-grade DigHEM anomalies to an unexplained Pb geochem anomaly (obtained by BHP from a stream bank sample). The DigHEM responses were of low amplitude and described to culture in DigHEM's interpretation report. False anomalies were not unexpected. The original Double cove grid was extended with the addition of two lines (Traverses A and B) to the south of the original grid lines. These lines were surveyed with Genie using 100m coil spacing and with ground magnetics.

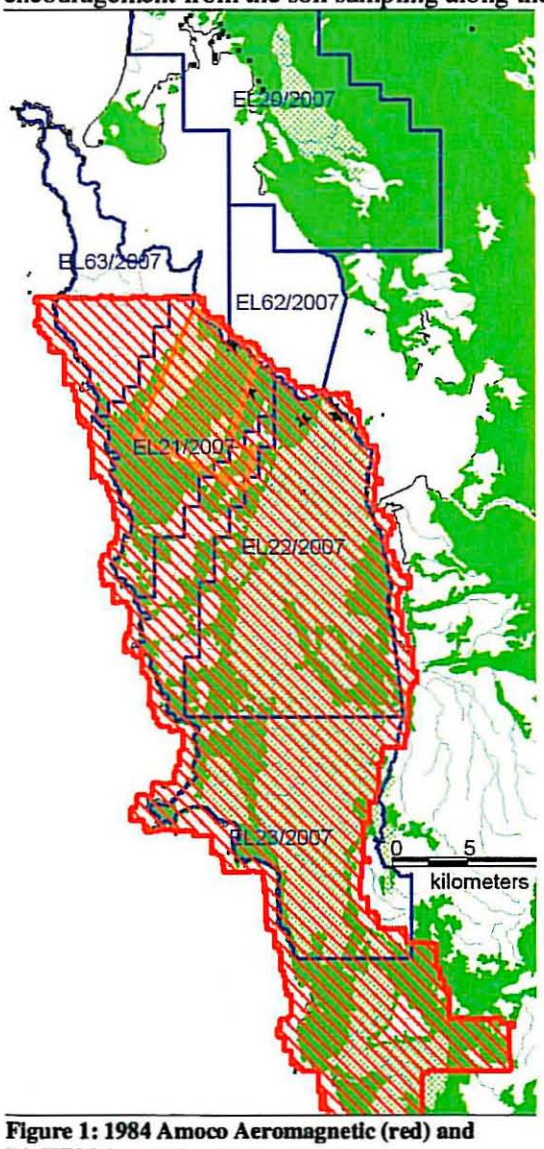

Figure 1: 1984 Amoco Aeromagnetic (red) and DigHEM (orange) survey coverage

The Genie survey recorded three anomalies on each line, however the target Dighem responses were not located and most likely that these are false, although the Genie survey did not properly cover the area of the DigHEM anomalies. Comparison between the Dighem magnetics grid and the ground magnetic confirms that the Dighem EM anomalies have been plotted close to their true position. Geochemistry was the main reason for following up these dubious Dighem anomalies and since re-sampling of the creek has failed to repeat BHP's anomalous geochem values, it is not recommended that the Dighem anomalies by further pursued.

2. *Albina:* Albina (North) A single line was chosen for ground examination to see if the Lucas Creek volcanics extended this far southwest. The ground magnetics confirms the location of the traverse relative to the aeromagnetics. A VLF survey was also made, but no significant responses were obtained. (Northwest Cape was used a right angles to the desired direction – since Japan was not detectable.)

Albina (South). These lines were sited over an area of different magnetic character with the southernmost line over a discrete magnetic anomaly. Anomalous gold (0.25g/t) had been found in a rock chip taken from the area during the 1983/84 field season. Magnetics and VLF were read over both lines and Genie over part of line B. A well-defined Genie response was obtained at 400E on traverse B. A moderate conductivity is indicated. The response is very close (within 140m) to the possible bedrock Dighem conductor defined by the grade 1 and 2 anomalies 52C and 47A. This conductive zone is one of several in the area (the others being mostly better conductors). A graphitic shale is the likely source.

The direction of the VLF transmitter used was at right angles to the desired direction and the VLF results should be disregarded. Sampling of the area for gold failed to confirm the original values or to find other potentially anomalous areas.

Butler Creek
This prospect was chosen as a possible northern extension of the ironstones, which lie close to the Cambrian/Precambrian contact (e.g. anomalies 128 and 129). On line of magnetics was surveyed. The results show excellent agreement with the aeromagnetic data. The contact is indicated at 525mW, which is also in agreement with the geological map. The magnetically high areas were sampled and assayed for gold with disappointing results.

Anomaly 128
A Mines Dept assay of an ironstone near this area returned a value of 0.15g/t gold. One long traverse and one short traverse were surveyed by magnetics and VLF. A strong magnetic anomaly of 2000nT was obtained over a gabbro on the Cambrian/Precambrian contact. A barely noticeable response or 100nt was recorded over the ironstone. A broad VLF response was centered on 300W.575N; no attempt has been made to find or interpret the response. Further sampling failed to find any better gold values.

