TNG LIMITED

ENIGMA MINING LTD

MOUNT HARDY PROJECT
CORE FACILITY SAMPLING REPORT

EL 27892

Tenement/s	EL 27892	1:250 000 Sheet Name	Mount Doreen (SF5212)
Holder	Enigma Mining Ltd	1:100 000 Sheet Name	Yeundumu (5253)
Manager	TNG Limited	Datum	GDA94-52
Operator	TNG Limited	GDA_E	755000-770000
		GDA_N	7540000-7572000
Commodity	Cu, Pb, Zn, Au, Ag		
Elements Analysed	Sb, Sn, Cd, Ag, Sr, Rb, Pb, Au, Pt, As, Hg, Zn, Cu, Ni, Co, Fe, Mn, Cr.		
Keywords	Base metals, copper, zinc, lead, gold, VTEM, ground EM, geophysics, mapping, surface geochemistry, pXRF, ICP analysis, old workings.		
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Report Date	11 February 2013		
Distribution	TNG Limited		(1)

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APPENDICES

1. INTRODUCTION AND RATIONALE

In 1967 Mines Branch, Northern Territory Administration completed a 7-hole diamond drill program, totalling 504m (1656 feet) investigating primary and secondary mineralisation at the Mount Hardy prospect within **EL 27892 - currently held by TNG Limited (see Table 1)**

Table 1: EL Tenement Details

TITLE	PROSPECT	AREA	GRANT DATE	EXPIRY DATE
EL27892	Mount Hardy	32 blocks (107.76 km^2)	04/08/2010	03/08/2016

The drill program identified the importance of secondary mineralisation within the Mount Hardy copper showing. 1968 assays reached 5.7% copper within supergene mineralisation with the majority <1% in the primary sulphide zone.

All seven of the holes are currently stored in the Alice Springs Core facility and are in very good condition. In November 2012 TNG Limited re-logged the core, sampling where more than a quarter of split core remains, with the aim of:

- Gaining understanding of the concentrations and styles of both secondary and primary copper mineralisation.
- Closing out the mineralised intervals where sampling had not taken place originally.
- Investigate the mineralisation suite of both primary and secondary mineralisation.

The hole collars were GPS positioned during the September 2012 field program conducted by TNG Limited. Collar for holes 1-3, 6 and 7 were located with 4 and 5 (both within the main pit area and subsequently masked by material) located from the geo-referenced 1968 drilling plan. Hole locations and downhole surveys are summarised in **Table 2.**

Table 2: Summary of BMR Diamond Drill Collars

HOLE_ID	EASTING_GDA94	NORTHING_GDA94	DEPTH_ft	DEPTH_m	DIP	AZIMUTH_MAG
MHDDH001	766542	7552997	310.0	94.488	-50	163
MHDDH002	766541	7552964	145.0	44.196	-50	153
MHDDH003	766447	7552912	207.0	63.094	-45	142
MHDDH004	766559	7552935	90.0	27.432	-65	335
MHDDH005	766559	7552935	110.0	33.528	-75	335
MHDDH006	766491	7552939	309.0	94.183	-45	153
MHDDH007	766420	7552965	484.0	147.523	-50	147

2. SAMPLING

A total of 249 samples (summarised in **Table 3**) were submitted for geochemical multi-element analysis and fire assay (MH01XXXX) with 5 petrological samples (PETRO 1 to 5), see **Table 4** taken to analyse the primary and secondary sulphide suite, the style of mineralisation and any associated alteration. Where too little core remained to sample Niton XRF readings were taken on the quarter core at foot intervals. A total of 150 Niton XRF readings were taken and the distribution and intervals are summarised in **Table 3**.

The sampling was done to geological intervals and in both visibly mineralised and non-mineralised schist in order to close out the mineralisation and gain understanding of the concentrations in both secondary and primary copper mineralisation.

