Newsletter May to June mining period 2018. The Malbunka Copper Mine Project (MCM Project), ML 29494, Central Australia.

This newsletter covers mining undertaken in 2018 in the desert of Central Australia at the Malbunka Copper Mine 220 kilometres west of Alice Springs by Dehne and Maureen McLaughlin and support workers for the recovery of discoidal azurite specimens on white kaolinite matrix described as "azurite suns". The 2 month field season program involved 5 mine expeditions on a 6 nights bush and 4 nights recovery and replenishment in Alice Springs. Advanced planning times were important to the project as mine workers flew in from the USA, Hobart (Adam and Tim) and the East Coast. We also had several weeks assistance from our local Alice Springs based paint salesman manager and weight lifter Logan Williams.

The objective in 2018 was to continue driving down the anticlinal cusp in the main adit based on finds of small and large azurite specimens in 2D and 3D form reported in our 2017 newsletter. See Photo 1.

Photo 1: Large cabinet 3D size rose like sun with fine white baryte and minor malachite exposed in L3 layer below sandstone hanging wall in May 2018. Specimen cleaning will reveal if some of the malachite is psuedomorphing the azurite.

In 2017 and in 2018 we tunnelled 5 metres each year down the anticline cusp across a 4 metre wide face. In 2018 there was a change over the first metre where the former specimen productive L0 layer (L0 is the lowest layer followed by L1, L2 and L3) demonstrated 95% re-solution of the original azurite sun. See Photo 2 below.

Photo 2. Profiles of L0 casts (ghosts) of azurite suns sitting below the L1 azurite layer.

Re-solution is encountered in the L0 azurite layer in all areas of the mine where L0 is encountered but in the Adit drive in 2018 re-solution or ghosting was extreme. There was a detailed description in the 2017 newsletter of this phenomena. By June we were 4 metres further into the face, and re-solution of the "reliable" L1 layer also became evident. Most of L2 became obscure. However, where L3 intersected small faults with 10cms throw in the hanging wall several large up to 8 inch plates of azurite were still found at each half metres advance of the face (Photo 1). L3 also produced some nice multiple assortments of 4 inch suns but quality soon deteriorated. Malachite in the form of thin circular plates became common in parts of the face in the L1 layer and above but specimen quality material was rare. The notorious "paper azurite" also became common. Attractive, but so thin, quality specimens were restricted to less than 10 pieces. The economics of continuing at the Adit face became questionable.

In discussion with mineral collector Steve Scott of Las Vegas during trip 3, on Trip 4 we took a 7 metre step back from the east facing Adit drive and cut a half metre deep, 3 metre wide face into the north wall of the drive. Ghosting became prevalent over a short distance and L3 specimen quality material deteriorated. Specimens need to be cleaned from this new face to

pass final judgment on future potential but given what is known about mineralisation in the north limb of the anticline, not much hope is held for reserves in this area.

On the last trip into the mine, we did one more half metre cut into the Adit face and called it quits and put some of the effort we had expended there down to necessary exploration for reserve estimation. Equipment was transferred down the decline to the Down Dip Drive (DDD) which we knew was a good specimen producer. It always pays to have at least 2 operating faces. When one depletes, the fall back can be quickly brought on line and work planned to develop another backup face.

Photo 3. ***The USA family team in harmony preparing a half metre deep undercut using 900 watt Makita hammer drills with wide blade cutting tools sharpened by the local butcher in Alice Springs and kept in running order by the Pope family in Hobart. Left to right is Steve Scott, Daniel Scott and Bob Callum. Adit face photo.***

Lighting sources and power lines were already in place and soon we had the mining face and approach tunnels lite up like "fairyland", according to Peter Whitehead who had accompanied his wife Denise on a mine visit during T5. We produced bi-coloured azurite suns from the L0 layer, paint and some specimens from L1 and L2 and royal blue suns up to 5 inches across L3. Most pleasing were clusters of 1 to 1.5 inch suns on cabinet and large cabinet kaolin matrix which have been in short supply.

Further mining would focus on the DDD as it may have a 3 year life at 5 metres advance a year across a ~5 metre face. This would deplete the current estimated resource. The DDD is in the south limb of the anticline and runs parallel to the main drive but is downthrown by at

least 2 faults. However, a lot can happen in 15 metres of driving in this azurite deposit. In addition, the south limb of the anticline steepens quickly from 8 degrees to over 20 degrees and past mining following down the limb shows deterioration in specimen quality.