Anomaly 129 is at the southern and of the Cambrian/Precambrian contact and was previously investigated by BHP. The area was covered by two lines of the Dighem survey and several anomalies recorded. The prospect was not part of the 1984/85 field program, however the core was re-assayed for gold. No anomalous values were recovered.

Birthday Bay
This prospect had been designated as a possible tin target, given a magnetic anomaly in proximity to a sequence of carbonates. Two traverses were surveyed with magnetics; traverse 'A' confirmed the presence of a buried magnetic source, traverse 'B' indicated shallower material. Geochemical sampling returned low tin, but the prospect is buried under cover. Basic volcanics have been mapped along the coastline and these are the likely source of the magnetic anomaly. Although the potential of this area has not been thoroughly disproved (an EM survey is suggested for this), there is little encouragement.

Thomas Creek
This prospect lies within an area mapped as sediments, but reinterpreted was Hibbs River volcanics. Anomalous gold samples. Four lines spaced 200m apart were surveyed with magnetics and VLF

plus three intermediate lines 50m spaced. Reasonable VLF responses were obtained but the re-sampling failed to detect any anomalous gold (maximum value 0.12g/t).

Urquhart (North)
Two adjacent weak bedrock Dighem anomalies (105C and 106C) on the flank of a magnetic anomaly and lying within 500m of a high Cu stream sediment sample. Magnetics and genie on two grid lines, with weak magnetic and genie EM response. Ground mapping located graphitic shales and these are the likely source of the anomalies. The cause of the high copper geochem anomaly is through to be due to minor chalcopyrite, which occurs within quartz veining in the sediments. This is considered unprospective.

Urquhart (South)
This prospect was defined by two conductive zones within the volcanics. (Dighem responses 125D to 129F & 125E to 128XC). Two traverses, 300m apart, were pegged and magnetics and genie surveys were carried out. Correlation of the DigHEM and ground magnetics verified the positioning of the traverses and suggested (at 1:20,000 scale) that the northern traverse (300S) should have intersected the middle of the western EM zone and have crossed the southern tip o the eastern zone. No good Genie responses were obtained: A weak anomaly on 300S at 010W lies between the expected locations of the two Dighem zones. These zones were generally poorly defined by the low frequency (900Hz) channels and it is possible that the highest Genie frequency (3037Hz) was not high enough to detect the largely 7200Hz Dighem response. The lack of any encouraging geochem results means that there is no incentive to try an accurately located the DigHEM zones.

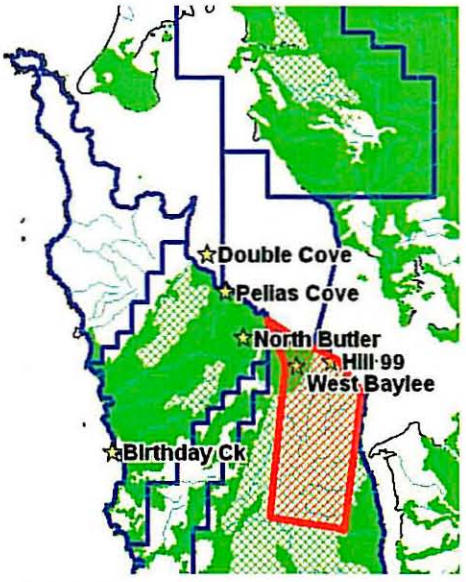

Figure 2: 1986 Amoco DigHEM coverage - Muddy Cove

1986-Amoco JV DigHEM

Mitre Geophysics recommended that both the Muddy Cove and Hibbs River volcanic belts be covered by Dighem in 1985 with a total of 269 line km being flown. This was amended later with the inclusion of the 84 line km over the Wanderer North area and the deletion of the Hibbs River coverage. The Hibbs River belt with dropped due the scarcity of volcanics observed during the 1983-84 field season.

Seven anomalies were targeted for ground evaluation using Bishop's recommended Max-Min EM system. However, as the Sorell program was integrated with that at Elliott Bay, the level of the Sorell anomalies were downgraded in respect to those delineated over the Lewis Creek Volcanics at Elliott Bay. Thus no follow-up was implemented during the 1985-86 field season. However, in 1986 follow up of the Wanderer North area Dighem anomalies displayed geochemical anomalism on major prospective structures within a good stratigraphic horizon. Coincident Maxim EM and magnetic anomalies are covered by late Tertiary gravels and remain untested. This area, however, is outside MHM's tenements

In the Muddy Cove area, they found
1. Two good responses across strike to the east of the 'main zone' and apparently within the Muddy Cove Volcanics (also called the Noddy Creek Volcanics).
2. Two intermediate responses, across strike in the centre of the volcanics.
3. Two intermediate responses, across strike on the western adage of the volcanics.
4. Two widely spaced intermediate responses, across strike within the volcanics.
5. A single intermediate response in the south-eastern corner of the volcanics.
6. A single good response to the east of the 'main zone' and located on the Cambrian sediments/volcanics contact.
7. A zone of three weak responses within the volcanics.
* The so-called 'main zone' is the long line of good responses in the north western quadrant, immediately to the west of the volcanics. The zone runs out to near Asbestos Point (about 100m to the west) and is probably due to serpentinite (although there is none mapped at, or south of Asbestos Point). The discrepancy of >100m suggests that there may be some (expected) positioning errors.

