

**EL14/2006 “Dove River”
Annual Report 2013**

Anson Griffith (Technical Services Manager)

Pluton Resources Ltd.

December 2013

Summary

This report is the seventh Annual Report for the Dove River exploration licence (EL14/2006) and is submitted in accordance with the Mineral Resources Development Act (1995) by Pluton Resources Limited (Australian Stock Exchange Code: PLV) on behalf of its subsidiary Dove River Pty Ltd.

The Dove River exploration licence contains a number of mineral occurrences, old mines and an historical goldfield (Five Mile Rise). Areas of hydrothermal alteration within the licence commonly yield anomalous metal values. The tenement has not been systematically explored for gold, and in particular no work has previously been conducted on the source of gold below the Ordovician rocks that host the Five Mile Rise Goldfield. A review of previous literature confirmed the lack of activity in exploring the Cambrian basement both where exposed and concealed under cover.

Pluton contends that the region shows similar characteristics to that of the copper-gold, high-sulphidation and porphyry districts in New South Wales, including the Cadia and Goonumbla deposits including the styles of mineralisation and related alteration.

Plutons' primary focus is to add value to the Dove River licence by demonstrating the potential for bulk tonnage mineralisation in proximity to the Cambrian Dove Granite. Work to date has largely been focussed on three main areas of historic mineralisation within the tenement: the Devon Mine area, the Powerful Mine area and the Five Mile Rise Goldfield.

No new exploration was undertaken within the Dove River exploration licence within the reporting period. This is attributed to the continuing uncertainty surrounding the land tenure status of the World Heritage Extension Area that encompasses a significant proportion of EL14/2006 – Dove River. Liaison with the Federal Department of Environment has not provided any further clarity on the issue nor has the change of federal government to a Liberal-National Party Coalition. Due to the uncertainty of land tenure status, the Board of Pluton Resources Limited has been unable to commit to exploration expenditure.

Previous exploration work completed in the 2012 reporting period included the completion of a geophysical survey where one Induced Polarisation (IP) line was completed near the Great Caledonian workings by SJ Geophysics Pty Ltd, Delta, Canada. The work program was successful in that a drill target was defined at approximately 150 metres below the current workings. The target is considered worthy of drill testing.

Further IP geophysical surveying work is also recommended to be completed over the southern flank of the Five Mile Rise Goldfield.

Contents

1. Introduction	5
2. Tenure	5
3. Location and Land Classification	5
4. Topography	5
5. Vegetation and Soil	5
6. Access	6
7. Geology	7
7.1. Precambrian schist	8
7.2. Cambrian Volcanics (updated).....	8
7.2.1.Lower fine felsic volcanics.....	8
7.2.2.Mixed volcanic and volcanoclastic rocks.....	9
7.3. Dove Granite	9
7.3.1.The Powerful Granite.....	10
7.3.2.The Dove Granodiorite (Dove Granite).....	10
7.4. Owen Group.....	11
7.5. Tertiary Basalt	12
7.6. Quaternary Glacial and Fluvial Deposits	12
8. Exploration History	13
8.1. Description of Workings	13
8.1.1.Five Mile Rise Goldfield.....	13
8.1.2.Devon Mine	17
8.1.3.Other Mines.....	20
9. Modern Exploration History	21
9.1. Mt Lyell (1965-1971).....	21

9.2. Freeport (1973).....	22
9.3. Comalco (1974-1979).....	23
9.4. Shell (1980-1984).....	23
9.5. CRAE (1985).....	24
9.6. RGC (1989-1990).....	24
9.7. Rio Tinto Exploration (1996-1997).....	26
10. Exploration Completed by Pluton Resources 2006-2012.....	27
11. Exploration Completed by Pluton Resources 2013.....	30
12. Expenditure.....	32
13. Conclusions.....	33
14. Future Work.....	34
15. References.....	35

Appendix 1 List of Digital Files

1. Introduction

Pluton Resources Limited is an Australian Stock Exchange (ASX) listed mineral exploration company exploring for metallic minerals within EL14/2006 (Dove River) by way of its subsidiary company Dove River Pty Ltd. Pluton continues to assess the tenement primarily for porphyry style alteration systems and mineralisation with a primary objective of identifying bulk tonnage copper-gold-silver mineralisation. The tenement is considered prospective for exploration due to similarities in aspects of the geology to porphyry-style copper-gold districts on mainland Australia and possible hybrid VHMS systems (Henty and Mt Lyell) in Tasmania.

2. Tenure

A tenement application (EL14/2006) for an area of about 36.5km² was made by Southern Ocean Science Pty. Ltd. in 2006. It was successfully partnered and transferred to Dove River Pty. Ltd., and Dove River Pty Ltd subsequently vested as a wholly owned subsidiary into Pluton Resources Ltd in October 2006. Pluton Resources successfully listed on the ASX in December 2006.

The exploration licence is located in the Mt Read Strategic Prospectivity Zone. This provides for security of exploration tenure by way of compensation of reasonable cost of work conducted (or Mineral Resource defined) if a change in the tenements land status results in the licence being revoked.

3. Location and Land Classification

The licence is located about 35km south of the township of Sheffield (population approximately 1,000) and about 60km from port facilities at Devonport (**Figure 1**). The licence land classification consists of State Forest, MDC informal reserves, the Dove River Forest Reserve and approximately 15% of private land. The licence is located adjacent to Lake Cethana (a Hydro-Electric lake) and the Lemonthyme Power Station.

4. Topography

The topography of the licence is variable with a dissected plateau on the north of the licence and deeply incised creeks and (partially flooded) deep gorges of the Dove and Forth River valleys in the south (**Figure 2**).

5. Vegetation and Soil

Vegetation comprises wet and dry eucalypt forest typically dominated by *Eucalyptus Obliqua*, *Delegatensis*, and *Amygdalina* spp. On wetter south facing slopes and near river banks, there are occasional patches of rainforest, dogwood scrub and *Acacia Dealbata* forest. Undergrowth is dependent on how dry the site is, but typically consists of spiky heath or ferns.

A variable soil profile is developed throughout the tenement with outcropping bedrock generally restricted to road cuttings, ridge tops, cliffs and creek/river beds.

6. Access

Access to both the east and west of the tenement is via sealed road. Internal access and access to the south of the prospect is via formed forestry roads and four wheel drive tracks.

Access to the Five Mile Rise is via the Cradle Mountain Link Road (C132) then by way of a recently formed unsealed all weather forestry road from Daisy Dell. In part, this track parallels and crosses the Van Diemen's Land Company (VDL Co.) track which was constructed by Fossey in 1827 between Mole Creek and Burnie.

Access to the Devon Mine is initially by way of the VDL Co. track, then a southerly fork with a dedicated track to the mine. The mine track descends about 600m elevation from the Five Mile Rise.

Access to the Powerful Prospect is either from the south of the tenement by way of the Lemonthyme Road (C139) and then ungazetted track (locally known as River Road), or from the north via Lorinna.

