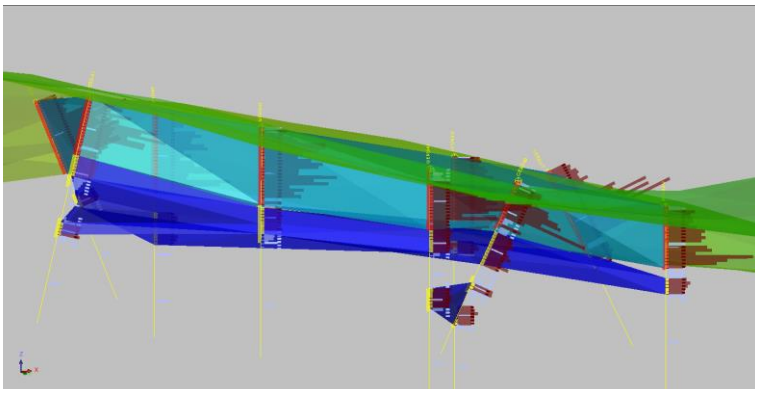
TECHNICAL REPORT

# Mineral resource Estimate – Corum Copper Project

## Licence 200712071, Corum Province, Turkey



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| **Prepared:** | **Florian Lowicki**<br>Pr.Sci.Nat Geol. (SACNASP)<br>*Resource Geologist* | |
| **Reviewed and Approved:** | **Dr. Ernst-Bernhard Teigler**<br>Pr.Sci.Nat Geol. (SACNASP)<br>*Principal Geologist* | |

**For:**

AVOD ALTIN MADENCILIK ENERJI INSAAT SAN. VE TIC. A.S.

**Effective Date:** 05 November 2018

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# 1 EXECUTIVE SUMMARY

DMT has been commissioned by AVOD ALTIN MADENCILIK ENERJI INSAAT SAN. VE TIC. A.S. (hereafter 'Avod' or 'the client') to prepare a mineral resource estimate based on a diamond drilling program executed in licence 200712071 in the Corum province, Turkey. The licence is held by the client. The primary target commodity is copper.

The mineral project started in 2013 with an initial program of a ground geophysical survey of magnetic and induced polarization (IP) along a river valley (Area A). After definition of some anomalies, DMT was contracted in 2016 to set-up an exploration program. This program started with geological mapping, which found another gossanous prospect (Area B). Based on the findings a drilling program was planned by DMT.

Resource definition work has been done following standard operating procedures (SOPs) designed and implemented on site by DMT in August 2018.

As a result of geological logging and assays of 20 drill holes, drilled to date, 3 bodies of copper mineralization have been discovered and respective three wireframes were modelled.

In total, assay data of 615 samples and density data of 209 samples have been available for this resource estimate. No block modelling or data interpolation has been done due to the early stage of the project. This report provides an inferred resource based on wireframes, which are envelopes of copper mineralization.

Several Cu cut-off grades were applied to the resource database and corresponding average grades were calculated. The portion of the assayed intervals was set in correspondence to the volume of wireframe, which again was used to calculate a bulk tonnage using an average density.

Following the two areas of investigation Area A and B and following the types of mineralization a sulfide body for Area A was modelled named body A and a sulphide body was modelled for Area B named B1 and an overlying oxidized body was modelled named B2. In consequence, three wireframes were modelled (Figure 1 and Figure 2).

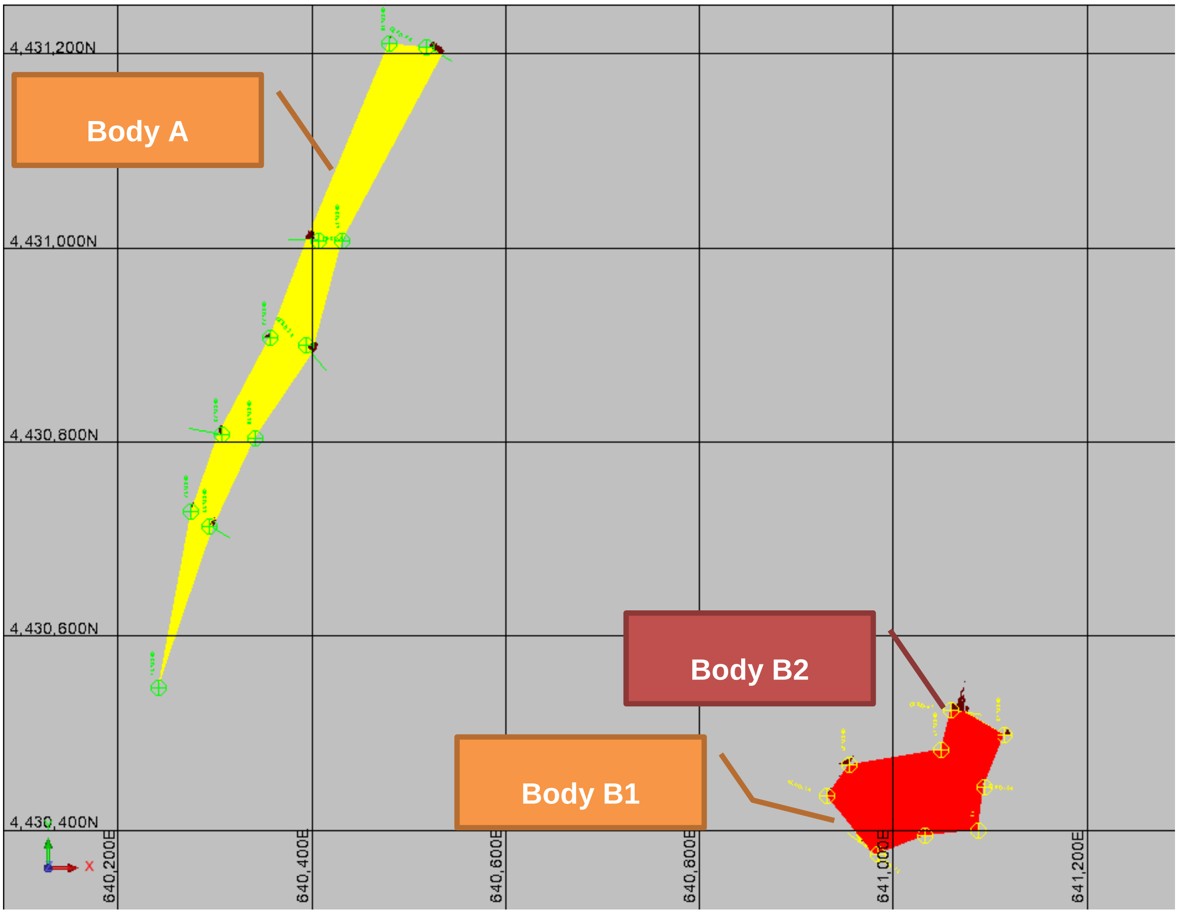



**Figure 1. Location of the three mineralized bodies A, B1 and B2 modelled.**

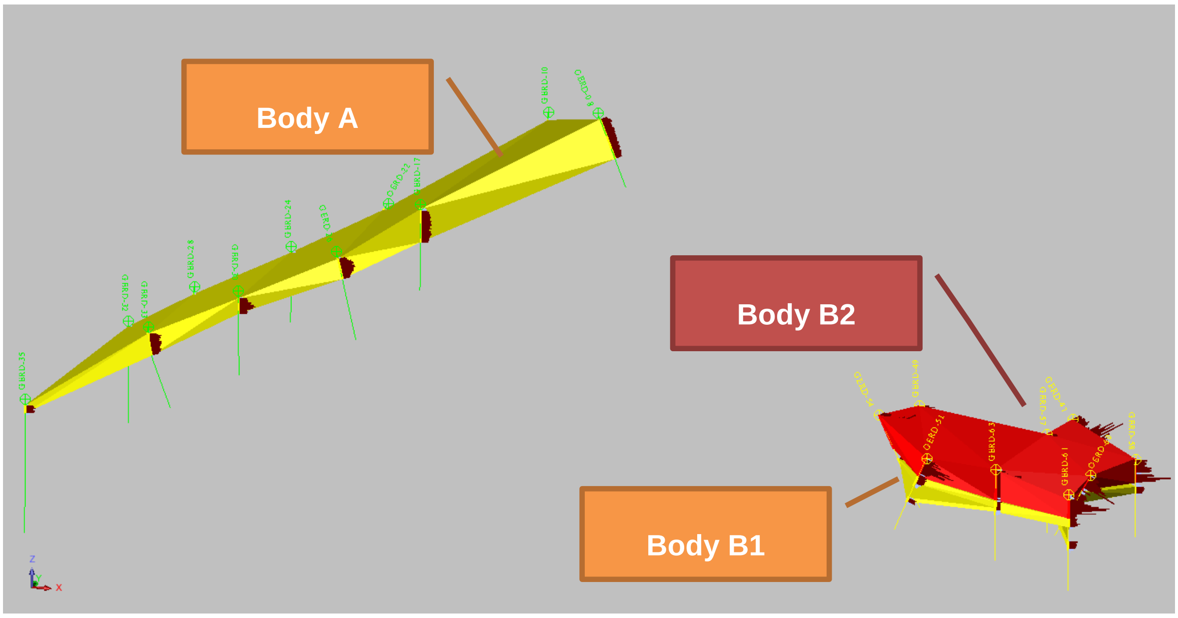



**Figure 2. 3D view to NNW onto the three mineralized bodies A, B1 and B2 modelled.**

**Following JORC requirements and considering potential economic viability a 1 % Cu cut-off grade has been assumed based on mining activities and grades in Turkey, which yields an inferred resource of 2.7 Mt at a grade of 2.0 % Cu (Table 1).**

**Table 1. Overview about inferred resource at a 1 % Cu cut-off grade**

| Category | Area | Body ID and Type of mineralization | Cu Grade [%] | Tonnage [Mt] |
|---|---|---|---|---|
| Inferred | Area A | Body A (sulfidic body in area A) | 1.7 | 1.6 |
| Inferred | Area B | Body B1 (sulfidic body in area B) | 1.4 | 0.3 |
| Inferred | Area B | Body B2 (oxidized body in area B) | 2.9 | 0.8 |
| Total Inferred | Area A+B | All three bodies A (sulfidic), B1 (sulfidic) and B2 (oxidized) | 2.0 | 2.7 |

The reader should note, that mineral resources are not mineral reserves and do not have demonstrated economic viability. Further investigations should be done to understand the geological and structural framework. Such an understanding is, however, crucial to upgrade the inferred resource to indicated or measured resource. Then further studies should investigate the modifying factors to convert these indicated or measured resource into a reserve.

# 2 INTRODUCTION

The project started in 2013 as a grass-root exploration project. Magnetic survey, done by the client and IP ground surveys, done by General Directorate of Mineral Research and Exploration (MTA), defined an anomaly along a river valley indicating the presence of disseminated sulphides (Area A).

In 2016 geological mapping was done under supervision of DMT and another gossanous body was discovered around 700 m W of the valley (Area B). In 2018, exploration drilling was done on both prospects and significant sulfidic and oxidized copper mineralization was intersected with copper concentrations up to 3 % in sulfidic (Area A and B) and up almost 8 % in oxidized mineralization (Area B).

Establishing geological and grade continuity the discoveries have been developed towardsa resource status. Estimation of the resource is subject of this report.

# 3 RELIANCE ON OTHER EXPERTS

This report has been prepared by DMT, for the client.

The client has contracted the company Aktif Yerbilimleri A.S. (AY) to manage the exploration program in the Corum licence. This company is specialized on several ground activities for mining and civil infrastructure.

The information, conclusions, opinions, and estimates contained herein are based on:

- Information available to DMT at the time of preparation of this report,
- Assumptions, conditions, and qualifications as set forth in this report, and
- Data, reports, and other information supplied by the client or AY and other third party sources, e.g. ARGETEST laboratory

For the purpose of this report, DMT has relied on ownership information provided by the client. DMT has not researched property title or mineral rights for the project and expresses no opinion as to the legal ownership status of the property.

# 4 PROPERTY DESCRIPTION AND LOCATION

The Corum licence area is located ca. 200 km to the E of Ankara, the capital city of Turkey and located in the Corum province between the villages Bogazkale in the W, Yuksekyayla in the E, Emirler in the N and Derbent in the S. The licence area 200712071 is covering an area of 1375 ha (13.75 $km^2$).

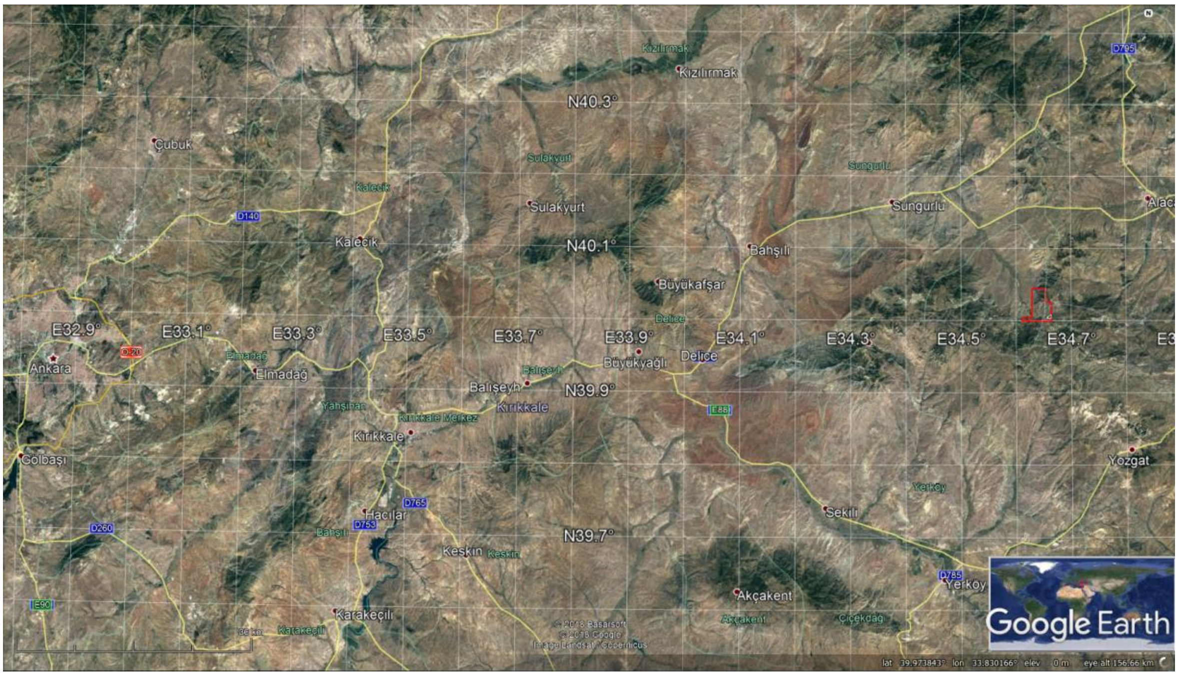



**Figure 3. Corum licence area 200712071 (red polygon) is located appr. 200 km to the E of Ankara (Source: Google Maps).**

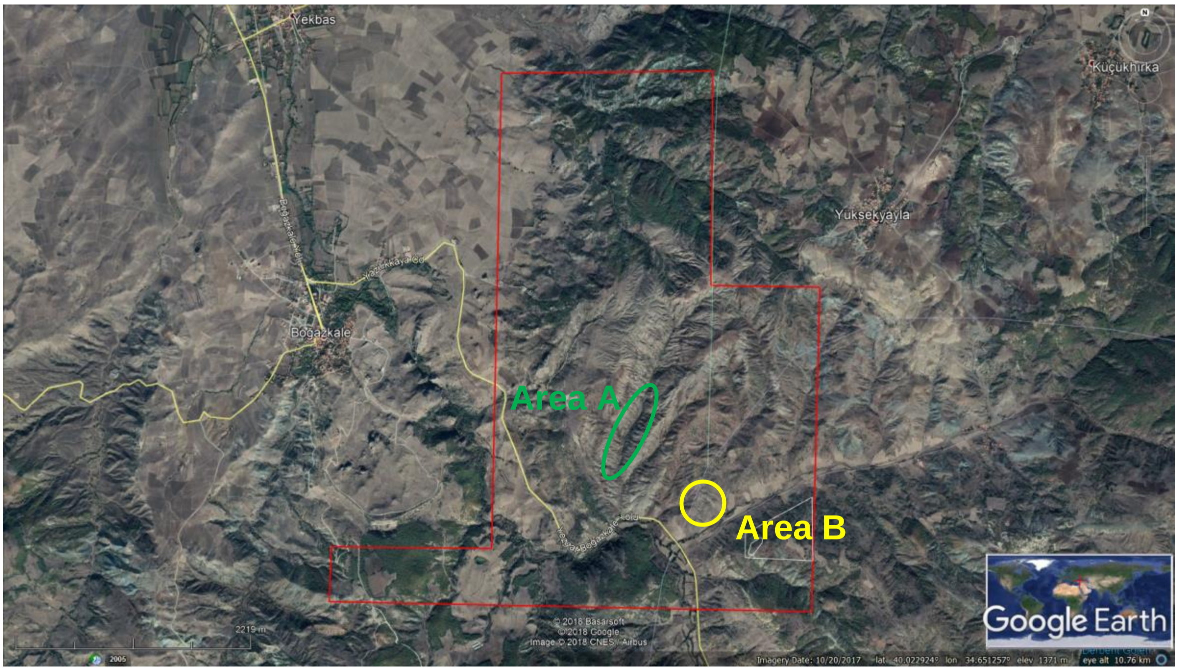



**Figure 4. The licence area 200712071 (red line) is located appr. 6 km to the E of the village Bogazkale; areas of drilling activities in green and yellow circle, Area A has sulfidic mineralization starting from some meters below surface, Area B has oxidized mineralization starting directly at surface and sulfidic mineralization below. (Source: Google Maps).**

The altitude of the drilled areas inside the licence range between 1230 m and 1300 m. Licence 200712071 is hilly and steeply incised by minor streams (Figure 5).

**Figure 5. General view of licence 200712071.**

**Figure 6. View along the valley (Area A) of licence 200712071.**

**Figure 7. View over gossan area (Area B) of licence 200712071.**

# 5 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

The licence area is located in the Corum province and accessible from Ankara within 2.5 hrs by car; 1.5 hour via D200 motorway to Delice and another hour via D190 motorway to Bogazkale. From the city center of Bogazkale it is another 6 km on the road to Yozgat, then turn left to enter the drilled areas A and B of the licence on unpaved tracks made for agriculture or forestry purposes. The province capital of Corum is accessible via motorways D190 and D785 within 1 hr by car.