Overall, in 1984 exploration activity in the area investigated the asbestos mineralisation and pentlandite occurrences in banded pyroxenite, gabbro and serpentinites of the ultrabasic belt. Considerable effort was expended on ground evaluation by geophysical surveys, costeaning, bulldozing tracks and diamond drilling culminating in the outlining of 8.5 million tones of 2.3% asbestos. Most drill holes were targeted on asbestos mineralisation though one was designed to test an EM anomaly at Noddy Creek. The anomaly was explained by an intersection of 3.4 meters of pyritic graphite.

1986 Citco International Mining Company

Macquarie Harbour bottom sediment survey located a Cu high (915ppm) at Double Cove, one of two highs in the survey area.

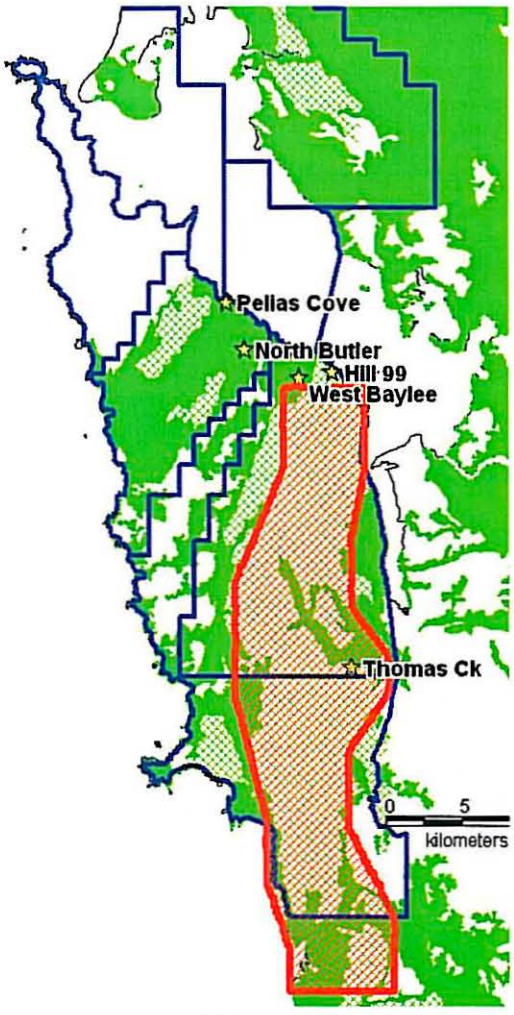

Figure 4: 1996 Plutonic Resource Geotem survey coverage

1996 Plutonic Resources Geotem Survey EL 4/92 and 7/92

Plutonic's preferred exploration strategy in the rugged Sorell Peninsula was to search for a major VHMS or intrusive related deposit using the most environmentally as well as technically sensitive airborne and ground exploration methods. This necessitated considerable delays in regional exploration assessment before a suitable time domain EM system could be mobilized to fly the terrain in 1996

The Geotem survey was expected to define mineralised targets worthy of detailed evaluation. The prominent AEM anomalies discovered were found to correlate with faults/shears within ultramafics of the Point Hibbs Melange Belt. Whereas, none of the thirteen anomalies located within the Noddy Creek Volcanics gave unequivocal late time responses that could be attributed to conductive sulphide mineralisation. Subsequently, no detailed follow up exploration was undertaken.

See Plutonic Annual Report 1997 for a complete list of Geotem anomalies.

1993 Plutonic Resource Briggs Creek ground EM

In 1993, Plutonic conducted detailed geochemical and ground EM surveys in the Briggs Creek area over DigHEM anomalies recommended by Bishop.(1986) within the Noddy Creek volcanics. These surveys failed to locate any significant EM or geochemical response and the airborne survey data of interpretation was considered questionable.

1994 Plutonic Resources IP, ground mag and ground EM Thomas Ck

In 1995, Plutonic Exploration decided to run a ground IP survey to test geochemical anomalies and alteration at the Thomas Ck Cu/Au prospect. Detailed mapping, bedrock geochemistry and IP survey defined disseminated and vein hosted Cu-Au mineralisation within an altered multiphase intermediate to mafic intrusive suit conf confirmed Amoco's results and indicated a significant zone of alteration with porphyry Cu-Au like characteristics.There was no significant mag anomalies.