Photo 4. View of 2018 mine tent camp showing new waste rock disposal area to left of camp over extensive area of old mine footprint.

Photo 5. Adam Abersteiner and Logan Williams deepening the Adit face floor with a brand new Chinese Dragon electric hammer designed to break 20 cms of concrete. The floor is a half metre thick of tough silicified sedimentary injectite and given Logans size and posture we had to buy a special tool to drop the floor for the taller workers.

The previous theory that we may have been driving on azurite enrichment down the Adit has been discounted and other stories are needed to try and explain the azurite distribution where the richest areas are topographically high and at the contact with the hanging wall. The best we can think of currently is that fluids under pressure coming from below move to the highest point of their containment. In this story the structurally disrupted down dipping anticlinal cusp we had been following is the source pathway for the fluids evidenced by their active removal of first generation azurite in L0 and L1.

Ground stability in the DDD drive area is good with few problem areas in the hanging wall. Mining in the DDD during Trip 5 started with defining and cutting of a new rock pillar in preference to using timber in the small 8 metre wide ball room created there in 2016. Over the last 2 years the DDD has acted as a sump for mine water inflows during severe storms in the area. A frog was found in the sump this year but disappeared during the season. What an incredible journey that frog had made into the mine.

The Adit drive face will now become the new sump and a small dam has been raised to convey water away from the DDD. Which brings us back to weather. Ten raindrops were noted during the whole 2 months at the mine. Rain was predicted but never came. This had an effect of feral animal distributions but did not bother the normal range of bird species that are noted in the area each year and recorded in our Mine Management Plan revisions.

Photo 6. L2 in the Adit face consisted of numerous coalesced suns and Adam suggested they would make exotic coffee table displays. So we are giving that market option a go in 2018.

Photo 7. Complex faulting in the quarry face showing 3 layers of sandstone thrust over each other separated by three mylonite horizons and cut off by a regional transverse fault with down-throw in the left of photo. Near vertical normal faulting is evident in vicinity of the blue tarp.

The more I look at the quarry face, the more complex the structures in the sediments become. What looks like simple sedimentary layers are not what they seem. The main structural deformations that occurred in the Amadeus Basin are said to have taken place during the Alice Springs Orogeny. Mylonites are a common geological feature of the region and are recorded locally in the above photo (mylonite is a rock produced by grinding of rock on rock as one slab is forced or twisted over the lower layer.). Slickensides on rocks exposed in creeks are common. The most massive demonstration of earth movements in the region is the scenic 400 kilometre fault scarp created by thrusting of the Heavy Tree quartzite over older Arunta complex metamorphics. Some basin authors advise that salt withdrawal accompanied by salt diapirism commensurate with our model of copper carbonate mineralisation were structurally important well before the Alice Springs Orogeny was underway.

Field work at the mine has established that local thrusting took part before and after azurite mineralisation as observed in the underground workings. The 2017 paper on the deposit suggested the copper carbonate was of lower Cambrian age. This begs the question of why is there any azurite left at all? Should it have not been altered to malachite? Is the deposit young? Still unanswered questions. That's all in the Dreaming of the Traditional Aboriginal Owners. The TAOs pictured below asked me do I ever get bored by the mining. I replied "yes" during waste rock removal and undercutting, but advised the excitement of uncovering wonderful azurite specimens was definitely not boring.