**Figure 8. Access from Ankara to Bogazkale (Source: Google Maps).**

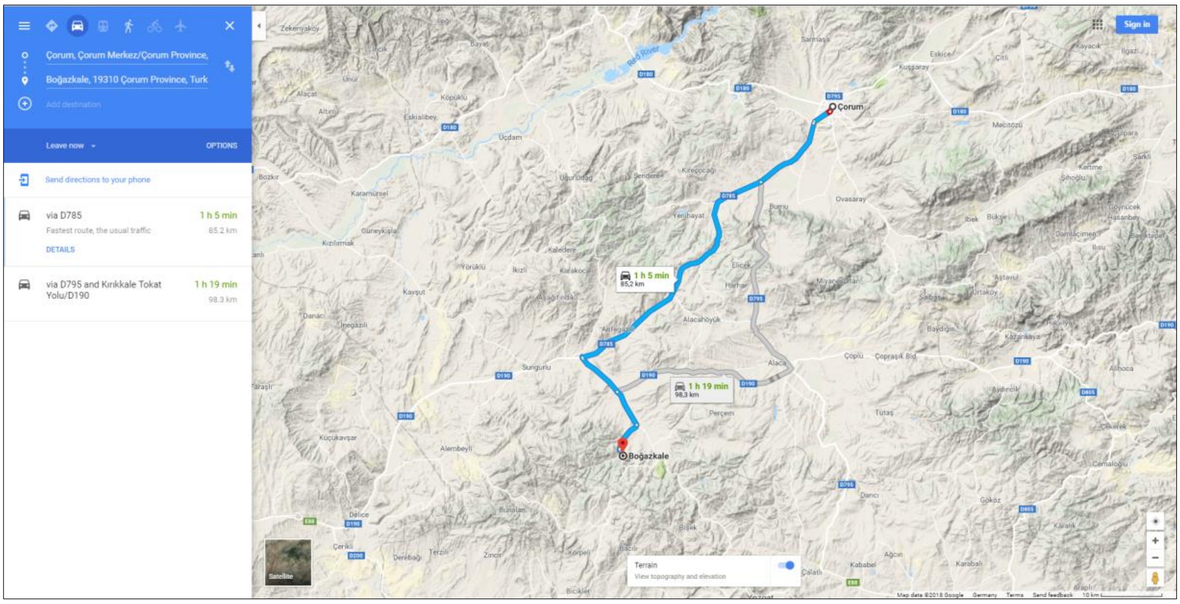



**Figure 9. Access from Corum to Bogazkale (Source: Google Maps).**


**Figure 10. Access from Bogazkale to the drilled areas A and B in the licence (Source: Google Maps).**

Corum is a northern Anatolian city and is the capital of the Çorum Province of Turkey. Çorum is located inland in the central Black Sea Region of Turkey, and is approximately 250 km from Ankara and 600 km from Istanbul. The city has a population of some 530 000 with a broad range of shops and services. The nearest airport is in Ankara, which connects internationally.

Çorum has a warm dry-summer continental climate with dry summers and cold, snowy winters, and mild to cool wet springs and autumns with light rain. (Source: https://en.wikipedia.org/wiki/Mugla).

Climate data for Çorum [hide]

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average high °C (°F) | 4.2 (39.6) | 6.2 (43.2) | 11.6 (52.9) | 17.4 (63.3) | 22.0 (71.6) | 25.9 (78.6) | 29.0 (84.2) | 29.3 (84.7) | 25.6 (78.1) | 19.7 (67.5) | 12.6 (54.7) | 6.4 (43.5) | 17.5 (63.5) |
| Daily mean °C (°F) | −0.4 (31.3) | 0.9 (33.6) | 5.1 (41.2) | 10.5 (50.9) | 14.8 (58.6) | 18.5 (65.3) | 21.1 (70) | 21.0 (69.8) | 17.0 (62.6) | 11.8 (53.2) | 5.9 (42.6) | 1.9 (35.4) | 10.7 (51.2) |
| Average low °C (°F) | −4.3 (24.3) | −3.7 (25.3) | −0.6 (30.9) | 3.8 (38.8) | 7.3 (45.1) | 10.2 (50.4) | 12.4 (54.3) | 12.3 (54.1) | 9.0 (48.2) | 5.2 (41.4) | 0.7 (33.3) | −1.9 (28.6) | 4.2 (39.6) |
| Average precipitation mm (inches) | 38.4 (1.512) | 30.4 (1.197) | 37.8 (1.488) | 52.6 (2.071) | 60.2 (2.37) | 54.3 (2.138) | 20.3 (0.799) | 14.4 (0.567) | 22.7 (0.894) | 29.9 (1.177) | 36.6 (1.441) | 47.2 (1.858) | 444.8 (17.512) |
| Average rainy days | 11.7 | 10.7 | 11.7 | 12.9 | 13.9 | 10.3 | 4.3 | 3.2 | 4.7 | 7.8 | 9.0 | 11.8 | 112 |
| Mean monthly sunshine hours | 77.5 | 98 | 151.9 | 186 | 238.7 | 273 | 316.2 | 313.1 | 252 | 176.7 | 111 | 65.1 | 2,259.2 |

Source: Devlet Meteoroloji İşleri Genel Müdürlüğü [6]

**Figure 11. Climate data for Corum.**

Required personnel for mining activities is locally available since the Corum province and surrounding provinces are known for copper mining and production.

The climate may be a challenge for open cast mining during the winter months.

Near the city of Bogazkale is the archaeological site of Hattusha, the former capital of the Hittite Empire, which is a UNESCO World Heritage site. However, this archaeological site is located 2 km away of the nearest drill hole and potential mining area.

# 6 HISTORY

After the company Aktif Yerbilimleri A.S. (AY) was contracted to make ground geophysics survey using magnetics, in 2013 the client contracted the governmental institution 'General Directorate of Mineral Research and Exploration (MTA)' in the same year to do ground geophysics survey using IP finding anomalies along a valley indicating disseminated sulphides (Area A), in 2016 a geological mapping program was done under supervision of DMT and another mineralised gossan-like body was prospected around 700 m West of the valley (Area B).

No other exploration work has been done before or is reported.

According to the client there was some mining activity in the mid 20th century. However, no information is available about location, extent or historic production.

# 7 GEOLOGICAL SETTING AND MINERALIZATION

This section is sub-divided into three sub-sections describing the general situation of copper mining in Turkey as well as the local geology and mineralization.

## 7.1 GENERAL / REGIONAL

There is excellent potential for both Cyprus-type and Kuroko-type VMS deposits in Turkey, especially in the productive northeastern Black Sea coast area (the Pontide Belt). These are the bimodal-felsic and mafic-dominated types of Franklin et al. (2005).

Kuroko-type deposits in Turkey are restricted to the Late Cretaceous bimodal volcanic rocks of northeastern Turkey, while Cyprus-type deposits are associated with ophiolitic rocks of the Kure district in northern Turkey and Ergani district in southeastern Turkey (Figure 12).

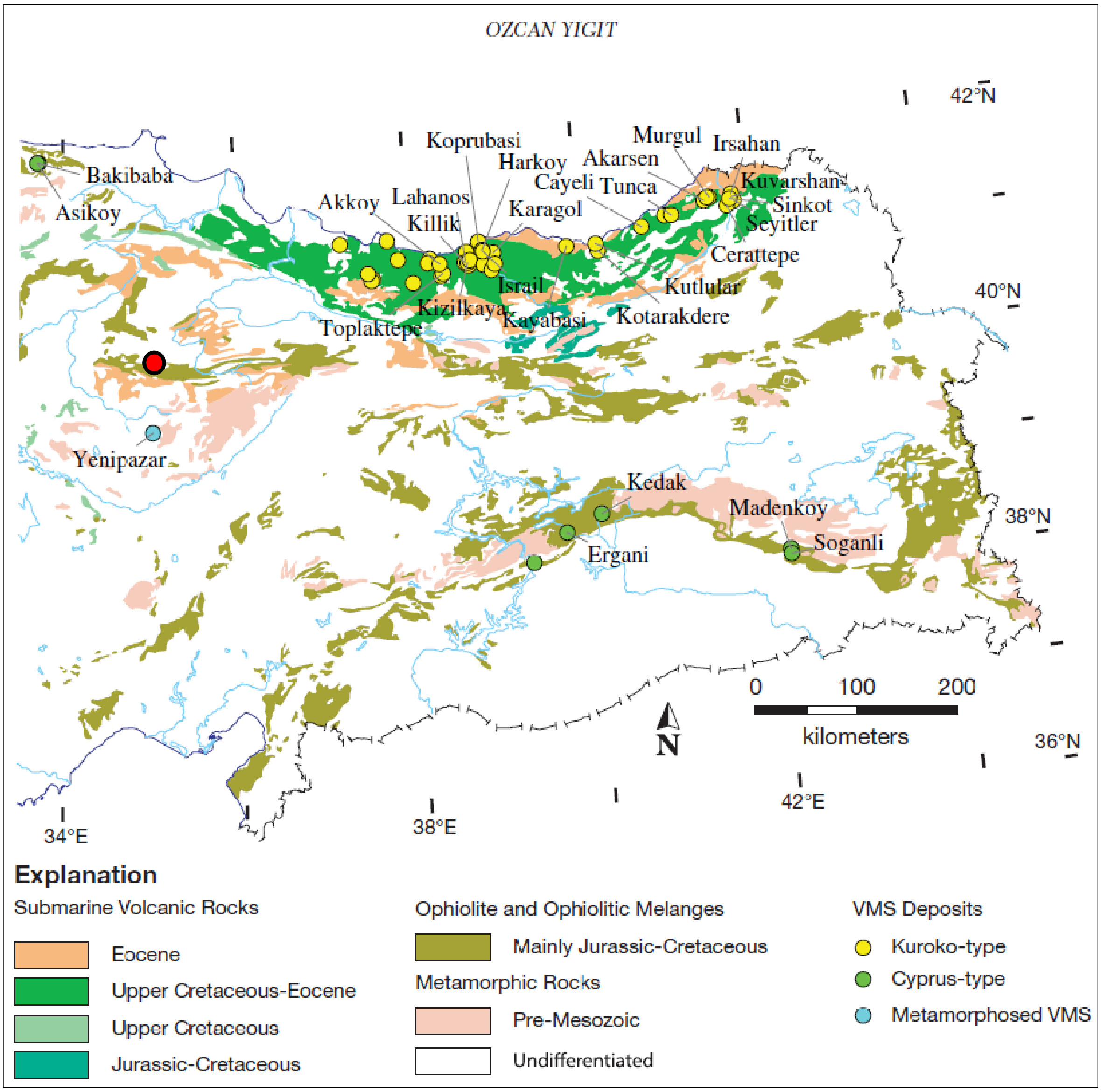



**Figure 12. Distribution of the VMS deposits and prospects of Turkey with emphasis on host-rock lithology (Source: Ozcan Yigit, 2009); location of licence area (red point).**

The licence area is located in the Vardar Ophiolitic Belt along the Izmir- Ankara-Erzincan suture zone (Figure 13).

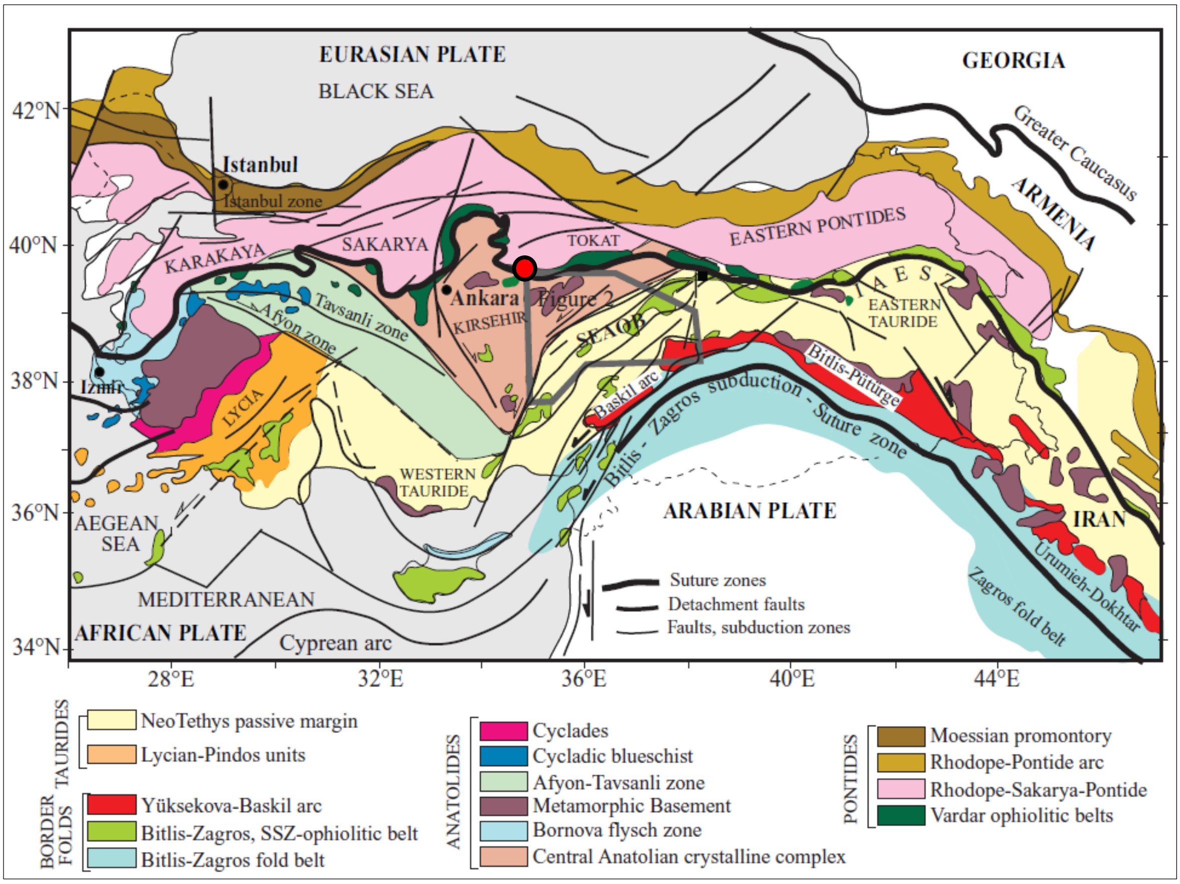



**Figure 13. Tectonic map of western Tethys showing main tectonic units and mineral deposits. Simplified and modified from Stampfli et al. (1998), Stampfli (2001), Jolivet et al. (1994), and Kaymakçi and Kus¸cu (2007). Abbreviations: IAESZ = Izmir- Ankara-Erzincan suture zone, SEAOB = Southeastern Anatolian orogenic belt, SSZ = Suprasubduction zone (Source: Ilkay Kuscu et al., 2013); location of licence area (red point).**

In the surrounding of the licence area Miocene and Oligo-Miocene sedimentary-rock hosted copper prospects are located (Figure 14; Cankiri-Corum-Yozgat Basin Area). Thus, the ophiolites might be the potential source for the Cu.

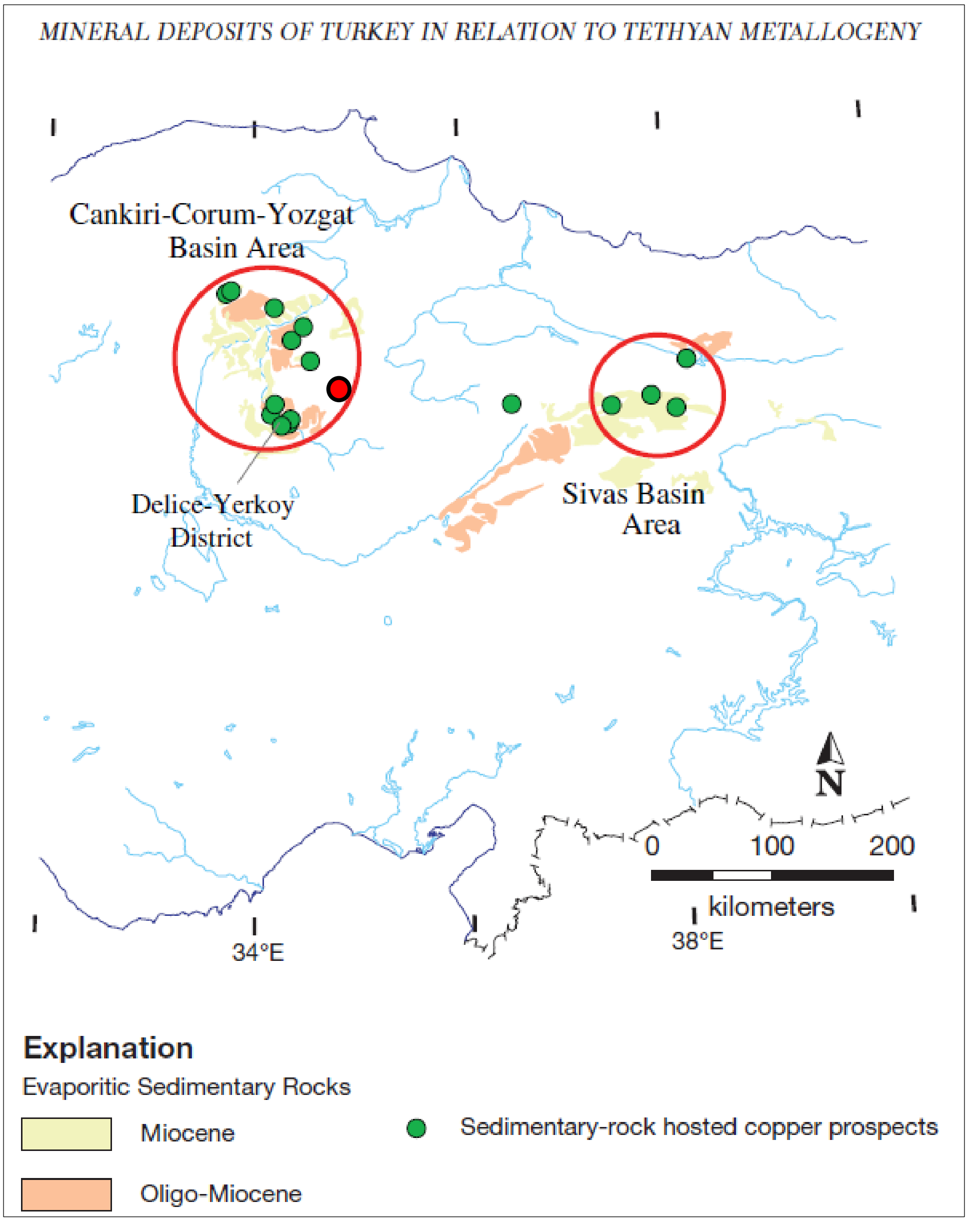



**Figure 14. Distribution of the sedimentary-rock hosted copper prospects of Turkey with emphasis on host-rock lithology (Source: Ozcan Yigit, 2009); location of licence area (red point).**

## 7.2 PROPERTY

This section is largely based on the site visit by Dr. Bernd Teigler (QP) in 2016, during which the following salient observations have been made.

