



Gold : Mantle Mining Corp Ltd (MNM)

By : Eagle Research (Keith Goode)	SEPTEMBER 2016 VISIT TO WOODS POINT IN VIC	19 October 2016
Year Low/High:	\$0.009 - \$0.022	Recommendation
Diluted No. Shares	1136.8m	Share Price
Diluted Mkt Cap :	A\$13m	Target Price
Net debt (est 30 June 2016)	-A\$1.6m	> A\$0.02
244m options out-of-the-money	www.mantlemining.com	T: +618 9389 3130

Mantle Mining Corporation Limited (MNM) – Reviving the Woods Point Goldfield

- **Mantle Mining (MNM) has recently acquired most of the Woods Point goldfield in Eastern Victoria, and applied for an EL covering most of the remainder. The project area covers a NW/SE striking dyke swarm in which the dykes have periodically bulged along their length. Within the dykes there are flat, east dipping and west dipping lodes, comprised commonly of visible gold in quartz, and which appear to have been usually enriched mostly on the upper edges where the lodes pass from the bulge into the sediments.**
- **The Morning Star mine is perceived to be the main asset, and it went through two major mining profitability periods, the first being after its discovery where parts of the hill graded up to ~44oz/t, and in 1865 when its expected average grade was 3.1oz/t (~100g/t), with some 266koz mined at ~2oz/t (~70g/t) in the first 9 years to 1869. And the second by GMA (part of WMC) from 1935 to 1963 for ~255koz at 0.65oz/t (~22.4g/t), when it closed due to increasing depth, power-line costs and a low gold price (US\$35/oz[A\$32/oz]). The last operator (MCO) went into receivership in late 2014, due to ignoring the historical records.**
- **Quite surprisingly although historically stated in more than one place (even since the 1860s) that the richer gold grades at Morning Star were in "dyke over sediment" on the contact, ie on the up-dip side, so for an east dipping lode or reef, the higher grades are on the western side. The previous owners (MCO) went into insolvency targeting the down dip sides of a number of reefs, which when developed, found they were uneconomic.**
- **Visiting the nearby, operating, A1 Gaffneys gold mine, highlighted a number of reefs that have been encountered, but barely exploited at Morning Star. Such as the breccia zones (currently being mined by A1 at ~10.5g/t [and discovered in an area of older stopes]), or the "mutton-fat" lodes (of which A1 has mined 3) being degenerated quartz near the payable reef, grading 3g/t to 10g/t or higher.**
- **However, of greater potential has to be the shape and length of the dyke bulge, A1's has increased from ~200m to >500m long and is completely non-uniform vertically and horizontally as shown in Figures 11 and 12. Morning Star's dyke bulge still has the same profile of its 1902 plan by Whitelaw, with barely explored north, south and lateral extensions or even parallel structures as have been encountered in other dyke bulges.**
- **Although there is a dyke swarm, it seems that only the main bulges were focused on, there are bulges that were not continued for one reason or another and have not been looked at for ~90 - 100 years. The Rose of Denmark for example was mostly mined/stoped outside of its dyke bulge over its 62-year life to 1926. The swarm also includes a number of pure auriferous quartz veins that appear to have mostly lain dormant for over 100 years.**

Other Key Points:

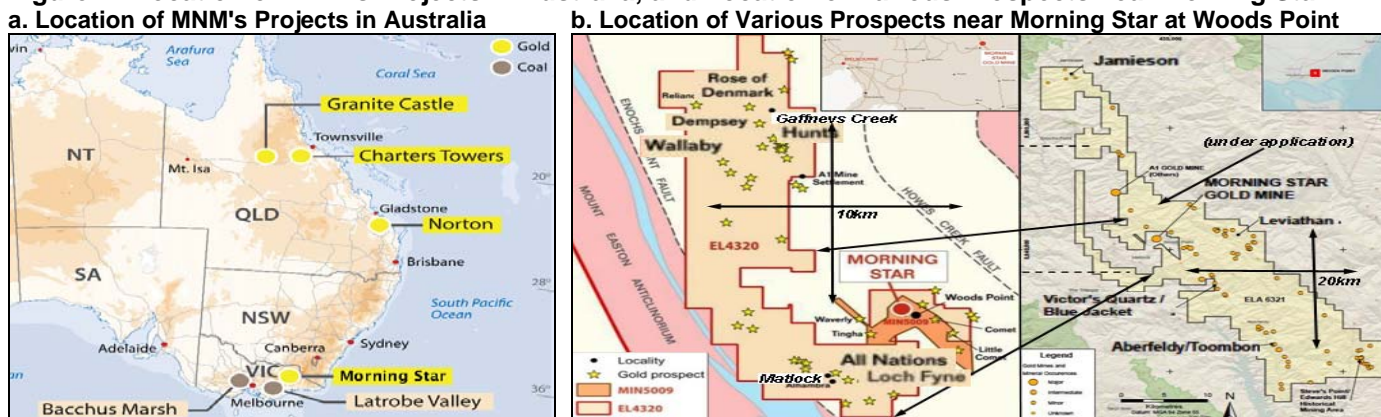
- **Infrastructure is good, as in most of the mine areas do seem to have historical access roads, and some refurbishment was made by MCO, however, the terrain does consist of steeply incised valleys.**
- **Vertical mineralisation "gaps" in the bulges appear to be fairly common, and perhaps drilling beyond the possible >100m vertical gap is then required.**
- **Some of Mantle's other gold projects look interesting, such as near Charters Towers, its NW/SE striking vein system at Granites Castle, or Norton project near Gladstone, but they have not been considered in this report.**
- **Ranking the numerous Woods Point prospects is required for exploration and may have to include their ability to be mechanised or mined by open-cut.**

Corporate Overview

This is our first report on Mantle Mining Corporation Ltd (MNM), which listed in November 2006, mostly on a group of prospects in the Charters Towers region. MNM dabbled in coal, uranium and phosphate, and coal in Victoria before acquiring the Norton gold project in QLD from NGF (Norton Gold Fields, now Zijin), in November 2013 for ~\$300k. Norton was progressing towards production when MNM acquired 95% of Morning Star Gold NL (MCO) in May 2016, which resulted after review in Norton being mothballed in August 2016, before major expense was incurred. MNM has stated its intention is to divest its coal assets.

The Morning Star acquisition was a \$200k down payment followed by 3 tranches of \$1m each (on 30 June 2016 [since paid], 31 October 2016 & 28 February 2017). Mantle estimated that it had ~\$0.3m cash after the 30 June payment of \$1m on 1 July, with ~\$2.54m expected to arrive from placements in SQ 2016 and a possible R & D refund of \$0.4m. The placements have resulted in the current **1136.8m fpo shares** in issue. There are also **244m options** that are "out-of-the-money" of which the nearest to expiry are 118.9m @ 1.5c by 30 November 2017. Mantle has also undergone a complete board change in 2016, with Rick Valenta (ex Chesser) becoming MD. Mantle's various projects (all in Eastern Australia) are shown in Figure 1a, with the new Morning Star tenement package, together with the EL Application in Figure 1b, covering most of the remaining goldfield, apart from AYC's holdings.

Figure 1. Location of MNM's Projects in Australia, and Location of Various Prospects near Morning Star

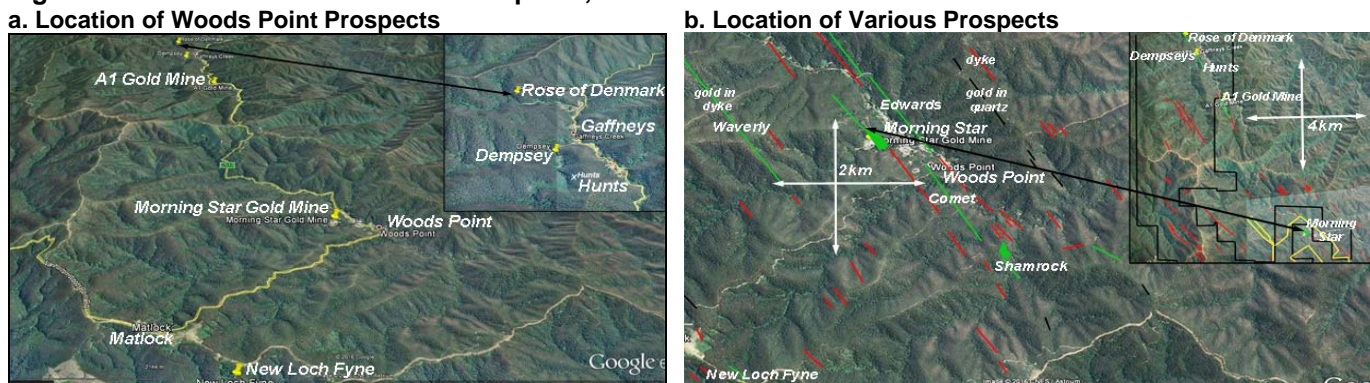


This report focuses on Morning Star, which ERA visited along with the Rose of Denmark, Dempseys and Hunts, plus a visit to the A1 Gaffney's Creek mine. We did not manage to visit New Loch Fyne, but it is included in Mantle's area of interest in the Woods Point goldfield.

