

EPM 16267 – CLARA RIVER 1  
REPORT FOR THE 12 MONTHS  
ENDING 19 JANUARY 2012

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Date: August 2012

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## SUMMARY

Exploration Permit for Minerals (EPM) 16267 – Clara River 1 was granted to Bowen Energy Ltd for a term of 3 years on 20 January 2009. The tenement is located in 98 sub-blocks 126km SSE of the town of Croydon. The EPM was granted to explore for economic sulphide copper nickel deposits, and possibly economic uranium deposits.

Bowen Energy originally applied for 17 Tenements in the Croydon Project area, but has subsequently rationalized these original 17 down to 3 tenements which include EPM 16272, 16274, and 16267. Bowen Energy has also picked up another tenement located on the south-western edge of the 3 remaining tenements which is EPM 17364. The decision to retain the current EPMs was based on the interpretation of magnetic data which has provided Bowen Energy with a sulphide copper nickel target (Fig. 2).

Bowen energy has subsequently relinquished sub blocks of EPM16267 in both 2010 and 2011.

## 1.0 INRODUCTION

EPM16267 – Clara River 1 comprises 100 sub-blocks. It is located 126km SSE of the town of Croydon in North West Queensland (Fig. 1). The EPM is boarded by two other Bowen Energy Tenements on the north and west is EPM 16272, on the west is EPM 17364. Another independent company has been granted the tenement that lies on the eastern border on 16274.

The region is generally gently undulating grazing country, and is drained by the main river system, being the Clara River, and numerous other ephemeral creeks, to the north-west into the Gulf of Carpentaria. The site is accessible via unsealed roads and tracks, south from the sealed Gulf Development highway, which leads to Croydon.

The EPM was granted for a term of three (3) years on 20 January 2009, primarily to explore for economic sulphide copper nickel deposits, and also uranium deposits. The sulphide copper nickel deposits are the main target and are hoped to be located in the Proterozoic mafic to ultramafic rock structure underlying the Jurassic to Quaternary aged alluvial deposits which are around 100-150m deep, in the south-west section of 16272SW.

## 2.0 Tenement

Exploration Permit for Minerals (EPM) 16267 – Clara River 1 was originally granted to Bowen Energy Ltd for a term of 3 years on 20 January 2009. The tenement was located in 98 sub-blocks 126km SSE of the town of Croydon. Pursuant to Section 139 of the Mineral Resources Act 1989 (MRA), Bowen Energy Limited hereby conducts a reduction of the area currently covered in EPM 16267.

Table 1 The sub-blocks to be relinquished from the tenure are detailed as follows:

BIM	BLOCK	SUB-BLOCKS
NORM	2790	J, K, M, N, O, P, R, S, T, U, W, X, Y, Z
NORM	2791	K
NORM	2792	F, G, H, J, N, O, S, T, , X, Y

Table 2 The sub-blocks to be retained in the tenure are detailed as follows:

BIM	BLOCK	SUB-BLOCKS
NORM	2791	F, G, H, J, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z
NORM	2792	L, M, Q, R, , V, W,