The overall metallogenic setting is ophiolitic. This metallogenic province is well known and described and further details can be read in the literature. Ophiolites are tectonically emplaced at their current position and are generally very strongly deformed.

Licence 200712071 appears to be largely covered by mafic lithologies. Ultramafic lithologies have been observed in the eastern part of the licence, where a small part mining licence for Mn exists. Sedimentary units are also present in form of carbonates and cherts, possibly radiolarites.

- Typical rock types of an ophiolite complex are wide-spread.
- Lithologies of interest appear to be folded and deformed.
- Serpentinisation of ultramafic units is common.
- Clearly identified lithologies are pillow basalts sensu lato, carbonates and cherts. In the eastern part serpentinite after dunite, harzburgite and chromitite has been observed.
- Strong sea floor alteration is evident. Chloritisation and epidotisation together with stockwork of calcite and quartz indicate an overprint by a hydrothermal system.

**Figure 15.Lithologies observed. Top left: pillow basalt with calcite stockwork. Top right: gossanous layer. Bottom left: interbedded chert and carbonate. Bottom right. Basaltic breccia.**

The following types of mineralization have been observed:

a) massive chromitite: a very small lens has been discovered in the eastern part of the licence

b) gossan/gossanous rocks: along a zone of strong alteration several lenses of gossanous material can be observed. Malachite staining is very rare. The gossan is clearly after sulfide, presumably pyrite and the massive part represents oxidized cupriferous pyritic sulphide bodies. One malachite-stained outcrop was subject to testing by German explorers in the 50s. This pit is not open anymore.

c) disseminated minor to accessory pyrite is present in the underlying plagioclase-phyric basalt, which is typical for a mid-ocean ridge setting.

d) malachite-stained basaltic breccias: They appear to be spatially separated from the gossanous zone, possibly stratigraphically above and several locations are known. Breccias do general show a quartz-calcite-stockwork.

e) manganiferous chert is developed in the licence and is hosted by pinkish carbonates. In the eastern part the mineralization has been tested by trial mining. The pits are still open and some of the stockpile is still on site.

# 8 EXPLORATION

After the company Aktif Yerbilimleri A.S. (AY) was contracted to make ground geophysics survey using magnetics, in 2013 the client contracted the governmental institution ‘General Directorate of Mineral Research and Exploration (MTA)’ to do ground geophysics survey using IP. Maps and sections of chargeability and resistivity were produced.

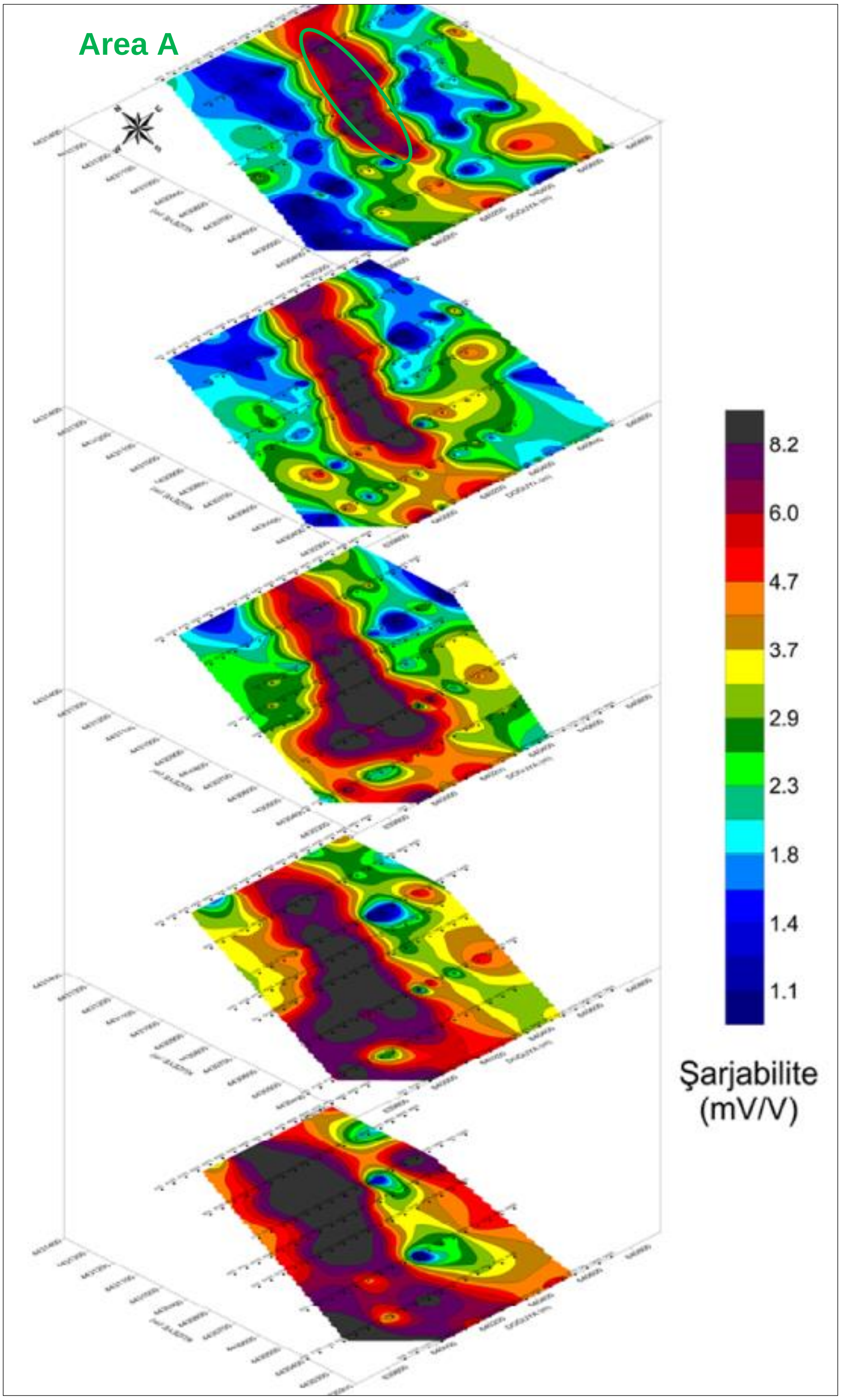



**Figure 16. Stacked maps of chargebility.**

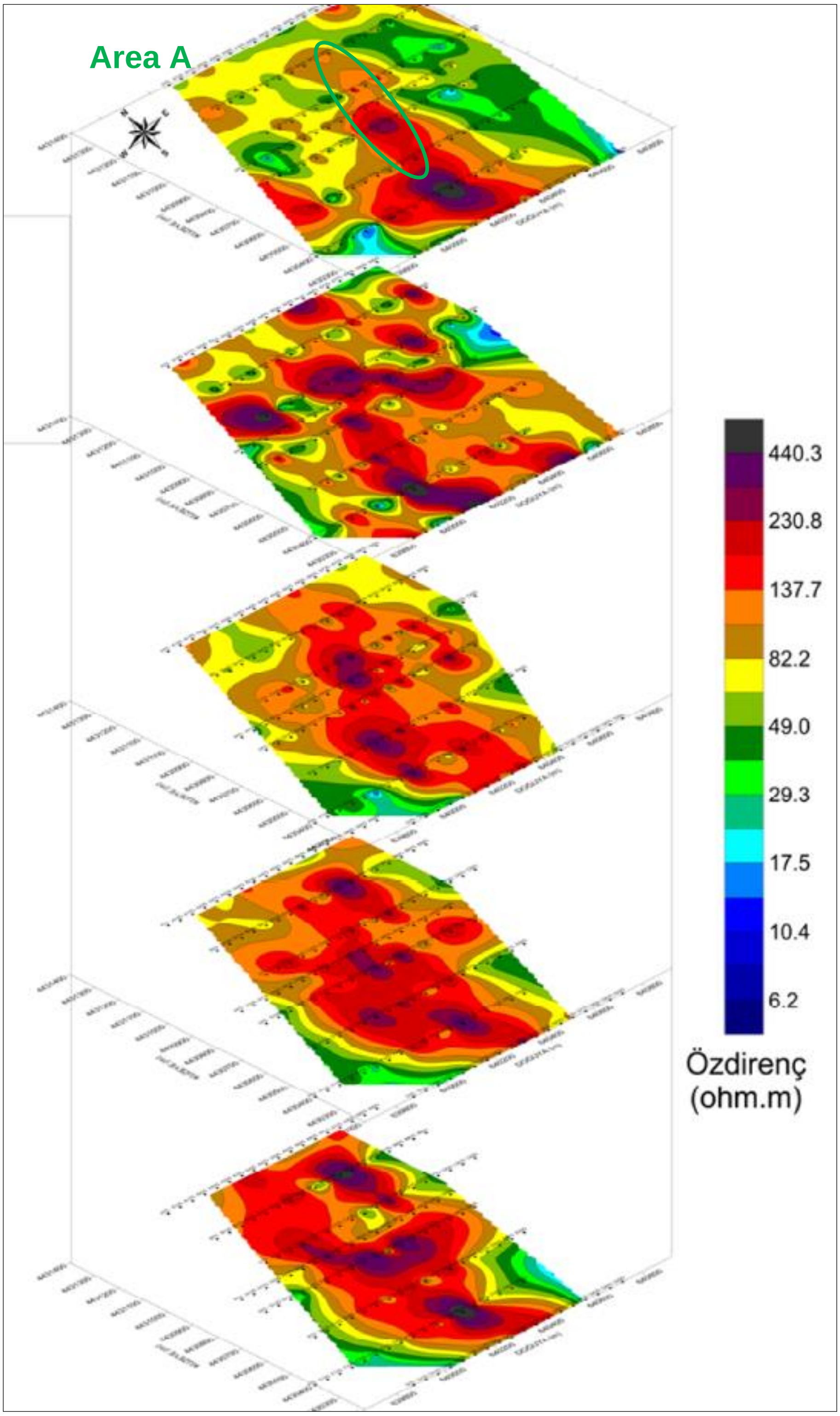



**Figure 17. Stacked maps of resistivity.**

Based on these geophysical results, a mapping program was set-up implemented by DMT. On-site personnel was trained to map the project site. A 1:25 000 scaled governmental geological map H33-D3 was available before commencing mapping.

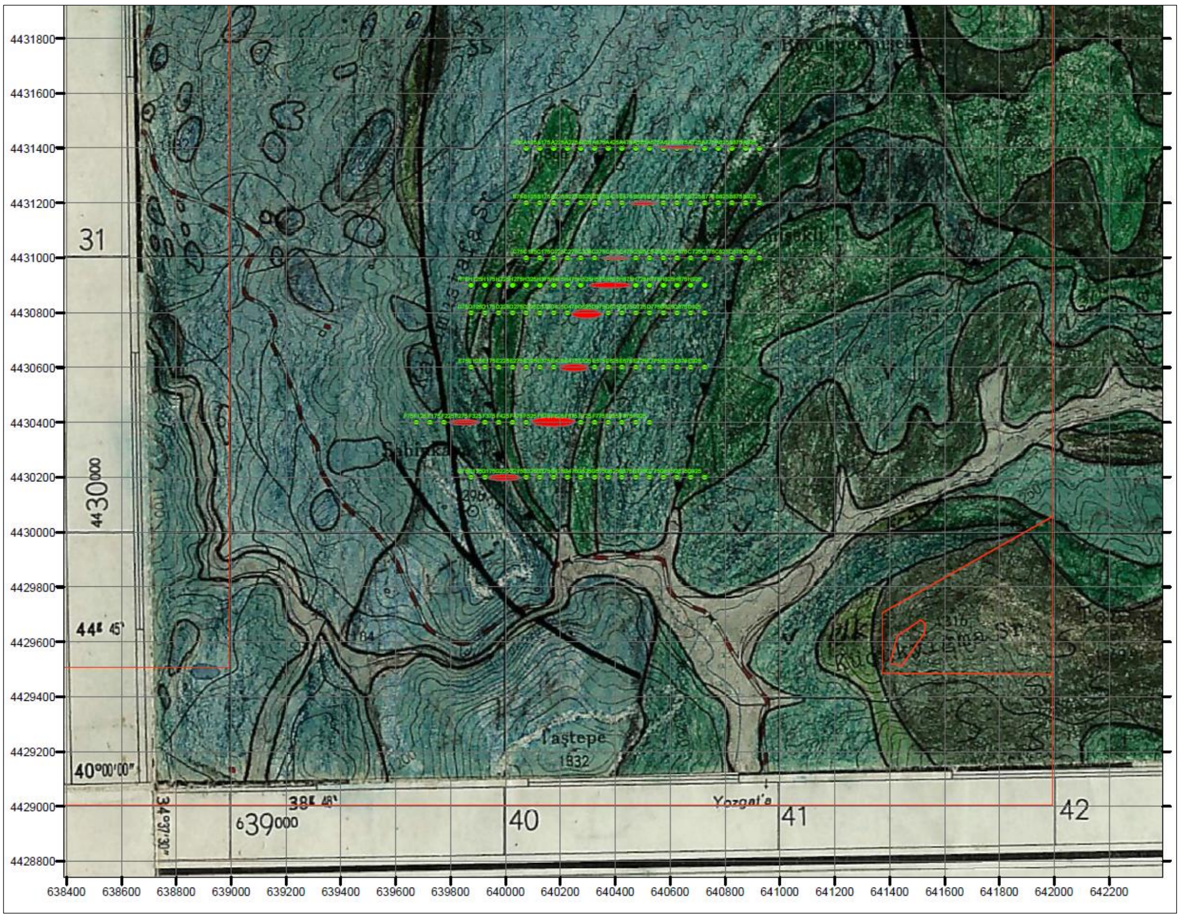


Figure 18. Outcrop of 1:25 000 scaled governmental geological map H33-D3.

Following-up geological mapping of parts of licence 200712071 was successfully performed by Avod's staff with focus on area A. Another area B (gossan) was identified during mapping. However, a large proportion of the licence area remains unmapped.

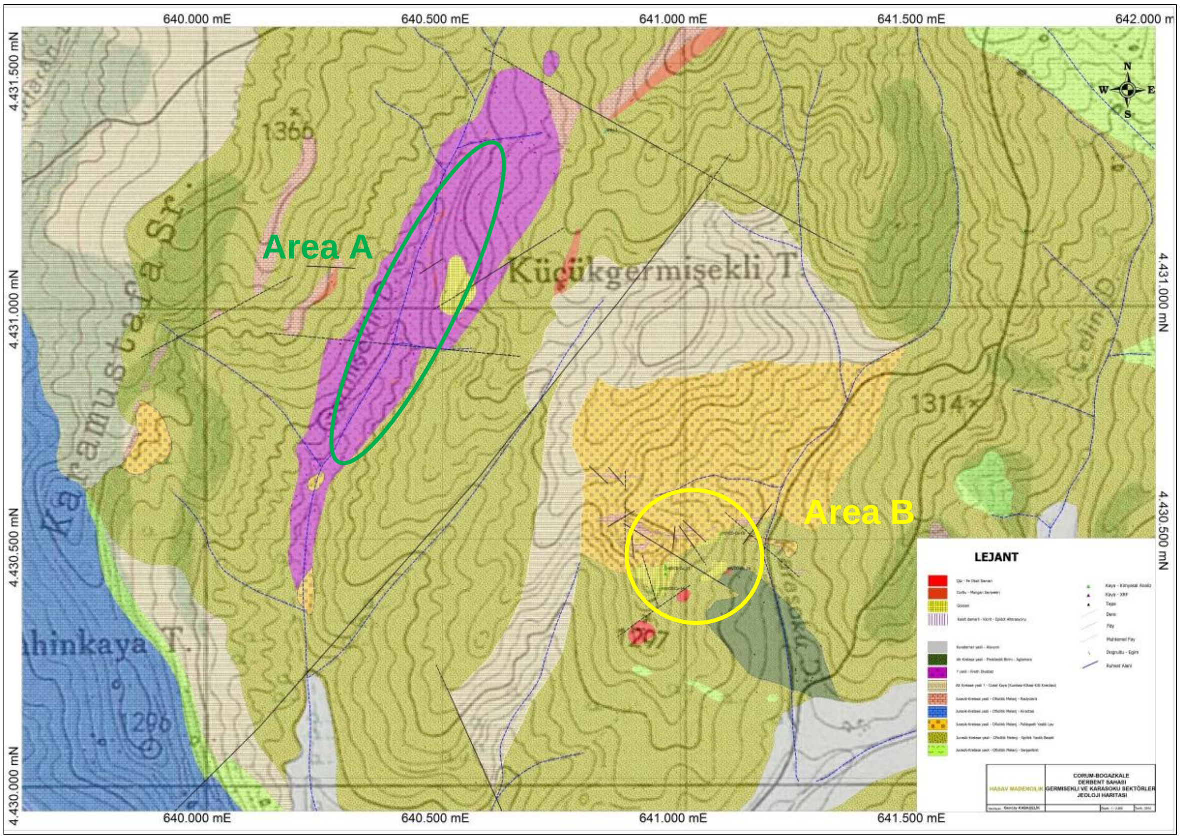



**Figure 19. Geological map prepared by Avod.**


**Figure 20. Legend for geological map.**

Field observations indicated the high mineral potential to host economic sulfide mineralization. All evidence pointed to a large hydrothermal system operating during the genesis of the rock pile with all potential to host a significant Cu massive sulfide deposit.

Based on these results, DMT recommended a drilling program to locate the copper mineralization in situ and to test any depth continuation of mineralization with the main objective to develop a resource. DMT planned and implemented SOPs including a sampling program in 2018 to achieve a representative data basis for bulk density and relevant chemical concentrations.

Theoretical cross sections were prepared and drill hole locations and orientations proposed (Figure 21).