During mid April to early May 1995, Zonge Engineering Pt Ltd from Adelaide conducted two gradient array surveys totalling 7.0 line km over the grid area, and three dipole-dipole lines amounting to 1.25km to further define the best gradient array anomalies. These surveys were designed to outline the extent and relative intensity of disseminated or stockwork vein controlled sulphide mineralisation at Thomas Creek.

The gradient array IP survey was selected for the reconnaissance survey because it is relatively easy to deployed and has a high rate of data acquisition. It also has better horizontal resolution and location of anomalies than the other array type used in this survey: dipole-dipole (D-D). D-D was used for detail surveying to better define the gradient array anomalies generated from the gradient array survey because it has better depth sensitivity, freedom from inductive coupling, and is less sensitive to small inhomogenities.

The gradient array survey used N-S lines 100m apart with a 25m receiver dipole and a 1400m source dipole (Array 1) and a 1200m source dipole (Array 2). Given the equipment and environment, this receiver spacing would give reliable information on sulphide occurrence to 150m depth for bodies greater than 15x15m wide at the surface, and 60x60m at depth (resolution decreases with depth). Array 1 provided the strongest IP anomalies in the middle of the grid, an area containing coincident pyrite and copper anomalism. This copper mineralisation appeared to be concentrated along the edges of the chargeability highs/resistivity lows. The zone was defined by a 30 millirad contour with a peak value of 44.5 millirads, extending from 5550N to 6000N between 69450E and 70000E. The IP anomaly is most likely to be a response from disseminated sulphides. The D-D IP was applied over this area to test the depth expression. Strong (2.5 to 3 times background) IP anomalies were detected on all three lines.

Mitre Geophysics analysed survey methods, equipment, data and anomalies reported in the Plutonic 1995 Annual Report, and the drilling follow up reported in the 1997 Annual Report. The survey and data are clean and well reported, and the survey design was a clever use to gradient and dipole arrays to maximise coverage and efficiency. The technology and processing, however, are now very outdated. The IP anomalies generated by the Zonge survey are genuine response to the sulphide mineralisation tested by drilling in the 1996 field season (8 BQTK diamond holes totalling 800 meters). It is disappointing that only low grade (0.1-0.2% Cu) disseminated pyrite-chalcopyrite mineralisation with only minor vein mineralisation was intersected in diorites. However, I do not believe that the drilling results mean that Thomas Creek has been cleared of significant porphyry potential for two reasons:

1. The small size and old technology means that the depth of penetration of the Zonge IP was only a maximum of 200m for a very large disseminated body (probably much less). Modern time-domain IP surveys would double or even potentially triple this.
2. As seen at the Ann Mason deposit, the zone of maximum IP response does not necessarily correspond with the zone of maximum mineralisation and may instead provide a vector towards the mineralisation
3. There is an odd background chargeability difference between Array 1 and Array 2, which may be related to mineralisation at depth or changes in lithology.

Geophysically, the prospect could be better defined by using a modern 3D-IP survey. This would give reliable information on sulphide occurrences up to 600m depth, however it would be an expensive exercise. Lines 2.4km long spaced 200m apart would need to be cut in to the scrub. This, and the remoteness of the survey area, would combine to give at least survey cost of over $150,000. I think there needs to be better analysis of the geochemical markers and geological setting to firm up the prospect as a viable porphyry copper target. Engaging a porphyry copper expert geology would be a good beginning to assess the worth of further geophysics or geology in this area.