Background History to Morning Star (MNM acquiring 95%)

The discovery of gold at Morning Star goes back to the alluvial gold rush along the Goulburn river where miners worked their way south from Jamieson to Gaffney's Creek in 1860, which was initially believed to be the southern limit (at Raspberry Creek) of alluvial gold. Dempsey's was discovered in a nearby creek to Gaffney's as shown in Figure 2a, recording 36oz in the first 12ft x 12ft (~3.6m x 3.6m) paddock, and 45oz/t (1540g/t) from Dempsey's reef in the river bed. Figure 2a also shows the tracks on the ridges that became the main routes for accessing the Woods Point goldfields, due to the steeply riven terrain.

Figure 2. Location of Woods Point Prospects,



Wm Gooley continued south in early 1861, sampling the streams and discovered gold at Gooley's Creek ~2 mls (3km) south of Woods Point, reputedly averaging 50oz to the paddock which sparked a gold rush further south from Gaffney's. Interest picked up significantly later in 1861, with the discovery of a number of sizeable gold nuggets (23oz, 36oz, 37oz, 82 oz and a number of 17's [oz]), all of which were apparently not "that waterworn and semi-crystalline" at the junction of the Jordan and BB creeks with the comment that they had to have come from the BB creek branch. The BB creek dyke as shown in Figure 9a, appears to be folded, with the top half partly in the river bed, but little mention has otherwise been made of it.

By early 1862, there were reputedly up to ~4000 alluvial miners working the numerous creeks/ivers from Gaffney's Creek (SE of Rose of Denmark) to Jericho (~6km SE of Matlock), as shown in Figures 1b and 2a. While an alluvial claim was being worked in mid-1861 at the junction of what became Morning Star Creek and the Goulburn river, one of the workers, Joe Corry, cut across a spur on his way to the creek and discovered quartz studded with gold - which became Morning Star, and the JV crudely crushed 15cwt rock for 33oz ie 44oz/t (or ~1500g/t, 1oz/short ton =34.3g/t).

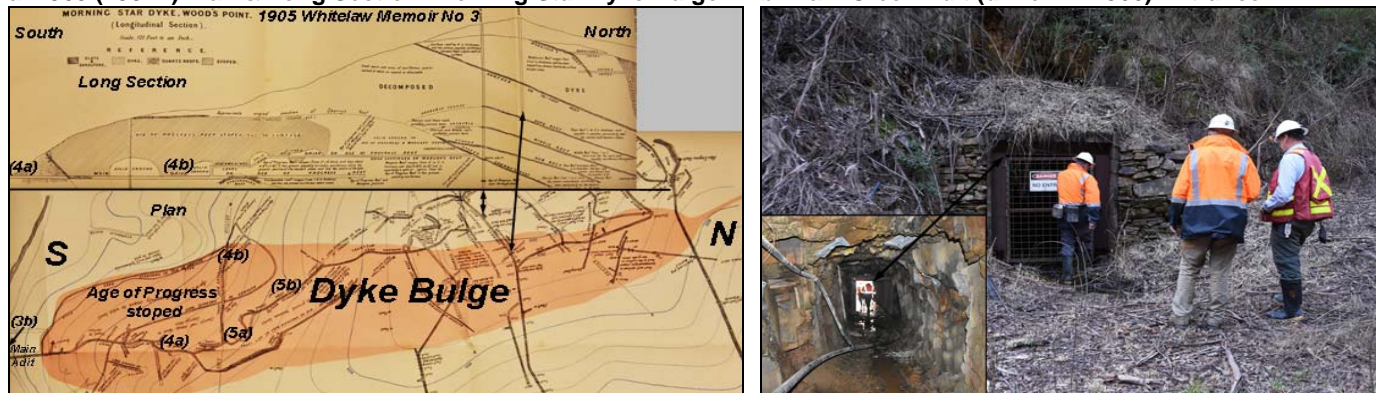
Within a short space of time, the Morning Star hill area was covered in claims. Morning Star was found to consist of a series of visible gold in quartz reefs that were contained within a bulge in a diorite dyke (that was part of the NW/SE striking Woods Point dyke swarm shown in Figure 2b). The diorite dyke was initially mined from surface (where it had been weathered to "rotten granite" which made extraction easier), and later by adit (often to dewater the workings, or for easier access say from creek level).

Table 1. Historical Gold Production at Morning Star (1861 to 1963)

Morning Star (1861 to 1963)	1861-3	1864-9	1870 - 79	1880 - 89	1890 - 99	1900 - 09	1910 - 19	1920 - 29	1930-39	1940-49	1950-59	1960-63	Total
t (short)	17372	118560	62848	11771	40629	2107	1253	64057	34352	136562	190939	27804	708254
oz	68173	197383	21530	2669	16410	851	426	65146	32823	93232	118821	9525	626989
oz/short t	3.9	1.7	0.3	0.2	0.4	0.4	0.3	1.0	1.0	0.7	0.6	0.3	0.9
g/t	134.5	57.1	11.7	7.8	13.8	13.8	11.7	34.9	32.8	23.4	21.3	11.7	30.4
Highest grade (per decade year)	1864	1870	1887	1896	1906	1919	1922	1935	1949	1954	1961		
t (short)	27214	13374	51	8126	114	1253	11965	2171	15441	18167	5251		
oz	73949	6423	159	4548	181	426	17686	5361	17028	17771	2355		
oz/short t	2.7	0.5	3.1	0.6	1.6	0.3	1.5	2.5	1.1	1.0	0.4		
g/t	93.2	16.5	106.9	19.2	54.4	11.7	50.7	84.7	37.8	33.5	15.4		

There are no clear gold production records over the period to 1864 when the first Mining Act came in, and estimates have been made from the 7 main mining companies working Morning Star (MST), as shown in Table 1, with ~ 68.2koz over the period of 1861 to 1863, and almost 74koz recorded in 1864 alone, with few records for the gold won from alluvial mining, apart from possibly 110koz by 1869. There are many comments of the extremely high grades won in the early years to 1864, ranging from 5oz/t to 44oz/t.

Figure 3. 1905 Plan & Long Section of Morning Star Dyke Bulge, and the Main Creek Adit entrance
a. 1905 (1902?) Plan & Long Section: Morning Star Dyke Bulge **b. Main Creek Adit (driven in 1866) Entrance**



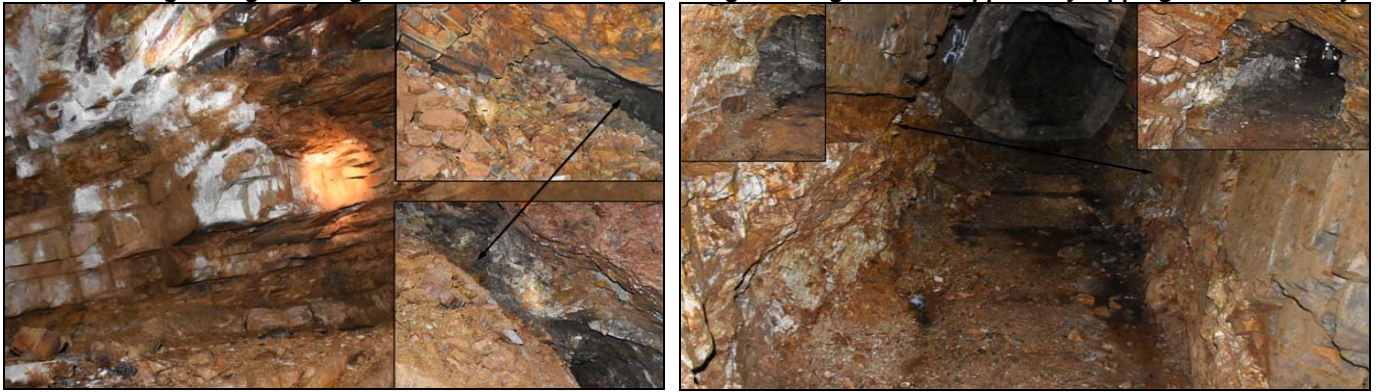
Grades seemed to have been fairly volatile as in Morning Star's Age of Progress reef averaged 20oz/t in 2H1863, rising to 40oz/t in February 1864, 5oz/t in August 1864 and by late 1864 it was back to ~35oz/t. **In 1865** it was stated that the **expected average grade** of the reefs at Woods Point was **3.1oz/t (~100g/t)**. At the beginning of 1866, there were 113 mining companies, however, the speculative bubble burst as Morning Star's total official production dropped from ~8-20koz/qtr in 1866 to 3-8koz/qtr in 1867.

Figure 4. Age of Progress Stope (1866?) and Pillar, and Stacpoole's Reef (possibly partly brecciated)
a. Age of Progress Stope (1866 ?) and Pillar **b. Stacpoole's Reef (possibly partly brecciated)**



Such that by September 1866, ~32 mining company's were in liquidation. The Morning Star company in the first 5 months of 1863 had sold gold worth £15,506 for £2,008 capital and £1,338 costs, by October 1866, its 5 shareholders had each received ~£20,000 from mining the Age of Progress and Cherry reefs down from their outcrops, with 4 adits driven and a 5th in progress. However by 1867, Woods Point had already acquired a reputation of disappointment for **failing to maintain grades (above 3oz/t [~100g/t])**.