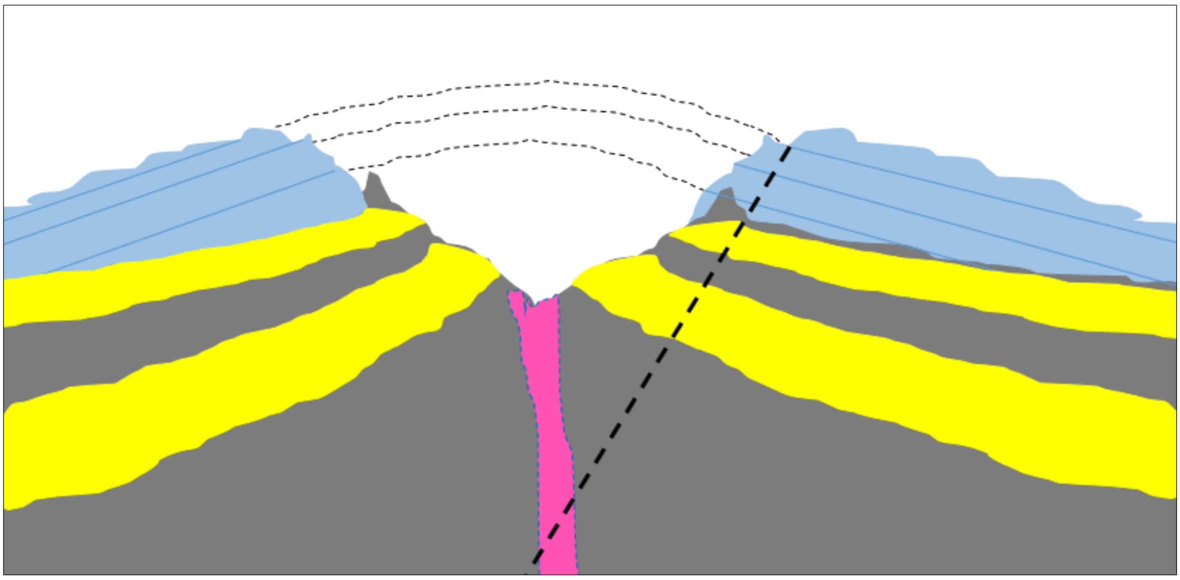


**Figure 21. Example of theoretical cross section and proposed drilling.**

## 9 DEPOSIT TYPES

The overall stratigraphic setting appears to be higher in the typical ophiolite sequence (see Figure 22). The setting is typical for a volcanic cupriferous massive sulfide.

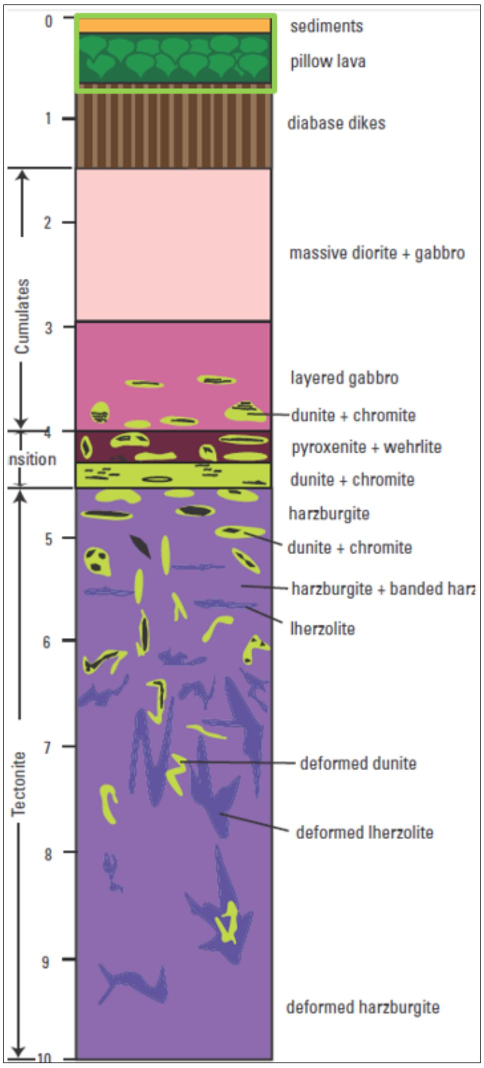
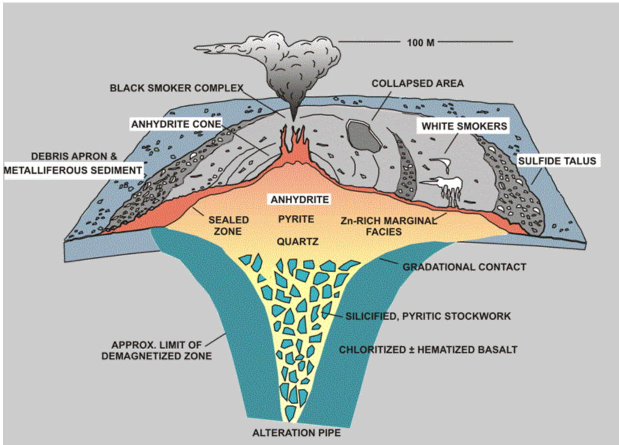



**Figure 22. Typical lithological column of an ophiolite sequence (source USGS). The green square indicates the interpreted stratigraphic position of the lithologies of interest for licence 200712071.**



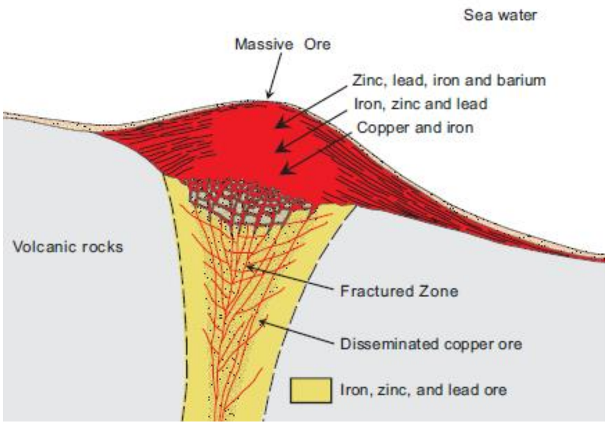



**Figure 23. Typical cross-sections through volcanic massive sulphide deposits (sources: USGS & web). Note: Vertical and lateral zonation (Cu, Zn, Pb, Fe, Mn, Ba), demagnetization and alteration. Laterally the ore-equivalent layer may develop into cherts.**

By weathering these volcanic massive sulphide deposits can be altered as shown in Figure 24.

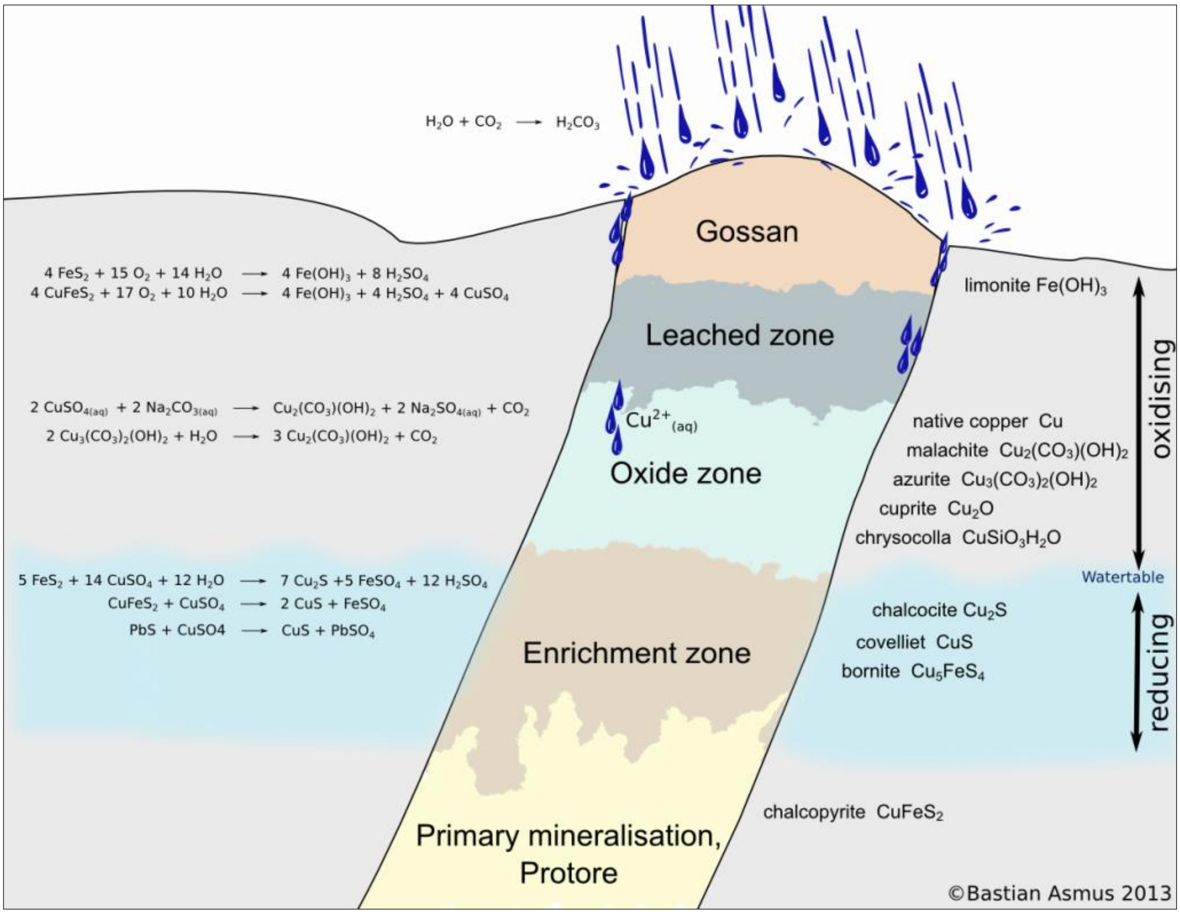



**Figure 24. Schematic view of a sulphide vein. You can see the oxidation zone, consisting of the gossan, the leached zone and the oxidised zone. The reducing zone consists of the enrichment zone and the area of primary mineralization. Significantly modified after Evans (1992) and Ottaway (1994) (Source: http://en.archaeometallurgie.de/gossan-iron-cap/).**

Gossan is a term from prospecting and exploration. The gossan may also be called iron cap. This is so because it denotes mainly an accumulation of iron hydroxides and oxides that has formed near surface on top of sulphide-rich veins or lenses. It forms during a supergene sulphide ore enrichment, when weakly acid surface water percolates through the mineral deposit. Many sulphide ores are oxidised in this process and brought into solution:

$$H_2O + CO_2 \rightarrow H_2CO_3$$

The resulting solutions may dissolve other minerals (Evans 1992). In sulphide ore bodies for example pyrite ($Fe_2S$) breaks down to sulphuric acid and limonite ($Fe(OH)_3$). Limonite is insoluble in water and remains in the upper zones of the oxidised ore body. Since yellow limonite and/or reddish hematite is very conspicuous it is easily recognized by prospectors and indicates the presence of a sulphide-rich body.

$$4FeS_2 + 15O_2 + 14H_2O \longrightarrow 4Fe(OH)_3 + 8H_2SO_4$$
$$4CuFeS_2 + 17ox + 10H_2O \longrightarrow 4Fe(OH)_3 + 4H_2SO_4 + 4CuSO_4$$

In the underlying leached oxide zone other ore minerals are dissolved by sulphuric acid. The ore body is “leached” and the metal ions are transported down to where they may be partly precipitated as oxides again. A zone with oxidized ore remains. Carbonated, oxidizing water may form carbonates such as malachite or azurite (Menschel & Usdowski 1975), eg:

$$2CuSO_4 + 2Na_2CO_3 \longrightarrow Cu_2(CO_3)(OH)_2 + 2Na_2SO_4 + CO_2$$
$$2Cu_3(CO_3)_2(OH)_2 + H_2O \longrightarrow 3Cu_2(CO_3)(OH)_2 + CO_2$$

The copper ions of the dissolved copper sulphate $CuSO_4$ react with carbonates which are also easily dissolved in carbonated water. Malachite $Cu_2(CO_3)(OH)_2$ or azurite $Cu_3(CO_3)_2(OH)_2$ are thereby precipitated. In contact with water azurite reacts to malachite. However, other ores like cuprite, chrysocolla, or even native copper can occur in this zone.

The greater part of the dissolved metal freight is reprecipitated in the reducing enrichment zone below the water table. Thus, the ores of the enrichment zone may significantly surpass the metal content of the primary mineralisation. Typical reactions are:

$$PbS + CuSO_4 \longrightarrow CuS + PbSO_4$$
$$5FeS_2 + 14PbSO_4 + 12H_2O \longrightarrow 7Cu_2S + 5FeSO_4 + 12H_2SO_4$$
$$CuFeS_2 + CuSO_4 \longrightarrow 2CuS + FeSO_4$$

(Source: http://en.archaeometallurgie.de/gossan-iron-cap/).

# 10 DRILLING

Based on results of the geophysical surveys, geological mapping and considering the unknown geometry and orientation of copper mineralization, 20 diamond drill holes (1380 m) were drilled to target the potential mineralization in Area A and Area B.

Of these 20 holes 13 holes have been drilled with PQ diameter completely, 7 holes were telescoped to HQ. In total, 1062 m were drilled PQ, 318 m were drilled HQ. The central drilling of Area A has a line spacing of around 100 m with each line bearing two holes distanced 30 to 40 m. The lines are cross cutting the valley. The drilling of Area B is evenly distributed over the area with a spacing varying from 40 m to 60 m.

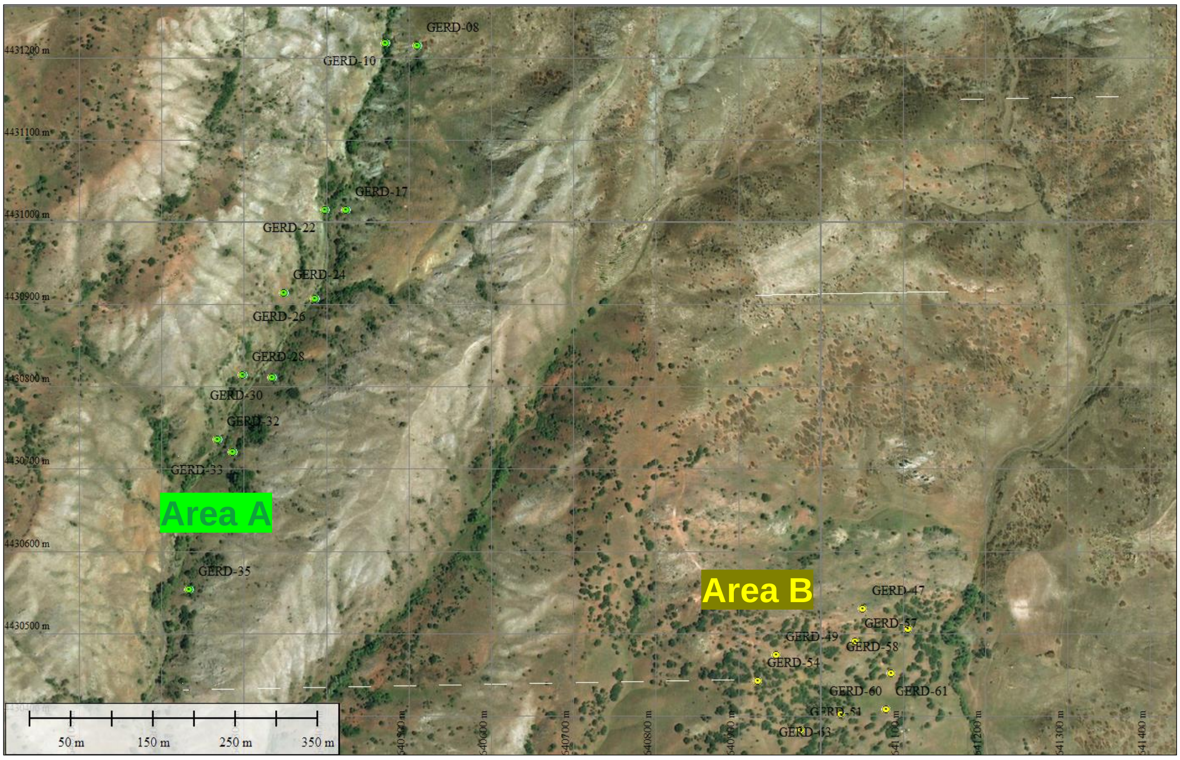


**Figure 25. Drill holes of Area A and B.**

Table 2 summarizes the location and orientation of drill holes.

**Table 2. Summary of drill holes**

| Hole ID | Area | Easting | Northing | Elevation | Inclination | Azimuth | End of hole |
|---|---|---|---|---|---|---|---|
| GERD-08 | A | 640518 | 4431208 | 1286 | 120 | -60 | 60.0 |
| GERD-10 | A | 640479 | 4431211 | 1283 | 0 | -90 | 57.7 |
| GERD-17 | A | 640431 | 4431008 | 1265 | 0 | -90 | 67.9 |
| GERD-22 | A | 640406 | 4431008 | 1264 | 270 | -60 | 60.0 |
| GERD-24 | A | 640356 | 4430908 | 1255 | 0 | -90 | 60.0 |
| GERD-26 | A | 640393 | 4430900 | 1256 | 140 | -60 | 69.7 |
| GERD-28 | A | 640306 | 4430808 | 1248 | 0 | -90 | 64.8 |
| GERD-30 | A | 640341 | 4430805 | 1248 | 0 | -90 | 65.6 |
| GERD-32 | A | 640275 | 4430729 | 1241 | 0 | -90 | 79.6 |
| GERD-33 | A | 640294 | 4430714 | 1242 | 0 | -90 | 63.8 |
| GERD-35 | A | 640241 | 4430547 | 1229 | 0 | -90 | 105.0 |
| GERD-47 | B | 641059 | 4430524 | 1278 | 98 | -60 | 66.1 |
| GERD-49 | B | 640954 | 4430468 | 1297 | 0 | -90 | 69.4 |
| GERD-51 | B | 640983 | 4430376 | 1284 | 305 | -60 | 73.7 |
| GERD-54 | B | 640931 | 4430436 | 1297 | 110 | -60 | 76.6 |
| GERD-57 | B | 641049 | 4430484 | 1277 | 0 | -90 | 77.1 |
| GERD-58 | B | 641114 | 4430499 | 1258 | 0 | -90 | 61.4 |
| GERD-60 | B | 641093 | 4430445 | 1259 | 275 | -60 | 57.8 |
| GERD-61 | B | 641087 | 4430401 | 1256 | 0 | -90 | 75.6 |
| GERD-63 | B | 641032 | 4430395 | 1273 | 0 | -90 | 71.2 |

For all drill holes information about collar location and orientation, down-hole survey, cored diameter, geological and geotechnical information was available from start of hole down to end of hole.

Table 3 summarizes the availability on further data of cored diameter, chemistry, density, sourced from drill holes and interpreted intervals of sulfidic and oxidized Cu bearing intervals.