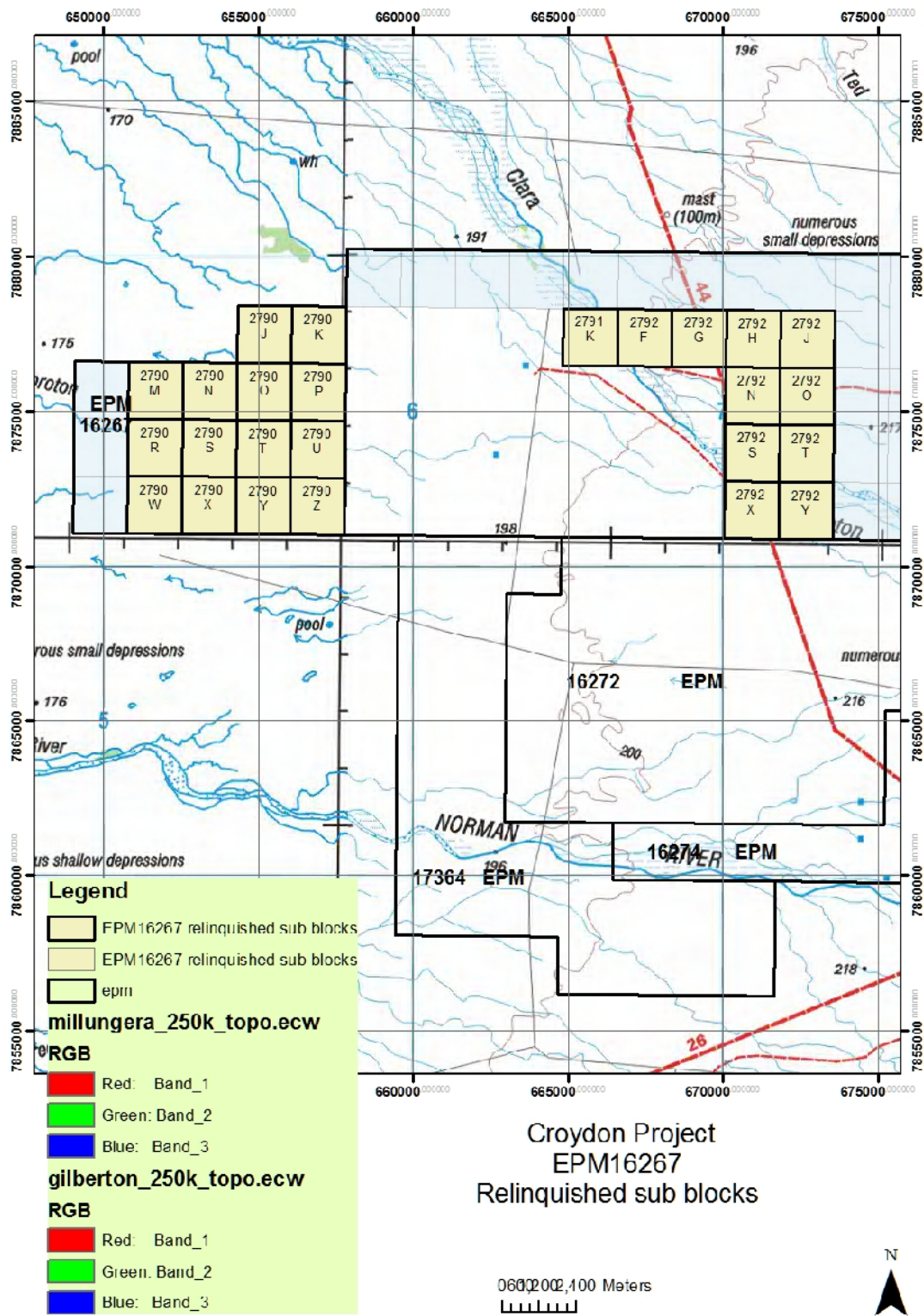


Figure 1 relinquished sub blocks

### 3.0 PREVIOUS EXPLORATION

Queensland Metals in 1984, in Ato P 3689M tested a large magnetic dipole 150km NNW of Richmond in NQ with two vertical percussion holes. The exploration approach was to find the source of high fluorine levels in groundwaters of the Gilbert River Formation. High fluorine levels in ground water are empirically related to known mineralized districts of Australia.

Following detailed ground and airborne magnetic surveys, the magnetic anomaly was interpreted to be a flat lying and potentially layered body. The first hole targeted the magnetic high and the second a magnetized low zone (dipole low to the south of magnetic high feature)

Both holes intersect mafic rock types interpreted to be altered basalt. Hole CCH01 (located in EPM 17364) reached basement at 134m intersecting weakly chloritised magnetic basalt. Hole CCH02 (located in EPM 16272SW) reached interpreted basement at 125m and intersected chloritised non magnetic and layered basalt. Both holes were affected by major water inflow and sample recovery was low with probable high sample contamination.

Other exploration in the general area has mostly been concentrated on determining locations of economic uranium ore bodies. In 1974 Esso reported in CR 4600 on drilling in reduced Yappar Member sediments of the Gilbert River Formation in an area immediately west of the Bowen application. The reduced state was indicated by the presence of pyrite cubes and massive pyrite cement with carbonaceous material also present. Results were disappointing with radioactive peaks being noted near the basement dolerite/sediment contact as well as in zones of carbonaceous shales. Highest analysis was only 29 ppm U.

In CR 5027 Chevron reported on drilling of several targets in its search for roll front type mineralisation in Jurassic Hamstead Sandstone of the Loth Formation and in the Lower Cretaceous Gilbert River Formation. Results were generally disappointing with anomalous radioactivity noted in sediments slightly above the sediment/basement contact, in weathered granites, and in minor thin carbonaceous clays of the Loth Formation. Highest core assay was 1 foot of 0.1 lb/ton U<sub>3</sub>O<sub>8</sub> in CDH 2AT.