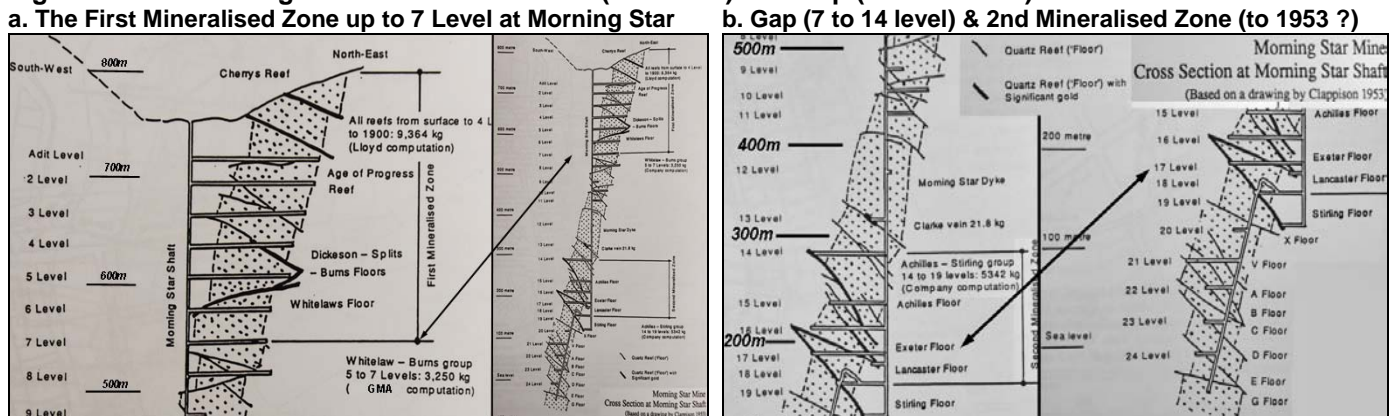
Figure 5. Possible edge of Age of Progress into Sediments, and Age of Progress dipping more shallowly
a. Possible edge of Age of Progress into Sediments **b. Age of Progress Reef apparently dipping more shallowly**



The size of the Morning Star's dyke bulge was delineated as shown in Figure 3, and by the end of 1869 as shown in Table 1, 266koz had been won at an average grade of 2oz/t (67g/t), essentially from the upper part (to Level 4) of the first payable series shown in Figure 6a. The dykes could initially have easily been identifiable on surface (for Figure 2b), because the area was soon denuded of trees, unlike now.

As shown in Table 1, production dropped significantly, with comments being made that in 1875, that shaft sinking in the diorite had become significantly harder, having penetrated beyond the brown oxidised zone into the fresh rock. In the hammer and tap era, development advance in very hard rock could be as low as 3m/10ft per week. Deep drilling did intersect deeper reefs in 1887 and 1889, and an engine shaft to 3 level did start being sunk, but production drifted, possibly in favour of richer pickings elsewhere. In 1914, Whitelaw noted that there were still no workings below creek level and recommended sinking a new Morning Star shaft ~200ft north of the southern end of the bulge (then delineated as ~1600 to 1700ft long [x 0.3 for m] x 350ft wide [south] to 200ft wide [north], dipping ~85° west & plunging steeply south).

Figure 6. The Morning Star Mineralised Zones (to 1953 ?) and Gap (7 to 14 Level)



In 1919 Post WWI, Government funding of £10,000 was received to sink a 4-compartment shaft, designed to the 1800ft level (2300ft below the top of the hill), and develop and install a new crushing plant, but by 1926 the mine was exploring again and closed in 1927 after treating ~64kt for ~66koz (~10kozpa for 7 years) as the mine was uneconomic, the shaft having been sunk ~1000ft. At that time, break even grades at Woods Point / Morning Star were ~18g/t to 22g/t.

GMA (Gold Mines of Australia) formed in 1930 and in 1933 it took over Eastern Australia and its sister company WMC took over Western Australia. In 1934, GMA took an option on Morning Star, started drilling and dewatered the mine to target an intersection made in 1886, developed to it on Whitelaws floor (reefs or lodes were called floors), punched up and discovered the Burns floor, which was in addition to the 3 floors intersected between 800ft & 1200ft. In that first 1930s decade GMAs highest grade was in 1935 (5.4koz, 2.5oz/t), while the highest annual production was 7.4koz from 9.2kt in 1939 (despite the bushfire). In 1938, a 1000ft drillhole from Level 10 level intersected 35dwt (60g/t) over 19in on Level 15 (Achilles).

In January 1939, a bushfire razed the town of Woods Point and the mine, with people surviving from entering the main adit, and GMA rebuilt the mine due to its high returns from 1936 and 1937. Although gold production was only ~93koz in the 1940s, dividends of £260,000 were paid and by 1949, Achilles had been developed, & a battery loco was in use. By 1954 a further £185,000 had been paid, but a loan was then taken out for the inclined shaft within the dyke as shown in Figure 6b, from 19 to 24 Level. Some of the quartz reefs/floors encountered were regarded as insignificant (b/even was >20g/t) due to the cost pressures of financing the power line and its annual maintenance cost, and increasing depth in a low gold price environment (US\$35/oz [A\$32/oz]).

In 1959, the board decided that they could not justify shaft sinking below 24 Level and started closing the mine. Under GMA, the highest treatment rate was 28kt in 1959, and highest annual production 17,771oz in 1954. Was Morning Star closed prematurely by GMA - maybe, it has been widely commented that the **success of WMC was founded on GMA's Morning Star** (*Kambalda nickel was discovered in 1964*).

However, a group involving Harry Stacpoole took over GMA in May 1960 and formed Morning Star Gold Mines NL which continued to 1963 before it ran out of capital, despite a Government loan. So although the inclined shaft had been sunk to 25 level, it lacked the finance to develop 25 level and a number of other possibilities, the <20g/t stockpiles were treated and the mine completely closed in 1963.

Morning Star then lay dormant until Mt Conqueror (MCO) bought the assets from Alore NL in 1993, and completed trenching showing 4g/t, executed a drill programme to 50m depth and were deciding open-cut or underground when they refurbished the Morning Star adit, the shaft down to 2 level and installed a new headgear and winder, but stopped possibly because of the low gold price. By 2004, the mine was back under review by MCO again, and by JQ2005, MCO had restarted re-establishing the shaft and were down to 5 level and had drilled the gap zone but with negligible success (intersections of 0.3g/t to 3.1g/t), and at the AGM in November 2005, the company's name was changed to Morning Star Gold NL.

In September 2006, MCO reported that they had dewatered the **No 6 and 7 levels** and collected 17 grab samples on 7 level from Campbell's Reef **averaging 18g/t**, with 4 samples >35g/t and 1 sample >78g/t, and the dewatering and shaft rehabilitation had now reached 8 level (see Figures 6a and 14a).

In October 2006, MCO reported that they had channel sampled Burns Reef on 5 level with 14 of the 19 samples >35g/t, an average grade of 175g/t and a high grade range of 108g/t to 1663g/t. Burns Reef was reported as up to 75cm thick. In September 2007, encouraging grades were being encountered in the No7 sub-level of up to 274g/t with an average of 39.7g/t, and diamond drilling had intersected the "Morning Star **South**" **dyke at 71m below surface**. In December 2007, MCO reported 3 out of 5 holes in the gap zone below 9 level as containing vg (visible gold), plus a 40m - 60m northerly extension to the dyke bulge.

In March 2008, MCO reported two new reefs, both showing coarse vg : Kenny and Maxwells on the eastern contact of the gap zone, while commenting that the western contact had usually been more productive in gold ozs than the eastern contact (- MCO later swapped horses and insisted that the east was better than the west). In June 2008, MCO announced its intention to extract a 3kt parcel @ 12g/t from Maxwell's (a brecciated quartz vein/stockwork) accessed from 9 Level for toll treatment offsite, and 9 level was fully recommissioned for rail and kibble extraction of the ore. **However, in Nov 2008, MCO went astray** and stopped mining to review a new reef 5m above Maxwells, and explore Waverly (west of MST).

In July 2009, MCO announced its intention to start 4 stopes, stoping from 4 Level mining the Dickenson and Shamrock brecciated stopes (apparently based on grab samples in surrounding development drives), and possibly Burns from 6 Level, and develop 7 level Kenny for possible extraction via Whitelaw through 9 Level - all of the stopes were on the down-dip side of the reefs. **MCO had forgotten a historical fact that had been written many times since 1866, that the high grades at Morning Star were on the up-dip, not down.**

MCO also announced its intention to re-open the historical pathway to Wallaby where a grab sample from mullock returned an assay of 79g/t, while also examining the Hunts dyke. A PFS had also been conducted on a stand-alone plant, and with a \$4.5m strategic JV injection from Ample Rise, in December bought an 80ktpa Gekko gravity plant for \$2.5m. Following a presentation in Europe in November 2010, MCO was able to **place \$15m of stock** (32m shares @ 46cps). The presentation was impressive, forecasting grades of 15gpt and 80ktpa **by 2011 rising to 120ktpa & 150kozpa by 2014**, and included a JV in which Shandong Tianye agreed to spend \$4.5m over 2011-2012 to earn a 51% interest in two regional licences.