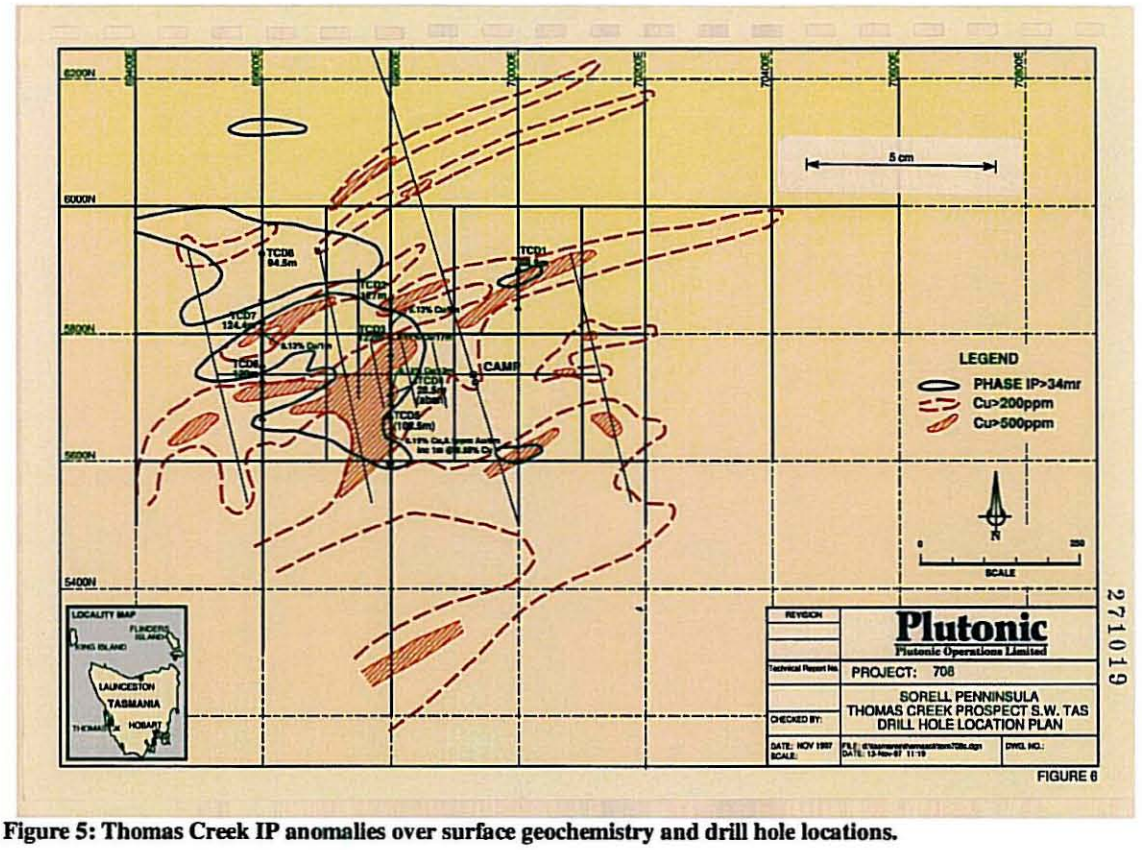

Figure 5: Thomas Creek IP anomalies over surface geochemistry and drill hole locations.

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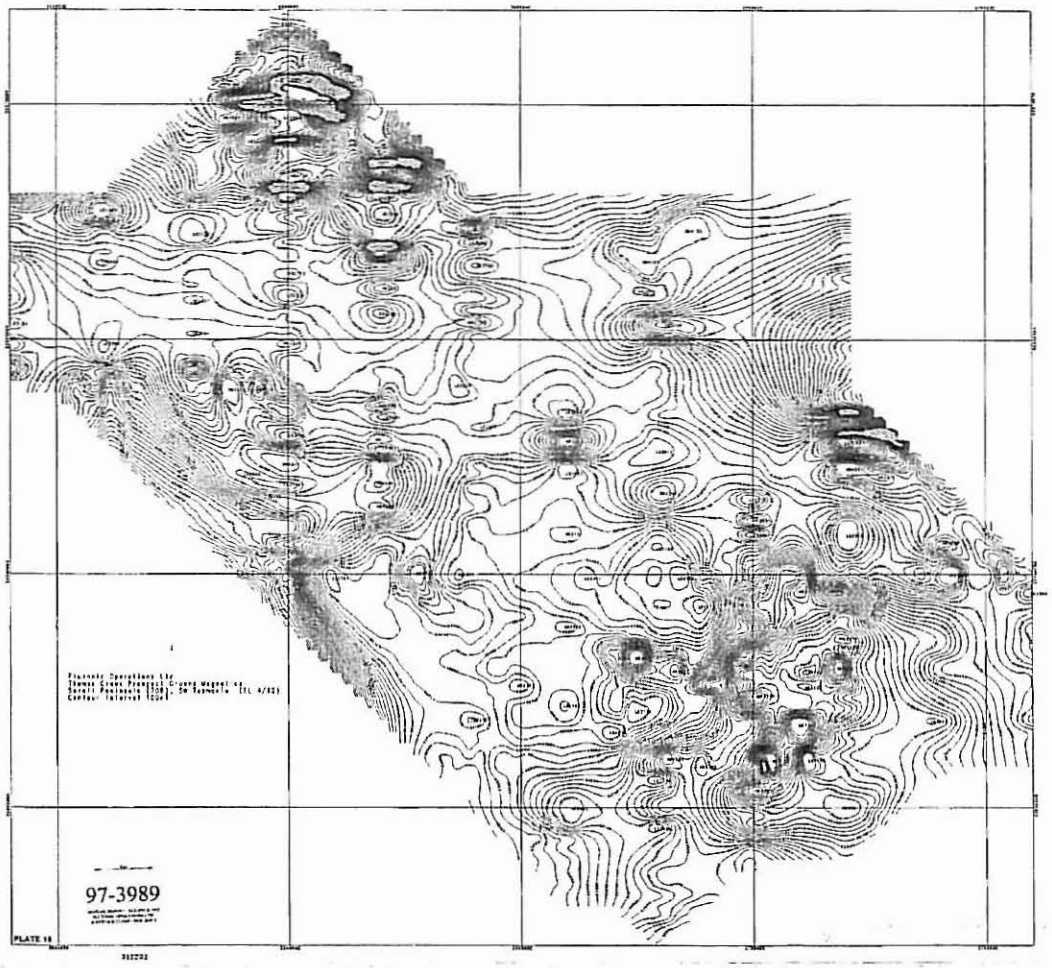


Figure 6: Thomas Creek contoured image of the ground magnetic survey.