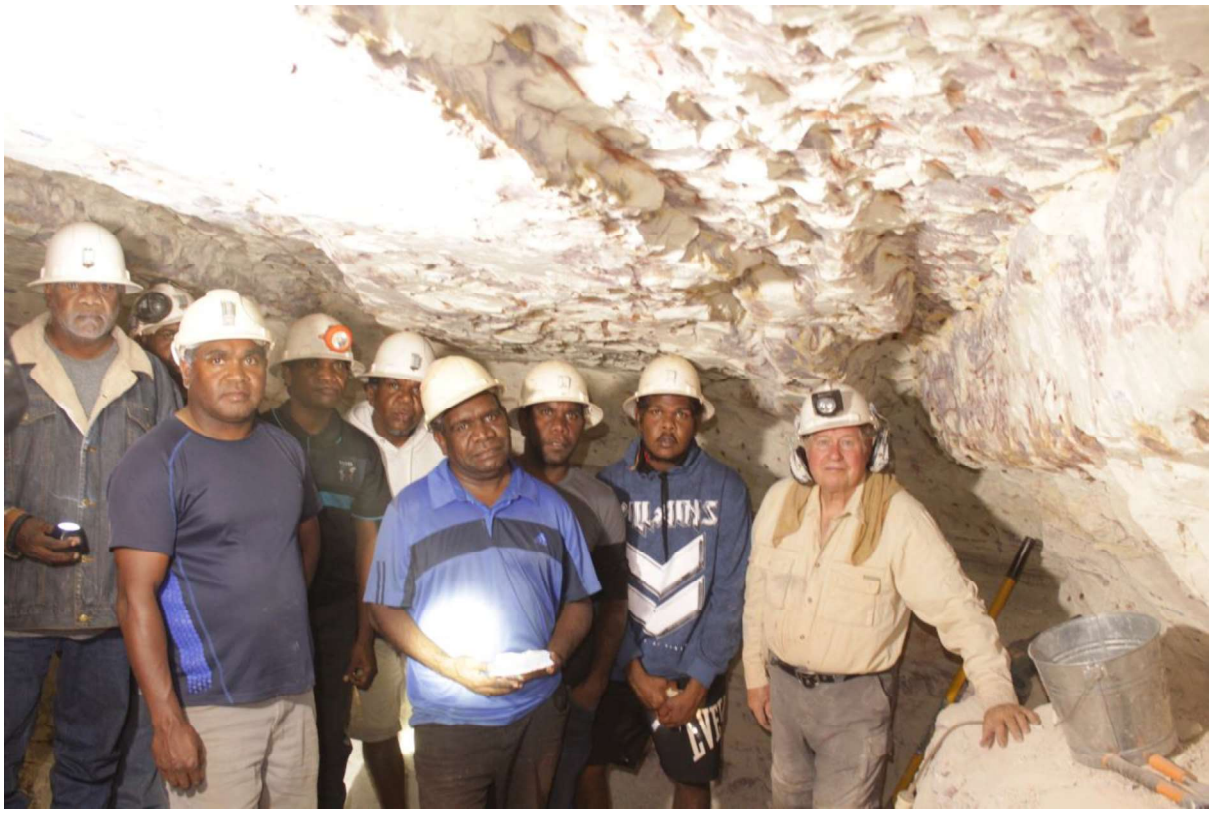

Photo 8. Traditional Aboriginal group on mine inspection visit on first week of project commencing in 2018.

Photo 9. Last of the wood in the mine, cut by Cameron and Tracy Griffins in 2017. We now use this remaining wood as a wet weather emergency supply.

The paper published in January 2017 in **Ore Geology Review** (82 (2017) 170-180) titled "**Primary diagenetic copper carbonate at the Malbunka copper deposit, Amadeus Basin, Northern Territory, Australia** by authors Erik Melchiorre, Dehne McLaughlin, Ralph Bottrill and Jay Hight, received positive feedback from Geologists at our display room in Tucson in January-February this year. Petroleum geologists remarked on the fluid flow features in photographs of the sediments and advised the hydraulic fracturing photos showed fracture patterns similar to those achieved by artificial fracturing in petroleum wells. The difference in hydraulic fracturing in our mine compared to artificial fracture stimulation is that the mine elated fluids have come from below: artificial fracturing is introduced from above.

Researchers in copper oxide deposits were excited by the thesis that the MCM is a primary copper carbonate deposit. Theodore Bornhorst from the A. E. Seaman Mineral Museum of Michigan Tech provided a published article of a primary chalcocite deposit in Michagan State which he advised was probably the sulphur rich equivalent of our sulphur poor deposit. The low sulphur character of the primary cupriferous fluids at the MCM project was further confirmed during the year by analysis run by Dr Aleksandr Stepanov (Sasha from the 2017 mining trip) that confirmed large amounts of said chalcocite in the mine hill, as advised by past geologists who had worked there, were malachite and dark clay.

Photo 10. The blues and greens of azurite in a hot fire when 2 degrees at the mine.

Photo 11. Daniel Scott at mine work face Adit Drive dropping specimen bearing material onto seat cushions. Photo: Bob Callum.

Despite our best assessments of specimen potential at the mine, we can not be sure what surprises in specimen type or reserve quantity may turn up in 2019. Contact Dehne on 0402450905 or dehne.mclaughlin@bigpond.com if you want to be a part of that adventure.

Cheers

Dehne and Maureen McLaughlin July 2018.