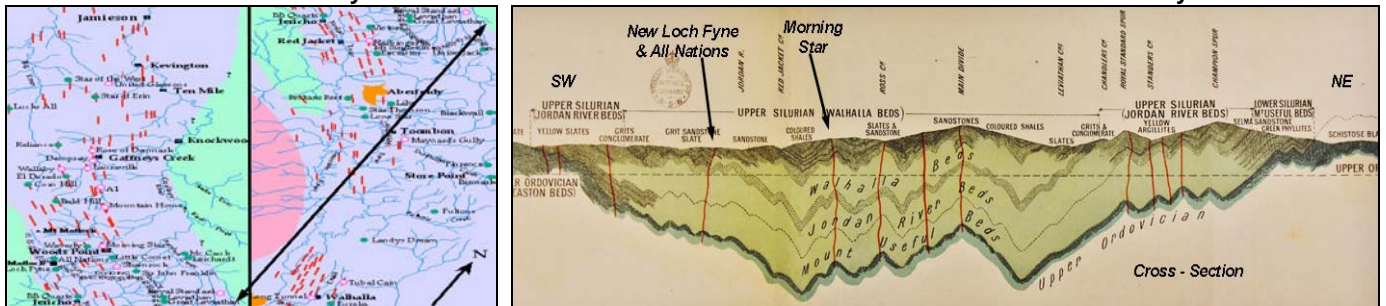
In its Jan 2011 progress report MCO basically reported that *the plant was not working*, it had a vsi (vertical shaft impactor) for its secondary crusher, which couldn't cope with the hard diorite waste, and then could not produce a satisfactory product, so it was split into a low grade and high grade con - both treated offsite. In the meantime MCO went on a "**spending spree**" with infrastructure upgrades, new offices, a water plant, a paste plant, regional diamond exploration and development, underground development, etc.

In June 2011, the plant was apparently working on low grade ore, Maxwells had been prepared for stoping and ~80m of development was required to access Kenny. The high grade cons from Rose of Denmark and Morning Star were being despatched for smelting into dore and the low grade cons could be treated elsewhere with cyanide to achieve an acceptable recovery, and there were winder issues. In March 2012 MCO was receiving loan finance in \$2m tranches, and MST stope production was only 6.8g/t from development access to Dickenson and Maxwells. Donaldson, Campbell and Perkins targets were all down dip, and when developed found to be sub-economic. In June 2012, MCO had a trading halt, went into administration in November 2014 & the **receivers** were negotiating a sale to Mantle in August 2015.

Geology

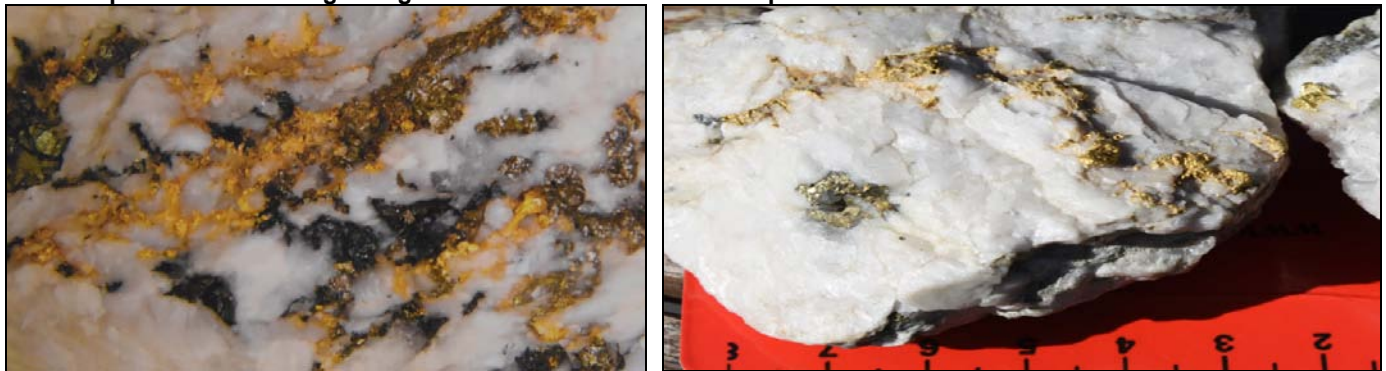
Located ~115 km east of Melbourne, the Woods Point goldfield lies within a dyke swarm that extends from Jamieson Creek to Walhalla as shown in Figure 7a. The dykes and gold mineralisation are believed to have been injected in the Devonian period into the Upper Silurian sediments of shales and sandstones that have been folded into a synclinorium as shown in Figure 7b.

Figure 7. The Jamieson to Walhalla Dyke Swarm, and Cross-Section Across Woods Point Synclinorium
a. The Jamieson to Walhalla Dyke Swarm **b. Cross - Section NE/SW Across Woods Point Goldfield Synclinorium**



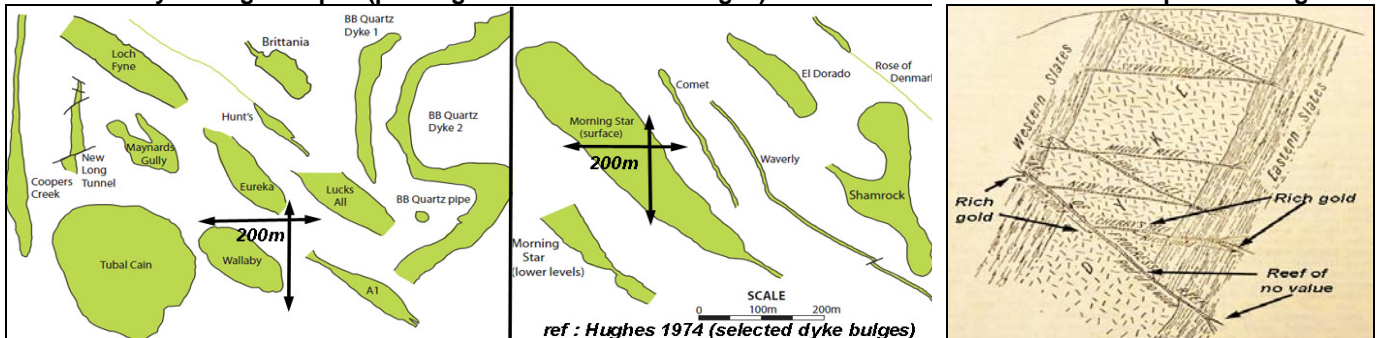
Just what caused the dyke swarm to occur and why some dykes bulged at particular positions along their length does not seem to have been clearly determined (and hence there could still be undiscovered / hidden dyke bulges, as the ones mined are those that were encountered during mining operations). The reefs have been described as shrinkage cracks or overthrust faults, resulting from the dyke cooling and brittle-cracking, with bleaching/alteration and silicification of the dyke (along with pyrite and gold mineralisation) adjacent to the main reefs. *For some reason, the reefs appear to stop being flat or dipping west after the upper mineralised zone.* There often appears to be visible gold in quartz, although carbonates are also present, and the composition or quality of the gold may vary in each of the bulges. The bulges come in different shapes and sizes as shown in Figure 9a, and have been more recently discovered to vary considerably in plan and vertically, as seen by the A1 experience in Figures 12a & 12b.

Figure 8. Gold in Quartz Specimens from Morning Star, and Rose of Denmark reefs
a. Gold Specimen of Morning Star gold reef **b. Gold Specimens from Rose of Denmark reefs**



The gold from Morning Star is reputedly different and apparently easily recognisable compared to A1 or Rose of Denmark, as Morning Star's gold appears to be more "brassy in colour", because it apparently has a ~3 gold to 1 silver ratio (or for ~15oz gold, get ~5oz silver). Whitelaw in 1916 stated that the gold at Morning Star was almost pure for the first 30m to 60m, increasing with different sulphides (Pb, Zn, Cu with depth). Some specimens are shown in Figures 8a and 8b, and perhaps Morning Star's gold does appear to be more yellowy, but away from sunlight in Figure 8b, the difference does not appear that obvious.

Figure 9. Different Dyke Bulge Shapes, and Cross-section at the top of Morning Star
a. Different Dyke Bulge Shapes (per Hughes 1974 Selected Bulges) **b. Cross-section top of Morning Star**



There are numerous references to the "richer gold" values occurring in the up-dip reefs of Morning Star into sediment, where the dyke overlies the sediment, but not in other bulges (even depicted by visual comparison in the regularly published "Prospectors Guide to Victoria" since the late 1800s).