**Table 3. Summary of data available for drill holes as meterage [m] and number of samples or interpreted intersections [no] (EODH: end of drill hole, DIAM: diameter, QUAL: chemical data of Cu, Pb, Zn, Fe, S, Ag, Au and others, DENS: density of massive sulfide MS, disseminated sulphides DISS and oxidization OXID, INTP: interpreted sulfidic SULF and oxidic OXID intersection based on 1% Cu cut-off)**

| DHID | AREA | EODH | DIAM PQ [m] | DIAM HQ [m] | QUAL [m] | QUAL [no] | DENS MS [m] | DENS MS [no] | DENS DISS [m] | DENS DISS [no] | DENS OXID [m] | DENS OXID [no] | INTP SULF [m] | INTP SULF [no] | INTP OXID [m] | INTP OXID [no] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GERD-08 | 1 | 60.0 | 60.0 | | 37.0 | 37 | 0.5 | 5 | 0.5 | 5 | | | 32.0 | 1 | | |
| GERD-10 | 1 | 57.7 | 57.7 | | 37.0 | 37 | 0.5 | 5 | 0.5 | 5 | | | 28.0 | 1 | | |
| GERD-17 | 1 | 67.9 | 36.2 | 31.7 | 29.0 | 29 | 0.5 | 5 | 0.5 | 5 | | | 26.0 | 1 | | |
| GERD-22 | 1 | 60.0 | 20.3 | 39.7 | 23.0 | 23 | 0.5 | 5 | 0.5 | 5 | | | 18.0 | 1 | | |
| GERD-24 | 1 | 60.0 | 60.0 | | 31.0 | 31 | 0.5 | 5 | 0.5 | 5 | | | 27.0 | 1 | | |
| GERD-26 | 1 | 69.7 | 69.7 | | 20.0 | 20 | 0.5 | 5 | 0.5 | 5 | | | 16.0 | 1 | | |
| GERD-28 | 1 | 64.8 | 62.3 | | 19.0 | 19 | 0.5 | 5 | 0.5 | 5 | | | 13.0 | 1 | | |
| GERD-30 | 1 | 65.6 | 23.2 | 42.4 | 16.0 | 16 | 0.5 | 5 | 0.5 | 5 | | | 12.0 | 1 | | |
| GERD-32 | 1 | 79.6 | 19.1 | 60.5 | 20.0 | 20 | 0.5 | 5 | 0.5 | 5 | | | 16.0 | 1 | | |
| GERD-33 | 1 | 63.8 | 16.3 | 47.5 | 21.0 | 21 | 0.5 | 5 | 0.5 | 5 | | | 17.0 | 1 | | |
| GERD-35 | 1 | 105.0 | 57.1 | 47.9 | 10.0 | 10 | 0.5 | 5 | 0.5 | 5 | | | 6.0 | 1 | | |
| GERD-47 | 2 | 66.1 | 66.1 | | 41.0 | 41 | 0.3 | 3 | 0.3 | 3 | 0.5 | 5 | 6.0 | 1 | 31.0 | 1 |
| GERD-49 | 2 | 69.4 | 69.4 | | 39.0 | 39 | 0.3 | 3 | 0.3 | 3 | 0.5 | 5 | 10.0 | 1 | 25.0 | 1 |
| GERD-51 | 2 | 73.7 | 73.7 | | 41.0 | 41 | 0.3 | 3 | 0.3 | 3 | 0.5 | 5 | 10.7 | 2 | 19.3 | 1 |
| GERD-54 | 2 | 76.6 | 76.6 | | 42.0 | 42 | 0.3 | 3 | 0.3 | 3 | 0.5 | 5 | 5.0 | 1 | 28.0 | 1 |
| GERD-57 | 2 | 77.1 | 77.1 | | 43.0 | 43 | 0.3 | 3 | 0.3 | 3 | 0.5 | 5 | 10.0 | 2 | 23.0 | 1 |
| GERD-58 | 2 | 61.4 | 13.1 | 48.3 | 30.0 | 30 | 0.3 | 3 | 0.3 | 3 | 0.5 | 5 | 5.0 | 1 | 19.0 | 1 |
| GERD-60 | 2 | 57.8 | 57.8 | | 39.0 | 39 | 0.3 | 3 | 0.3 | 3 | 0.5 | 5 | 13.0 | 2 | 15.0 | 1 |
| GERD-61 | 2 | 75.6 | 75.6 | | 39.0 | 39 | 0.3 | 3 | 0.3 | 3 | 0.5 | 5 | 13.0 | 2 | 15.0 | 1 |
| GERD-63 | 2 | 71.2 | 71.2 | | 38.0 | 38 | 0.3 | 3 | 0.3 | 3 | 0.5 | 5 | 8.0 | 1 | 24.0 | 1 |

# 11 SAMPLE PREPARATION, ANALYSES AND SECURITY

SOPs were designed and implemented in August 2018. All work of data acquisition was done following these SOPs. For details about the procedures applied see document: 'Data Acquisition Manual – Standard Operating Procedures on the Copper Project for Licence 200712071, Corum Province, Turkey' finalized by DMT in August 2018.

## 11.1 SAMPLING

Sampling was done based on integer meter marks considering core losses. Core losses were allocated to the end of each drill run or allocated to distinct zones, when possible. The samples were taken in 1 m intervals starting two metres above visual mineralization in the hanging wall host rocks and ending two metres below visual mineralization in footwall host rocks. Before sampling, the mineralization type and respective intervals were logged. Two types of mineralization have been generalized as follows:

- Disseminated sulfides in basalt with some intercalations of massive sulfides. The disseminated mineralization is hosted by strongly broken core. Some larger pieces or rarely complete core exceeding not more than 10 cm is predominantly massive sulfide lying in between the broken core with disseminated sulfides.

- Oxidized mineralization with indication of azurite and malachite, also strongly broken predominately.

## 11.2 DENSITY DETERMINATION

For determination of density pieces of unbroken core were selected specified per mineralization

- Drill core of disseminated sulfides in basalt (5 samples per hole when available * 20 holes = 100 samples)
- Drill core of massive sulfide (5 samples per hole when available * 20 holes = 100 samples)
- Drill core of oxidization showing Cu mineralization (5 samples per hole when available * 20 holes = 100 samples)

A total of 300 samples were planned be determined for bulk density in maximum. Actually, 209 pieces of unbroken core were available with a length of ca. 10 cm. These pieces were packed in plastic bags and labelled with sample ID (Table 4).

**Table 4. Amount of sample dispatched to ARGETEST for density determination.**

| Type of mineralization | Number of samples |
|---|---|
| **Disseminated sulfides in basalt** | 82 |
| **Pieces of drill core of 10 cm length in maximum interpreted to belong to thin layers of massive sulfide partly within disseminated sulfides in basalt** | 82 |
| **Mineralization in oxidation** | 45 |

A density sample sheet containing the sample ID, respective drill hole ID, interval depth, and type of mineralization was prepared. Then all samples were sent to ARGETEST for density determination using laboratory code SGR-02 (water replacement method using graduated flask; see Figure 26). Using this method, the volume of the sample is determined by placing the sample in a water filled graduated flask and reading off how much water is displaced calibrated in milliliters, where 1 ml = $1cm^3$, the mass of the sample is measured using a balance and density can be readily calculated:

- Density = $Weight_{SampleDry}$ / $Volume_{Replaced\ Water}$

Density measurements can be effected by the ability of water to infiltrate through any open pores/fractures. However, waxing was not applied due to the solid and impermeable characteristics of the core selected. After density determination the pieces of core were sent back to Avod's core shed and put back into the core boxes.

**SGR02** Specific Gravity Core, SG: Analysis can be conducted on whole samples of rock or core in irregular shape. Specific gravity is determined by measuring the displacement of water. A sample is dried at 105°C to remove all moisture then allowed to cool. The sample of the rock or drill core is first weighed in air then submerged in a container of water. Measure the mass of immersed sample and record the weight then calculate for specific gravity. Sample can also be coated with a thin layer of hot wax (**SGR04**) so that any soluble material in the core or rock is not in contact with the water.

**Density** if reported will be a conversion from specific gravity

where: Density = SG x Density of water

Density of the sample will be determined based on the temperature at the time of easurement.

| TEMPERATURE °C | DENSITY OF WATER (g/cm$^3$) |
|---|---|
| 19 | 0.998405 |
| 20 | 0.998203 |
| 21 | 0.997992 |
| 22 | 0.997770 |
| 23 | 0.997538 |
| 24 | 0.997296 |
| 25 | 0.997044 |

**Figure 26. SGR02 - bulk density determination as described by ARGETEST.**

## 11.3 SAMPLE REDUCTION

In order to get a representative sample, the entire 1 m sample was crushed using a Jaw crusher to -2 mm and reduced to approximately >1 kg using a riffle splitter.

Every 20th sample the full reject is passed through the splitter again to produce a field duplicate of about >1kg. This field duplicate is to control splitting procedures, representive-ness and laboratory procedures.

Jaw crusher, riffle splitter and bins were cleaned with brushes and compressed air before the next sample was processed in order to avoid contamination.

**Figure 27. Steps of sample preparation: Equipment in core shed (Top Left), Crushing (Top Right), Splitting (Bottom Left), Cleaning (Bottom Right).**

The 1 kg split samples were packed in plastic bags and labeled with sample ID.

In each batch of 20 samples 3 QA/QC samples were inserted; one CRM sample to control overall laboratory work, one blank sample to control sample preparation (contamination) in the laboratory and one second split duplicate to control sample preparation (sample crushing and splitting) in the field.

A sample sheet containing the sample ID, drill hole ID, interval depth, length of recovered core, the length of sulfide or oxide mineralization and sample weight was prepared including QA/QC samples.

## 11.4 SAMPLE DISPATCH

In total, 754 samples (615 samples from drill holes) were dispatched to laboratory ARGETEST, which is certified to ISO Quality Management System ISO 9001: 2015.

## 11.5 SAMPLE PREPARATION

All samples were tracked, weighted, dried at 80 °C, fine crushed to 70% less than 2 mm diameter, then split off **500 g** and pulverized to better than 85% less than 75 microns (ARGETEST sample preparation code: **PREP-02**).

## Numune Hazırlama / Karot-Kayaç Örnekleri

### Core and Rock Preparation

Karot ve kayaç örnekleri için numune hazırlama sırası ile kurutma, kırma ve öğütme işlemlerinden oluşmaktadır. Numuneler cevher yapısına göre 60 - 80 - 105 °C'de kurutularak kırıcılardan % 70'i ≤ 2 mm olacak şekilde kırma işlemi yapılır ve standart bölücülerden öğütme numunesi alınarak % 85'i ≤ 75 mikron olacak şekilde öğütülerek numune hazırlama işlemi tamamlanır.

Karot ve kayaç örneklerinde farklı bir kurutma sıcaklığı belirtilmediği taktirde 80 °C olarak kurutma işlemi yapılır.

Numune arşivleri % 70 ≤ 2 mm olacak şekilde vakumlu paketlerde 3 ay saklanır ve 3 ay sonunda talep doğrultusunda numunelerin iadesi gerçekleşir.

*Preparation of core and rock samples consists of drying, crushing and pulvarizing processes. The samples are dried at 60 – 80 – 105 °C according to ore structure, and the crushing process is made in a way that 85 % of the crushed material is less than 2 mm, and pulvarizing samples are gained from the standard dividers, and they are pulvarized in a way that 70 % will be less than 75 microns, then sample preparation process is completed.*

*If different drying temperature is not indicated in core and rock preparation, drying process is made in 80 °C.*

*Sample archives are stored in vacuum packages that contain material size will be 70% ≤ 2 mm for 3 months, and at the end of the 3 months, the samples are returned upon request.*

### Karot-Kayaç Numune Hazırlama / Core and Rock Preparation

| Kod / Code | Açıklama / Description | |
|---|---|---|
| PREP 01 | Kırma 1 kg %70 ≤2 mm / Öğütme 250 g %85 ≤75µm | Crush 1 kg 70% ≤ / Pulverization 250 g ≤85% 75µm |
| PREP 02 | Kırma 1 kg %70 ≤2 mm / Öğütme 500 g %85 ≤75µm | Crush 1 kg 70% ≤ / Pulverization 500 g ≤85% 75µm |
| PREP 03 | Kırma 1 kg %70 ≤2 mm / Öğütme 1000 g %85 ≤75µm | Crush 1 kg 70% ≤ / Pulverization 1000 g ≤85% 75µm |
| PREP 04 | Kırma 1 kg %90 ≤2 mm / Öğütme 250 g %85 ≤75µm | Crush 1 kg 90% ≤ / Pulverization 250 g ≤85% 75µm |
| PREP 05 | Kırma 1 kg %90 ≤2 mm / Öğütme 500 g %85 ≤75µm | Crush 1 kg 90% ≤ / Pulverization 500 g ≤85% 75µm |
| PREP 06 | Kırma 1 kg% 90 ≤2 mm / Öğütme 1000 g %85 ≤75µm | Crush 1 kg 90% ≤ / Pulverization 1000 g ≤85% 75µm |
| CRUSH-EXT | 1 kg fazlası ilave kırma/kg | Extra crushing over 1 kg per kg |
| CRUSH-EXT 01 | Numune kırma/kg | Crushing/kg |
| PULV-EXT | İlave öğütme/250 g | Extra Pulverizing/250 g |
| DRY 01 | 60 °C kurutma/numune | Dry 60 °C per sample |
| DRY 02 | 80 °C kurutma/numune | Dry 80 °C per sample |
| DRY 03 | 105 °C kurutma/numune | Dry 105 °C per sample |

**Figure 28: Extract from ARGETEST Catalogue 2017-2018; sample preparation methods.**

## 11.6 SAMPLE STORAGE

All sample archives are stored in vacuum packages that contain material size of 70% ≤ 2 mm for 3 months. After 3 months, the samples were returned to Avod's core shed to be stored by AVOD for future work, if required.

## 11.7 SAMPLE ANALYSIS

The pulverized 500 g samples was homogenised and 1 g of sample was digested by multi-acid (HF:$HNO_3$:$HClO_4$:HCl) digestion digesting the whole sample.  Then the dissolved sample was analysed by ICP (ARGETEST sample preparation code: **AT-4 / GAR 05**). When the upper detection limit of this method was reached  for Cu, Pb, Zn or Ag then method **AT-4 / Over** was applied for the samples concerned.

## AT-4

### Multi Asit / Multi-Acid

Multi asit çözünmesi HF:$HNO_3$:$HClO_4$:HCl kademeli çözünmesinde oluşmaktadır.

Bu çözme metot daha çok kuvars içerikli yapılar için uygundur. Numunenin tamamı multi asit ile parçalanır ve ICP-ES ile sonuçlandırılır.

**Bu metot birçok yapıyı tamamen parçalama esasına dayanmaktadır.**

*Multi acid dissolution occurs in the gradula dissolution of HF:$HNO_3$:$HClO_4$:HCl.*

*This dissolution method is rather appropriate for quartz containing structures. Whole sample is decomposed with multi-acids and finalized with ICP-ES.*

***This method is based on the principle of complete decomposition of many structures.***

| Kod / Code | Açıklama / Description |
|---|---|
| GAR 05 | **Multi acid** / 31 Element |
| GAR 05-Ext | |
| GAR 06 | **Multi acid** / 48 Element |
| GAR 06-Ext | |

GAR 06 Paketi iz elementlerini de içermektedir.

*GAR 06 package also contains trace elements.*

* İşaretli parametrelerde kısmi buharlaşma olabilir.

** In "*" marked parameters, volatilization during fuming may result in some losses.*

| Package | Element | Dedeksiyon Limiti / Detection Limit | | |
|---|---|---|---|---|
| GAR 05 / GAR 06 | Ag | 0.5 | 100 | ppm |
| | Al | 0.01 | 15.00 | % |
| | As * | 1 | 10000 | ppm |
| | Ba | 1 | 10000 | ppm |
| | Be | 0.5 | 5000 | ppm |
| | Bi | 5 | 5000 | ppm |
| | Ca | 0.01 | 40.00 | % |
| | Cd | 0.5 | 5000 | ppm |
| | Co | 1 | 1000 | ppm |
| | Cr | 1 | 10000 | ppm |
| | Cu | 1 | 10000 | ppm |
| | Fe | 0.01 | 30.00 | % |
| | K | 0.01 | 20.00 | % |
| | La | 1 | 1000 | ppm |
| | Li | 5 | 5000 | ppm |
| | Mg | 0.01 | 20.00 | % |
| | Mn | 1 | 10000 | ppm |
| | Mo | 1 | 10000 | ppm |
| | Na | 0.01 | 20.00 | % |
| | Ni | 1 | 10000 | ppm |
| | P | 0.001 | 10.00 | % |
| | Pb | 2 | 10000 | ppm |
| | S * | 0.01 | 30.00 | % |
| | Sb * | 5 | 10000 | ppm |
| | Sn | 5 | 10000 | ppm |
| | Sr | 1 | 10000 | ppm |
| | Ti | 0.01 | 10.00 | % |
| | V | 1 | 10000 | ppm |
| | W | 5 | 10000 | ppm |
| | Zn | 1 | 10000 | ppm |
| | Zr | 0.5 | 1000 | ppm |

**Figure 29. Extract from ARGETEST Catalogue 2017-2018; multi acid digestion plus ICP finish.**

For gold, the pulverized 500 g samples were homogenised and 30 g of sample was used for a fire-assay collection technique.  The fire-assay prill was analysed by AAS (ARGETEST sample preparation code: **AT-1 / FA-01**).

AT-1

## Değerli Metaller / Precious Metals

### Altın / Gold

Altın analizi için uygulanan metotlar;

- Kupelasyon ( Fire Assay ) sonrası AAS - ICP veya gravimetrik metot ile sonuçlandırma.
- Asit liçi ile DIBK ( DIBC ) ekstraksiyonu sonrası AAS ile sonuçlandırma

*The methods used for gold analysis;*

- *Conclusion with AAS - ICP or gravimetric method after Fire Assay.*
- *Conclusion with AAS after DIBC extraction with acid leaching.*

### Kupelasyon / Fire Assay-Au

| Kod / Code | Açıklama / Description | Dedeksiyon Limiti / Detection Limit | | |
|---|---|---|---|---|
| FA 01 | 30 g / AAS | 0.005 | 10 | ppm |
| FA 02 | 50 g / AAS | 0.005 | 10 | ppm |
| FA 03 | 30 g / ICP | 0.005 | 10 | ppm |
| FA 04 | 50 g / ICP | 0.001 | 10 | ppm |
| FA 05 | 30 g / Grav. | 2 | - | ppm |
| FA 06 | 50 g / Grav. | 2 | - | ppm |
| FA 07 * | (-75µm +75µm) Fire Assay / Grav. - AAS | 0.005 | - | ppm |
| FA 08 * | (-106µm +106µm) Fire Assay / Grav. - AAS | 0.005 | - | ppm |

*Metalik kupelasyonda 1000 g'a kadar numune 75 µm veya 106 µm 'lik eleklerden geçirilerek elek altı ve elek üstü ayrı ayrı analiz yapılmaktadır. Sonuçlar elek altı / elek üstü olarak raporlanabildiği gibi ağırlıkça ortalama alınarak tek bir rapor halinde de verilmektedir.