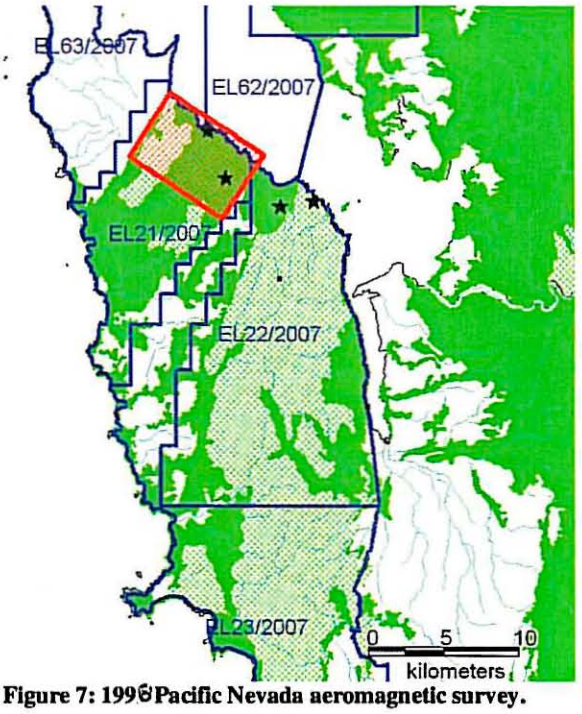


Figure 7: 1998 Pacific Nevada aeromagnetic survey.

1998 Pacific Nevada aeromagnetics survey EL 10/97

UTS flew a detailed aeromagnetics survey over the northern portion of the Double Cove Belt. The survey was flown at 50m line spacing at 50m elevation. The coverage is outlined in figure 2.

1999 Pacific Nevada IP over Hill99, North Butler, West Baylee and Pelias Cove EL 10/97 and EL9/98

Exploration of Pacific-Nevada during 1998-99 included a review of previous work and reconnaissance field assessment through regional stream sediment and rock chip sampling. The initial sampling programme was designed to test the northern extension of the Point Hibbs Mélange Belt along the coastal stretch between Steadman Beach and Muddy Cove. Two prospective areas were identified – the North Butler and Hill 99 prospects. Grid based soil sampling and ground geophysical surveys were carried out over both of the prospects as well as West Baylee and Pelias. The gradient array IP survey of Hill99 identified a linear moderate conductivity high coincident with the copper-zinc anomalous soil zone as well as a bullseye conductivity anomaly centered at 5306150mN/370110mE. The ground TEM failed to identify any conductive anomalies of probable economic significance.

West Baylee: The gradient array IP survey carried out south of line 5306000N identified a northeast trending coincident high conductivity anomaly extending for approximately 350m between 5305600N and 5306000N. This anomaly is broadly coincident with the anomalous gold in soils.