The alteration distance of the grade penetration of the reefs into the sediments and the lateral length of grade payability along the dyke bulge can also vary. Whitelaw in 1916 for example had the Age of Progress payable for 12m to 15m west into the sediments and up to half-way along the dyke bulge, with Cherry payable for 1100ft (~330m) along the dyke bulge and 30m to 60m into the eastern sediments. While Cherry is flattish in the section shown in Figure 9b, some sections do have Cherry dipping west, however, the general rule at Morning Star has been "dyke over sediment carries the richer gold", with the higher grades usually in the "up-dip" section, not "down-dip, sediment over dyke" - as MCO discovered.

Mining and Treatment at Morning Star

A production rate of 80ktpa (the designed plant size) increasing to 120ktpa (the Nov 2010 presentation) is all very well, but **someone obviously didn't do the math / consider the logistics**. The 1t scotch cars next to the shaft as shown in Figure 10b have no couplings, which implies hand tramping, and ERA did not see any signs of battery locos, although they were apparently used on the Achilles level by GMA.

In the June 2008 trial stoping plan, MCO stated that the existing facilities could be able to support mining 50tpd (ie 50 scotch cars pushed by hand to the shaft and back to the workings per day - unless a battery loco was going to be used), and for the single deck cage, 50 trips per day too (unless a double deck cage is used). For 6 days per week or a 26-day month that is 1300tpm or ~15,600tpa.

Figure 10. The Morning Star Plant & Diorite Dyke rock specimen, and Morning Star Shaft & 1ton scotch car
 a. Morning Star Plant and Diorite Dyke rock specimen b. Morning Star Shaft (at surface) & 1 ton scotch car



Even when GMA was mining Morning Star in the 1950s it was usually only achieving ~15ktpa to 20ktpa (see Table 1), the 28kt peak in 1959 probably included surface stockpiles (before closure). In an underground picture of the refurbished 9 level (MCO Dec 2009), it does show 3 people standing abreast across a drive, so a battery loco could be possible there. It is probably why MCO additionally focused on exploring and developing regional prospects as perhaps that was how MCO intended to fill its plant.

As for the plant, it was a design disaster (ERA view). It was designed by Gekko using the vein ore apparently from more than one mine, and hence was not designed to process the hard diorite (/magpie rock) host of the dyke, spotted black on white (the brown is the oxidised form) as shown inset in Figure 10a, such that pebbles formed that could not be crushed. Plus it seems to have had a concentrate issue, and a paste plant is required to put the tailings into the underground workings, because there is no tailings dam.

In hindsight in ERA's view, instead of fixing the shaft, building a plant, new offices, buildings, winder etc, MCO should have toll treated (which was its 2008 plan), and like A1, sunk a decline (per the 2007 AGM). However, the waste is very visual, so ore sorting should be possible, the issue then may be the tailings.

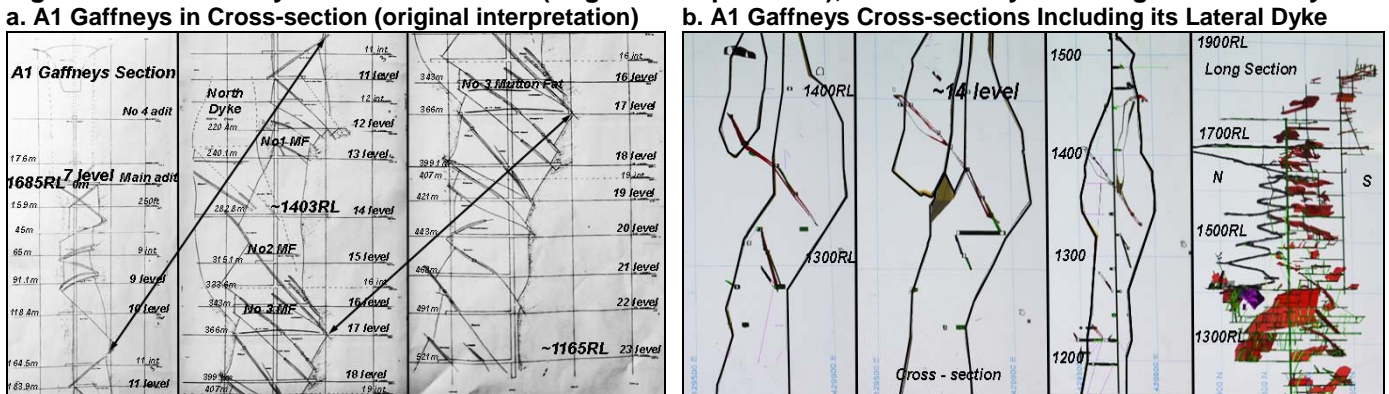
Based on our visit into the old workings at Morning Star, there appears to be plenty of broken stocks of unknown grade (Figure 5a), and even the sidewalls / pillars containing Age of Progress ore have clearly not been channel sampled (Figure 5b). The shallow dipping stoped reefs have not been mined to South African standard as in the last stage is to use industrial vacuum cleaners to "hoover" the footwall, when high grades are being mined. The old access cross-cuts and drives have not been **vamped** either (some have had the rail and sleepers removed and possibly re-used, but the floor is still covered in rock chips).

Perhaps a greater open-cut over the surface workings is a possibility and fill the stopes exposed with paste-tailings, or try and find/locate a tailings dam. Once paste filled, the pillars may be able to be extracted too. However, **decline access** appears to be required to achieve any degree of production, possibly using the historical **main Morning Star adit** (just above 2 level), **or from the northern** (and apparently mostly unmined) end of the dyke bulge. Based on what was not mined, but identified by MCO on 7 level etc and down to 9 level, there could be a number of >5g/t ore sources (break even was >20g/t), and there do appear to be other sources as shown in Figures 15 and 16 on page 9 of this report.

Comparison with A1 Gaffneys (AYC)

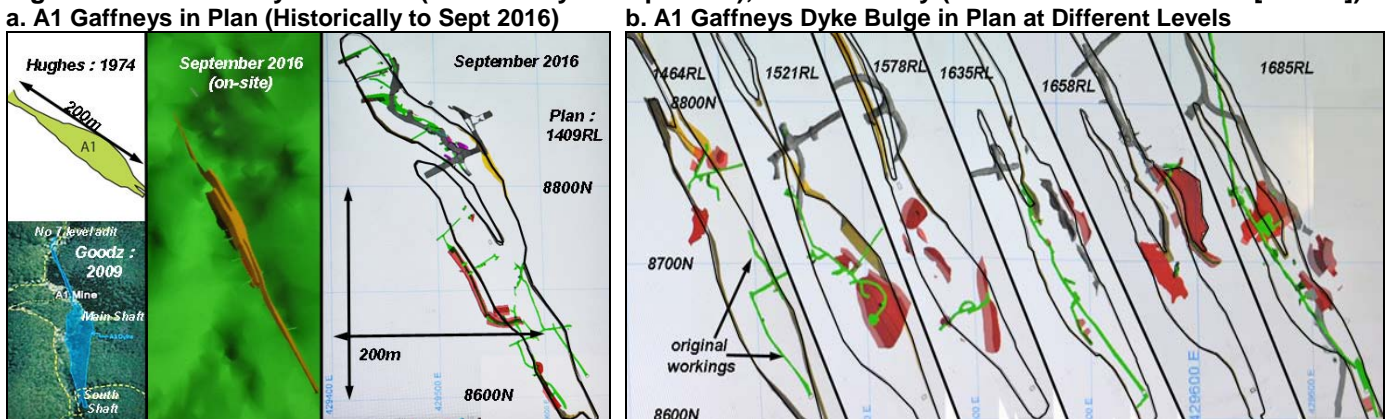
It can be seen that in cross-section, A1 (in Figure 11a) appears to be very similar to Morning Star (shown in Figures 6a and 6b), except that A1 has mined 3 lodes of "MF or Mutton Fat", which is apparently the degenerated form of a quartz lode, typically grading 3g/t to 10g/t or higher, and reputedly often adjacent to a payable lode or reef. There have been comments regarding MF at Morning Star, but it was generally ignored as being too low grade. A1 also has a North Dyke, adjacent and separate to their main dyke, and it has a large "gap" (~70m to 90m) below its 9 level (that is ~90m below its main adit). A1 stated that the Victory reef passes through both dykes as shown in Figure 11b, and the new breccia mineralisation (coloured purple in Figure 11b), extends beyond the original perceived northern limit of the A1 dyke bulge.

Figure 11. A1 Gaffneys in Cross-sections (original interpretation), and Currently Including its Lateral Dyke



The plan of the A1 dyke has gradually evolved as shown in Figure 12a, from **historically ~200m** long by up to 45m wide and ~700m deep, when drilling in **2008 and 2009 extended it to >500m long**. While vertically it is clearly very variable and not simply straight-sided, as shown in Figure 12b, which could be viewed in comparison to Morning Star, which has apparently has had little (if any) lateral drilling. Most of the change in the perception of what the A1 dyke bulge looks like may have been related to its decline development, that has extended the dyke bulge north and south, and defined a lateral parallel structure.