**In the metallic fire assay, samples up to 1000 g are sifted through 75 µm or 106 µm sieves, and the upper sieves and the under sieves are analyzed separately. The results can be reported as under sieve / upper sieve as well as taking an average in weight, and also given as a single report.*

**Au ≥ 10 ppm olması durumunda gravimetrik analiz metodu uygulanır.**

***In the event that Au ≥ 10 ppm, the method of gravimetric analysis is applied.***

**Figure 30. Extract from ARGETEST Catalogue 2017-2018; fire assay plus AAS finish.**

All certificates of assays together with the related Excel sheets were sent directly to DMT by ARGETEST.

## 11.8 SAMPLE SECURITY

At all times the drill core and samples were inaccessibly for persons not involved in the project or not authorized to get in contact with the drill core and samples. The samples were stored in a locked core shed and under security service. All transports were organized and carried out by authorized persons only.

# 12 DATA VERIFICATION

Data verification was done on several levels, which are described in detail below.

## 12.1 SITE VISITS

A visit inspecting the copper showings in the licence area has been done in 2016 by Dr. Bernd Teigler, who is a competent/qualified person registered at SACNASP.

A site visit to inspect drilling activities has been done in April by Florian Lowicki who is a competent/qualified person registered at SACNASP. Another site visit for implementation of SOPs and training of on-site personal has been done in August 2018 by Florian Lowicki. Florian Lowicki visited the core storage yard in the village Alibeyli, around 70 km from Izmir and almost 800 km from the licence area. All drill core is stored there and was logged, sampled and prepared before dispatch to ARGETEST in Ankara.

## 12.2 STANDARD OPERATING PROCEDURES (SOPS)

SOPs procedures set-up specifically for this project have been implemented and trained in August 2018. The SOPs include a comprehensive QA/QC management to enable DMT to control the quality and representativeness of acquired data, e.g. meter marking was controlled by photographs prior cutting, sample recovery was noted, weights of dispatched and received sample were recorded and QA/QC sample sets were included in each batch of $20^{th}$ samples (see details in chapter: 'Sample Preparation, Analyses and Security')

The client has contracted Aktif Yerbilimleri A.S. (AY) to manage the exploration program in the Corum licence. This company is specialized on several ground activities for mining and civil infrastructure. AY is doing all survey work and all work related to geological logging, sampling, sample preparation and sample dispatch.

All laboratory work is done by ARGETEST, a laboratory certified to ISO Quality Management System (ALS: ISO 9001:2015). ARGETEST provided results of bulk density and assay data for each sample submitted.

## 12.3 AVAILABILITY OF DATA

Up to date, 20 drill holes (1380 m) have been drilled. The following data sets are available for all of these drill holes (for details see Table 3 in chapter: 'Drilling'):

- Collar location and orientation
- Hole deviation
- Drill diameter
- Core recovery
- RQD: geotechnical rock quality data
- Geological logs distinguishing host rocks and several types of copper mineralization
- Sample list comprising samples for density determination from drill holes including sample ID, respective hole ID, depth interval and type of mineralization.
- Sample list comprising samples for chemical analysis from drill holes including 'from' and 'to' intervals of 1 m marking, sample recovery, type and portion of copper mineralization and QA/QC samples plus information about name of laboratory and methods to be applied for sample preparation and chemical analysis.

Assay certificates as PDF sent by ARGETEST and corresponding Excel file including the bulk density in [t/m$^3$] and following chemical parameters in [%]: Ag (ppm), Al (%), As (ppm), Au(ppm), Ba (ppm), Be (ppm), Bi (ppm), Ca (%), Cd (ppm), Co (ppm), Cr (ppm), Cu (ppm), Fe (%), K (%), La (ppm), Li(ppm), Mg (%), Mn (ppm), Mo (ppm), Na (%), Ni (ppm), P (%), Pb (ppm), S (%), Sb (ppm), Sn (ppm), Sr (ppm), Ti (%), V (ppm), W (ppm), Zn (ppm), Zr (ppm), Cu (%), Zn (%)

Coordinates of drill hole collars and other spatially oriented data were provided by the client to DMT in map datum UTM ED50 Zone 36 Northern Hemisphere.

In addition, the client provided the following: licence coordinates and licence certificate, detailed geological map covering the area of investigation scaled to 1: 2 500, geophysical maps of induced polarization and magnetic survey and a topographical map scaled to 1:25 000.

A digital terrain model covering the area of investigation was sourced from NASA server. The data set of Shuttle Radar Topography Mission (SRTM) has a resolution of 1 arc second (around 40 m). This data set was converted from WGS84 to UTM ED50 Zone 36 Northern Hemisphere using ARCGIS transformation ED_1950_To_WGS_1984_30 1784 with an accuracy of 2 m.

## 12.4 DATA PREPARATION AND MANAGEMENT

All data of drilling and trenching has been compiled to a Relational Database Management Software (RDBMS), Microsoft Access, in order to be checked for consistency and errors. Thereafter data has been transferred to the modelling software Geovia Surpac to visualize the drill holes in a 3D environment. A digital terrain model (DTM) was also added to Surpac and visualized. Topographic, geological and geophysical maps have been draped onto the DTM. Available collar locations were validated against the DTM, surface topographic features, geology mapped and licence boundaries.

All these data are the underlying basis for the geological interpretation and wireframe modelling.

## 12.5 DRILLING LOCATION AND ORIENTATION

All surveying work is done by the company Aktif Yerbilimleri A.S. (AY) to manage the exploration program in the Corum licence. All holes have been surveyed at collar position and down-the-hole, in order to identify any deviation from the planned path. A full topographic survey is planned in the near future to support a resource upgrade and planning of mining activities. Currently, a comparison of surveyed collar positions with the SRTM DTM shows discrepancies of 5 meters for some of the holes.

At this early stage of work, the available DTM is appropriate. However, for a follow-up resource upgrade and mine plan a detailed survey has to be available in order to consider morphology adequately.

## 12.6 DRILLING RECOVERY AND DIAMETER

Drilling was aimed at maximising sample recovery in order to ensure representative nature of the samples. The overall core recovery is 90 %. The core recovery within sulfides is 88 % and within oxidization 85 %.

**Table 5. Core recovery within interpreted bodies A, B1 and B2**

| Interpreted Body | Description | Number of holes | Metres of copper mineralization above 1% Cu | Core recovery [%] |
|---|---|---|---|---|
| **A** | Sulfide mineralization in Area A | 11 | 211 | 88 |
| **B1** | Sulfide mineralization in Area B | 9 | 80 | 86 |
| **B2** | Oxide mineralization in Area B | 9 | 199 | 85 |

The overall high core recovery is assessed as to have produced representative unbiased samples.

## 12.7 GEOLOGICAL LOGGING

The aim of the geological logging was to obtain the maximum amount of relevant standardised and accurate geological information from the core to form the basis of the delineation of mineralised zones. The valuation of these mineralised zones was based on geologically controlled sampling.

The geological information that was generated from logging the drill core includes the following:

- Thickness of copper mineralisation
- Major rock types hosting the copper mineralisation
- Visual distribution of copper mineralisation
- Relevant styles of alteration or weathering
- Faults and their orientation.

All logging was done based on codes with focus on major and minor rock type, color, grain size, structure, texture, contact, type and degree of mineralization, type and degree of alteration.

Table 6 shows the codes for major and minor rocks. However, the major rock type logged is basalt predominantly brecciated, a few intervals are logged as radiolarite

**Table 6. Major and minor rocks**

| Code | Description |
| --- | --- |
| **SERP** | Serpentinite |
| **DUN** | Dunite |
| **RAD** | Radiolarite |
| **HARZ** | Harzburgite |
| **PB** | Pillow Basalt |
| **CACH** | Carbonate and Chert Series |
| **MCU** | Massive copper mineralization (>50% Cu-minerals) |
| **SMCU** | Semi-massive copper mineralisation (>10%,<50% Cu-minerals) |
| **LCU** | Low copper mineralisation (<10% Cu-minerals) |
| **FB** | Fault Breccia |
| **FG** | Fault Gouge |

Table 7 shows the scheme that was applied to describe the mineralized intervals.

**Table 7. Type and Degree of Mineralisation**

| Code | Description | Degree of Copper Mineralisation |
| --- | --- | --- |
| CCP | chalcopyrite | none |
| BN | bornite | accessory (<1 % Cu-minerals) |
| CC | chalkosite | weak (<2 % Cu-minerals) |
| CV | covellite | moderate (<5 % Cu-minerals) |
| MAL | malachite | strong (<10 % Cu-minerals) |
| AZ | azurite | massive (>10 % Cu-minerals) |
| CUP | cuprite | |
| PY | pyrite | |
| LM | limonite | |
| MS | muscovite | |
| EP | epidote | |
| CAL | calcite | |
| QTZ | quartz | |

Core samples have been geologically and geotechnically logged to a level of detail to support geological modelling. Logging results have been checked against drill core and core photographs. Based on these results, logging is assessed as qualitative to be used for modelling.

## 12.8 SAMPLING

In total, 20 holes intersecting sulfidic or oxidic copper mineralization have been representatively sampled resulting in 615 samples taken. Samples were taken on regular intervals of 1 m considering core losses. The overall sample recovery is 87 %.

**Table 8. Samples taken from drilling in Area A and B separated by sulfidic and oxidic intervals and host rock in the 2 m of hanging and footwall of mineralization**

| Area | Mineralization | Number of samples | Meters sampled | Recovery [%] |
|---|---|---|---|---|
| **A** | Sulfidic | 241 | 241 | 88 |
| **A** | Hostrock | 22 | 22 | 92 |
| **B** | Sulfidic | 114 | 114 | 88 |
| **B** | Sulfidic/Oxidic | 10 | 10 | 85 |
| **B** | Oxidic | 198 | 198 | 85 |
| **B** | Hostrock | 30 | 30 | 92 |

## 12.9 SAMPLE PREPARATION AND ANALYSIS

All results of the used CRM OREAS 623 fall within the recommended range. Hence, the analytical method applied is assessed as suitable to have produced reliable chemical concentrations of Cu. This validation focuses on Cu only since the assay results show only marginal values for other elements of interest like Pb, Zn, Ag and Au.

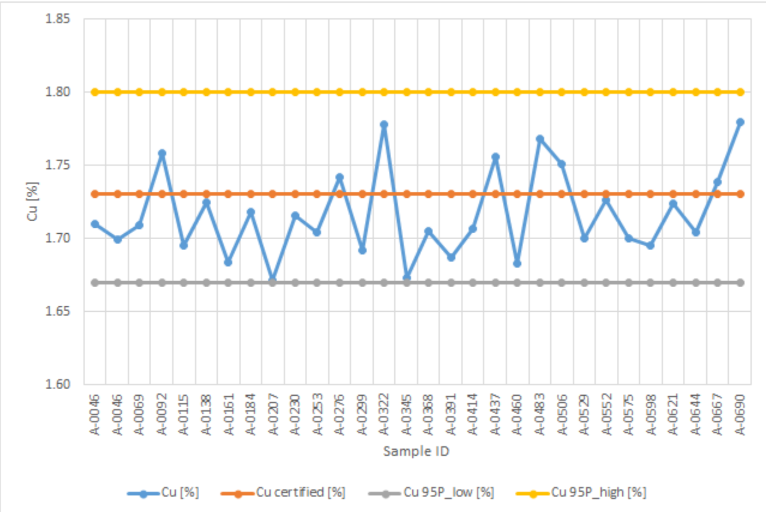



**Figure 31. Assay results for CRM OREAS 623 for Cu.**

Cu concentrations of all blank samples (crushed quartz) was below the detection limit. Hence the sample preparation method in the laboratory is assessed to be free of contamination.

Second split duplicates reproduced Cu with a deviation not exceeding 5 % for Cu in average. Hence, the sample reduction procedure (crushing and splitting) applied by Avod in core shed is assessed to have produced representative results for Cu. Two extraordinary large errors can be explained by a sample mix-up (see Table 9: yellow and orange numbers).

**Table 9. Deviations of Cu of second split duplicates**

| Sample ID | Cu [%] | Sample ID Duplicate | Cu [%] | Relative Error [%] |
|---|---|---|---|---|
| A-0020 | 1.48 | A-0021 | 1.47 | 1 |
| A-0043 | 0.97 | A-0044 | 0.98 | 1 |
| A-0066 | 1.42 | A-0067 | 1.43 | 1 |
| A-0089 | 1.46 | A-0090 | 1.47 | 1 |
| A-0112 | 1.37 | A-0113 | 1.40 | 3 |
| A-0135 | 1.49 | A-0136 | 1.54 | 4 |
| A-0181 | 1.24 | A-0182 | 1.22 | 1 |
| A-0204 | 0.15 | A-0205 | 0.15 | 1 |
| A-0227 | 1.55 | A-0228 | 1.58 | 2 |
| A-0227 | 1.57 | A-0228 | 1.58 | 1 |
| A-0250 | 1.94 | A-0251 | 1.98 | 2 |
| A-0273 | 1.79 | A-0274 | 1.85 | 3 |
| A-0296 | 1.54 | A-0297 | 1.54 | 0 |
| A-0319 | 6.24 | A-0320 | 5.68 | 9 |
| A-0342 | 1.13 | A-0343 | 1.10 | 3 |
| A-0365 | 2.70 | A-0366 | 2.35 | 13 |
| A-0388 | 1.53 | A-0389 | 1.56 | 2 |
| A-0411 | 0.98 | A-0412 | 1.25 | 27 |
| A-0434 | 1.27 | A-0435 | 1.23 | 3 |
| A-0458 | 4.89 | A-0458 | 4.89 | 0 |
| A-0480 | 1.38 | A-0481 | 1.41 | 3 |
| A-0503 | 2.73 | A-0504 | 2.57 | 6 |
| A-0526 | 0.04 | A-0527 | 0.04 | 2 |
| A-0526 | 0.04 | A-0527 | 0.04 | 2 |
| A-0526 | 0.04 | A-0527 | 0.04 | 5 |
| A-0526 | 0.04 | A-0527 | 0.04 | 5 |
| A-0549 | 2.47 | A-0550 | 2.86 | 16 |
| A-0572 | 0.70 | A-0573 | 0.66 | 6 |
| A-0595 | 1.25 | A-0596 | 1.36 | 8 |
| A-0618 | 0.36 | A-0619 | 0.33 | 6 |
| A-0641 | 1.23 | A-0642 | 1.26 | 2 |
| A-0664 | 1.45 | A-0665 | 1.44 | 1 |
| A-0687 | 0.83 | A-0688 | 0.89 | 7 |
| A-0687 | 1.26 | A-0688 | 0.89 | 29 |

## 12.10 DENSITY DETERMINATION

A total of 209 samples were selected for density measurements. Basis of the selection was a minimum sample length of 10 cm. A plot of densities vs. levels of Cu, Fe or S or combinations does not show any correlation. However, the measured densities are in a reasonable range and the amount and spatial distribution of samples is assessed as representative for the types of mineralization.

**Table 10. Average bulk density per type of mineralization and interpreted body**

| Area | Interpreted Body | Mineralization | Number of samples | Density Average [t/m³] | Density Minimum [t/m³] | Density Maximum [t/m³] |
|---|---|---|---|---|---|---|
| **A** | | Disseminated sulfides in basalt | 55 | 3.0 | 2.4 | 3.3 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **A** | | Pieces of drill core of 10 cm length in maximum, interpreted to belong to thin layers of massive sulfide partly within disseminated sulfides in basalt | 55 | 4.5 | 3.2 | 5.5 |
| **A** | **A** | **Disseminated sulfides in basalt including partly thin layers of massive sulfide** | 110 | **3.7** | 2.4 | 5.5 |
| **B** | | Disseminated sulfides in basalt | 27 | 3.0 | 2.7 | 3.4 |
| **B** | | Pieces of drill core of 10 cm length in maximum, interpreted to belong to thin layers of massive sulfide partly within disseminated sulfides in basalt | 27 | 4.0 | 3.0 | 5.0 |
| **B** | **B1** | **Disseminated sulfides in basalt including partly thin layers of massive sulfide** | 54 | **3.5** | 2.7 | 5.0 |
| **B** | **B2** | **Mineralization in oxidation** | 45 | **2.6** | 2.4 | 2.9 |

## 12.11 CONFIRMATION OF HISTORICAL DATA ACQUISITION

There is no historical data used for this estimate.

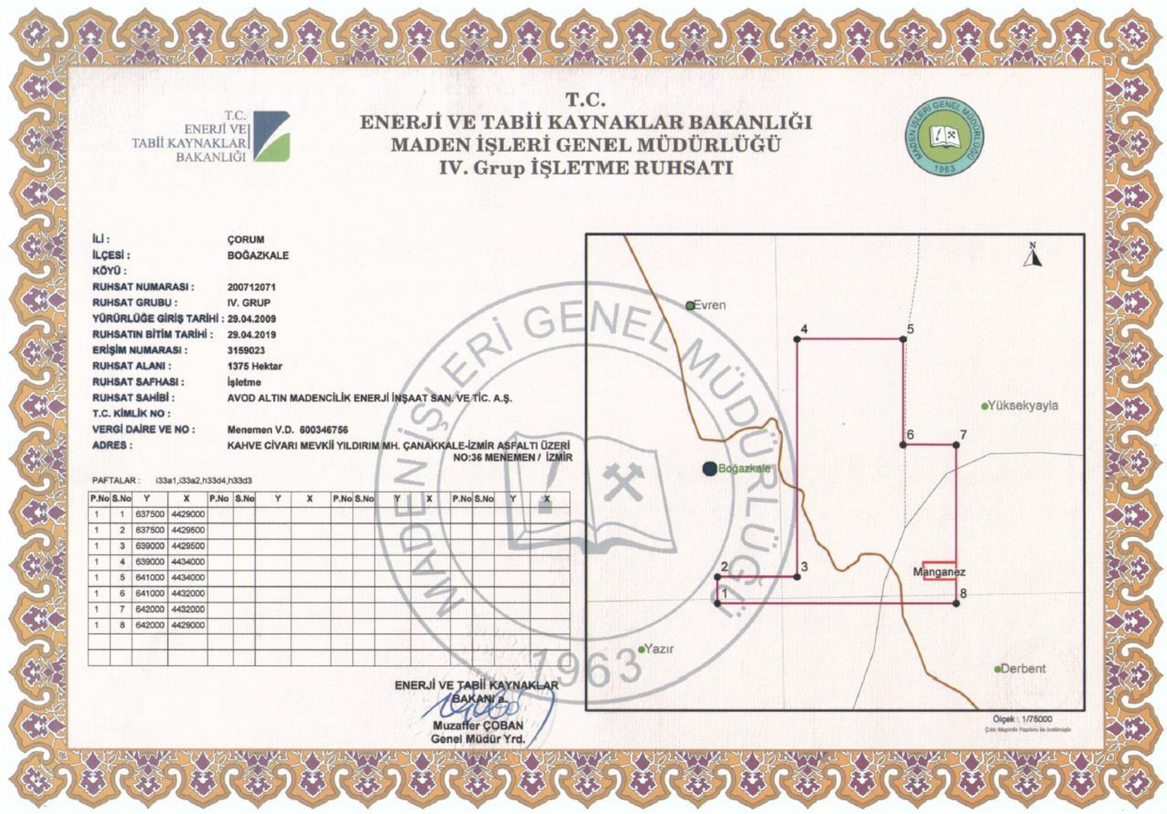
## 12.12 CONCESSION AREA

Avod holds licence 200712071 with the coordinates given in Table 11.