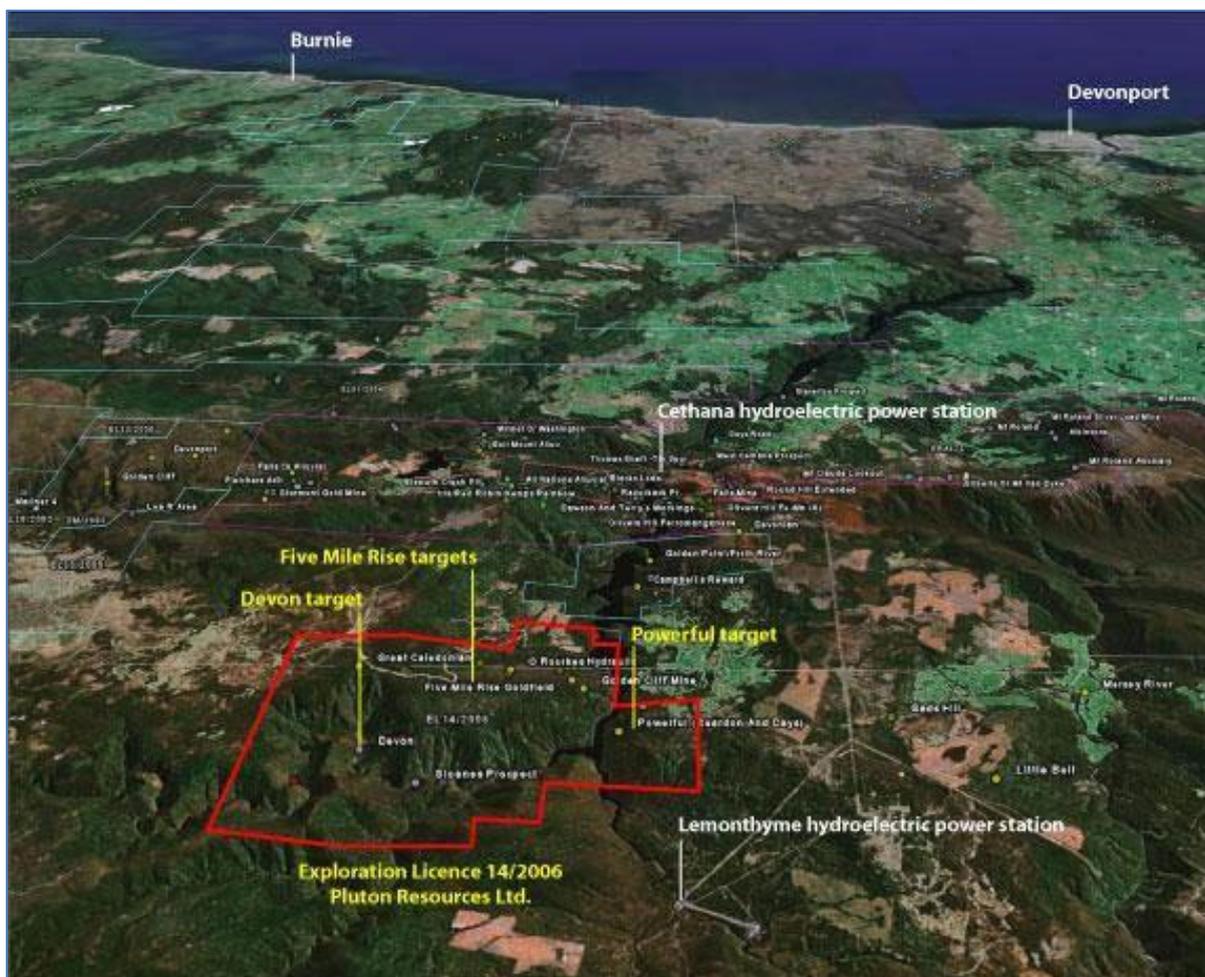


Figure 1: Licence Location and Principal Targets

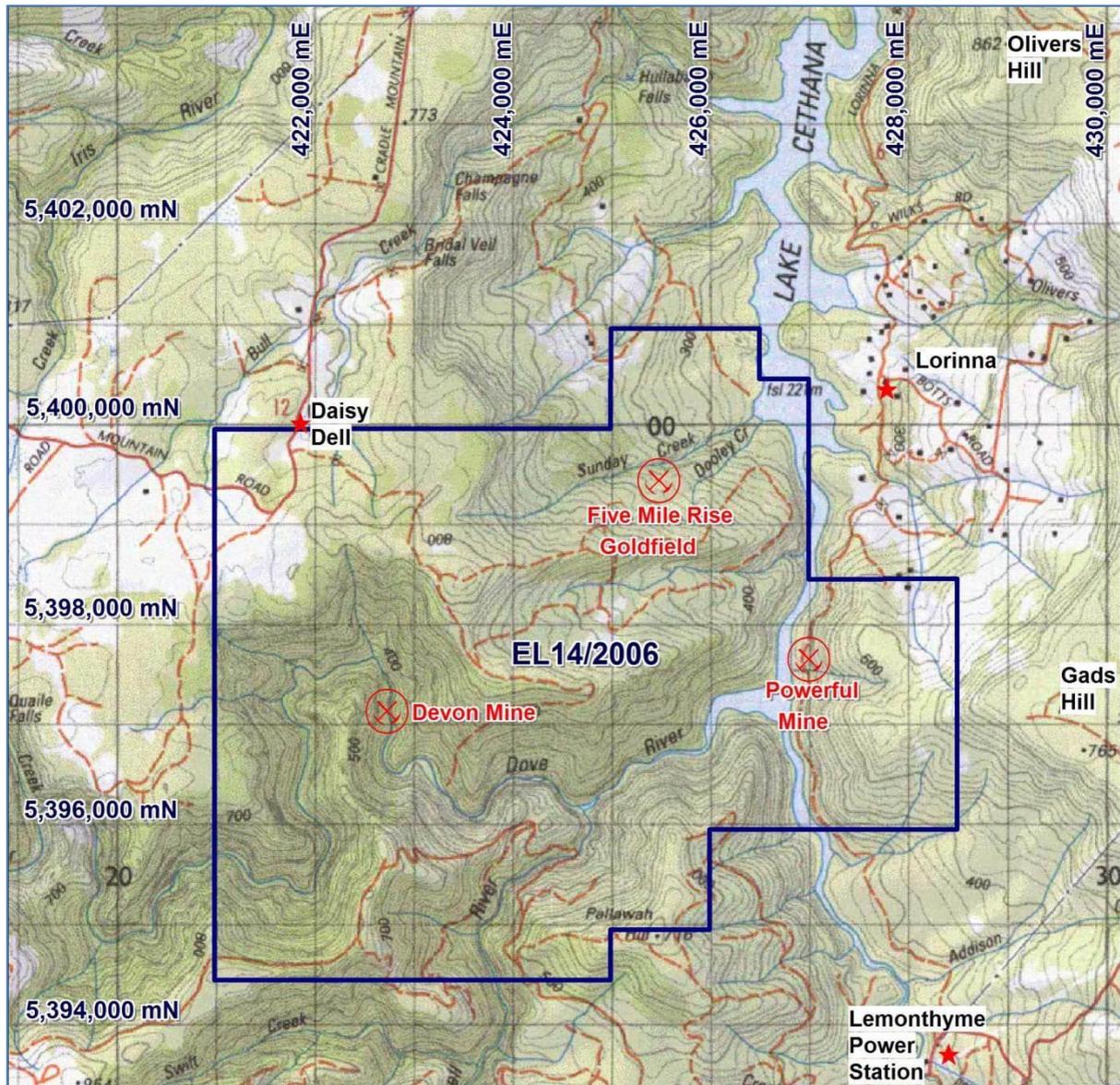


Figure 2: Exploration Licence 14/2006 Dove River Location and Prospects.

7. Geology

EL 14/206 (Dove River) is contained within the northern portion of the c500Ma Cambrian Mt Read Volcanic Belt (MRV). The MRV comprises mainly acidic and lesser mafic volcanics and associated intrusive rocks. The MRV unconformably overlies Proterozoic metasedimentary rocks and is itself unconformably overlain by Cambro-Ordovician siliclastics and limestones. Rocks to the north of the Dove River Licence are intruded by the Devonian Dolcoath Granite.

Palaeozoic and Proterozoic rocks may be covered by outliers of Permian sedimentary rocks and there is a variable veneer of Tertiary basalt, sedimentary rocks and sediment.

The Mount Read Volcanic Belt is highly mineralised. It contains numerous and some very large polymetallic VHMS style deposits (e.g. Hellyer, Que River, Rosebery) and volcanogenic porphyry-VHMS hybrid copper-gold deposits (e.g. Mount Lyell, Henty).

The Dove River area is dominated by Proterozoic schists in the south with younger Cambrian, Ordovician, and Tertiary rocks exposed progressively northwards. Very little detailed work has been undertaken in the current licence area.

A description of the known lithologies and observed variations within the licence and potential correlations are summarised below.

7.1. Precambrian Schist

The oldest rocks in the area are Proterozoic schists of the Tyennan block. The schists are typically light grey and strongly deformed. They are strongly foliated with a typically finely spaced crenulation cleavage evident as alternating mica rich and quartz rich lamellae. Bedding is rare, but where observed in cut hand-specimen is isoclinally folded. Fold limbs are sheared parallel to the spaced cleavage. Kink banding is common. Bedding is rare in outcrop and then typically only visible on water-worn surfaces. Metamorphic grade is variable but not well defined. Very fine garnet of metamorphic origin is rare but indicates an amphibolite metamorphic grade. Reid (1967) describes these rocks as quartz-sericite schists and quartzites and indicates that there are areas of minor sulphide mineralisation and moderate alteration (typically hematitic).

Proterozoic schist borders the Powerful Prospect and was intersected in the upper parts of drill hole DR2. The schists here are hematite and potassium feldspar altered; alteration clearly related to intrusion of the hornblende-biotite Dove Granite and associated dykes. An intrusive contact between older Proterozoic schists and younger granitic and porphyritic intrusive rocks is exposed upstream and west of the Devon Mine in the Dove River.

7.2. Cambrian Volcanics (updated)

The Cambrian volcanics within the Dove River licence area have not been assigned a formal correlation within the Mt Read Volcanic stratigraphy. It has been inferred they should be grouped with the Eastern Quartz Phyrlic Sequence (Corbett, 2003) or the Tyndall Group (Herrmann, 1989 in Fleming and Castro, 1989). More recent work by Pluton suggests that correlation with any one part of the MRV is simplistic. The geochemistry supports a correlation with Suite 1 and 2 volcanics of Crawford et al (1992). Suite 1 comprises the Eastern Quartz Phyrlic Sequence, Central Volcanic Complex and the Tyndall Group. The suite includes many of the Cambrian granitoids, quartz feldspar porphyries and the footwall andesites at Hellyer. They are transitional med-high K Calc-alkaline rocks (Crawford et al 1992). SiO_2 vs. K_2O plots of volcanics from confirm this broad chemistry. This suite is from the basal to middle stratigraphy within the Mt Read Volcanics

7.2.1. Lower fine felsic volcanics

The oldest Cambrian rocks in the Dove River area comprise fine-grained silica-rich massive bedded and cliff-forming sedimentary sequences. These rocks do not come into contact with the Proterozoic schists in the Dove River area, with the two packages being separated by intermediate and felsic granitoids (Dove Granite). The lowermost part of this unit is exposed in cliff section west of the Devon Mine where more typical massive beds overlie a 20m thick unit of finely laminated siltstone.

Beds adjacent to quartz-porphphy exposed at the Devon Mine are fine grained and cream or grey coloured. Dark-grey diffuse round spots to 15mm indicate hornfelsing. Bedding is more clearly evident in contact-metamorphosed rocks with concentration of spots subtly indicating beds of up to about 75cm. The unit was originally mapped by Jennings (1963) as Precambrian schist. However, the unit lacks the foliation and folding evident in Precambrian schists to the south. A generally northerly dip is, however, consistent with that observed in nearby volcanoclastic rocks to the north. As such, the unit is almost certainly of Cambrian age. The unit was intersected in drilling DEVD1 and DEVD2 and field samples are consistently finer grained than the volcanoclastic units (e.g.: drill hole DR1). Petrography indicates the fine unit might represent an epiclastic variant of the volcanoclastic rocks, but is of similar bulk compositional type. Correlation of this unit with rocks elsewhere is uncertain. Based on gross lithological character of probable vitric material derived from a more volcanic origin, it is similar to vitric tuffs of the Back Peak Beds described by Herrmann (in Fleming and Castro, 1989).

7.2.2. Mixed volcanic and volcanoclastic rocks

A progressively coarsening quartz-rich volcano-sedimentary sequence gradationally overlies (?) the vitric tuff to the north. This unit was mapped as Lorinna Greywacke on regional maps by Jennings (1963). This sequence comprises angular clast rich poorly sorted sandstone, pumecious sandstone, and quartz rich volcanoclastic sandstones. Fine grained flow greywackes and possible volcanics of near identical composition to the quartz rich volcanoclastics were observed in core from DR1.

Based on reconnaissance mapping and drill core, there may be an increasing lithic component up stratigraphy. Beds may be laminated but are typically massive in outcrop. Differentiation between quartz-phyric volcanoclastics and quartz-porphphy can be difficult, particularly in areas of hydrothermal alteration. The unit is thought at this stage to be largely derived from water-supported mass-flow, preserving finer and more delicate biotite alongside much larger quartz and sometimes angular lithics. The prevalence of rounded quartz and biotite indicates a proximal origin, with material possibly derived from an extrusive form of the quartz-phyric porphphy.

7.3. Dove Granite

The Dove Granite is regionally mapped as three occurrences, one in each of the Mersey, Forth and Dove valleys. Montgomery (1893) remarked on the similarity between granite east of the Dove River licence (at Gads Hill) with Devonian Dolcoath Granite located north of the Dove River licence. In contrast, on visiting the Five Mile Rise Goldfield, Twelvetrees (1913) concluded that the granite showed greater affinity with other Cambrian age granites of the West Coast. In producing the last geological map and explanatory notes of the area, Jennings (1963) described a relationship of granite intruding what he thought to be Ordovician rocks. He concluded that the Dove Granite was Devonian. Radiometric K-Ar and Rb-Sr ages determined by McDougall and Leggo, (1965) firmly suggested the Dove Granite is Cambrian, albeit with some outlying Ordovician ages that were attributed to argon loss. Unfortunately, Jennings interpretation persists in citation through much of the literature and company reports until the 1980's.

The reality is that few workers completed little if any work on the Dove Granite. Pluton is the first company to systematically sample the granite, mainly to determine if the Dove Granite is of the right

composition to produce copper-gold porphyry deposits. Based on revisiting the field specimens in hand sample, there are two different granitic rocks that can be identified within the Intrusive Complex.

These are tentatively subdivided into the Powerful Granite and the Dove Granodiorite.

7.3.1. The Powerful Granite

The Powerful Granite is a quartz biotite granite that when potassically altered appears to be coarsely porphyritic. It was originally confused with the “granite-porphyry” of Smyth (1981) in the vicinity of the Devon Mine where it crops out as a potassically altered porphyritic rock in the Dove River downstream from the Devon Mine. Re-examination of drill core from the Devon Mine clearly shows a transition from weakly altered “Dove Granodiorite” to strongly altered porphyry with no discernable hornblende or plagioclase. The Powerful granite is a geochemically distinct unit. The first 90m of drill core from drill hole DR1 is the best record of the fresh rock type.

A common trait of this rock is the well-rounded quartz phenocrysts. The rounding is possibly due to silica solubility with shallow depth of intrusion, consistent with intrusion of the porphyritic rock at shallow levels within the Cambrian sequence.