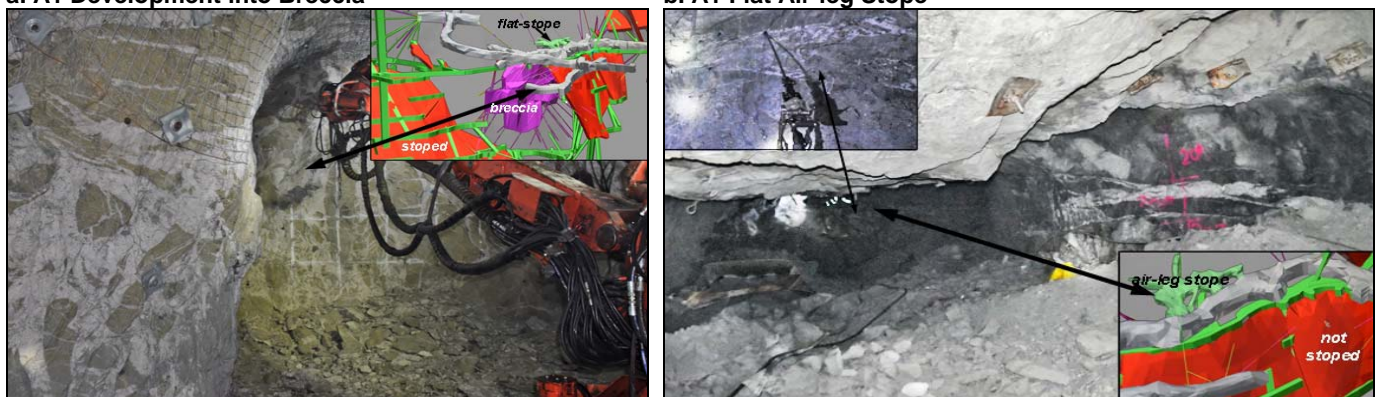
Figure 12. A1 Gaffneys in Plans (Historically to Sept 2016), and Vertically (from 1464RL to 1685RL [7 level])



On the underground site visit, we saw the breccia block in development (that was expected to be >30kt @ 10g/t to 11g/t), & a flat airleg stope (possibly ~10g/t to 20g/t) as shown respectively in Figures 13a & 13b, both of which have been discovered in an area of older stopes (*inferring potential for Morning Star*).

Figure 13. A1 Development into Breccia, and Flat Air-leg Stope at A1

a. A1 Development into Breccia b. A1 Flat Air-leg Stope

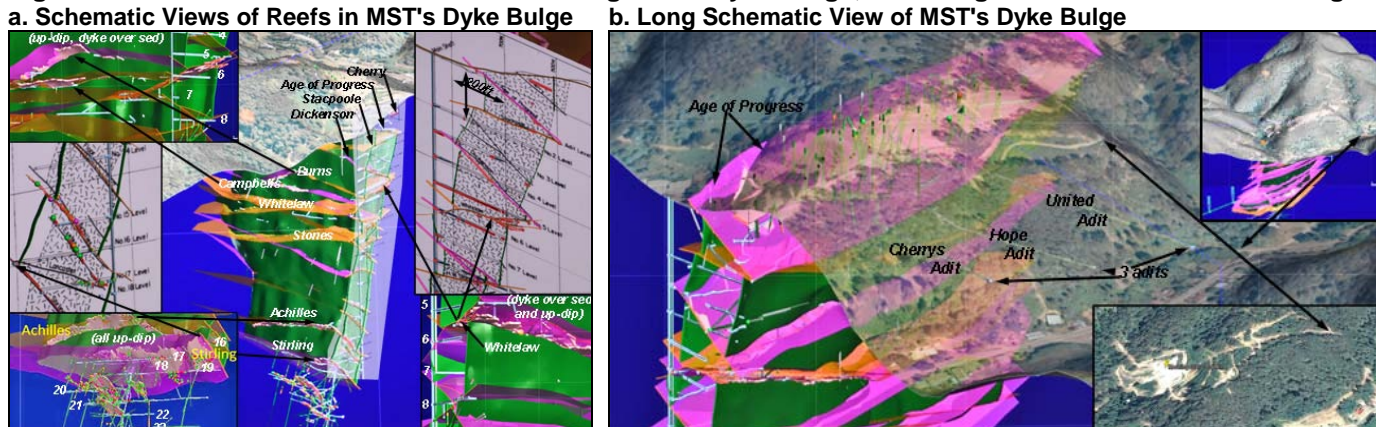


Morning Star also has breccia areas that have been historically intersected, but ignored because they were relatively lower grade, or the grades were below the required break-even grade (of possibly ~20g/t).

Upside Potential at Morning Star

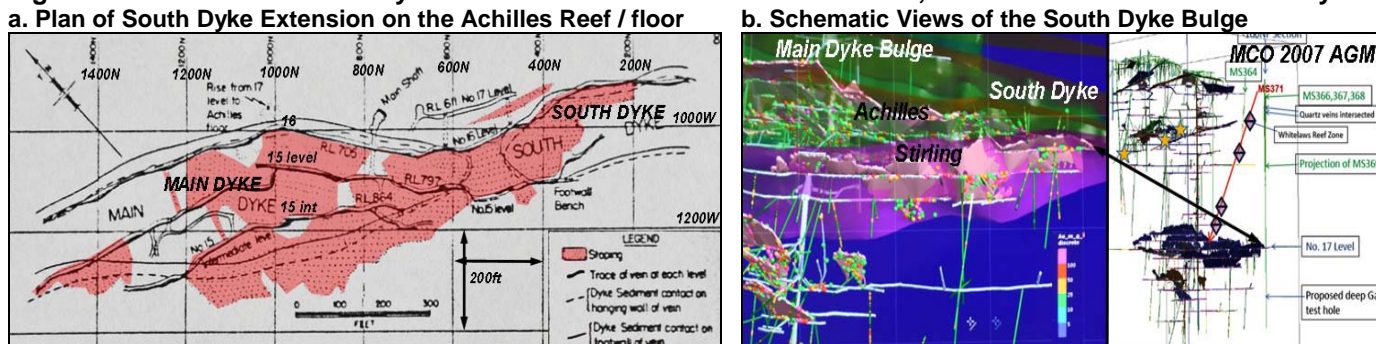
There appears to be a fairly general market view that Morning Star has essentially been mined out. After all the reefs are well defined as shown in Figures 14a and 14b and GMA knew what they were doing. **However, GMA were limited to payability being >20g/t and a US\$35/oz gold price, and Morning Star does not appear to have been drilled laterally for possible parallel structures, or significantly north or south.** The plan we used to enter the main adit and visit the underground workings was Whitelaw's 1902 version (ie almost 115 years' ago), published as a Memoir in 1905 and shown in Figure 3a, and seemed to be still fairly accurate.

Figure 14. Schematic Views of Reefs in Morning Star's Dyke Bulge, and Long Schematic View of the Bulge



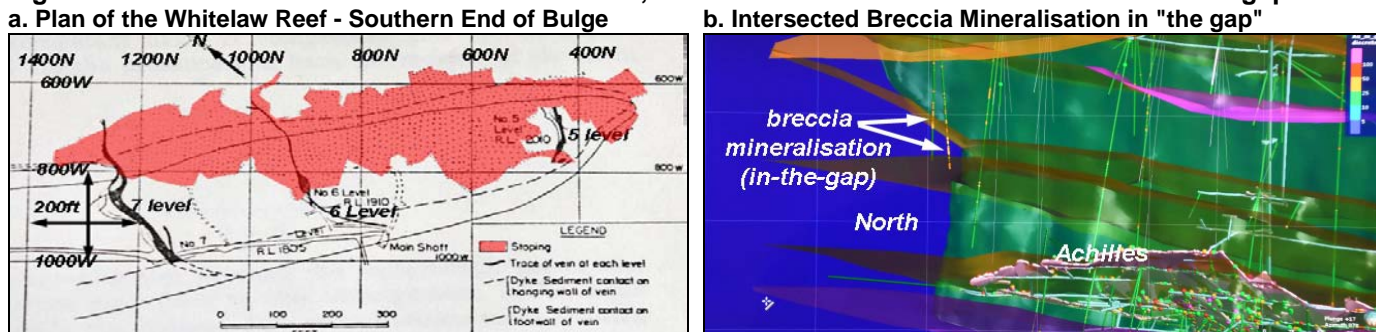
As shown in Figure 14a, there was some stoping on the ABC reefs below Stirling, however, it is the Achilles floor or reef that is interesting, because it includes the **South Dyke extension** shown in Figure 15a (in a 1953 Conference paper). Within the paper, it states that "south of the bulge, Whitelaw (1913) mapped a narrow continuation of the dyke for a considerable distance on surface". And on 15, 16 & 17 levels it has been found to be 600ft (180m) long x 180ft (54m) wide, separated from the main bulge by 100ft (~30m) of mineralised sediments with the veins continuing from one bulge to the other, and stoped.

Figure 15. Plan of the South Dyke Extension on the Achilles Reef / floor, & Schematic Views of South Dyke



Of course what happens to the thickness of the South Dyke from its "narrow continuation (just where on surface)" to 180ft wide at ~15 level is unclear, except that MCO reported intersecting the South dyke at about Whitelaw level, ~71m below surface (presumably from the creek) in September 2007, and showed it in a figure (15b) in its AGM, referring to 3 drillholes MS366, 367 & 368 with 5m of veining and shearing on the eastern side of the dyke, and apparently beyond the stoped limit of Achilles, but then switched to drilling the "gap" zone, leaving the **South Dyke position untested**, as shown in Figure 15b. In December 2007, MCO also reported that they had **extended the dyke bulge by 40m to 60m further north**.