Table 3: Summary of Niton XRF and Lab sampling

Hole ID	From (ft)	To (ft)	From (m)	To (m)	No of samples
Niton XRF Sampling					
MHDDH001	220	231	67.1	70.4	12
MHDDH003	120	149	36.6	45.4	30
MHDDH004	23	60	7.0	18.3	38
MHDDH006	48	106	14.6	32.3	37
MHDDH007	196	314	59.7	95.7	33
Lab Multi-element Analysis (ICP/FA)					
MHDDH001	140	221.67	42.7	67.6	
	223	223.67	68.0	68.2	
	224.5	233.5	68.4	71.2	
	233.92	236.17	71.3	72.0	
	237	245	72.2	74.7	Total: 38
MHDDH002	51.84	121.72	15.8	37.1	Total: 23
MHDDH003	93	122	28.3	37.2	
	148.43	162	45.2	49.4	
	171.5	199.67	52.3	60.9	Total: 22
MHDDH004	0	25	0.0	7.6	
	58	86.75	17.7	26.4	Total: 16
MHDDH005	17	55.5	5.2	16.9	
	72	75	21.9	22.9	Total: 12
MHDDH006	16.42	88.5	5.0	27.0	
	106	143	32.3	43.6	
	257.75	262.75	78.6	80.1	
	275	302.75	83.8	92.3	Total: 48
MHDDH007	62.5	63.5	19.1	19.4	
	89.67	90.5	27.3	27.6	
	105	115.58	32.0	35.2	
	128.33	160	39.1	48.8	
	167.25	172.42	51.0	52.6	
	179	196.33	54.6	59.8	
	205.5	292.92	62.6	89.3	
	314	397.17	95.7	121.1	
	401	407.83	122.2	124.3	Total: 90

Table 4: Petrological sample descriptions and intervals

Hole No	Sample No	Depth (ft.)	Depth (m)	Lith	Mineralisation	Description
MHDDH007	MHDP 1	232.83	70.97	PQV	Cpy/Cc/Native Cu	Mineralised quartz stringer ~70mm wide
MHDDH007	MHDP 2	266.00	81.08	PQV	Mal/Chrys/Cpy/ Native Cu	Mineralised vein quartz taken from main mineralisation in DDH 7.
MHDDH007	MHDP 3	369.75	112.70	PQV	Cpy/Py/Bornite /Cc	Mineralised quartz stringer possible bornite
MHDDH003	MHDP 4	130.00	39.62	PLRS	Native Cu	Hematite and native copper within possibly altered PLRS.
MHDDH004	MHDP 5	36.00	10.97	PQV	Mal/Chrys/Box work	Mineralised vein quartz with malachite/ chrysocolla in fractures and limonite boxwork.

3. GEOLOGY

The drilling covers approximately 200m along strike length at the Mount Hardy prospect with associated historical workings. The prospect is situated predominantly within Lander Group Schists (PLRS) with minor intruding pegmatites and both mineralised and barren quartz veining.

The mineralisation is held within the quartz veining as dominantly oxidised malachite, chrysocolla and iron oxides with minor chalcocite. Primary mineralisation is observed at depth, below the weathering profile, and includes native copper and Chalcopyrite, specifically observed in DDH007.

4. RESULTS

As found in the 1968 report the majority of mineralisation is contained within secondary mineralisation, dominantly malachite. The highest copper value, of 5.3% was found in DDH 2 over an intersection of 0.6m (true thickness) with copper contained in malachite and chrysocolla. DDH 1, 5 and 6 also returned >1% copper assays exclusively from copper oxides held within quartz veins and stringers.

DDH 7 was the only hole to return significant copper ICP results from primary mineralisation, although not as high as the oxide copper. Combined with the 1968 assays 0.53% copper, over multiple intervals between 89.61m and 106.99m totalling 15.05m is held within primary chalcopyrite. The ICP assay returned 5.0% copper between 101.2 and 101.5m (0.26m true thickness).

The thickest intersection of copper mineralisation was found within DDH 3 with Niton XRF values showing 1.64% copper found over 6.08m at a depth of 37.5m. This is a broad zone of mixed supergene and primary copper with malachite, azurite, native copper, chalcocite and chalcopyrite hosted within vein quartz and minor schist. The interval is based upon Niton XRF values but is comparable to 1968 assays.

Niton XRF readings taken in DDH 6 upgraded the existing 1968 assays to 1.95% copper over 2.81m from 15.99 to 19.24m, and 4.22m of 2.27% copper at from 27.28 to 32.15m. Both are from secondary copper oxides occurring in the supergene profile. Niton XRF values have been compared, where possible, with both 2012 ICP analysis and the 1968 assays. The 2012 ICP assays and 1968 assays are considered more representative of the grade over an intersection however the Niton XRF values highlight the significant intervals effectively.

The full assay results of both the lab multi-element analysis and the on-site Niton XRF analysis are found in the attached down hole geochemistry file (EL27892_2013_01_DownholeGeochem.txt) with lithology logs and codes in accompanying files.