Work by Afmeco in 1982 (CR 12062) produced only a few radiometric anomalies which were associated with weakly sericitised Croydon Volcanics close to the contact with the Olsen Granite. Also in 1982 Minlex drilled an area on the western edge of Bowen's lease (CR 10629) as a result of strongly anomalous fluorine content (92 ppm) in water in the Prospect and Lily bores. Both bores were alkaline with background U levels only.

Queensland Metals Corporation's CR 14604 details work undertaken in 1985 mainly for Sn and base metals. Appendix 3 is a 1983 CSIRO report on a "Hydrogeochemical Study of Some Ground Waters From an Area West of the Gregory Range, Central North Queensland" by Angela Giblin. This discusses, amongst other things, uranium-fluorine geochemistry and notes that the New Water Anomaly can be explained by normal

precipitation of the uranium content of groundwater in a swampy environment and does not necessarily signify a uranium orebody source for the contributing groundwater.

Work in 1984-86 by PNC Explorations Australia Pty. Ltd targeted uranium mineralisation associated with the Middle Proterozoic Olsen Granite and Croydon Volcanics and in particular radiometric anomalies associated with greisen alteration in the SW of their ATP (which lies to the east of the Bowen application area). They concluded in CR 15843 that the origin of the most intense anomaly, A4, was unclear with groundwater movement along the unconformity or introduced into fractures most likely. This anomaly consists of rhyolite intruded by a small greisenised granite vein a few metres below the Idalia Rhyolite / Gilbert River Fm. Boundary and had a maximum assay of 130ppm U. Other anomalies are greisen style uranium occurrences associated with Sn mineralisation with a maximum assay of 440 ppm U associated with green uranium secondaries. They conclude that the Sn potential of the greisenised granites remain significant.

#### **4.0 EXPLORATION UNDERTAKEN**

A review and re-interpretation of existing data, including a detailed review of remotely sensed magnetic data, has provided exploration strategies for the tenure.

Bowen Energy has entered in Ancillary Section 31 agreements with the Ewamain and Tagalaka People #2 to facilitate cultural heritage and native title considerations in our exploration.

Exploration will target, potential roll front or palaeochannel style uranium mineralisation within the on lapping Mesozoic and Jurassic sequences of the Eulo and Eromanga basins. Additional potential exists for gold, and base metal occurrences within units of Proterozoic Croydon Volcanic Group and other Igneous Units of the Georgetown block in North Queensland.

This area is considered by Bowen Energy to be prospective for magmatic nickel-copper-PGE mineralisation (e.g. Jinchuan, Voiseys Bay, Norilsk, Pechenga). Empirically key features of these deposit types are interpreted to be present in the project area.

The project contains a prominent magnetic complex which is evident in the government regional airborne magnetic data. Earlier exploration in the region indicates this magnetic feature lies beneath approximately 100m of Mesozoic and Jurassic cover sequences.

During 2009-2010 GRS resources ( a geophysical group) have conducted both three dimensional and two dimensional modeling of the main magnetic complex hosted within this project. This has confirmed a layered magnetic complex with a prominent keel structure at depth. Resulting from this work was the planning of 6-7 MIMDAS lines to determine if there are coincident conductive bodies' associated with the magnetic mass at depth.

Unfortunately this work did not progressed due to delays in getting the crew to site caused by wet weather whilst on other client jobs. It is envisaged that this work will

commence as soon as possible following the wet season. Bowen Energy's Croydon Project area includes two significant magnetic anomalies representing likely intrusions. The target is massive sulphide bodies within or associated with the magnetic sources.

In May 2011, Geo Discovery windowed out the relevant regional aeromagnetic data around these two anomalies and ran a UBC MAG3D inversion to confirm the setting and geometry of the magnetic sources – results of the inversion model are attached in Appendix I.

In September 2011, Quantec Geoscience were contracted to run several reconnaissance TEM lines across the two bodies to ascertain the presence of possible associated conductors – results are attached in Appendix II.

No field exploration has currently been undertaken by Bowen Energy since the company was granted EPM 16267 within the relinquished areas of EPM16267.

## **5.0 GEOLOGY**

### **5.1 Volcanic and Igneous Rocks**

#### **Croydon Cauldron Subsidence Area**

Exposures of igneous rocks are restricted to the extreme northeastern margin of the lease area. They include both intrusive Esmeralda Supersuite granites as well as related volcanic deposits belonging to the Croydon Province and form the westernmost exposures of the huge Croydon Cauldron Subsidence Area. This 120 km by 50 km structure was formed by the eruption of vast amounts of ignimbrite airfall deposits accompanied by subsidence along marginal faults and intrusion of the granitic rocks. The Croydon Volcanic Group has been dated at approximately 1550 Ma and is thus of Mesoproterozoic age.