7.3.2. The Dove Granodiorite (Dove Granite)

The Dove Granodiorite is an equigranular hornblende granodiorite and has a porphyry variant. The porphyry unit adjacent to the Dove Granite at the Devon Mine is typical of porphyries mapped elsewhere in the tenement. The inference has been made by Herrmann 1989, M.Vicary (pers. Comm.) that the porphyry at the Devon Mine correlates with the quartz-feldspar porphyries that intrude the Sticht Range Beds, the Back Peak Beds and the Precambrian units near Back Peak (**Figure 3**). Such an association would suggest Cambrian Granite at depth in this location if the porphyry at Devon is a marginal phase of the Dove Granite as suggested by Herrmann 1989 and Jennings 1963.

This proved to be correct when the Devon Mine was drilled.

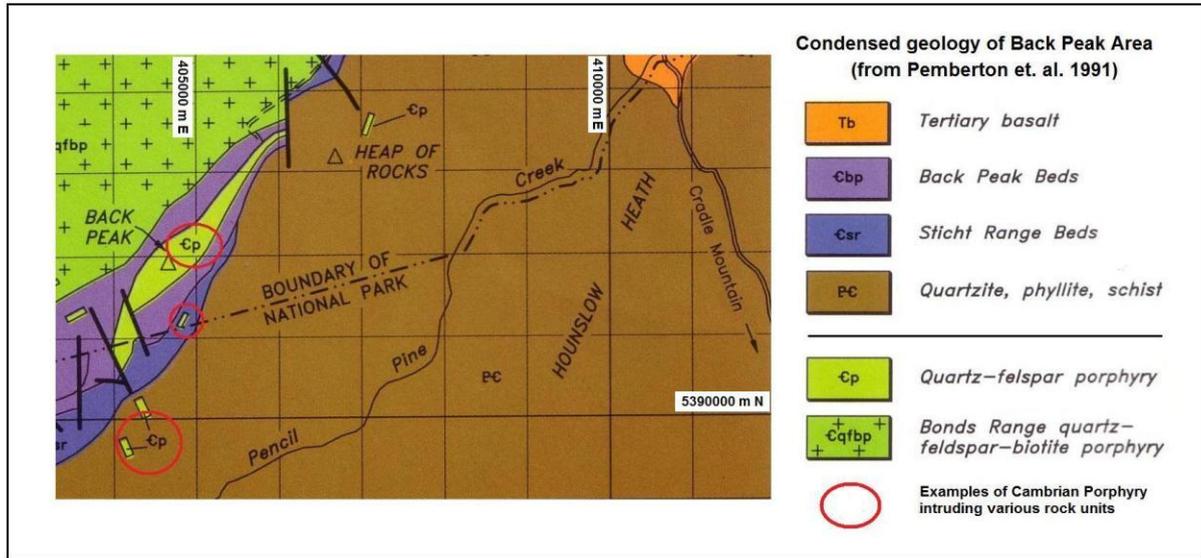


Figure 3: Examples of Cambrian Porphyry intruding various units in the vicinity of Back Peak (modified from Pemberton et. al. 1991).

NB: coordinates in AMG Zone 55, datum AGD66.

This unit was originally separated into two granitic rocks that were differentiated on the basis that one was dominated by biotite with lesser or little hornblende, whereas the other was dominated by hornblende as the mafic mineral. Potassic alteration of the rock has been found to account for most of the variation. The contacts with the quartz rich granite are commonly sharp and the granite is strongly altered indicating the granodiorite intrudes it.

The less altered biotite (-hornblende) granodiorite crops out on the access track to the Devon Mine and in the river downstream of the Devon Mine. It comprises grey, equigranular quartz-feldspar-biotite with rounded dark-grey biotite (+hornblende) rich clots (possible xenoliths) to 20cm. Inclusions of laminated and altered rocks (Proterozoic xenoliths) are rare. Xenoliths were also recorded in drill cores from DEVD1 and DEVD2.

The hornblende-rich rock crops out south of the Powerful Mine (but also possibly south of the Devon Mine) and in drill core from Powerful (DR3). The rock is medium grained, equigranular and visually similar to the biotite granite except for the prevalence of hornblende as the primary mafic component. The hornblende "granodiorite" is commonly perceptibly magnetic in hand specimen that is consistent with classification as an I type magnetite series "granite".

There is also a perceptible concentration of sulphides within the more mafic clots in hand specimens of the biotite (-hornblende) granodiorite, possibly indicating an as yet unrecognised mineralised late magmatic phase within the granite suite. Several potassic dykelets cross cut the granodiorite in DR2 and DR3 and may be the expression of such a magmatic phase.

7.4. Owen Group

Conglomerate and sandstone sequences are regionally unconformable on Middle Cambrian volcanic rocks, however no true conglomerates occur at the base of the Ordovician on the licence. At Five

Mile Rise, the basal unit was observed in drill core and is a bioturbated coarse to pebbly sandstone. Overlying this is a pale yellow fissile siltstone interbedded with fine and pebbly sandstones and minor shale. The sequence has been identified by several previous workers as the Moina Sandstone. The sandstone dips gently (15-20 degrees) to the north-northeast forming a veneer over the Cambrian stratigraphy.

Several kilometres northeast of the Dove River licence, the Moina Sandstone is underlain by thick sequences of Roland Conglomerate. The absence of the conglomerate units on the licence was thought to indicate extension north of Five Mile Rise in the late Cambrian. More recently, an outcrop of conglomerate was located at the bottom of the Winspears Farm property. This is the first record in this locality and may either represent a basal unit to the Moina Sandstone on Five Mile Rise or a separate fault controlled block. Regionally the structures controlling this facies variation may be coincident with northwest-trending aeromagnetic linears north of the licence.

Gordon Limestone conformably and gradationally overlies the Moina Sandstone just north of the licence area near Lorinna. Both this and the Moina Sandstone were faulted during the Devonian Tabberabberan Orogeny.

7.5. Tertiary Basalt

The Tertiary Basalt at the Powerful Prospect was intersected by diamond drill hole DR2 in the previous drilling program. The basalt is a fine-medium grained vesicular dark rock with occasional zeolites and calcite veins. At Powerful, it is underlain by approximately 11 metres of probable Tertiary lake sediments. Herrmann in Fleming and Castro (1989) estimated Tertiary Basalt flows over much of the region to be only a few tens of metres thick.

7.6. Quaternary Glacial and Fluvial Deposits

Although not prominent in the main part of the licence area there are surficial deposits of questionable fluvial origin on flatter parts of the Forth River valley that could be attributable to glacial action. These deposits are small and initial assessment suggests the sediments cover an area of minimal prospectivity.

8. Exploration History

The Dove River licence area was prospected for gold and silver-lead until the middle of the 19th Century.

James "Philosopher" Smith discovered alluvial gold in the Forth River in 1859 near Golden Point approximately three kilometres north of Lorinna (Jennings 1963). Malcolm and Alex Campbell opened the first hard rock mine, Campbell's Reward, in the early 1880's on the east side of the Forth River. It was not until 1887 that a discovery at Five Mile Rise (previously termed the Middlesex Goldfield) was made by J Aylett at the "Great Caledonian" Mine (Reid, 1919).

A number of leases at Five Mile Rise were pegged around the initial discovery in the following year. However, the alluvial prospects proved of little worth to the early miners. Montgomery (1893) described the alluvial workings as shallow, suggesting that no great depth to the auriferous wash probably accounted for the quick demise. Hard rock sources were soon located and developed by underground workings on the auriferous lodes. The lodes were gold rich in the oxide zones near the surface with gold not recoverable from the sulphide lodes at depth using techniques available at the time. By 1891 work had all but ceased on the gold field due to the rush at Bell Mount to the north (outside the licence area) and only three mines returned to production before work again ceased in 1901 (Jennings, 1963).

James Smith later discovered a galena lode south west of the site of the Devon Mine and Malcolm Campbell located the Devon Lode in 1897 (Reid, 1919). The Devon Silver-Lead Mining Company NL acquired the lease from Campbell later in 1897 (Jennings, 1963) in the form of four sections covering 40 acres. The Devon Mine and Five Mile Rise Mines were operated on several occasions in the 19th Century with the most advanced mining activity being at the Devon Mine. A summary of the workings is given in **Table 1** and a detailed description of the workings is given below.

8.1. Description of Workings

8.1.1. Five Mile Rise Goldfield

Six prospects on the Five Mile Rise mineral field constitute the main hard rock workings. These are the Great Caledonian, Glynn, Thistle, Golden Hill, Golden Cliff and Union Mines all of which were originally developed between 1887 and 1901. There are other workings mentioned in the area, although details of these prospects are uncertain. The only form of exploration on these prospects as individual targets has been by prospecting via adits and shafts. All but the Great Caledonian were accessed by adits, with the flat ground around the Great Caledonian only allowing access by a shaft.

All the lodes in the goldfield are said to occupy small faults that strike at approximately 140 degrees. The lodes outcropped as gold rich rubbly gossans and passed into mixed sulphide ores at depth containing silver-lead and pyrite with accessory chalcopyrite, arsenopyrite, gold, sphalerite and sometimes bismuthinite. The veins are irregular in width and extent and only enriched as gossan at surface. They occupy tension cracks which are sympathetic in width to, but do not generally cause replacement of, the variable lithology within the Moina Sandstone (Jennings, 1963).

Mineralisation is reported to extend below the Moina Sandstone host rock in several cases, for example Johnson's Reef is said to be approximately 300m south of the Great Caledonian

workings and the host rock is described as being decomposed greenish “granite” and the main outcrop as “largely dense hematite”. The description of the host rock in the deepest levels of the Great Caledonian is the same. At the Union Mine, the lodes are said to pass into hematitic quartz lodes at depth. At Golden Cliff the bottom adit was driven into the sub-Ordovician country rock, however the lode was never met with.

Twelvetrees re-examined the Five Mile Rise Goldfield in 1913. The workings were abandoned, however by 1919 when Reid visited Five Mile Rise Goldfield, the Thistle Mine was once again being worked for galena ore and alluvial gold was also being intermittently taken from O'Rourke's “Hydraulic” lease.

Deposit Name	Size(tonnes)/ Production(oz)	Deposit Form ; Strike and Dip	Max. Width	Commodities Recovered	Gangue Minerals	Comments on development, history and sub-Ordovician mineralisation
Great Caledonian	Small ~200t crushed/ ~100oz	Several ferruginous veins of "rubbly sandstone" / Unknown	30cm?	Gold	"Cellular silica" (Twelvetrees, 1907), limonite and quartz	Accessed by shaft with a cross-cut and winze, possibly driven by O'Rourke from cliffs to the south, dewatering attempted once (1933 – Nye). Mineralisation reported in Ordovician host and Cambrian "Granite" deeper in the workings (confirmed presence in mullock, Reid, 1919). Considered sub-greywacke of the „Lorinna Formation" (Robinson pers. comm. in Jennings, 1963).
Glynn	Probably a little over 100t / 19oz+	Vein; Strikes west of north and dips steeply west (Harcourt Smith, 1898)	90cm	Gold	Silver	An open cut near the head of Sunday Creek (tributers workings of Smith, 1898) and separate shaft later connected by a winze from the tributers workings. An adit 7.5m below the open cut intersects the lode at 15m. A five head battery was established 7.5m above big creek. The gold is argentiferous and there is no mention of connection to the Cambrian basement.
Golden Cliff	Small/ Unknown, probably <50oz	One main vein, possibly others ; 330/-40W (Twelvetrees, 1913)	10cm	Gold	Arsenopyrite, manganese, quartz (MRT deposits database)	Narrow vein with grades to 42 g/t Au as free gold in oxide and in pyrite at depth. One shaft adjacent to Winspears Rd sunk from an open cut 4 foot wide 30 foot long and deep. Two adits, the upper of which is 18m and extends 9m beyond the lode. The lower adit 30m below is 36.5m long and has a short drive and rise at the end but did not intersect the lode. The lower adit is in „dark mica granite" (Twelvetrees, 1913).
Golden Hill	Smallish >60t/ >20 oz	Three veins; Approx. 140/80E	60cm and 90cm as gossan	Gold	Pyromorphite, quartz, pyrite and sphalerite (Smith, 1898)	An open cut and adit were constructed in 1898. The adit intersects three thin quartz-sulphide veins which pinch and swell along fault zones within the Moina Sandstone, The No.3 vein carries grades to 23g/t Au (Waller, 1901). A 15 head stamper battery originally located at the Great Caledonian was located at the end of a tramway below the mine and was used for crushing. Sulphides possibly replacing bedding adjacent to lodes. Silver and Lead reportedly extracted from lower levels of the mine (Askins, 1980).