The results confirmed the presence of both mineralisation at surface and at depths of up to 122m. With mineralisation present in all 7 of the BMR drill holes. The most impressive results included:

- 10.7m @ 4.1% Cu (XRF result) from 6.9m to 17.5m, including 1m @ 27% Cu
- 7.0m @ 1.64% Cu (XRF result) from 37.5m to 44.5m, including 3m @ 5.7% Cu

A summary of the most impressive intersections and mineralisation style and mineralogy, combined with original BMR assays are summarised in **Table 5**.

Table 5: Summary of Significant Copper Intersections and Grades by Drillhole

Hole Number	From	To	True Thickness (m)	Cu_%	Description	Assay Data
68MHDDH001	**58.674**	**58.979**	**0.264**	**5.00**	Malachite and azurite stained vein quartz	From original assay BMR
68MHDDH002	**24.460**	**25.180**	**0.624**	**5.30**	Malachite and chrysocolla	Niton XRF result, similar to BMR
68MHDDH003	**37.480**	**44.500**	6.079	**1.64**	Broad zone of mixed supergene and primary copper in both vein quartz and schist. Malachite, azurite, native copper, chalcocite, and chalcopyrite. Below Pit #2.	Niton result. Similar to BMR 26'@ 1.32% Cu from
68MHDDH004	**6.86**	**17.520**	**3.800**	**4.10**	Drilled down plunge from main pit area. Malachite, azurite and some minor chalcopyrite and chalcocite towards the base.	
68MHDDH005	**5.182**	**10.058**	**1.860**	**0.98**	Drilled down plunge from main pit area. Malachite and minor chrysocolla and limonite copper staining.	ICP results. Not reported from 1968
68MHDDH006	**15.99**	**19.235**	**2.810**	**1.95**	Malachite and azurite in gneiss with stringer veining. Vein #2.	XRF result. No ICP. Upgrades the existing BMR of 13' @ 0.456%
and	**27.28**	**32.154**	**4.221**	**2.27**	Malachite dominant in quartz veining and sheared schist.	
68MHDDH007 Overall @ 0.3% Cu Cut off	89.61	106.99	**15.05**	**0.53**	Broad zone of primary chalcopyrite mineralisation	ICP results combined with original BMR data.

Significantly hypogene chalcopyrite was observed downhole in DDH07. This was confirmed by the petrographic investigation these are summarised below but the report in full is found in **APPENDIX XX.**

The petrographic samples identified mineralisation hosted within deformed quartz veining. The quartz is most likely to be of hydrothermal origin and has undergone both strong tectonism, with shearing, and retrograde metamorphism and alteration (sericite) in places. The hypogene chalcopyrite has been completely and partially replaced by supergene chalcocite, native copper and bornite in the mixed supergene/sulphide zone. With oxides and carbonates including malachite, chrysocolla, azurite and brochantite dominating weathering profile with malachite penetrating along fractures in the host.

The quartz veins are held within a meta-psammite host with biotite displaying a weak schistosity where it has not been replaced by sericite. The host was probably stable under greenschist to lower amphibolite facies.

5. CONCLUSIONS

The logging and extended sampling of the 1967 Mount Hardy diamond drill holes confirmed the presence of significant secondary copper, dominantly malachite with associated chrysocolla, chalcocite and brochantite with hypogene chalcopyrite observed in lower quantities at depth.

Both 1968 and 2012 sampling confirmed secondary copper oxides returning the highest grades with the highest copper values hosted exclusively in malachite and chrysocolla. Secondary oxides are present down to approximately 30-40m in many of the holes with a broad overlapping zone combining both supergene mineralisation and sulphides extending to approximately 60m.

Significantly re-sampling of the 1967 core has confirmed, where mineralisation was intersected, unlike at surface, it rarely extends into the surrounding Lander Beds. Both secondary and primary sulphides are confined almost entirely to quartz veining. These include large named veins extending over many metres and very fine <5mm stringers both crosscutting and parallel to foliation planes. Where high concentrations of mineralised quartz stringers occur copper grades can reach up to 5%.

The combination of Niton XRF sampling with the 1968 assays has allowed some comparison of historical data with the visible mineralisation. The re-sampling has resulted in minor upgrades of the 1968 intersections as well as gaining further understanding into the less obviously mineralised fine quartz stringer hosted mineralisation.

6. REFERENCES

Grainger D. J. 1968. The Mount Hardy Copper Field, Northern Territory. Bureau of Mineral Resources, Geology and Geophysics Record 1968/100.

7. APPENDICES