The main volcanic lithologies in the lease area are relatively flat lying dacitic to rhyolitic ignimbrites or ash-flow tuffs containing common but unusual graphite pellets up to 1 (or rarely 2 cm) in diameter. They have been subdivided into various lithological units generally on the basis of phenocryst content and/or flow textures. The main unit is the Idalia Rhyolite which consists of a number of flow units of massive rhyolitic to rhyodacitic ignimbrite with 1-3mm crystals. The flows are densely compacted and welded, partly recrystallised and crystal-rich but pumice-poor with intense deuteric alteration (chlorite + sericite ± epidote) in places. The degree of recrystallisation and alteration suggests that the presently exposed rocks may have been overlain by as much as 3 km of eruptive material which has been subsequently eroded.

The volcanics have been intruded by similarly aged igneous rocks belonging to the Esmeralda Supersuite of S-type granitic rocks at depths of between 1-3 km. Contact thermal and hydrothermal alteration is extensive in the volcanic rocks adjacent to the eastern margin of the Esmeralda Granite, the main igneous rock in the lease area. This is often manifested as zones of greisenisation, chlorite-tourmaline alteration and tin



mineralisation. The Esmeralda Granite is a very coarse to medium grained biotite granite which is porphyritic in part. It contains numerous quartz veins and narrow zones of sericitised microgranite, generally NE trending, and also microgranite zones with tourmaline-feldspar nodules up to 150 mm in diameter. Graphitic and metasedimentary xenoliths are common on its margins, especially around the Croydon area where graphitic metasedimentary lenses up to 3 km long and 250 m wide have been reported. Scattered outcrops of metasediments and siliceous manganese-rich and granite-rich breccias suggest a general NNW strike in the lease area, especially along the contact with the volcanics.

The Nonda Granite outcrops in the lease area as an occasionally porphyritic, fine grained marginal variant of the Esmeralda Granite. It contains granite, granodiorite and microgranite components and is also found as xenoliths and irregular stocks in the Esmeralda Granite. In places it displays intense sericite alteration.

Geophysical data shows several narrow somewhat sinuous linear features which are considered to be dykes under sedimentary cover. These unnamed dykes are thought to consist of augite-bearing dolerite of the Kennedy Province Intrusives.

## 5.2 Sedimentary Rocks

The vast majority of the lease area is covered by onlapping westerly to southwesterly dipping sedimentary rocks of the Carpenteria and Karumba Basins. These range from Jurassic to Quaternary age and are separated from the Proterozoic basement rocks by a major unconformity with significant unconformities separating some of the sedimentary units as well.

The oldest rocks of Middle to Late Jurassic age belong to the Eulo Queen Group and consist of the Hampstead Sandstone and the Loth Formation. The Hampstead Sandstone is composed of quartzose sandstone, with conglomerate and minor fine grained sandstone and siltstone. These are commonly cross-bedded. The Loth Formation consists of clayey quartz sandstone, micaceous clayey quartzose sandstone and siltstone. Both formations are considered to have formed in fluvial channel and flood plain environments.

Late Jurassic to Early Cretaceous sediments are represented by the Yappar Member and Coffin Hill Member of the Gilbert River Formation. These outcrop as scattered outliers and mesas fringing the Proterozoic basement rocks. The Yappar Member consists of commonly pebbly quartzose sandstone with minor conglomerate and siltstone. The Coffin Hill Member lies unconformably on this unit and consists of thinly interbedded clayey quartzose sandstone and siltstone and contains marine fossils. Basal conglomerates of these units can locally contain gold and/or tin mineralisation.

Another significant unconformity occurs above the Mesozoic sediments incorporating three phases of Tertiary tectonism, active erosion and subsequent deposition followed by planation and deep weathering. Cenozoic Karumba Basin sediments from the latest of these phases outcrop in the lease area as the Claraville Formation and consist of quartzose sand and gravel derived from the Croydon Province to the east. The

underlying earlier cycles are represented by clayey sandstones, conglomerate and sand claystone and range in age from early to mid-Tertiary through to the Pliocene.

Siliceous duricrust caps Proterozoic rocks and Mesozoic valley fill. Laterite is common on the Esmeralda Granite with ferruginous weathering occurring in patches on soils developed on the Claraville Formation sediments.

### 5.3 Structure

The western portion of the lease lies on the Claraville Shelf situated between the Millungera Depression to the south and the Croydon-Smithburne basement High to the north.

