

## **ANNUAL REPORT for MLNs 808,821 and 869**

<b>Title Holders</b>	<b>T Starr, M Starr, K Starr L Starr</b>
<b>Manager</b>	<b>T Starr</b>
<b>Tenements</b>	<b>Mlns, 808,821 and 869</b>
<b>Project Name</b>	<b>McKinlay Mine</b>
<b>Report</b>	<b>Combined annual report for period ending 31<sup>st</sup> December 2016</b>
<b>Author</b>	<b>Tom Starr</b>
<b>Commodity</b>	<b>Gold</b>
<b>Date</b>	<b>8<sup>th</sup> January 2017</b>
<b>Datum</b>	<b>13 24' 05" 131 44' 10"</b>
<b>250,000 map</b>	<b>PINE CREEK SD 52-8 Deposit no 87</b>
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## SUMMARY

This document reports on the activities carried out on the tenements during 2016 and activities proposed for 2017.

### HISTORICAL SUMMARY

The history of the McKinlay Mine, known by other names over time, has been reported in detail in previous reports to the Department.

**1937-1938** S Hardy mined 127 tons of ore with a head grade of approx. 6.5 g/t and recovered approx. 3.27g/t using a stamper and mercury. (Hossfeld 1940)

**1940** Paul Hossfeld (senior geologist with the then North Australian Aerial, Geological and Geophysical Survey) found significant areas of mineralization over a strike length of approximately one kilometer, from the surface, existing costeans and open pits.(Hossfeld 1940).

**1974** AW Newton (a geologist with the then Northern Territory Geological Survey) reported on an exploration investigation by unknown persons. Newton could not correlate data provided to him with the work carried out by Hossfeld reporting little or no gold on the surface and at depth. (Newton 1974)

**1993** T Starr attempted to ascertain which of the above reports represented the actual situation at the McKinlay Mine. Existing rock chip tracks in existing costeans were presumed to be those of Hossfeld and of the Newton era due to differing degrees of oxidization of the chipped surfaces.

Starr chipped tracks where possible in between the existing tracks. Starr's assay results correlated well with Hossfeld's reported results. (Starr 1994-1997)

Starr drilled 2 holes that intersected the ore zones above 25metres and reported results that indicated that surface results were likely to continue to at least 20 metres depth. (Starr 1994-1997)

**1994** Dominion Gold tested McKinley ore for recovery at their Cosmo-Howley plant. Dominion reported a leach recovery of 90.3%

**1994-1997** Starr was granted approval to trial mine a 2000 tonne parcel which was to be trucked to Cosmo-Howley for bulk testing. The wet season and Dominion's closure of Cosmo essentially resulted in the 2000 tonne parcel remaining at the McKinley Mine site. Other toll treatment deals were discussed with Solomon Pacific and Acacia Resources.

**2006** Graham Hamilton (Geologist with Cullen Resources) collected three samples from the stockpile. Samples were diamond saw halved by Starr and Hamilton sent the samples to Pontifex and Associates for detailed petrology (Starr 2009).

Samples assayed at between 22.3 g/t and 52.1 g/t with gold particle size ranging from 2-100 microns. Gold appears to be associated with quartz rather than the after pyrite matrix (Pontifex Mineralogical Report No. 8951 2006)

**2008** Australasia Gold Limited was granted a license by the tenement holders to carry out further exploration on the McKinlay Mine. A report titled the "Annual Report 2008" was furnished to the Department.

In summary Aust. Gold drilled 10 RC holes and intersected ore zones at depths of up to 48 metres. Gold bearing zones appeared to narrow with depth and grade appears to be lower. (Plavsa 2008)

**2009-2010** Extensive comminution and gravity recovery tests were carried out on approximately 120 kilograms of McKinlay ore by Gekko Systems of Ballarat. Gravity recovery as a precursor to intense cyanide leach of concentrates found that just 69% of the gold could be recovered into a mass of 12%. Ideally a higher grade into a lower mass of about 5% is reported as typical by Gekko Systems. Pre test crushing to P<sub>80</sub> passing 75um with significant gold particle size < 50um is likely to be the reason for the less than average results reported by Gekkos.