**Table 11. Coordinates limiting the licence area**

| Point ID | Easting | Northing |
|---|---|---|
| **1** | 637 500 | 4 429 000 |
| **2** | 637 500 | 4 429 500 |
| **3** | 639 000 | 4 429 500 |
| **4** | 639 000 | 4 434 000 |
| **5** | 641 000 | 4 434 000 |
| **6** | 641 000 | 4 432 000 |
| **7** | 642 000 | 4 432 000 |
| **8** | 642 000 | 4 429 000 |

The licence certificate was also provided to DMT. An independent validation on the licence and ownership status has not been done by DMT at this stage.



T.C.
ENERJİ VE TABİİ KAYNAKLAR BAKANLIĞI
MADEN İŞLERİ GENEL MÜDÜRLÜĞÜ
IV. Grup İŞLETME RUHSATI

T.C. ENERJİ VE TABİİ KAYNAKLAR BAKANLIĞI

İLİ : ÇORUM
İLÇESİ : BOĞAZKALE
KÖYÜ :
RUHSAT NUMARASI : 200712071
RUHSAT GRUBU : IV. GRUP
YÜRÜRLÜĞE GİRİŞ TARİHİ : 29.04.2009
RUHSATIN BİTİM TARİHİ : 29.04.2019
ERİŞİM NUMARASI : 3159023
RUHSAT ALANI : 1375 Hektar
RUHSAT SAFHASI : İşletme
RUHSAT SAHİBİ : AVOD ALTIN MADENCİLİK ENERJİ İNŞAAT SAN. VE TİC. A.Ş.
T.C. KİMLİK NO :
VERGİ DAİRE VE NO : Menemen V.D. 600346756
ADRES : KAHVE CİVARI MEVKİİ YILDIRIM MH. ÇANAKKALE-İZMİR ASFALTI ÜZERİ NO:36 MENEMEN / İZMİR

PAFTALAR : i33a1,i33a2,h33d4,h33d3

| P.No | S.No | Y | X | P.No | S.No | Y | X | P.No | S.No | Y | X | P.No | S.No | Y | X |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 637500 | 4429000 | | | | | | | | | | | | |
| 1 | 2 | 637500 | 4429500 | | | | | | | | | | | | |
| 1 | 3 | 639000 | 4429500 | | | | | | | | | | | | |
| 1 | 4 | 639000 | 4434000 | | | | | | | | | | | | |
| 1 | 5 | 641000 | 4434000 | | | | | | | | | | | | |
| 1 | 6 | 641000 | 4432000 | | | | | | | | | | | | |
| 1 | 7 | 642000 | 4432000 | | | | | | | | | | | | |
| 1 | 8 | 642000 | 4429000 | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

ENERJİ VE TABİİ KAYNAKLAR
BAKANI a.
Muzaffer ÇOBAN
Genel Müdür Yrd.



**Figure 32. Certificate of licence 200712071.**

All drilling and investigation results is covered by the licence.

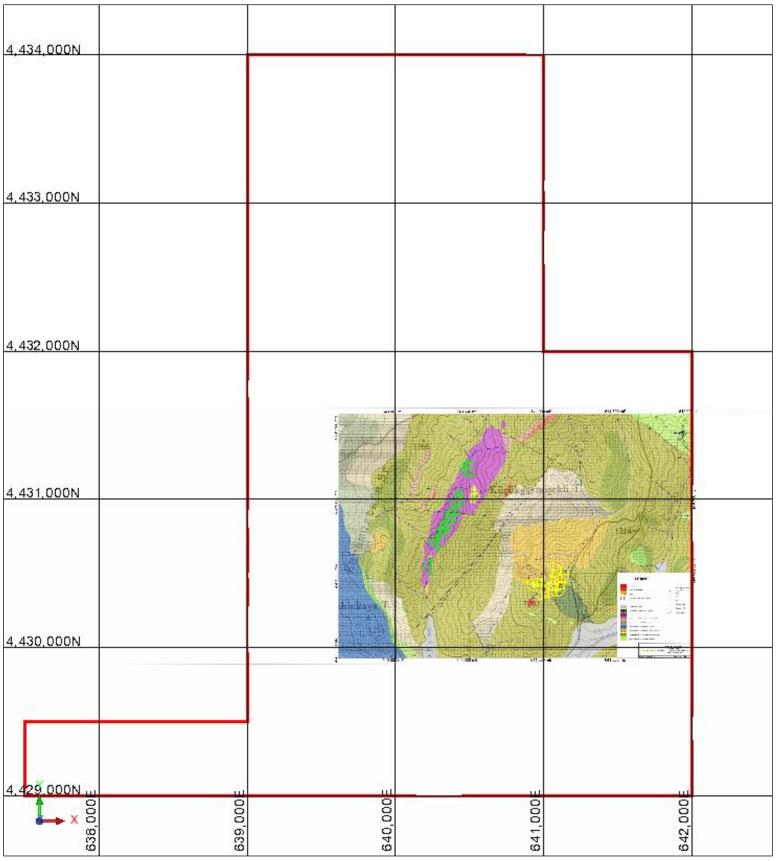



**Figure 33. Licence (red boundary) covering the mapped and drilled areas.**

## 12.13 DIGITAL TERRAIN MODEL

Up to date a detailed survey of topography is not yet available. For that reason, a DTM was sourced from Global Mapper software using SRTM in 1arc-second resolution in map datum UTM ED50 Zone 36 Northern Hemisphere.

## 12.14 MINED OUT AREA

According to discussion with the client there were underground mining activities in the past in Area A. However, location and extent of the mine is unknown. No documents are available about historic production. Thus, DMT cannot assess the amount of tonnage already mined out.

## 12.15 DATA QUALITY SUMMARY

DMT assesses, that the quality and quantity of data available is sufficient to state a resource. It should be noted that a more detailed digital terrain model might affect this resource especially in Area A, where the drill holes are located E and W of the valley floor in a distance of around 40 m which is the resolution of the SRTM DTM used. Hence the steep incision of the valley floor is strongly smoothed and flattened. Also, the missing information about historic mining activities might affect this resource estimate. For follow-up resource upgrades these points should be considered.

# 13 MINERAL PROCESSING AND METALLURGICAL TESTING

This is an early stage project and no mineral processing and/or metallurgical test work have been done.

# 14 MINERAL RESOURCE ESTIMATES

This report provides a mineral resource estimate based on a diamond drilling program executed in licence 200712071. The basis of this resource estimate is the volume of 3 wireframes modelled based on drill holes with data of assays and density. Several Cu cut-off grades were applied to the database to calculate respective average grades of Cu. The percentages of the remaining intervals were set in correspondence to the volume of wireframe, which again was used to calculate a bulk tonnage using an average density.

The wireframe model and estimate of this chapter are dated 05 November 2018.

## 14.1 GEOLOGICAL MODEL

The general concept, which underlies the wireframe interpretation is based on a simple hole to hole interpretation. The geological and structural framework with focus on the geometry and orientation of mineralized bodies is not yet fully understood and needs more investigation. Understanding of these parameters will generate higher confidence in the geological interpretation of the mineralization.

However, the results from logging and chemical analysis of exploration drilling look robust and show a geological and chemical lateral continuity with more or less sharp contacts at top and bottom. The internal zonation does not drop below 1 % Cu with only a few exceptions.

## 14.2 STATISTICAL ANALYSIS

Up to date 615 samples from drill holes are available, which are representative for the logged and interpreted mineralization. Results of basic statistics are shown in Table 12. All chemical parameters are weighted by sample length and density.

**Table 12. Basic statistics of mineralized body A (sulfidic) in Area A (211 samples)**

| | | Cu [%] | Pb [%] | Zn [%] | Fe [%] | S [%] | Au [ppm] | Ag [ppm] |
|---|---|---|---|---|---|---|---|---|
| Mean | | 1.69 | 0.00 | 0.03 | 17.82 | 12.76 | 0.02 | 0.87 |
| Std. Error of Mean | | 0.03 | 0.00 | 0.00 | 0.23 | 0.28 | 0.00 | 0.06 |
| Std. Deviation | | 0.40 | 0.00 | 0.07 | 3.36 | 4.02 | 0.01 | 0.87 |
| Minimum | | 0.91 | 0.00 | 0.01 | 10.89 | 4.10 | 0.00 | 0.00 |
| Maximum | | 3.05 | 0.00 | 0.87 | 30.00 | 27.79 | 0.09 | 5.43 |
| Range | | 2.14 | 0.00 | 0.86 | 19.11 | 23.69 | 0.09 | 5.43 |
| Percentiles | | | | | | | | |
| | 10 | 1.23 | 0.00 | 0.01 | 13.29 | 8.17 | 0.01 | 0.00 |
| | 20 | 1.37 | 0.00 | 0.01 | 14.88 | 9.34 | 0.01 | 0.00 |
| | 30 | 1.45 | 0.00 | 0.02 | 16.03 | 10.38 | 0.01 | 0.00 |
| | 40 | 1.51 | 0.00 | 0.02 | 16.84 | 11.45 | 0.01 | 0.47 |
| | 50 | 1.60 | 0.00 | 0.02 | 17.60 | 12.05 | 0.02 | 0.82 |
| | 60 | 1.71 | 0.00 | 0.02 | 18.68 | 13.10 | 0.02 | 1.02 |
| | 70 | 1.89 | 0.00 | 0.03 | 19.54 | 14.54 | 0.02 | 1.32 |
| | 80 | 2.08 | 0.00 | 0.04 | 21.14 | 16.35 | 0.02 | 1.56 |
| | 90 | 2.27 | 0.00 | 0.07 | 22.17 | 18.42 | 0.03 | 2.01 |

**Table 13. Basic statistics of mineralized body B1 (sulfidic) in Area B (80 samples)**

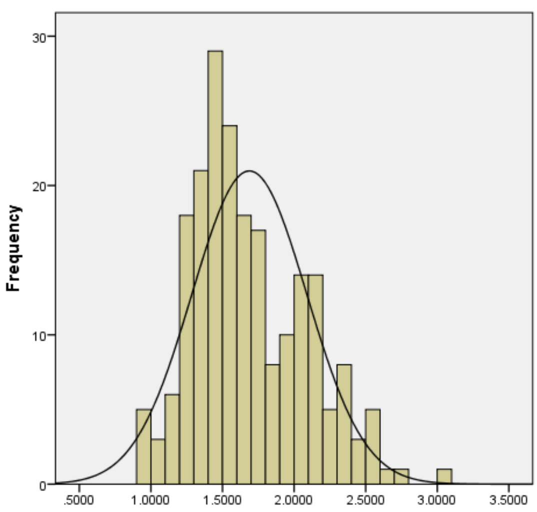
| | | Cu [%] | Pb [%] | Zn [%] | Fe [%] | S [%] | Au [ppm] | Ag [ppm] |
|---|---|---|---|---|---|---|---|---|
| Mean | | 1.35 | 0.00 | 0.08 | 17.97 | 12.97 | 0.02 | 0.92 |
| Std. Error of Mean | | 0.02 | 0.00 | 0.02 | 0.44 | 0.41 | 0.00 | 0.10 |
| Std. Deviation | | 0.20 | 0.00 | 0.22 | 3.92 | 3.69 | 0.02 | 0.87 |
| Minimum | | 0.98 | 0.00 | 0.01 | 11.02 | 6.31 | 0.00 | 0.00 |
| Maximum | | 1.90 | 0.00 | 1.81 | 29.60 | 23.89 | 0.14 | 3.25 |
| Range | | 0.92 | 0.00 | 1.80 | 18.58 | 17.58 | 0.14 | 3.25 |
| Percentiles | | | | | | | | |
| | 10 | 1.06 | 0.00 | 0.01 | 13.82 | 9.01 | 0.00 | 0.00 |
| | 20 | 1.15 | 0.00 | 0.01 | 14.55 | 10.20 | 0.01 | 0.00 |
| | 30 | 1.24 | 0.00 | 0.02 | 15.52 | 10.88 | 0.01 | 0.26 |
| | 40 | 1.28 | 0.00 | 0.02 | 16.19 | 11.35 | 0.01 | 0.57 |
| | 50 | 1.33 | 0.00 | 0.02 | 17.31 | 12.14 | 0.01 | 0.87 |
| | 60 | 1.40 | 0.00 | 0.03 | 18.30 | 13.08 | 0.01 | 0.97 |
| | 70 | 1.44 | 0.00 | 0.03 | 19.69 | 13.97 | 0.02 | 1.19 |
| | 80 | 1.52 | 0.00 | 0.04 | 21.06 | 15.80 | 0.02 | 1.57 |
| | 90 | 1.60 | 0.00 | 0.15 | 23.68 | 19.00 | 0.03 | 2.04 |

**Table 14. Basic statistics of mineralized body B2 (oxidic) in Area B (199 samples)**

| | | Cu [%] | Pb [%] | Zn [%] | Fe [%] | S [%] | Au [ppm] | Ag [ppm] |
|---|---|---|---|---|---|---|---|---|
| **Mean** | | **2.78** | **0.00** | **0.09** | **13.45** | **1.70** | **0.02** | **1.83** |
| **Std. Error of Mean** | | 0.10 | 0.00 | 0.01 | 0.36 | 0.19 | 0.00 | 0.09 |
| **Std. Deviation** | | 1.44 | 0.01 | 0.18 | 5.09 | 2.63 | 0.02 | 1.29 |
| **Minimum** | | 0.42 | 0.00 | 0.00 | 5.09 | 0.06 | 0.00 | 0.00 |
| **Maximum** | | 7.83 | 0.10 | 1.46 | 29.97 | 14.92 | 0.12 | 8.37 |
| **Range** | | 7.41 | 0.10 | 1.45 | 24.88 | 14.86 | 0.12 | 8.37 |
| **Percentiles** | | | | | | | | |
| | 10 | 1.21 | 0.00 | 0.02 | 7.52 | 0.10 | 0.00 | 0.29 |
| | 20 | 1.53 | 0.00 | 0.03 | 8.64 | 0.14 | 0.01 | 0.85 |
| | 30 | 1.77 | 0.00 | 0.04 | 9.88 | 0.18 | 0.01 | 1.09 |
| | 40 | 2.09 | 0.00 | 0.05 | 11.06 | 0.23 | 0.01 | 1.40 |
| | 50 | 2.55 | 0.00 | 0.06 | 12.84 | 0.32 | 0.01 | 1.64 |
| | 60 | 2.89 | 0.00 | 0.07 | 14.84 | 0.85 | 0.02 | 1.93 |
| | 70 | 3.41 | 0.00 | 0.07 | 15.94 | 1.95 | 0.02 | 2.30 |
| | 80 | 4.05 | 0.00 | 0.09 | 17.69 | 3.01 | 0.02 | 2.86 |
| | 90 | 4.61 | 0.00 | 0.11 | 20.01 | 4.67 | 0.04 | 3.40 |

The sulfidic body B1 overlain by the oxidic body B2 has lower copper grades (average 1.4 % Cu, maximum 1.9 % Cu) than the sulfidic body A (average 1.7 % Cu, maximum 3.1 %). The oxidic body B2 show a significant enrichment in concentration of Cu averaging to 2.8 % with maximum concentrations of 7.8 % Cu.

Figure 34 shows frequency plots of Cu separated for interpreted bodies A, B1 and B2. It is obvious that these data sets are following more or less a normal distribution, which indicates that these data belong to a single sample population, which again indicates that there is no requirement to sub-domain. No outliers were observable. Thus, a top-cut was not required.



Cu [%] in body A (sulfidic)

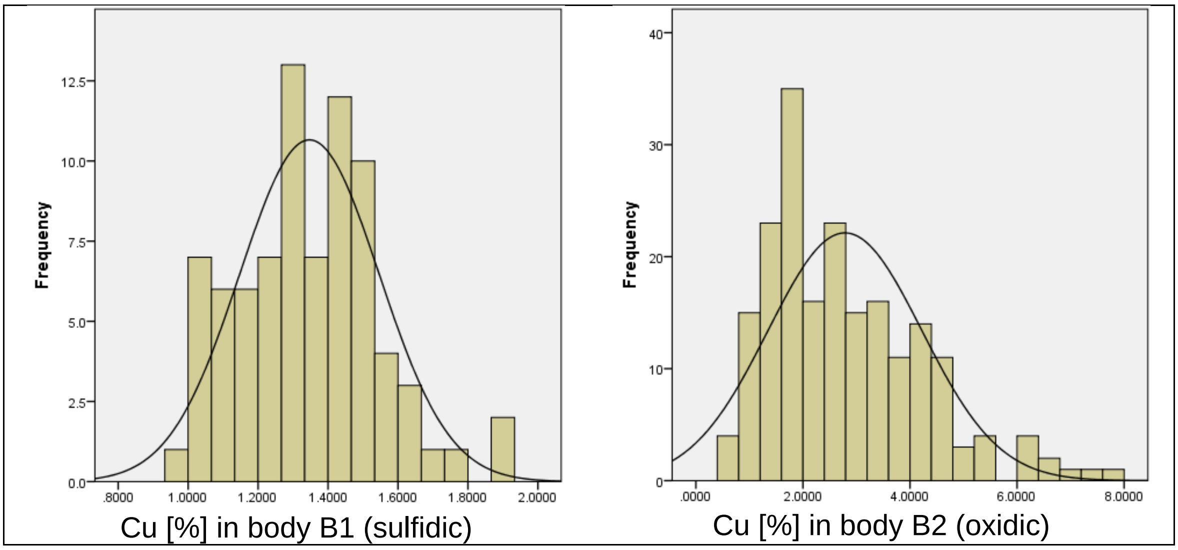



**Figure 34. Frequency plots of Cu for interpreted bodies A, B1 and B2.**

A significant correlation is not obvious for any of these elements besides for Fe and S.

## 14.3 INTERPRETATION OF MINERALIZED ZONES (DOMAINS)

Following the two areas A and B and types of mineralization a sulfide body for area A was modelled named body A and a sulphide body was modelled for Area B named B1 and an overlying oxidized body was modelled named B2. (Figure 35). In consequence, three wireframes were modelled. A drill hole to drill hole interpretation was required until further investigations will clarify the detailed geological structure (geometry and orientation) of the copper mineralization and generate a larger assay data base.