Major structural trends are evident from the alignment of significant drainages on the Mesozoic cover with a major trend of NW-SE. A particularly well developed NW photo lineament occurs along the Borer river in the south of the lease area with a similar feature lying along the Yappar River to the north, the Yappar Lineament. The prominent E-W trend of the Clara River and Norman River at the southern end of the lease may represent a major structural trend as well (Fig .4.).

## 6.0 CONCLUSIONS AND RECOMMENDATIONS

Following a review of existing data the areas selected for relinquishment are interpreted to contain no immediate economic targets and potential and are therefore recommended for relinquishment.

## 7.0 REFERENCES

Brickell, A.A. 2008. Brief Geological Summaries, Bowen Energy Ltd, Croydon Uranium Lease Applications Areas.

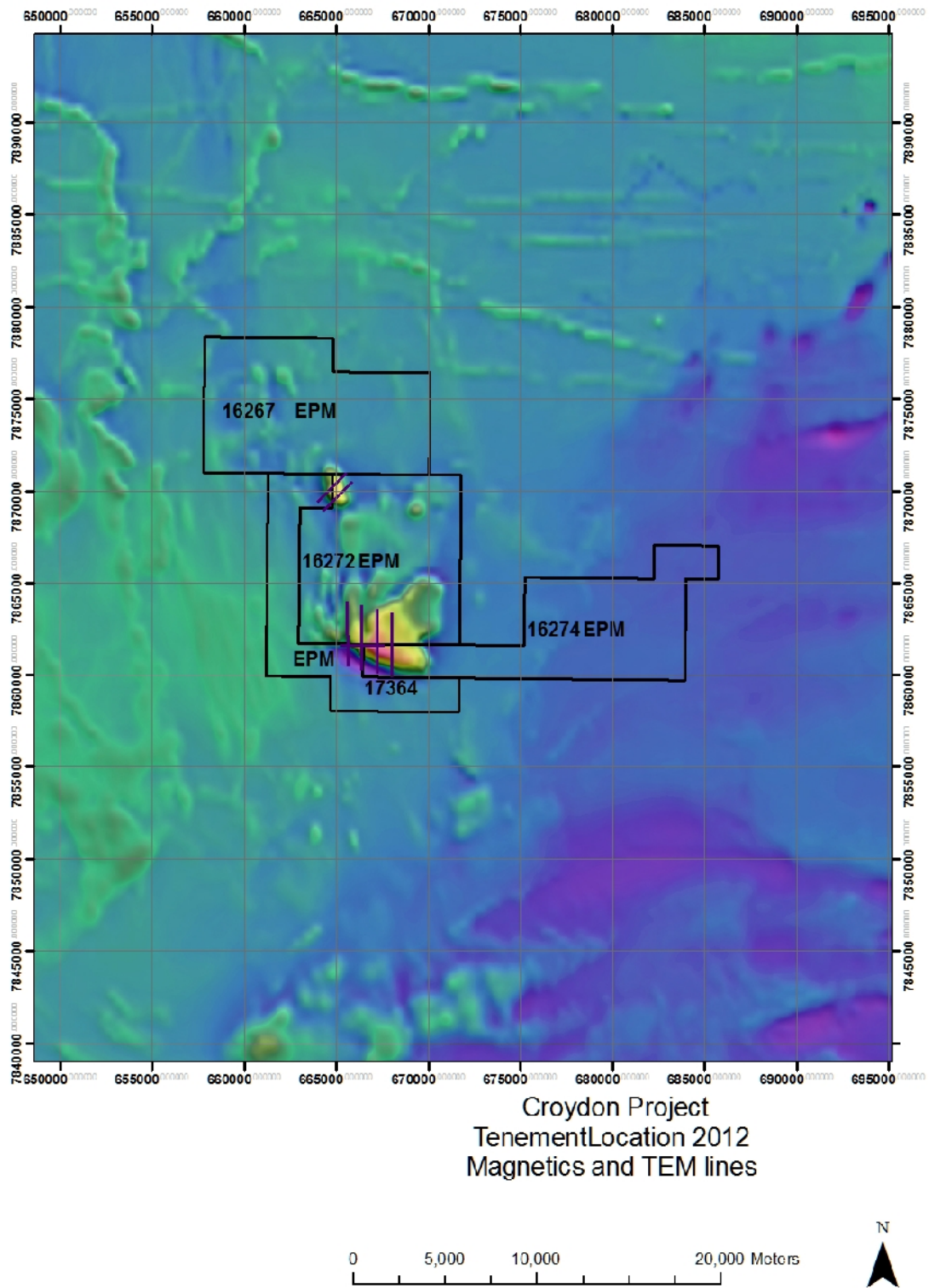


Figure .2. Magnetic Signature of Rocks Under Project Area