**2011** Efforts to determine the best method to recover fine gold continued with EDI Downer and Consep. Consep produced a flow sheet using gravity to produce a concentrate for their Acacia Reactor. Field trips to the mine site determined the site to be geologically and environmentally stable. Bulk samples were collected and sent to Amdel pending further metallurgical testing.

**2012** Due to failing health of the two senior tenement holders, Eric and Betty Gardiner, an agreement was entered into with Tom Starr for Starr to purchase their shares in the tenements. Little else could take place on the tenements whilst tenement status was being determined.

**2013** Sale agreements between Betty and Eric Gardiner AND Tom Starr were finalized. Formal transfers of titles were completed.  
Water bore data search found that 4 bores were drilled in 1984 at flow rates of 1 litre/second.  
Mining companies operating in the general area were contacted re their interest in the McKinlay project.  
Initial contact was made with Minesite Services via Mines Dept. re the potential to develop an exploration/bulk sample agreement.

### **Activities carried out in 2014**

1. A preliminary agreement was entered into with Minesite Services to further explore and bulk sample the tenements with the aim to transport sample ore to Crocodile Gold's Union Reefs mill.
2. The director of Minesite Services, geologist Andrew Jettner had in place an agreement with Crocodile Gold to have ore toll treated at the cost rate of 1 gram per tonne.
3. In May 2014 Starr and Jettner conducted meetings and McKinlay mine site visits to locate all historical workings and to comprehensively survey all known points eg costeans, pits and drill holes with the aim to collate all known geological data and produce a 3D model of the ore body.
4. Jettner made further visits to the mine site in June 2014 with staff to complete survey work and subsequently produced a 3-D model of the known ore zones of the McKinlay.
5. Jettner provided a report to Starr regarding survey work and modeling. (Attachment 1.)
6. On the basis of the survey work results Jettner and Starr further developed the plan to carry out infill drilling and bulk sampling of the ore body.

7. Appropriate statutory Mines Dept. permits were discussed and agreed and prepared for submission.
8. Jettner continued to liaise with Crocodile Gold, the ore cartage operator was organized. Starr met with Ban Ban Springs Station manager/owner Martin Gschwenter at the station homestead and informed him of likely activity and asked if he could identify any concerns. **No concerns were articulated** however Martin asked to be kept up to date with activities, which was agreed.
9. After all physical, access road and mine site earthworks and activity timeline had been developed and a detailed financial budget for all activities agreed and all Departmental documentation requirements drawn-up for submission, Crocodile Gold changed the toll milling price from 1g/t to 2.5g/t which rendered the potential to bulk sample the ore body non viable. The reasons for the change are not known.
10. As no disturbance to the tenement area occurred during 2014 the area remains environmentally stable with native vegetation dominating the general landscape.

### **Activities carried out in 2015**

1. Starr attended the mine-site after notifying Ban Ban Station management.
2. Surface samples were collected from quartz veins paralleling the main ore zone to check for gold occurrence and particle size.
3. The entire tenement holding was physically checked for changes
4. Samples were collected from the ore stockpile that exhibited quartz vein folding for the purpose of particle sizing as these samples mostly return high grade (50g/t) values.

5. Starr met with the new manager of Ban Ban Springs Station (John Boot) at the station homestead to discuss proposed activities at the McKinlay. Future meetings were proposed for mutual benefit as Starr managed the property for 13 years and can provide significant assistance to John going forward.

6. Starr met with Andrew Jettner of Minesite Services in Darwin to discuss the McKinlay and Jettner's Redbank tenements. Jettner's trial work on Redbank ore could be indicative of what might be expected from McKinlay ore using similar recovery equipment.

7. McKinlay quartz samples collected as described in 2. above returned all particle sizes < 100 um with the greater proportion < 50um except for 1 gold particle which was 200um. Grade was approximated at 2g/t.