Figure 16. Plan of Southern End of Whitelaw Reef, and Intersected Breccia Mineralisation in "the gap"



It can also be seen that the veins appear to strike NW/SE along the dyke boundaries as shown in Figure 15a, however, on Whitelaws as shown in Figure 16a, they are depicted as striking NE/SW across the dyke. And in Figure 16b, the orange drillhole intersections, which represent breccias, have never been

considered. **There appears to be material upside potential** in the vicinity of Morning Star as inferred from Figure 2b, **plus another apparently mostly untested bulge at Shamrock** (south of MST & within the ML), **with the regional potential** such as Rose of Denmark & Hunts/Dempseys, an added plus.

Regional Exploration

However, it is not that simple, as MCO and some of the 1866/67 investors discovered. Three prospects that are near to Morning Star are Edwards, Comet and Waverly as shown in Figure 2b. MCO did not explore Edwards probably because of its historical "salting" reputation, in which mullock was mixed with good stone in 1866 that pushed its share price to £20 per share, but in MQ1867 it produced a mere 112oz from 1530t (2.5g/t), causing its share price to collapse and the mine to close.

MCO did focus on Comet and Little Comet (and must have missed the historical reference that gave 264oz from 498t from Little Comet in 1890-1891, and 1546oz from 1900t up to the closure in 1905), as MCO allocated 76koz in 2007 (later reducing it in section to 60koz in 2008) as having been won from the "Comets", and >50koz to Waverly. MCO reported estimating Waverly's 50koz on the basis of 600m long x 1m thick, mined to 30m to 50m deep (possibly 40m) and grades reputedly >1oz/t, which with a lower SG could have resulted in ~40kt to 50kt, and hence ~50koz. Waverly did have some 7oz/t and 2oz/t crushings in 1864, but by 1868 it had run out, and closed in 1869 at total production of 727oz from 2239t. Waverly later reopened briefly and produced (from central and north) 99oz from 958t between 1881 and 1883.

MCO drilled 7 diamond drillholes (it had bought 3 diamond drill rigs) at Waverly in 2008 for little result, and then drilled another 9 diamond drillholes in 2011/12 to ~100m each at Waverly North, with a best result of 0.9m @ 6.8g/t. Numerous old workings does not necessarily infer large gold production, as shown by Royal Standard (in the EL application area) which has a good reputation in a number of publications, probably because it reputedly paid dividends of £44,800 within 6 months in 1866. It started as an open-cut and produced 2934oz from ~300t (9.8oz/t or 335g/t) in June 1866, followed by 8339oz from 2700t in SQ1866 & 3834oz from 1558t in DQ1866 (total 15107oz from 4558t). But that was it, the gold ran out at about 70ft (21m), ~ 6 companies drove 21 adits plus development into it, adding only 1872oz from 3910t, because *Royal Standard predated conventional drillhole exploration* - historically it appeared to be by adit.

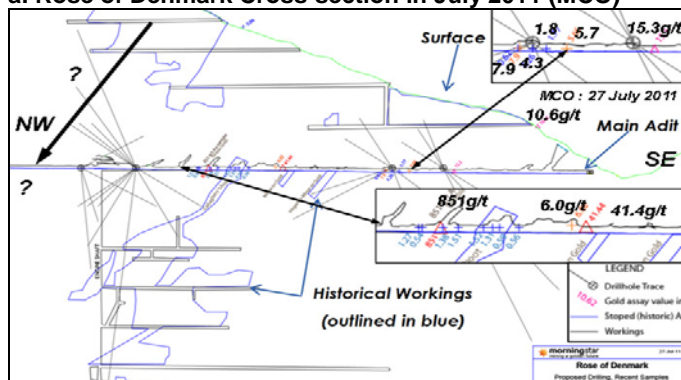
MCO did not report anything significant from Comet's possible 7 diamond holes or the 4 diamond hole follow-up in 2011, and in fact apart from Rose of Denmark, did not report anything really significant regionally, despite the effort of improving access and reopening All Nations, Shamrock, Loch Fyne, Wallaby, and Alhambra; of which the last 3 all had planned drilling and for Loch Fyne planned trial mining. Loch Fyne did produce ~110koz from ~139kt between 1864 and 1929. Loch Fyne's best year was in 1898 when it produced 12,214oz from 12,935t, however, ore apparently seemed to mostly run out below 3 level, such that during the 1920s, typical production was ~2,400 tons per year for ~2,100ozpa.

Rose of Denmark through Dempseys to Hunts (MNM 46.6% of the JV [ie 95% of 49%])

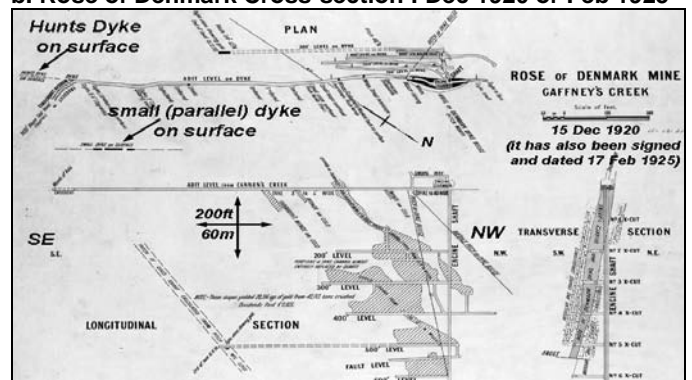
The last drilling by MCO was at Rose of Denmark (ROD), where it had trial mined and treated ~500t (out of a planned 2000t programme) and realised ~8g/t from treating it through the MST plant. The ROD to Hunts line is shown in Figure 1b and inset in Figure 2a and 2b. MCO did comment that 35 grab samples from ROD had averaged 19.2g/t, some with vg (Figure 8b), of which the best was 851g/t. MCO designed a 26 diamond drillhole programme from 4 cuddies in the main adit as shown in Fig 17a and all drilled parallel to the adit, of which a few were completed and on the racks at the MST core shed, mostly uncut / and hence unassayed with the odd removed "gap" in the core. *These drillholes have now been assayed, with results pending.*

Figure 17. Rose of Denmark in Cross - sections in 2011 & ~1920 (showing little change in the past 100 yrs)

a. Rose of Denmark Cross-section in July 2011 (MCO)



b. Rose of Denmark Cross-section : Dec 1920 or Feb 1925



ERA had thought that ROD was separate to Hunts, but a 1920 (or 1925) plan clearly states it as being an extension of the Hunts dyke as shown in Fig 17b, although the inset shown in Figure 18a, infers that they

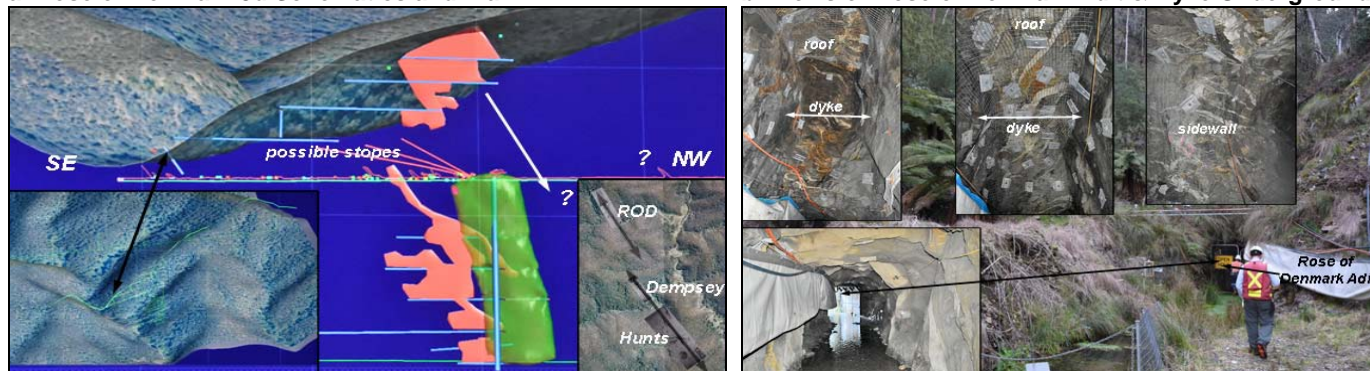
are separate. The ROD had quite a long life (~66 years), from 1864 to 1929 in which it produced ~40koz as shown in Table 2 below. (The main adit took ~10 years to be developed from 1882 to 1892).