Union	Smallish	One vein plus disseminated mineralisation 162/-75E	60cm	Gold	Chlorite, quartz, galena, sphalerite (main lode) Hematite and pyrite (porphyry hosted lodes)	Established pre-1893 by the Campbell Brothers, worked by E.C James again in 1917. 3 shafts and an 80m adit with the last 18m reported to be porphyritic Cambrian rocks with sparse hematite veins containing up to 0.1% Cu. The main lode occurs on the faulted Cambrian – Ordovician contact at depth.
Thistle	Smallish	Three fracture filling veins / No.1 NNW/-80W, No.2 NNE/-85E, No.3 (largest) NNW/-65W	30cm	Gold, Silver, Galena	Quartz, sphalerite, arsenopyrite, pyrite and minor chalcopryrite (Askins, 1980)	Discovered by the Campbell Brothers and originally worked for gold on the rich gossanous „joints“. Later worked for small amounts of galena in the unoxidised portion of the lode (Reid, 1919). Galena was argentiferous and included trace gold and a peak of 14.5g/t in No.1 lode. Two adits (upper and lower - longer) and a number of shallow shafts and trenches (Askins, 1980). Lodes numbered 1-3 (E to W).
O'Rourke's Hydraulic	Significant proportion of gold from the field (>100oz?)	An area of wash approximately 155 metres long, 3-3.75 metres deep and 40-60 metres wide.	Alluvial (see form)	Gold	Quartz (sometimes attached to gold)	Coarse angular talus worked over three creeks in the vicinity of the Union Mine" (Jennings, 1963) and east of Glynn Mine (Harcourt Smith, 1898). A dam on „Big Creek“ and water race then piped water to site with less than hydraulicking pressure. Instead water was used to wash the gravel in a long sluice. The area had been worked to within twenty metres of the small dam feeding the „pressure main“ in an attempt to locate the source reef (Waller, 1901). The angular nature of the gold suggested short deposition distances, however no source had been located (Harcourt Smith, 1898)

Table 1: Summary Details of Individual Prospects in the Five Mile Rise Goldfield

8.1.2. Devon Mine

The Devon Mine was mined for galena from clean 7 to 40cm veins producing high grade handpicked argentiferous lead. Consequently the Devon Mine has long been considered and reported as a lead-silver deposit, however appreciable gold and copper grades accompanied the lode material and the mixed sulphide portion of the lodes and any associated disseminated sulphide was never recovered. The mine was the only prospect in the district to pay its way despite the restrictive location and associated transport costs of horse-packing its clean galena ore to market.

Reid (1919b) reported that 172 tons of galena ore was produced from the Devon Mine to May 1899 and Twelvetrees indicated that 290 tons of silver-lead ore was produced since 1899 suggesting a total production of 462 tons to June 1907 including production of 25 tons since November 1906. Production at the mine continued sporadically until 1912.

Harcourt-Smith visited the Devon Mine in 1898 which was then operated by the Devon Silver Mining Company, development at the site was being hampered by poor access. An adit had been driven 26 metres in a westerly direction approximately 7.5 metres above the river, a second adit (approximately 36.5 metres north and approximately 5 to 5.5 metres below the first adit) had been driven 7.5 metres in 1898. Drives were established in the orientation of the intersected lodes (north-south orientation) in the first adit and the second adit was also noted by Waller (1901) and associated workings are described by Twelvetrees (1907).

The lodes reported in the first adit are at the entrance (7.5cm of galena dipping west), at 12 metres (a narrow gossanous vein) and at 15 metres (23cm of galena with a NNE strike and an 80 degrees easterly dip - the Devon lode or No.1 lode). Harcourt Smith reported that the tunnel had been continued for 10.5 metres past the drive on the Devon lode at 15 metres. There was no further development on this main adit. In 1901 when Waller visited, the main lode had been driven south for 25 metres and north for 47 metres (later confirmed by Reid 1919b) and stoped out above the drive. Twelvetrees reported that it had only been driven 7 metres to the north (probably back filled) and 31.5 metres to the south in 1907. A 12 metre rise was put in on the south drive (Twelvetrees 1907) and this was driven some 55 metres back to the north and stoped in from the „level 1“ adit below.

The Devon (No.1) lode is described as being 60 to 90 centimetres wide, typically with 38 centimetres of clean galena in the centre of the lode. Twelvetrees (1907) had noted the width varied from around 10 centimetres to 90 centimetres in outcrop and that very little galena (<2.5 centimetres) showed in the southern drive, however in the top of the rise from this drive the lode was carrying 10 to 13 centimetres of galena to the south and 7.5 to 10 centimetres going north. He also noted the outcropping lode took a more northerly strike at the northern end and has been proven to extend over 122 metres. Twelvetrees also believed that if the main adit was continued another 10m that it may intersect another parallel lode which takes the form of a gossan approximately 60 metres above the river level, bearing 9 degrees east of north and being sub vertical.

Apparently this development did occur because a second lode is described at 27.5 metres in Reid's account (1919b). This lode (No.2) is driven 9 metres south and 25 metres north where it branches, one vein of 5 to 7.5 centimetres of mixed sulphide ore being followed on 350 degrees for 23 metres and the other vein of 5 to 15 centimetres of good grade galena being followed on 025 degrees for 23 metres. A sample from the face of the north-easterly branch assayed 62.2% lead and

2884 g/t silver. No stoping had occurred on this vein in 1919. The south drive on this lode exposed a little galena and chalcopryite in porphyry.

A third poor quality lode is described at 38 metres and is driven on north and south for 6 metres, the gossan of this lode at surface assaying only 12g/t silver. The final length of the main adit was stated to be 52 metres (Reid, 1919b).

Lodes in the northern adit were encountered at 1.5 metres (this is a 7.5cm west dipping vein according to Twelvetrees and it probably equates to the west dipping vein in the entrance of the first adit) and at 7.5m where development was still occurring at the time of Harcourt-Smith's visit (1898). The development had found the lode barren for 3.5 metres to the south. Ore was being encountered again at 6.5 metres from the cross cut with up to 46 centimetres of galena with lesser chalcopryite, in one place, however the lode pinched out to a "thread" in the drive floor. The lode is described as splitting in two at the end of the south directed drive with each vein only carrying around 10 centimetres of clean galena. The whole drive contains a little disseminated pyrite and stringers of galena in the wall rock (Harcourt Smith, 1898).

Twelvetrees indicated the main lode was cut at 21 metres in the northern adit (which is contradictory, so it is either incorrect or is a further lode) and was driven 21 metres north and 44 metres south and that the lode was pyritic (which agreed with Harcourt Smiths description of the lode encountered at 7.5 metres). Reid later (1919) describes the No.1 lode as being intersected at 15 metres with drives north over 30.5 metres and south over 61 metres. The lode was also reported as being stoped out above and below the drive to the south for 30.5 metres before the lode pinches out.

In the northern drive on the No.1 lode, a winze was sunk 5 metres from the "flat sheet" and 5 metres down, the lode showing 18 centimetres of galena to the north, unfortunately water was encountered here. By the end of the northern drive, the lode is almost barren of galena with bands of quartz and "gossan" only (Twelvetrees, 1907).

Reid (1919b) reported that from the end of the second adit a main shaft 2.5 x 1.25 metres has been sunk 30.5 metres depth on the No.1 lode to open up a third level. A ladder-way shaft 10.5 metres northward has been sunk to 23 metres, drives were reportedly developed north and south at the 18 metre and 30.5 metre levels (Reid 1919b) and a winze joins these levels (Nye, 1928). High grade ore was reported from these workings, (7.5 to 18 centimetres) however these were underwater when visited by Reid (1919b). This main shaft was being operated by means of a pumping and winding plant, the 4 inch pump controlled the inflowing water and was powered by way of flow from the creeks on the opposite bank of the river. However, continuous operation was not possible in summer.

The third level is also accessed by a shaft (according to Nye, 1928) which has been sunk some 21 metres deep from surface approximately 33.5 metres (Twelvetrees, 1907; 46 metres according to Reid 1919b) north of the winze. A drive has been directed south from the end of the shaft in an attempt to intersect the lode 12 metres below the bottom of the winze. Water was within 9 metres of the top when Twelvetrees visited (1907). However the lode had been encountered in this drive and apparently widened from 7.5 to 18 centimetres of galena.

Three other adits occur above the No.1 and No.2, two of which had been driven in recent years for prospecting purposes (Nye, 1928).

Despite the intensive work completed to extract lead and silver in the form of galena ore, historic assays for gold from the Devon lodes were very encouraging (**Table 2**) and made for an interesting target.

Sampler (date)	Sample type	Gold Values
Harcourt Smith (1898)	Selected lode material	Up to 4 pennyweights and 4 grains of gold per ton (~6 g/t)
Waller (1901)	Average gold grades from the 172 tons of hand-picked ore to 1901	5 pennyweights, 4 grains of gold per ton (~7g/t).
Reid (1919b)	Gossanous grab sample	Up to 20g/t Au
Hermann (1989), see modern exploration	Two lode samples (from mullock heap?)	3.6 and 6.3 g/t Au respectively

Table 2: Historical Gold Assays from the Devon Mine

The ore bodies are composed of mainly galena, abundant sphalerite, chalcopyrite and subordinate pyrite with a quartz-siderite gangue. The gold appears to increase proportional to the amount of chalcopyrite (Reid 1919b) and the lode in the northern shaft is banded suggesting open fissures with progressive precipitation. Oxidation of the ore down to river level has seen the development of cerussite, azurite and malachite. Gossanous samples may also have enriched gold values similar to the occurrences at Five Mile Rise.

At the time of Harcourt Smith's visit, a small open cut on the original discovery some 18 metres above the workings had been developed. Smith indicated that this too had a bunched appearance with lodes occupying a fault surface with variable dilation. One other lode potentially occurs 61 metres south-west of the mine where Harcourt-Smith reported a manganese gossan which strikes NNW and dips to the east (similar to the Devon lode).

Another lode termed the diagonal lode is present in the northern end of the surface development and apparently runs into the footwall where it may join with the No.2 lode. Further up the hill approximately 15 to 25 metres west of the Devon lode there is a surface outcrop described as the "big lode". This may correlate with the No.3 lode in Adit No.1. An adit was also driven in 36.5 metres west during 1922-23 at a point some 15 metres above the No.1 Adit. The Devon lode was not cut but a "wall" was passed through at 12 metres and a lode formation at 18 metres (possibly the diagonal lode). The adit must have terminated a short distance from the No.3 lode.