8. Ore stockpile samples were diamond saw split and analyzed under 20x magnification. Particle size was < 100um in all particles found. Numerous particles were found in 1 sample clustered along a quartz gossan intersection.

9. All historical sampling results were collated. Primarily sample assays from the surface to a maximum depth of 25 metres with a lower cutoff grade of 1 g/t Au and an upper cutoff grade of 13g/t Au were used to estimate potential ore grade over a strike length of 400 metres. Widths across the ore zone of samples assayed were used to estimate tonnage expected. (see fig 1 attached)

All high assays ( i.e. 14-60g/t) recorded elsewhere by Hossfeld, Starr, Dominion, Hamilton et al were ignored so as to remain conservative with estimates. Mean grade is estimated at 5.23g/t.

With a mean primary ore zone width of 4.3mtres to a depth of 25metres (oxidized material) over a 400 metre strike length then an estimated 86,000 tonnes ( similar to Jettner's 2014 estimates) at 5.23g/t may contain 14,462 onz Au.

10. The minesite remains environmentally stable after nil disturbance in 2015.

## **Discussion**

When mining of the ore finally takes place it is likely that a reduced tonnage at a higher grade will be achieved by careful selective mining. Further discussions with Jettner re Redbank has revealed that gravity will not recover an economical grade from the high grade ore, due probably to small particle size and will have to be leached. Whilst Redbank particle size is smaller than McKinlay when coupling Gekko Systems work on McKinlay ore with Pontifex petrology and Redbank recoveries then gravity recover of gold from the McKinlay can be put to rest.

The Mckinlay ore will need to be leached to recovery gold.

Toll treatment options do not exist and the capital costs of CIL or CIP plants are prohibitive for the small tonnages expected.

The McKinlay mine fits the commonly used formula for determining the optimum recovery system, i.e. low volume, relatively high grade, small gold particle size enabling relatively fast leach times and lower capital cost risk.

## **Proposed Activities for 2016**

1. Starr to liaise with Dept. Mines re their views on small scale heap leaching of McKinlay ore.
2. Starr to attend minesite to collect samples from stockpile for laboratory column leach trials.
3. If column leach tests are favourable, make appropriate arrangements with Mines Dept., crushing contractor and Ban Ban Station management to construct a trial leach pad and ponds for the leaching of the 2000 tonne stockpile.
4. If the trial is favourable then develop permit proposals for the mining of a 5-10,000 tonne pilot leach with the aim to conduct the leach in 2017.

## **Activities Carried out in 2016**

1. Activities outlined above were not achieved due to the focus being diverted by proposals from two separate interested parties.
  - Knappes Cassidy of Western Australia showed significant interest in a heap leach proposal where they were to organize a 3<sup>rd</sup> party to provide equipment, Knappes Cassidy the expertise for a 3 way share of profits. After providing **all** historical data Knappes Cassidy failed to make any further comment, not even to give a reason for loss of interest.
  - Mining Processing Solutions Pty Ltd of Perth together with the Australian Mineral Research Centre have developed a continuous vat leach system producing benign tails from oxidized ore which would suit the McKinlay project well. Their economic cut off for 4g/t ore was 33,000 per year with a projected profit with two years of operation. Our estimated 80,000 tonne reserve was viewed marginal with a capex of \$2.5 to set up. This project has not gone any further at present.

The discussions and actions with the above entities over the dry season of 2016 did not allow time to carry out the proposed activities.

Ban Ban Station was sold in December 2016 and endeavours are being made to contact the new owners with the aim to meet and discuss future proposed activities.

## **Proposed Activities for 2017**

Subject to the outcome of discussions with the new owner of Ban Ban Springs Station the activities proposed for 2016 as outlined above will be pursued.

Emphasis will be placed on Vat leaching over heap leaching especially if an economic system of denaturing of cyanide can be incorporated into the recovery equipment.