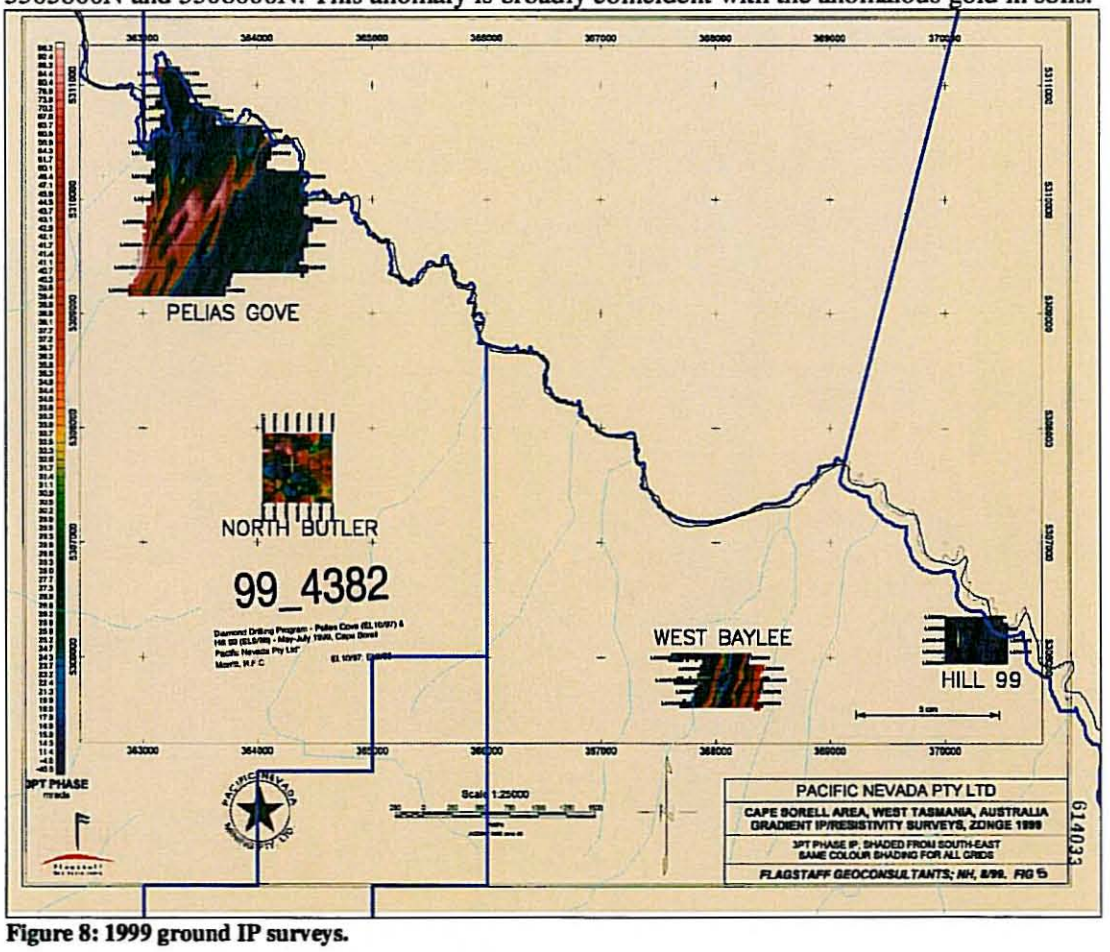


Figure 8: 1999 ground IP surveys.

Hill99 was drilled the next year with three diamond drill holes (Hill 99-1, Hill 99-2, and Hill99-3). The first two drill holes targeted the Cu-Zn soil anomalies/alteration and mapped massive sulphide and intersected minor Cu, Zn and Au. The third tested the IP bulls-eye but the target depth was not reach. The hole was abandoned in a shear zone after intersection intense alteration with blebby copper & zinc. The Hill99 target has an extensive alteration package of the type that hosts the Henty Gold and Hellyer zinc mineralisation to the north. Additional exploration is warranted.

Pelias cove was also drilled in 1999. The target was significant gold in panned heavy concentrates and a coastal occurrence of outcropping massive copper sulphides. Soil geochemistry produced a small base metal anomaly flanking Tertiary gravels. The IP survey produced two strong resistive anomalies under cover. Three diamond drill holes were drilled leaving one of the IP anomalies untested. The source of the gold was not determined by the drilling, though the drilling on the IP resistive anomaly encountered a silica flooded shear zone. This could easily be the source of the resistivity anomaly given enough thickness. Further work is warranted.

1999 Pacific Nevada Ground Magnetics North Butler

Surface mapping suggests that the North Butler prospect is underlain by a series of mafic volcanics and sediments, tightly folded around a WSW plunging axis.
Marker Exploration Pty Limited was engaged to complete a detailed ground magnetic survey on all cut lines. These data were interpreted by Nigel Hungerford of Flagstaff GeoConsultants. His report is included in the 1999 annual report. As with the geochemistry, the magnetics (and IP) closely reflect the underlying geology as mapped. Two features of note are:

a) the mafic volcanics are the magnetically most responsive units
b) the strongest IP anomaly lies towards the central-north of the gridded area over magnetically 'bland' formations.

North Butler was investigated by 6 diamond drill holes in 2000. There were commonly zones of 5-10% pyrite. The holes targeted on the IP anomalies intersected mafic volcanics overlain by 5-30% pyrite carbonaceous black shales. These were interpreted as the source of the IP anomalies. Interestingly, the up-dip projection of the pyrite units did not have an associated IP response. This is interpreted to mean pyrite removal at the surface.