Sporadic production at the Devon Mine continued until 1912 with production ceased in 1913 when Twelvetimes reported on the mine for a second time. In 1916 the lease was abandoned despite the lodes being encountered in both adits and apparently in the northern shaft. This suggests that the strike extent of the narrow clean galena shoots was limited. In 1919, Mr G.M.Day was extracting the remaining unstoped sulphidic ore and hoped to remove any gossanous material of commercial value (Reid, 1919b). Day was also hoping to de-water the shafts if enough water was available for power generation during the winter.

In 1923, the Mt Farrell Mining Company picked up the lease over the Devon, however no production was recorded to 1924 when the lease was dropped. The workings were abandoned in 1928 (Nye, 1928). A small parcel of ore was then exported in 1937 (Jennings, 1963) and a mining lease at Devon was held by Neville McCoy in 1980, it is believed the area was made accessible by bulldozer track at this time.

8.1.3. *Other Mines*

The Sirdar Prospecting Association's lease was approximately 5.5 miles upstream of the Devon Mine on the Dove River (Waller 1901) and ~1 ½ miles south west of Devon in a straight line (possibly near the licence boundary). One small galena vein reportedly in the Precambrian schists has been driven on for approximately 12 feet and 60lbs of galena extracted. A "gossan" apparently outcrops on the north side of the river on this section.

A copper prospect in the schists upstream from the Devon Mine was also reported. These workings were known as the Welcome Home Prospect and are located approximately 6 miles south west of the Devon Mine (outside the licence boundary).

The Silver Dove is also located in the licence downstream of the Devon Mine and is described as a 7.5cm pyromorphite vein in the Precambrian schist. This was driven for approximately 46 metres with no further encouragement (Reid 1919b).

The Powerful Mine is first referred to in Bulletin 14 (Twelvetrees, 1913) as Reardon and Days Mine. The mine is located approximately three kilometres south of Lorinna. The lode is in granite opposite the Dove River where it now enters Lake Cethana. The lode is comprised of quartz, specular hematite and pyrite. Two samples produced assays of 1.5 g/t gold and silver and no trace of gold and 6 g/t of silver. A bulk sample produced a trace of gold and 7.5 g/t silver.

Twelvetrees believed the lode was some 40-50 feet wide and strikes NW-SE with a 30 degree dip to the south west. Reid (1919) however, considered the lodes to be proven 8-14 feet wide in the cuts. Four cuts or adits were driven on the lodes with "granite porphyry" described between cuts three and four. The first three cuts are described as being 11, 18 and 25 feet, all of which are probably too short to describe the adit that leaves the Lorinna Road (originally the Pelion Road) south of the township. Pyrite is also said to be more plentiful where quartz is more abundant in the Powerful workings.

D. Davies show is described as being a hematite lode in the Precambrian schist and is sketched on Twelvetrees' map to the south-east of the Powerful Mine. The lode is said to strike northwest and samples from a small pit revealed neither a trace of gold nor silver (Twelvetrees, 1913).

A further prospect probably in the northern half of Lorinna occurs 200m west of G.Sloanes house. A 30 foot tunnel was driven on a specular hematite formation in quartz porphyry, the specularite attached to quartz said to be gold bearing. The vein is 6-8 inches wide with 2-3 inches of specularite. Granite sub-crop or float appears proximal to the prospect (Reid, 1919).

9. Modern Exploration History

Modern exploration commenced in 1965 when the area was examined by the Mt Lyell Mining and Railway Company Ltd, followed by Freeport 1973, Comalco and Shell 1974-1984 (with CRA managing from 1985-1987), RGC 1989-1990 and Rio Tinto Exploration 1995.

Exploration in the Dove River licence area has largely focussed on locating tin, tungsten or fluorine mineralisation associated with the younger Devonian (Dolcoath) granite to the north. With little or no tin or tungsten mineralisation identified, the area has been largely ignored. Some effort went into locating gold mineralisation at Five Mile Rise in the Ordovician rocks, however the Cambrian rocks have not been systematically explored for gold.

Exploration for base metals finished before the discovery of the Cadia and Goonumbla deposits in the 1990's, and the understanding these deposits brought to porphyry exploration in eastern Australia.

Exploration activities in the licence area are summarised below.

9.1. Mt Lyell (1965-1971)

Modern exploration began in 1966-67 when the area was examined by the Mt Lyell Mining and Railway Company Ltd as part of the exploration programs for base metal or tin mineralisation within EL8/1965.

The Mt Lyell Co. undertook an aeromagnetic survey and a regional -80# stream sediment survey for tin, copper and zinc. A close association between zinc and copper was noted regionally however, individual results were considered doubtful with known anomalous areas not all registering on the survey. Reid (1967) concluded that there could be real interest in the copper and zinc anomalies if it could be confirmed (by resampling) that the tenor of mineralisation at known localities such as Round Mount were not being identified.

Several areas were recommended for follow up stream sediment sampling including the anomalous copper in stream sediments (34ppm Cu) draining from the magnetic anomaly 12 (later aeromagnetic anomaly C) above the Powerful Mine.

Particular anomalies were followed up by more detailed exploration consisting of soil geochemistry and geological mapping on grids and reconnaissance geophysical surveys with VHEM equipment and a magnetometer (Foster 1969).

Anomaly C (Powerful) was gridded, with a B-Horizon soil survey and a ground magnetics survey completed. A few high values (probably anomalous) of cobalt and zinc were located on the margins of the magnetic anomaly but were attributed to the breakdown of ferromagnesian minerals in the basalt. The magnetic anomaly was found to correspond well to the outcrop of Tertiary Basalt. The diffuse and variable signature associated with the anomaly was potentially explained by magnetite in quartz-hematite-gold veins; however the restriction to the outcropping basalt was not fully explained.

Reid (1967) identified two locations where disseminated chalcopyrite and pyrrhotite occurred in "granite associated porphyry" upstream from the Devon Mine. Reid also located minor disseminated chalcopyrite in the Lorinna Greywacke on the southeast slopes of the Five Mile Rise.

Reid (1967) recognised that there were two ages of granite and therefore a possibility of two phases of mineralisation. The possibility of Cambrian mineralisation being remobilised in the

Devonian was not precluded. Reid (1967) also mapped a possible fourth body of Dove Granite in the Dove River west of the current licence.

The part of EL8/1965 containing the current EL14/2006 was relinquished in 1971. Later in the 1970's they concluded the probability of locating an economically viable deposit of their target type to be low and relinquished the entire licence.

9.2. Freeport (1973)

Freeport's primary target was porphyry copper mineralisation, but did not preclude the chances of finding gold, tin and tungsten or stratabound lead-zinc-copper. Freeport employed consultants Cundill, Meyers and Associates whose activities consisted of mapping, collecting rock chips and stream sediment sampling using -40# and -80#. Freeport's Licence was approximately the same area as the current licence.

Exploration focused on the flanks and cusps of the granite due to the presence of chloritic and kaolinitic alteration in the granite at the Powerful Prospect associated with minor disseminated pyrite-chalcopyrite (Walsham, 1973).

Freeport thought the Dove Granite to be younger (Devonian) in age (Austin and Serim referred to Jennings, 1963) even though the previous tenement holder (Reid, 1967) had indicated a Cambrian age. Austin and Serim (1973) also prefaced their investigation with the assertion that the Five Mile Rise gold-sulphide deposits were related to granite intrusion as assumed by Jennings.

Freeport located significant copper anomalism in stream sediments and -80 mesh stream sediment sampling was found to be a reliable method for identifying areas of known anomalism and it was recommended that -40# was not to be used again. Rock chips assayed to 0.16% copper in fractures in the Dove River near the Devon Mine and several regional 600ppm copper samples were collected from fractured granite and quartzite. One sample in quartzite from the east near the Powerful Prospect assayed molybdenum to 160ppm, but despite these anomalous samples no follow up work was done.

Despite not following up the anomalous samples, several other prospective features for porphyry style deposits were identified by Freeport in the brief assessment of their licence. These features include quartz veining in the Precambrian quartz-mica schists that was observed to increase near the granite contact, occasional disseminated pyrite within biotite granite and biotite-hornblende granite and quartz porphyry (Lorinna Greywacke) with considerable chloritic alteration.

Freeport also identified hematite alteration in the "Lorinna Greywacke" and concluded that this was caused by the late stages of the Dove Granite with chlorite veins containing minor gold and base metals (Walsham, 1973). It was also noted that "there are signs at Mt Lyell that hematite gossans preface the existence of acid volcanic ore bodies" (Walsham, 1973) and that the considerable hematite alteration noted in the licence may indicate a similar setting.

The discovery of Eastern Australian porphyry copper-gold deposits came much later than the exploration by Freeport (who in 1973 recently opened and operated the Ertsberg porphyry copper-gold mine in Indonesia) and the features they identified may not have had a context suitable to keep their interest in the project. Based on their understanding at the time, they concluded it was unlikely that a Cu-porphyry ore body of a size that would be suitable for Freeport existed in the

licence area. The EL was relinquished in 1973.

9.3. Comalco (1974-1979)

The main aim of Comalco exploring the Moina area was to locate a fluorite body (magnetite-fluorite skarn) for their aluminium smelting needs. Investigations also included the search for Sn, W, Au and Pb-Zn. Askins (1980) focussed on the broader area (488km² later reduced to 405km²) including 18km² released in 1976 by the Mines Department. This large exploration licence covered the whole of EL14/2006.

Comalco's activities included a literature search, stream sediment sampling, rock chip sampling, colour air photo collection, a reassessment of airborne magnetics, geological mapping and selected prospects were gridded and soil sampled. Follow up work on grids included rock chip collection, ground magnetics and induced polarisation surveys.

Comalco suggested that gold and lead at Five Mile Rise may be remobilised from volcanogenic base metal deposits and recommended an EM survey, however this was not done. Comalco also mapped the Dove Granite adjoining the Moina Sandstone at the Golden Cliff as previous workers had done. The level of alteration within rocks at this locality had even led Freeport (1973) and Jennings (1963) to conclude that the Dove Granite intruded the Moina Sandstone in this area. This strong alteration highlights the prospectivity of the Cambrian units in this area.

Future work identified by Comalco included follow up of copper and zinc anomalies in Olivia Creek, Dove River, a tributary below magnetic anomaly 14 (Zaravatjian, 1966) and copper from streams draining magnetic anomaly 12 (Zaravatjian, 1966) above the Powerful Mine.

Significant results include four samples of Dove Granite (rock chips) that contained anomalous Cu, Pb and Zn. Eight other anomalous samples were taken from the Lorinna Greywacke and maximum values for all rock chips in these units were 175ppm Cu, 245ppm Pb, 245ppm Zn and 1500ppm F.

Two -20# stream sediment anomalies of 65ppm Cu (60ppm considered anomalous using this mesh size) and one F anomaly of 950ppm were also found to drain the granite at the Powerful Prospect. Like Freeport had experienced, it was again recommended that a finer mesh size would be a more appropriate technique. Follow up work on select anomalies was then undertaken using -80#.

Stream sediment copper anomalism was defined in the Campbell River (to 375ppm Cu) using -80#, possibly attributable to weathered dykes intruding the schists that contain up to 340ppm in rock chip, this area was later relinquished by Shell in 1983.

9.4. Shell (1980-1984)

EL7/1974 was Joint Ventured with Shell in 1980. The licence was still a large 405km² holding when Shell became the Joint Venture Manager.