Table 2. Historical Gold Production at Rose of Denmark (1864 to 1926)

Rose of Denmark (1864 to 1926)	1860 - 69	1870 - 79	1880 - 89	1890 - 99	1900 - 09	1910 - 19	1920 - 29	Total		1911	1913	
t (short)	15330	24180	3499	2846	7201	43268	2789	99113	Highest	6646	Highest	7754
oz	5858	7087	731	3405	3837	18314	662	39894	gold	3637	mined	3631
oz/short t	0.4	0.3	0.2	1.2	0.5	0.4	0.2	0.4	Prodn	0.5	Prodn	0.5
g/t	13.1	10.0	7.2	41.0	18.3	14.5	8.1	13.8	(3637oz)	18.8	(7754t)	16.1

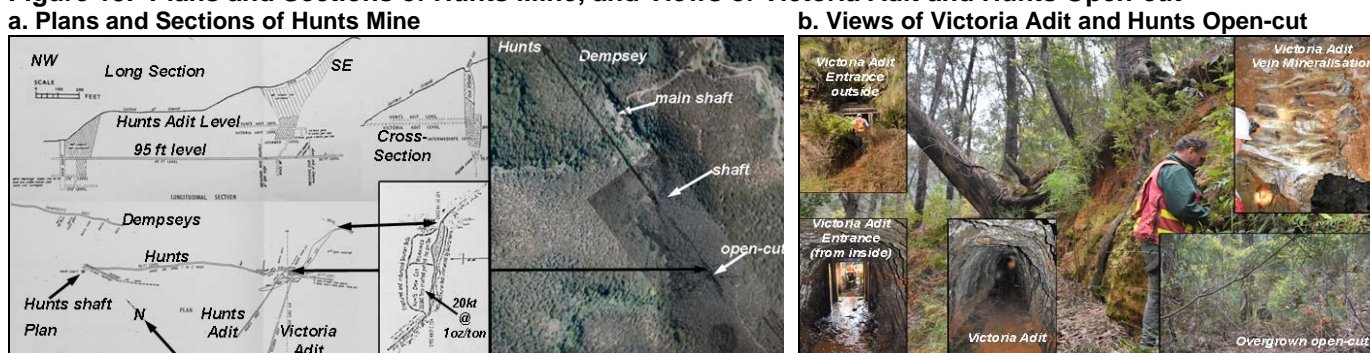
The Rose of Denmark is interesting because its ore mostly came from outside of the dyke bulge (which was relatively small and hidden below surface) as shown in Figure 18a, and the grade appeared to be in shoots plunging NW. Although MCO designed a detailed 26 diamond drillhole programme as shown in Figure 17a, the drill cuddy position on the NW side of the bulge was not planned to drill NW - where the theoretical shoot extension could be. There also appeared to be some mining further NW in the adit.

Figure 18. Rose of Denmark 3d Schematics and Plan, and Views of Rose of Denmark Adit and Underground



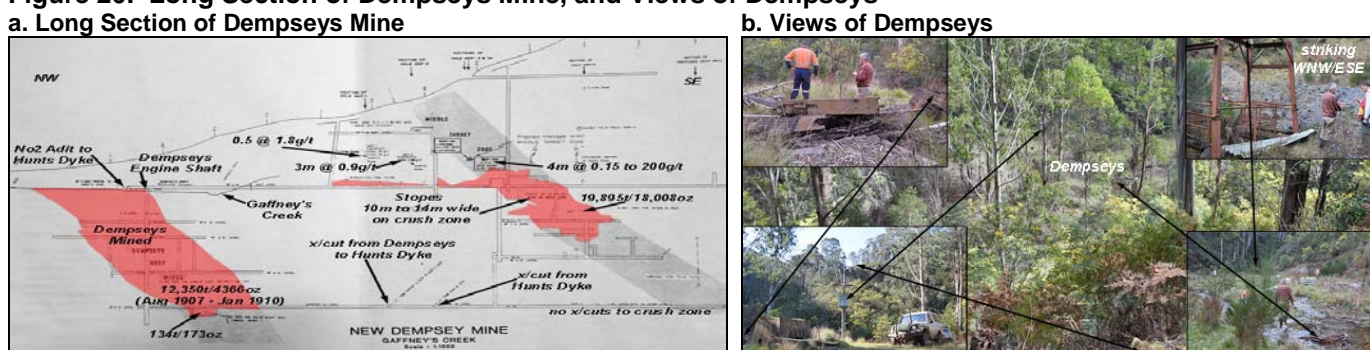
As shown in Figure 18b, the ROD adit appears wide enough to support mechanisation (which is an added advantage), and it has been well refurbished. While the extensive vein mineralisation across the dyke is clearly shown inset in the roof of the dyke in Figure 18b, it was only visible when looking SE (not NW).

Figure 19. Plans and Sections of Hunts Mine, and Views of Victoria Adit and Hunts Open-cut



The Hunts dyke/mineralisation is also different, in that it started as a sigmoidal ~WNW/ESE open-cut as shown in Figure 19a, with the dyke itself still striking NW/SE. Apparently 20kt were mined @ ~1oz/t in the open-cut, but for some reason it is often left out of the official production of 17,639oz from 75,042t from Hunts & Victoria between 1864 and 1887. ERA visited the overgrown open-cut as shown in Figure 19b and it does have very distinctive NE/SW and NW/SE structures, however as also shown in Figure 19b, the Victoria adit entrance is relatively small and grades were viewed as poor (4 - 6 dwt or 7-10g/t).

Figure 20. Long Section of Dempseys Mine, and Views of Dempseys



Of possibly greater interest is whether there could be overlooked E/W or NE/SW mineralisation. The plan in Figure 19a has Dempsey on a parallel structure, which is repeated in the section shown in Figure 20a, with clear x/cut links, the high grade plunges SE, and there is a 4-compartment WNW/ESE striking shaft.

Financial Considerations and Upside Potential

Mantle's immediate requirements are the ~\$2m remaining payment (\$1m on each of 31 October 2016 & 28 February 2017) for the 95% acquisition of Morning Star Gold NL (MCO). It is then a case of where to from here, with a review of Morning Star and its possibilities, plus what else Mantle has amongst its other Australian projects.

Morning Star still appears to be the main prize. Surprisingly, despite its >160 year history, Morning Star appears barely explored in terms of possible north, south and lateral extensions or potential parallel structures, as it still applies its **~1902 profile plan**, (compared to how A1 has evolved in Figure 12a). Post exploration could determine just how to access and mine Morning Star, or even vamp part of it (page 7). Secondary ore sources such as the Rose of Denmark probably need to be reviewed in terms of their capability to be mechanised or mined by open-cut, and if there are possible east-west structures. Plus the movable plant should be able to be fixed, and may even be capable of being used for toll treatment.

Other Gold Projects

Mantle gave an operational update on its other gold projects in its latest Annual Report (reported on 30 September 2016). In QLD: at Norton, gold mineralisation has been identified on additional structures and Norton is under review assessing alternatives to realise its value, while drilling targets have been identified at Granite Castle and the prospects adjacent to Charters Towers. Mantle also has interests in two old NSW goldfields that appear to have received little attention, being 100% of Lionsville (NE, Grafton district), & 13% of the Black Range JV with Heron[HRR] over the Overflow underground mine near Cobar.

Management

Board of Directors

Robert Barraket – Non-Executive Chairman since 2016. Bob is a lawyer and the Chairman of Barraket Stanton Lawyers in Sydney with over 50 years' experience advising international and Australian companies. Bob is also Chairman of explorer Axiom Mining Ltd.

Richard Valenta – Executive Director since 2016. Rick is a geologist with over 30 years' experience in Australia and internationally. Rick has played a key role in the discovery and advance into production of a number of significant gold projects. Rick was formerly MD of Chesser in Turkey which he took from discovery through to sale.

Ian King – Non-Executive Director since 2016. Ian is a founding director of BBB Capital, a Sydney-based boutique corporate advisory business. Ian has over 25 years' experience in investment banking and corporate advisory services across a broad range of sectors including mining and resources.

Matthew Gill - Non-Executive Director since 2016. Matt is a mining engineer with over 30 years' experience in Australia and internationally, including the successful re-commissioning, development and operation of three underground gold mines (Australia & PNG). Matt is also MD & CEO of White Rock Minerals Ltd.

Senior Management

Ron Cunneen - GM Morning Star Gold since 2016. Ron is a geologist with over 35 years' senior exploration and mining experience in Australia and overseas, having worked on many operations and projects. Ron was the Manager of Gympie Gold for 12 years (which was a narrow vein, high grade gold mine, similar to Morning Star).

Chart of Mantle Mining Corporation Limited (October 2015 to October 2016) (Source : www.yahoo.com)

MNM's share price has drifted back to 1.1c...

...as the market gets to grips with what the acquisition of Morning Star...

..could evolve into for Mantle



Disclosure

Mantle Mining Corporation Limited commissioned Keith Goode (who is a Financial Services Representative with Taylor Collison Ltd ACN 008 172 450, and is a consultant with Eagle Research Advisory Pty Ltd ACN 098 051 677) to compile this report, for which Eagle Research Advisory Pty Ltd has received a consultancy fee. At the date of this report Keith Goode and his associates held interests in shares issued by Mantle Mining Corporation Limited. At the date of this report, Taylor Collison Limited or their associates within the meaning of the Corporations Act, may hold interests in shares issued by Mantle Mining Corporation Limited.

Disclaimer

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