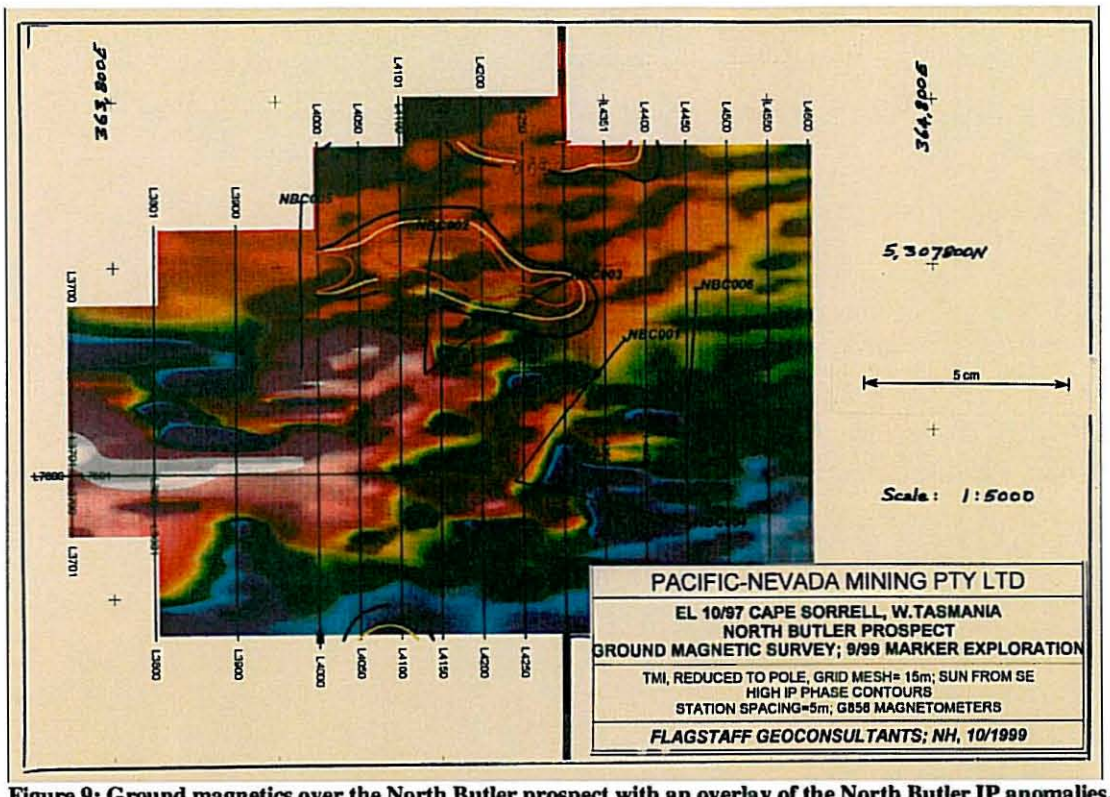


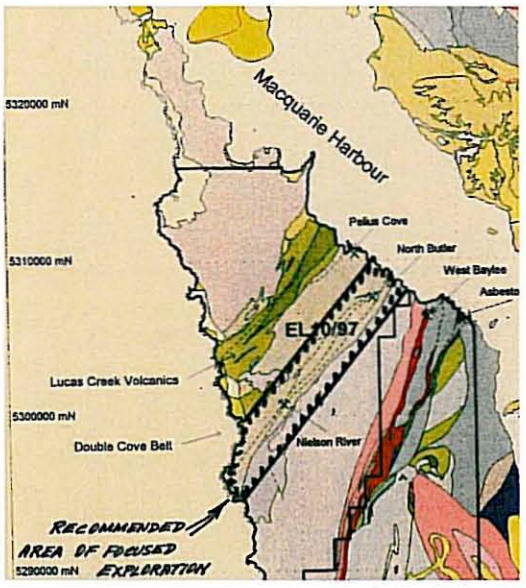
Figure 9: Ground magnetics over the North Butler prospect with an overlay of the North Butler IP anomalies.

No first-class anomalies have been interpreted (ie, no responses indicating good conductors recorded over a short strike length in an area of prospective geology). However a large number of responses have outlined weak to moderate conductors, several in areas of favourable geology. Since a massive sulphide deposit in these areas is likely to be only a moderate conductor, all of these responses are valid targets for follow up. The most promising have been outlined on the plans and numbered in order of priority and listed in the accompanying table. There are several other likely targets, but investigation of these can await the final interpretation. Any ground investigations should be planned directly from the aerial photographs.

A Maxmin EM system with highest frequency of 3555hz* is recommended for ground follow up. Extra care and certain procedures have to be taken in areas of steep topography*, but it has been my experience that the system is more sensitive than 'Genie' which was not particularly successful at Sorell. Magnetics should also be read to help the location (using the final Dighem plans). One or two lines should be surveyed in for each anomaly or anomalous zone, as was done at Sorell.

Recommendations

Hill99-03 targeted the coincident high phase and resistivity low anomaly at GR 370115E/5306150N at 150m depth. Localised zone of pyrite-chalcopyrite (up to 1.05% Cu) mineralisation and quartz-carbonate-sphalerite-galena veining with intense fuchsite alteration were intersected before drill stopped approximately 30m above the IP target. Given these signs of mineralisation and location of the IP anomaly flanking a major shear zone, which would act as a good fluid transport pathway, this target requires another drill hole – perhaps from the reciprocal direction to avoid the fault. Also, additional surface IP and EM/DHEM would provide a key to any massive or disseminated mineralisation.



The Pelias Cove target warrants additional work. It needs systematic geological mapping and sampling of all outcropping rock and areas not covered by Tertiary gravel. This combined with the detailed magnetics and IP should provide enough information to locate the source of the alluvial gold.

The Pacific-Nevada drilling program at North Butler has identified a major silica-carbonate-pyrite alteration zone in a folded sequence of clastic sediments and volcanics adjacent to a major structural system cutting through the Cape Sorell Peninsula. Pacific-Nevada considered that this intense alteration system adjacent to major structure to be very interesting because they can be associated with major gold deposits. Pacific-Nevada recommended focusing exploration efforts on the belt between North Butler and Point Hibbs including the Nielson River deposit.

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