Shell's exploration focus was for cassiterite rich magnetite or pyrrhotite rich skarns. Mineralisation models for targets were wriggilite skarn like Shepherd and Murphy Mine and Renison style skarn deposits. They had ancillary targets of coarse scheelite and stockwork greisens tin-tungsten deposits and sphalerite skarns adjacent to the Shepherd and Murphy Mine. Shell undertook a 250m

line spaced helicopter-borne magnetics survey with 100m terrain clearance to explore for their primary target.

Shell also undertook -20# stream sediments (despite the evidence from two previous surveys that a finer mesh is more appropriate) and a more localised survey using -80#. Pb anomalies (65 to 245ppm) in stream sediments south of Five Mile Rise were believed to be sourced from veins or related to "Devonian" Dove Granite emplacement rather than volcanogenic deposits and were not considered a priority target. Three -20# Pb anomalies were also identified in a tributary of Bull Creek near Daisy Dell in an area mapped as Tertiary basalt (Smyth, 1981).

Shell identified the "Lorinna East" bullseye anomaly adjacent to the Powerful Mine as "possibly a plug with a south dip". They drilled one 200m long percussion hole into the bullseye anomaly. The lithologies intersected were Tertiary basalt to 58m, Tertiary clays to 80m, Pre-Cambrian schist with minor granitic veining to 200m. Susceptibilities in the basalt were considered too low to explain the aeromagnetic anomaly (Smyth, 1981). Remanent magnetism studies were meant to be done on these basalts. The conclusion was that remnant magnetism caused the anomalies even though the aeromagnetic signal "could not be formational" according to the report and no evidence was tendered that remnant magnetism studies were done. The drill hole contained elevated Ba, Cu, Zn, however it was not assayed for gold, despite being located adjacent to the Powerful Gold Mine.

The exploration licence area was reduced in 1984 but no work was completed on the prospects within the current Dove River licence area retained in the 7/74 licence.

9.5. CRAE (1985)

In 1985, CRAE became managers in EL7/74 in a three-way joint venture with the Commonwealth Aluminium Corporation (Comalco) and Shell. CRAE embarked on another very widely spaced reconnaissance stream sediment survey north of the current licence and reprocessed and reinterpreted Shell's aeromagnetic data. Exploration licence 7/74 was reduced in 1987 with the Dove River area dropped, with the joint venture maintaining tenure over the Moina fluorite deposit via Retention Licence.

9.6. RGC (1989-1990)

RGC originally picked up the EL8/1988 to look for economically viable gold or Renison-style tin mineralisation in the Moina Sandstone and Gordon Limestone associated with the Dolcoath Granite. During 1989-1990 RGC conducted exploration on the Five Mile Rise area as part of a program that compiled and assessed previous geophysical data and integrated it with new sampling, mapping and ground geophysics. EL8/1988's southern limit was approximately the northing of the Devon Mine.

A 20.5km grid was established at Five Mile Rise with an east-west base line and 15 north-south lines spaced every 200m easting. Mapping was completed from scarce outcrop and C-horizon soil samples taken every 25m in a north-south direction. Soil sampling was aided by a well-developed soil profile allowing representative samples to be taken. The grid was largely located over the Ordovician Moina Sandstone. Results were not reported until 1990.

A program of stream sediment and rock chip sampling was undertaken by consultant W. Herrmann

for RGC in 1989. The stream sediment survey of approximately 160 sample sites was a regional program covering three other licences and EL8/1988 which overlaps with the current tenement. Fifty gram panned concentrate (from <0.5mm and >200 mesh fraction) and -200 mesh wet sieved fractions were collected at 20 locations within the current licence and assayed by Neutron Activation Analysis. Very high gold values were obtained from the sediments in the Five Mile Rise Goldfield. Moderate anomalism was obtained from the Powerful Prospect area and moderate-high anomalism was recorded in a south draining creek, north of the Devon Mine. This anomalous sample was not repeated in the creek immediately to the east suggesting a local source (**Figure 4**). The Dove River was excluded from the survey due to high water levels.



Figure 4: Gold Anomalous Samples Collected by Herrmann (1989) North of the Devon Mine

Herrmann (1989) also located two high grade gold, silver and base metal rock chip samples from the Devon Mine (3.6g/t Au, 428g/t Ag, 6.7% Pb, 1.95% Cu and 6.3g/t Au, 433g/t Ag, 7.8% Pb and 0.5% Cu) and a highly anomalous grade gold sample adjacent to the south draining creek north of the Devon Mine. This anomalous sample was from a NNW trending milky quartz vein with minor hematite. Despite this coincident stream sediment and rock chip anomalism, the area was not further scrutinised (Figure 4), neither was the prospectivity of the Devon Mine. Two further rock chips from the edge of Lake Cethana yielded low metal values, however one in the creek below Golden Cliff had gold to 0.093ppm.

Further rock samples (M prefix) were also collected but not assayed, these samples are believed to

have been destroyed when Placer took over RGC (M. Vicary pers. comm.). Thirty-nine of these were taken inside in the current tenement, many of which have been duplicated by rock chip sampling this reporting year.

Results from the C-Horizon soil survey at Five Mile Rise (1989) highlighted geochemical anomalism coincident with IP (chargeability and resistivity) anomalies south of Five Mile Rise. The RGC geophysicist also noted that chargeability highs in part may coincide with Dove Granite at depths of only 100-150m. Drilling was recommended. However because RGC mistakenly thought all mineralisation (including that in the Cambrian rocks) was Devonian, the targets were never followed up. Forty-one rock chip samples were collected on the Five Mile Rise grid over the Ordovician sandstones. Wacker bedrock sampling was recommended to follow up soil anomalies in the Ordovician rocks.

Castro and Fleming (1990) indicated that exploration re-focussed on geophysical methods rather than mapping and sampling as this data was previously completed in 1989. Ground magnetics and a gradient IP survey were conducted over the Five Mile Rise grid. Only reconnaissance mapping and sampling was conducted where soil geochemistry had indicated "slight anomalism".

A sub-regional magnetic gradient was defined on the Five Mile Rise grid. R. Deakin (in Castro and Fleming, 1990) interpreted the magnetic gradient in the north of the grid to be a slab of weakly magnetic rock with an equivalent intensity to the Dove Granite at approximately 100m depth and approximately 1km thick with superimposed individual 100-200 nT anomalies possibly reflecting basement highs. The ground IP survey did not define anomalous conductors, however several chargeability anomalies were defined at around 100-200m depth. Within Castro and Fleming's report (1990), R. Deakin reported on the survey and identified five chargeability anomalies and 6 drill targets which were never tested. Deakin also made the mistake of referring to the Dove Granite as Devonian.

After the geophysical surveys and final sampling were completed, RGC decided that no further work was warranted in the Five Mile Rise area. This is probably due to their stated primary aim of locating economically viable gold mineralisation related to the Dolcoath Granite in the second year of exploration. The data collected was considered to be largely sufficient for the assessment of the licence and the area within the current exploration licence (14/2006) was relinquished.

9.7. Rio Tinto Exploration (1996-1997)

Rio Tinto acquired a new Exploration Licence - EL30/1996 covering 242 km² which is approximately eight times larger than the current EL but it included the whole current EL. The target style was sediment hosted fine grained sulphide poor Carlin or Sepon style gold. They were focused on the Ordovician Gordon Limestone and the Moina Sandstone where they are intruded by Devonian Granite.

Rio Tinto collected 12 -80# stream sediment samples and 12 panned concentrate samples. They found the Five Mile Rise area to be anomalous for gold and lead. Rio Tinto then reviewed RGC's soil and ground geophysical data for Five Mile Rise and decided that existing small workings were not a viable target of this type. The main reason for their withdrawal was the lack of conductors in the RGC survey. The licence was surrendered November 1997.

10. Exploration Completed by Pluton Resources 2006 - 2012

During the 2006-2007 field season, Dove River Pty Ltd drilled three diamond drill holes, one at Five Mile Rise and two at the Powerful Prospect. In 2008, two diamond drill holes were targeted under the historical Devon Mine workings. The best drilling results are summarised below, highlighting narrow zones of metal anomalism (**Table 3**).

Hole_ID	From	To	Interval
DR1	232	242	10m @ 0.1% Cu
incl	232	233	1m @ 0.34% Cu
DR1	299	300	1m @ 0.52 g/t Au
DR1	315	316	1m @ 1.13g/t Au, 63.3g/t Ag and 3.03% Pb
DR1	336	337	1m @ 1.37g/t Au
DR2	90	98	8m @ 0.06% Cu, 0.27g/t Au, 149ppm Co, 0.59g/t Ag
including	90	91	1m @ 1.96 g/t Au, 0.09% Cu, 1.45g/t Ag and 145ppm Co
DR2	128	134	6m @ 55ppm Mo
DR2	138	152	14m @ 0.02% Cu
DR2	256	260	4m @ 0.04% Cu
DR3	31	32	1m @ 1.39 g/t Au
DR3	102	103	1m @ 170ppm Mo
DR3	132	133	1m @ 0.2 g/t Au, 0.05% Cu, 2g/t Ag
DR3	194	195	1m @ 0.12% Co, 2.15g/t Ag, Te, Se association
DR3	239	240	1m @ 93.4ppm Mo
DR3	366	367	1m @ 0.56% Zn, 0.11% Pb
DEVD1	80	81	1m @ 0.07% Cu, 1.1 g/t Ag
DEVD1	103	110	7m @ 0.08g/t Au, 0.7g/t Ag, 83ppm Co
DEVD1	168	169	1m @ 0.07g/t Au, 1.5g/t Ag
DEVD1	170	171	1m @ 84ppm Co
DEVD1	177	178	1m @ 0.08g/t Au, 0.07% Pb
DEVD1	202	203	1m @ 0.21g/t Au, 5.7g/t Ag, 0.25% Pb
DEVD1	211	212	1m @ 0.8g/t Ag, 0.07% Pb, 0.09% Zn
DEVD1	217	218	1m @ 0.04g/t Au, 0.9g/t Ag, 0.1%Pb
DEVD2	31	32	1m @ 63.4 g/t Silver
DEVD2	73	76	3m @ 190ppm Cobalt and 40ppm Molybdenum
DEVD2	79	81	2m @ 177ppm Cobalt
DEVD2	83	84	1m @ 0.23% Copper
DEVD2	100	112	12m @ 0.12 g/t Gold, 6.3 g/t Silver and 165ppm Cobalt
including	101	104	3m @ 0.33 g/t Gold and 19.6 g/t Silver
and	101	102	1m @ 0.43 g/t Gold, 17.2 g/t Ag and 208ppm Cobalt
and	103	104	1m @ 0.39 g/t Gold, 41 g/t Silver, 0.69% Copper, 0.51% Lead and 0.77% Zinc
DEVD2	119	120	1m @ 103 g/t Silver

Table 3: Pluton Drilling Intersections

Work completed during 2009 refocused on the regional rock chip data set and associated petrological study which considered rock chip data collected from the regional samples in Pluton's adjacent tenements and drill core from all recent drill holes. The petrological work was accompanied by an independent expert report into the porphyry potential of Pluton's Tasmanian tenements.

Work completed during 2010 involved revisiting the Powerful and Five Mile Rise Prospects including the collection of new hand samples from Five Mile Rise. An independent expert specialising in NSW porphyry-skarn alteration systems was asked to examine and compare the existing drill core to other porphyry prospects.

The report by Michael Van Dongen into the porphyry potential of the Tasmanian tenements identified multiple, crosscutting hydrothermal features, which are considered by Pluton to be characteristic of economic porphyry systems (cf. nine vein stages recognised within individual Northparkes deposits) and alteration zones, which provide reasonable evidence for porphyry mineralisation at Five Mile Rise. However, it was noted that vein densities in the DR1 core are not those expected of proximity to the economic parts of porphyry systems, but this is interpreted as not having intersected the zones of highest paleo-fluid flow.

Work completed during 2011 involved revisiting drill core from the Powerful Prospect, Five Mile Rise Prospect and the Devon Mine for the collection and submission of samples for lead isotope work. It is believed that the vein systems intersected during drilling are likely to be Cambrian in age and the lead isotope study was used to confirm this relationship.

In addition, geophysical IP surveys were recommended to be completed at the Five Mile Rise Prospect. One IP line is proposed near the extension of the Devon Structure and Great Caledonian workings and the second IP line is proposed over the southern flank of Five Mile Rise.

In 2012, SJ Geophysics Ltd was contracted by Pluton Resources Limited to acquire geophysical data at the Dove River licence in the vicinity of the Great Caledonian workings. Pluton completed a preliminary interpretation of the IP geophysical data generated at the Great Caledonian Prospect. The results of both the dipole – dipole and pole – dipole chargeability data indicate a geophysical anomaly located at approximately 150 metres depth at 300E on section line 1N.

Figure 5 shows the dipole – dipole interpreted chargeability. **Figure 6** shows the pole – dipole interpreted chargeability.

This anomaly remains to be drill tested.

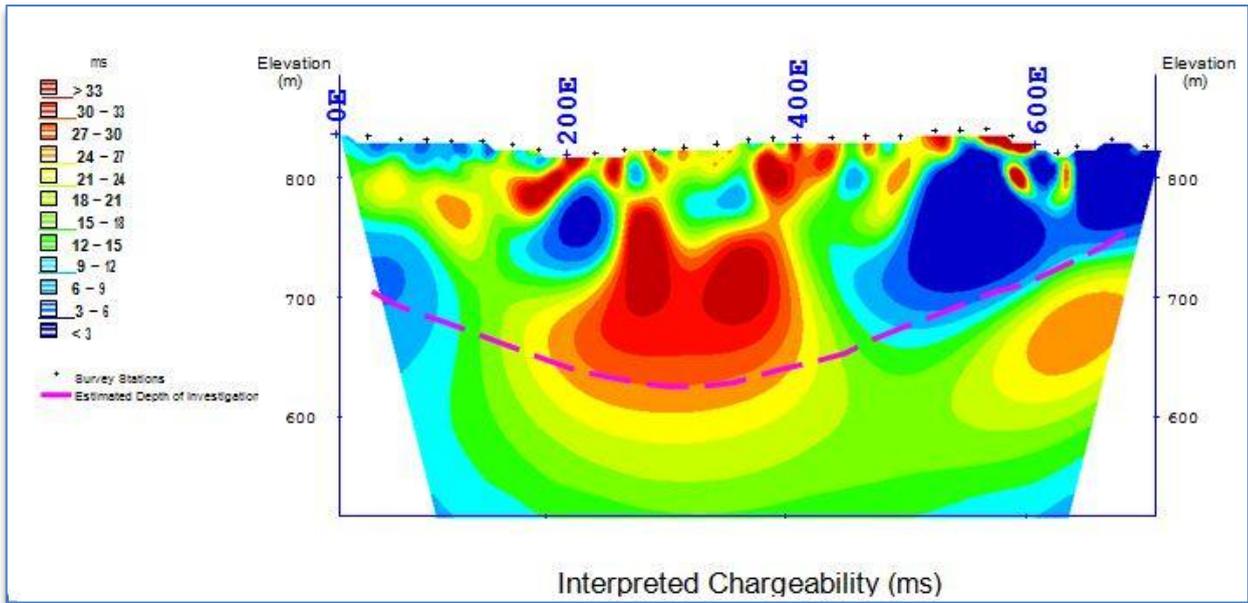


Figure 5: Dipole – Dipole Interpreted Chargeability Section 1N

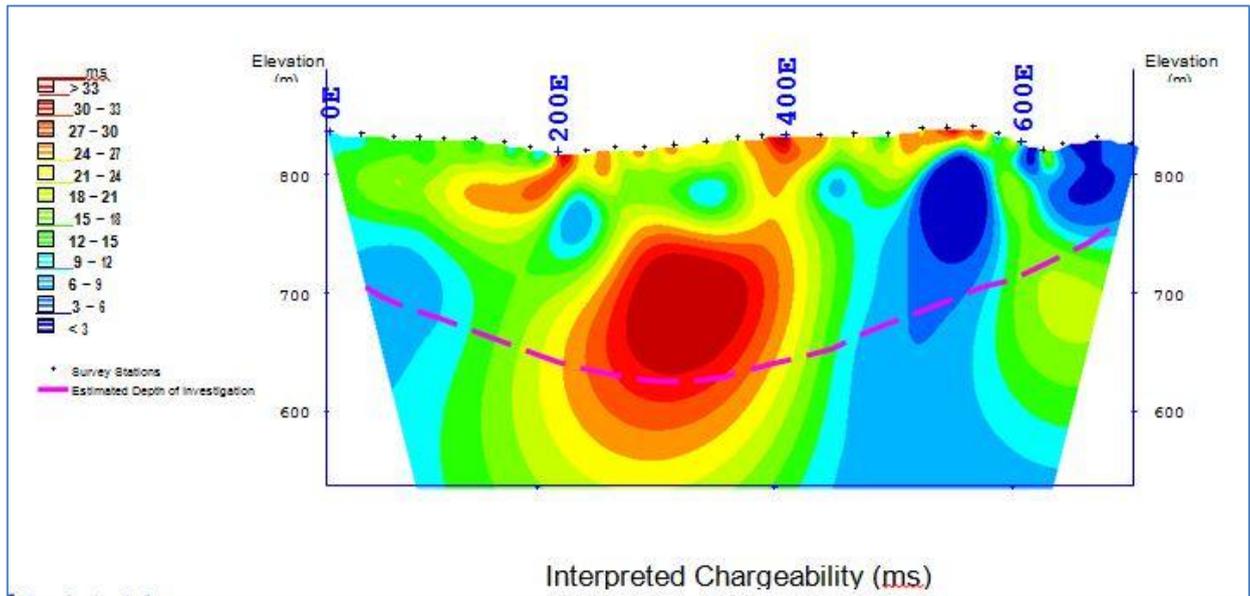


Figure 6: Pole – Dipole Interpreted Chargeability Section 1N

11. Exploration Completed by Pluton Resources 2013

Due to the addition of the World Heritage Area extensions by the previous Labor Government that covers a significant proportion of EL14/2006 – Dove River and the current uncertainty of the land tenure, the Board of Pluton Resources has not been able to commit exploration funds to the project to enable it to undertake its planned exploration in 2013. A summary of the World Heritage area extension listing is given in the following section.

Tasmania has over 1.4 million hectares of World Heritage-listed lands and forests. On June 24th 2013, this area was expanded by a further 170,000 hectares when the United Nation's World Heritage Committee accepted a nomination by the then Federal Labor Government for a 'minor boundary modification'.

On the 25th June 2013, the Hon Mark Butler, Minister for the Environment, Heritage and Water gave notice under section 315 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) that areas described in Schedule C were added to the Tasmanian Wilderness World Heritage Area in 2013. The areas labelled as “the extension area” and shaded in dark green are shown the summary map (Figure 7).

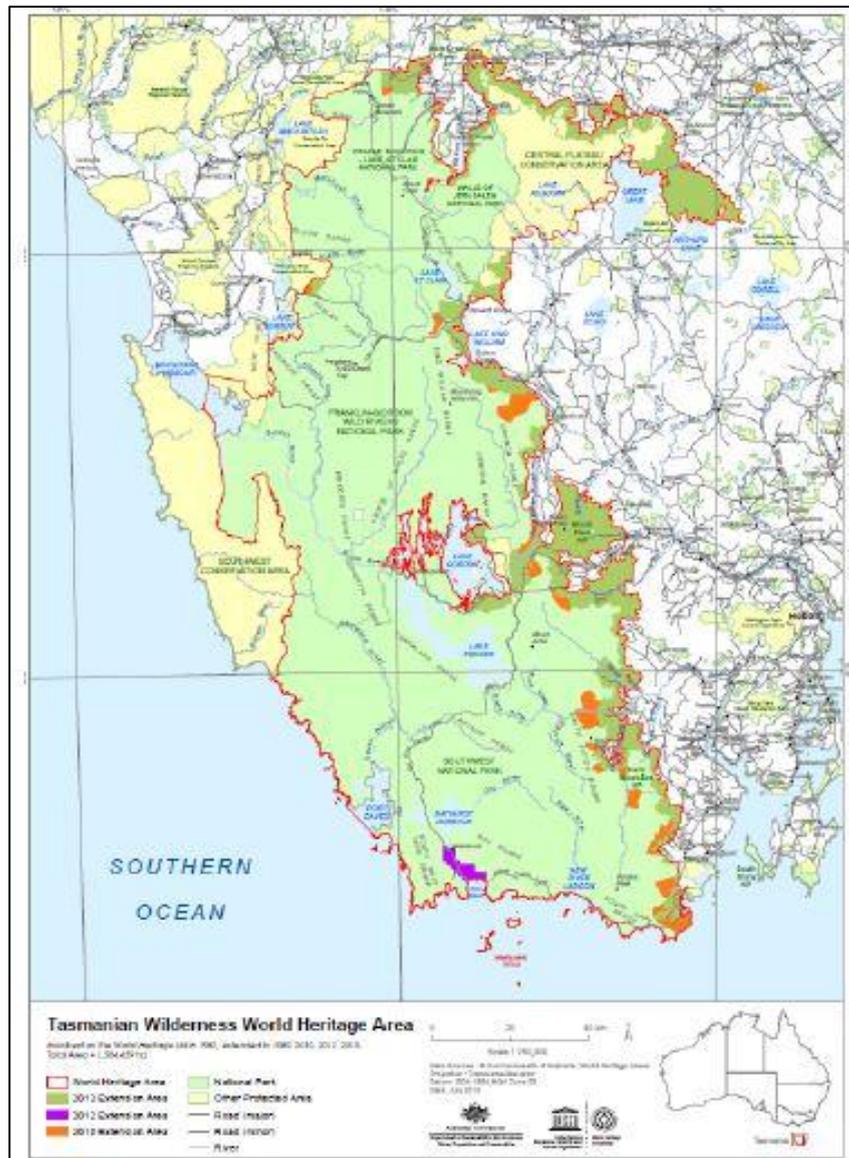


Figure 7: World Heritage Extension Areas 2013 Tasmania (dark green)

Three areas at Dove River were included as part of the extension in Schedule C and are summarised as follows:

Dove River Forest Reserve	2,415 hectares
Dove River Conservation Area	862 hectares
Swift Creek Conservation Area	462 hectares

The extension area encompasses a significant proportion of EL14/2006 Dove River and is shown schematically in **Figure 8**.

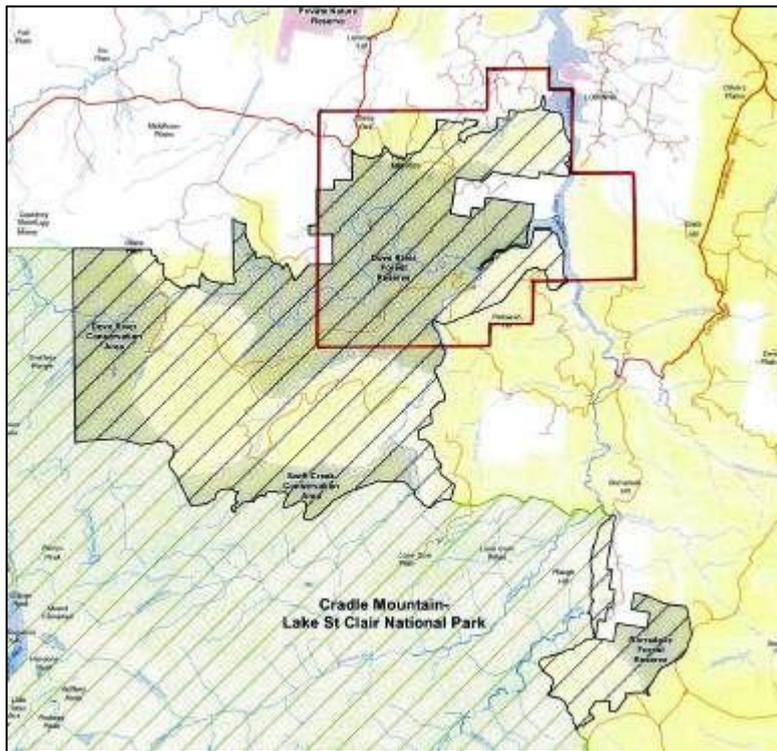


Figure 8: EL14/2006 Lease Boundary and WHA Extension Areas Dove River

On the 7th September 2013, a federal election to determine the members of the 44th Parliament of Australia was held. The incumbent centre-left Labor Party Government lead by Prime Minister Kevin Rudd was defeated by the centre-right Liberal/National Coalition opposition led by the Opposition leader Tony Abbott and Coalition partner the National Party of Australia led by Warren Truss.

Recent liaison with the Federal Department of Environment since the announcement on the World Heritage extension area has not provided any further clarity on the issue. In addition, the change of federal government and initial statements from the new Coalition government has done nothing to reduce the uncertainty surrounding the land tenure status.

We have recently written to the Federal Minister for the Environment requesting clarification on the issue and explaining how this is jeopardizing our tenure commitment. As yet, we have not received a response. However, upon receipt of clarification on the status of this issue, Pluton will be either able to commit the necessary expenditure or seek another exemption due to on-going in decision.

12. Expenditure

The expenditure requirement set by Mineral Resources Tasmania on the exploration licence was \$37,000 over the current reporting period. Pluton Resources has spent a total of \$938,000 on the licence over the last seven years.

During the reporting period, Pluton Resources has spent approximately \$8,131.13 on the Dove River licence being comprised of annual licence renewal and rental fees.

The expenditure detailed below is approximate for the 12 month period December 2012 to December 2013.

Geology	\$5,142.20
Geochemistry	NIL
Geophysics	NIL
Drilling	NIL
Track Clearing & Rehab	NIL
Other	\$2,988.93
Administration	NIL

Sub-Total	<u>\$8,131.13</u>
Previous Expenditure	<u>\$938,092</u>
Total to date	<u>\$946,223.13</u>

13. Conclusions

The Dove River exploration licence has considerable untested potential to host bulk tonnage copper-gold deposits. The alteration styles (potassic, phyllic and propylitic alteration) and the mineralisation style (disseminated copper in DR1 and gold-sulphide veins DR1, DEVD1 and DEVD2) intersected in drilling provide confirmation that the region is capable of producing mineralisation of interest for porphyry exploration. The challenge is to find geochemical, alteration and geophysical vectors to target areas of high fluid flow and potential traps for such mineralisation.

The focus of ongoing work will be to weigh up the comparable prospectivity for bulk tonnage deposits and smaller higher grade vein or skarn systems. With this in mind, the potential for bulk tonnage at Five Mile Rise has not been discounted and may yet prove to be a viable bulk tonnage target.

The IP survey completed over this area at the Great Caledonian Prospect has defined a target that is considered suitable for drill testing.

An additional IP survey line that was proposed in 2011 remains to be completed.

The Powerful system has been identified as likely too deep and “batholithic”, however strong magnetite veining with associated with elevated molybdenum values is a curious and largely unexplained feature which may have a proximal source that is richer in copper and gold. The likelihood is that targeting such mineralisation would be confounded by the interference by the magnetic flow bases of Tertiary basalts at very similar depths to known magnetite veining in the Cambrian units. It is also likely that if a more sulphide rich zone within the anomaly exists that EM methods would also suffer interference by the basalts as seen with Mincor’s VTEM surveys conducted on the Round Hill licence to the north

Pluton will continue to focus on adding value to the Dove River licence by demonstrating the potential for large-scale mineralisation in proximity to the Cambrian Dove Granite.

The variation of lithologies within the Dove Granite and associated porphyry indicates there are a range of compositions within the intrusive Cambrian rocks. The intermediate “hornblende granodiorite” phase of the Dove Granite intersected in the lower part of drill hole DR3 and porphyries intersected at the Devon Mine may be a more suitable source rocks than the more granitic phase.

14. Future Work

The Five Mile Rise area has been re-assessed to see if magnetic phases within the Dove Granite are a possible source rock for mineralisation. Hand samples collected during previous exploration programs by Pluton were found to be similar to other granodiorites within the Dove Granite. As a result, the broad copper anomaly in soils mirroring the mapped outcropping Cambrian volcanics south-east of Five Mile Rise have been identified as areas requiring ground IP geophysical surveys to locate areas of high fluid flow.

EM methods may also be considered for the Thistle prospects within the Five Mile Rise goldfield after the IP survey is complete.

Pluton has completed an interpretation of the IP geophysical data generated at the Great Caledonian Prospect. The results of both the dipole – dipole and pole – dipole chargeability data indicate a geophysical anomaly located at approximately 150 metres depth at 300E on section line 1N.

This anomaly is to be drill tested.

15. References

- Askins, P., 1980. EL 7/74 - Moina General Area, Report on all investigations to December 1979, Commonwealth Aluminium Corporation Ltd. Exploration Department (TCR 80_1416)
- Austin, G. and Serim, S., 1973. Exploration for Porphyry Copper, the Dove Granite area, Tasmania, preliminary field report, Cundill, Meyers and Associates Pty. Ltd. (Part of TCR 73_977)
- Corbett, K.D. and McClenaghan, M.P., 2003. A review and interpretation of the Lower Palaeozoic geology of the Que River – Sheffield Area with particular reference to the Cambrian volcanic sequences, *Tasmanian Geological Survey Record 2003/17*, Mineral Resources Tasmania.
- Crawford, A.J, Corbett, K.D. and Everard, J.L., 1992. Geochemistry of the Cambrian Volcanic Hosted Massive Sulfide Rich Mount Read Volcanics, Tasmania and some Tectonic Implications, *Economic Geology* 87, p597-619
- Fleming, M.J. and Castro, C.H. 1989. EL8/88 - Lorinna and EL36/88 - Round Mountain - Annual Report 1989, RGC Exploration Pty. Ltd. (TCR 89_3038)
- Fleming, M.J. and Castro, C.H. 1990. EL8/88 - Lorinna and EL36/88 - Round Mountain – Report on Areas Relinquished on 22 August 1990, RGC Exploration Pty. Ltd. (TCR 91_3163)
- Foster, M.J., 1969. Progress Report on Activities in EL8/65 Moina Area to March 1969, The Mt Lyell Mining and Railway Company Ltd. (TCR69_592)
- Funnell, F.R. and von Strokirch, T., 1987. Mt Romulus EL24/84, Progress Report on Exploration for the 12 months to 25th November 1987, CRA Exploration Pty Ltd (TCR 87_2725)
- Jennings, I.B., 1963. Middlesex 1:63360 Series Explanatory Report, Geological Survey of Tasmania.
- Madden, J., 1997. EL30/1996 Mersey - First and final report for the Period 9 November 1996 to 13 November 1997, Rio Tinto Exploration Pty Ltd. (TCR 97_4097)
- McDougall, I. and Leggo, P.J., 1965. Isotopic Age Determinations on Granite Rocks from Tasmania, *Journal of the Geological Society of Australia* Vol12, p.295-332.
- McDougall, J. and Reed, A., 2007 Dove River Annual Report, Tasmanian Company Report, Pluton Resources
- McDougall, J, 2011 Dove River Annual Report, Tasmanian Company Report, Pluton Resources
- Montgomery, A., 1893. Report on the Mineral Discoveries in the Neighbourhood of Bell Mount, Old Series Report No.111, Geological Survey of Tasmania
- Nye, P.B., 1928. Report on the Devon Mine, Unpublished Report, Geological Survey of Tasmania.
- Nye, P.B., 1933. Quarterly review of the gold mining industry of Tasmania for the quarter ending 30th June, Unpublished Report, Geological Survey of Tasmania.
- Pemberton, J. Et al. 1991. Geology of the Cradle Mountain Link Road-Mt Tor area, *Geol. Rep. Mt Read Volcanics Project Tasmania 4*, Division of Mineral Resources.

Reid, A.M., 1919. The Mining Fields of Moina, Mt Claude and Lorinna, Geological Survey Bulletin No.29, Geological Survey of Tasmania.

Reid, A.M., 1919b. The Mount Pelion Mineral District, Geological Survey Bulletin No.30, Geological Survey of Tasmania

Reid, K.O., 1967. Progress Report on Activities in EL8/65 (Moina Area) to June 1967, The Mt Lyell Mining and Railway Company Ltd. (TCR 67_470)

Smith, J. Harcourt., 1898. Report on the Bell Mount and Middlesex Mineral Fields, Secretary of Mines Report 1898-99, Geological Survey of Tasmania

Smyth, W.D., 1981. Exploration Licence 7/74 – Moina Progress Report on Exploration during the Period 1/1/1980 – 31/7/1981, The Shell Company of Australia Ltd. Metals Division. (TCR 82_1728 part 1)

Twelvetrees, W.H., 1907. Report on the Bell Mount and Middlesex District, Secretary of Mines Report, Geological Survey of Tasmania

Twelvetrees, W.H., 1913. The Middlesex and Mount Claude Mining Field, Geological Survey Bulletin No.14, Geological Survey of Tasmania

Van Dongen, M., 2010, Report on Consultation RE: Cethana Anomaly Area, December 2010, Unpublished Report, Uniquist Pty Ltd.

Waller, G.A., 1901, Report on the Mineral Districts of Bell Mount, Dove River, Five Mile Rise, Mount Pelion and Barn Bluff. Secretary for Mines Report 1900-01, Geological Survey of Tasmania

Walsham, B.T., 1973. Report on Exploration Licence Area No. 12/73 in the vicinity of the Dove River, Freeport of Australia. (Part of TCR 73_977)

Wilson, A., Cooke, D., and Thompson, J., 2002. Alkalic and high-K calc-alkalic porphyry Au-Cu deposits, A summary. CODES Special Publication 4, Giant Ore Deposits: Characteristics, genesis and exploration. p 51-55.

Zarzavatjian, P.A., 1966. Aeromagnetic Survey Staverton Area North Central Tasmania, AMEG Pty. Ltd. for The Mt Lyell Mining and Railway Company Ltd. (TCR66_431)

Appendix 1 - List of Digital Files

EL14_2006_201312_01_Report.pdf