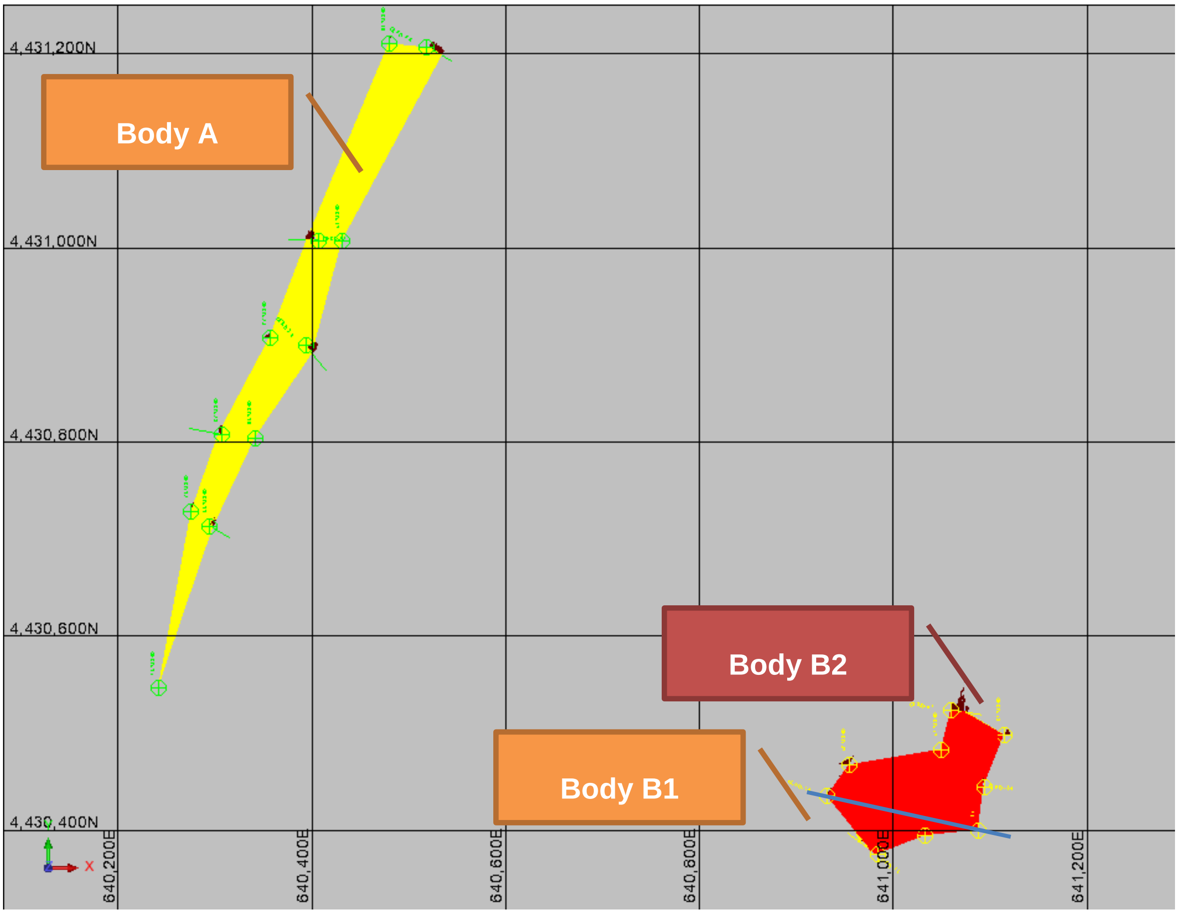



**Figure 35. Location of the three mineralized bodies A, B1 and B2 modelled; blue full line is location of cross section (see Figure 36).**

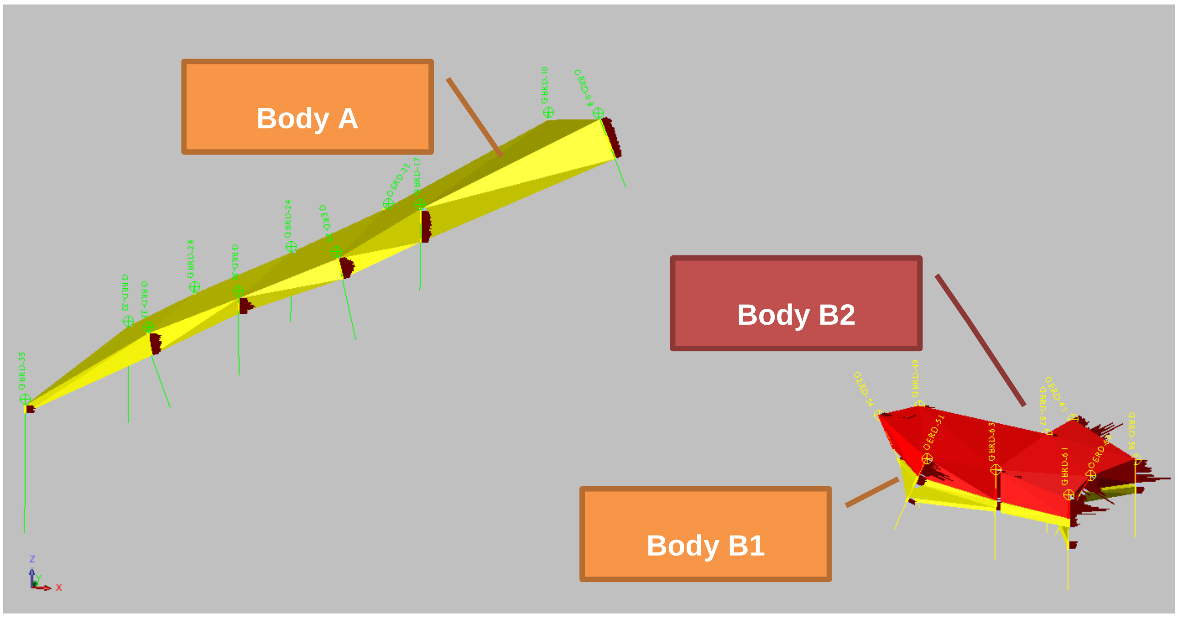



**Figure 36. 3D view to NNW onto the three mineralized bodies A, B1 and B2 modelled.**

Wireframes were set-up connecting mineralization contacts from drill hole to drill hole. Definition of mineralized intervals was based on 1 % Cu cut-off grade. This cut-off grade was chosen as a reasonable cut-off grade from comparable projects. Using this cut-off grade predominantly only the samples from the hanging and footwall host rock is excluded from the interpreted mineralized intersections and wireframe. From 615 samples 125 samples were excluded, which meets the approach of appr. 2 samples each in hanging and footwall contact; 4 samples multiplied by 33 interpreted intersections results to 132 samples. None of the samples within the interpreted mineralized intersection drops significantly below this 1 % Cu cut-off grade. The interpreted mineralized intervals were connected to wireframes. These wireframes resulted in 3D volume bodies. In total, 3 wireframes were modelled; A, B1 and B2. At this stage wireframes were modelled only in the area in-between drill holes and not extended to the untested areas beyond the drilled area in order to respect the complex geometry, which requires further investigations.

- **Wireframe A** is located in area A and is based on 11 drill holes each having one intersection of sulfidic material sampled and assayed and applying a 1 % Cu cut-off grade.
- **Wireframe B1** is located in area B and is based on 9 drill holes each having one intersection of sulfidic material sampled and assayed and applying a 1 % Cu cut-off grade.
- **Wireframe B2** is located in area B and is based on 9 drill holes each having one intersection of oxidized material overlying Wireframe B1 sampled and assayed and applying a 1 % Cu cut-off grade.

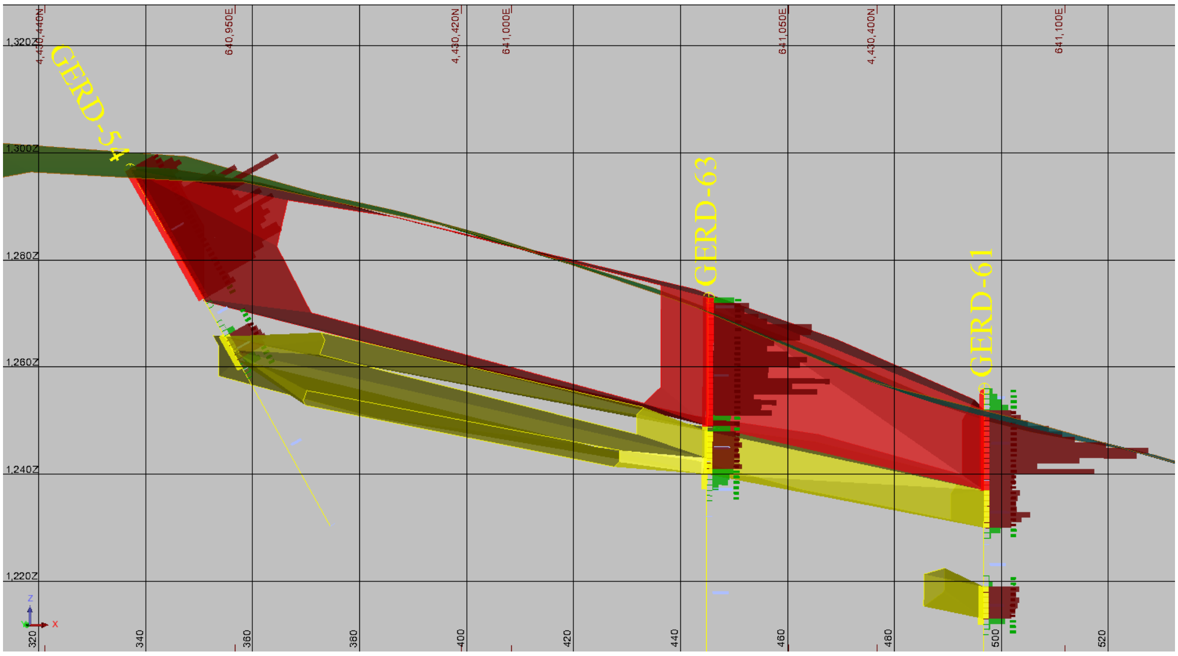



**Figure 37. Cross section trough mineralized body B1 and B2; location of cross section is given in Figure 35.**

Table 15. **Interpretation of mineralized bodies A, B1 and B2 is based on 33 intersections of 20 drill holes; this table shows these intersections and respective depth intervals**

| Area | Hole ID | Depth from | Depth to | Interval | Interpreted Body |
|---|---|---|---|---|---|
| **A** | GERD-08 | 5 | 37 | 32 | A |
| **A** | GERD-10 | 6 | 34 | 28 | A |
| **A** | GERD-17 | 4 | 30 | 26 | A |
| **A** | GERD-22 | 6 | 24 | 18 | A |
| **A** | GERD-24 | 5 | 32 | 27 | A |
| **A** | GERD-26 | 6 | 22 | 16 | A |
| **A** | GERD-28 | 6 | 19 | 13 | A |
| **A** | GERD-30 | 6 | 18 | 12 | A |
| **A** | GERD-32 | 4 | 20 | 16 | A |
| **A** | GERD-33 | 5 | 22 | 17 | A |
| **A** | GERD-35 | 5 | 11 | 6 | A |
| **B** | GERD-47 | 0 | 31 | 31 | B2 |
| **B** | GERD-47 | 31 | 37 | 6 | B1 |
| **B** | GERD-49 | 0 | 25 | 25 | B2 |
| **B** | GERD-49 | 31 | 41 | 10 | B1 |
| **B** | GERD-51 | 0 | 19.3 | 19.3 | B2 |
| **B** | GERD-51 | 19.3 | 26 | 6.7 | B1 |
| **B** | GERD-51 | 41 | 45 | 4 | B1 |
| **B** | GERD-54 | 0 | 28 | 28 | B2 |
| **B** | GERD-54 | 36 | 41 | 5 | B1 |
| **B** | GERD-57 | 0 | 23 | 23 | B2 |
| **B** | GERD-57 | 26 | 30 | 4 | B1 |
| **B** | GERD-57 | 46 | 52 | 6 | B1 |
| **B** | GERD-58 | 0 | 19 | 19 | B2 |
| **B** | GERD-58 | 22 | 27 | 5 | B1 |
| **B** | GERD-60 | 0 | 15 | 15 | B2 |
| **B** | GERD-60 | 17 | 28 | 11 | B1 |
| **B** | GERD-60 | 34 | 36 | 2 | B1 |
| **B** | GERD-61 | 4 | 19 | 15 | B2 |
| **B** | GERD-61 | 19 | 26 | 7 | B1 |
| **B** | GERD-61 | 37 | 43 | 6 | B1 |
| **B** | GERD-63 | 0 | 24 | 24 | B2 |
| **B** | GERD-63 | 25 | 33 | 8 | B1 |

## 14.4 WIREFRAME MODEL

In total, three wireframes were modelled: A, B1 and B2 based on 20 drill holes, for which geological, chemical and density data were available. The following volumes were calculated.

| Mineralized Body | Volume [$m^3$] |
|---|---|
| A (sulfidic) | 441 775 |
| B1 (sulfidic) | 93 517 |
| **TOTAL sulfidic mineralization** | **535 292** |
| B2 (oxidized) | 305 317 |

| TOTAL sulfidic and oxidized mineralization | 840 609 |
|---|---|

The following screenshots from Geovia's Surpac software show the wireframes from above and in 3D.

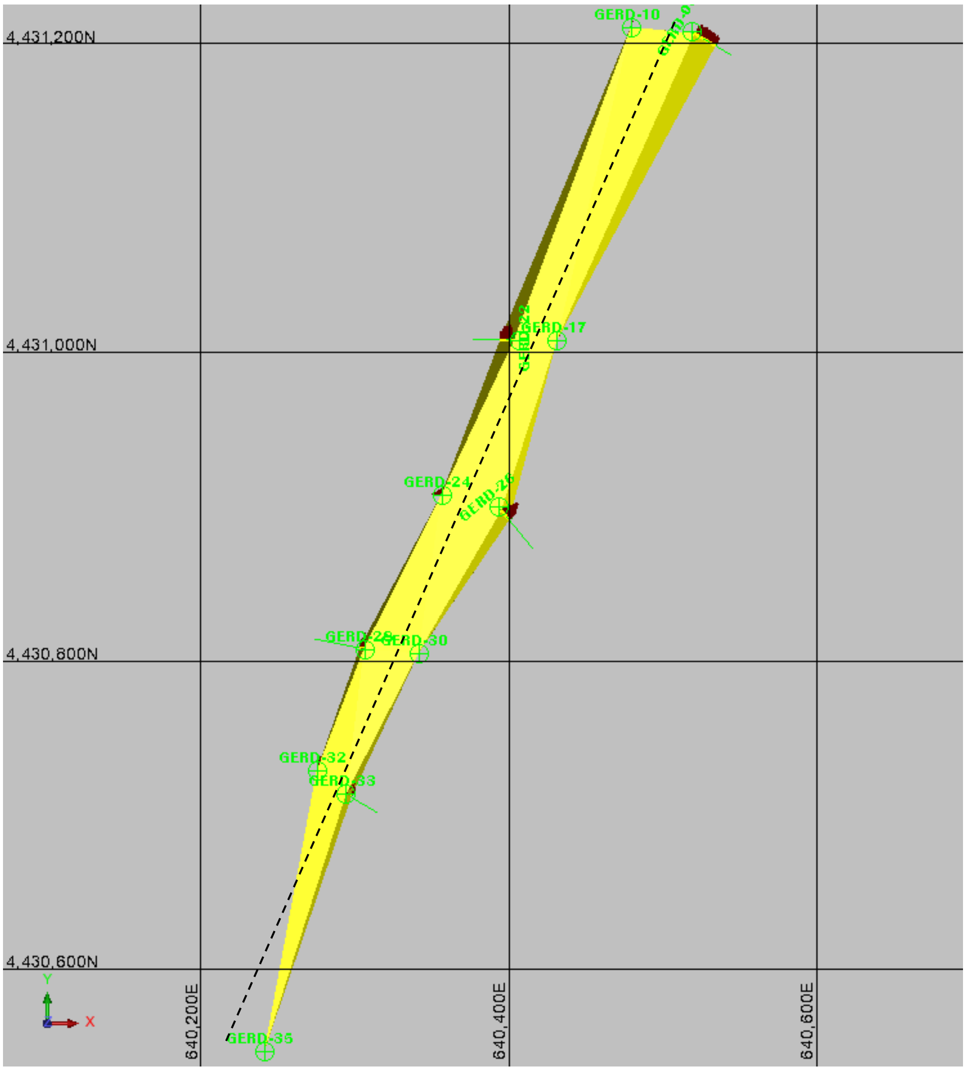



**Figure 38. Wireframe A from above and section line (black dashed line; see next figure).**

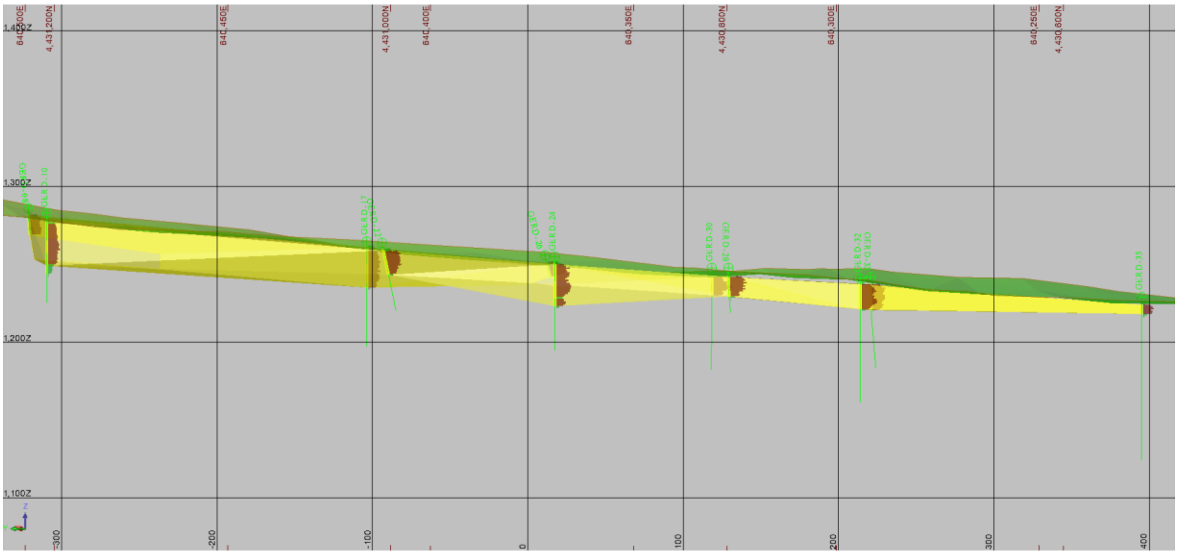



**Figure 39. Wireframe A in section (location of section line is given in Figure 38).**

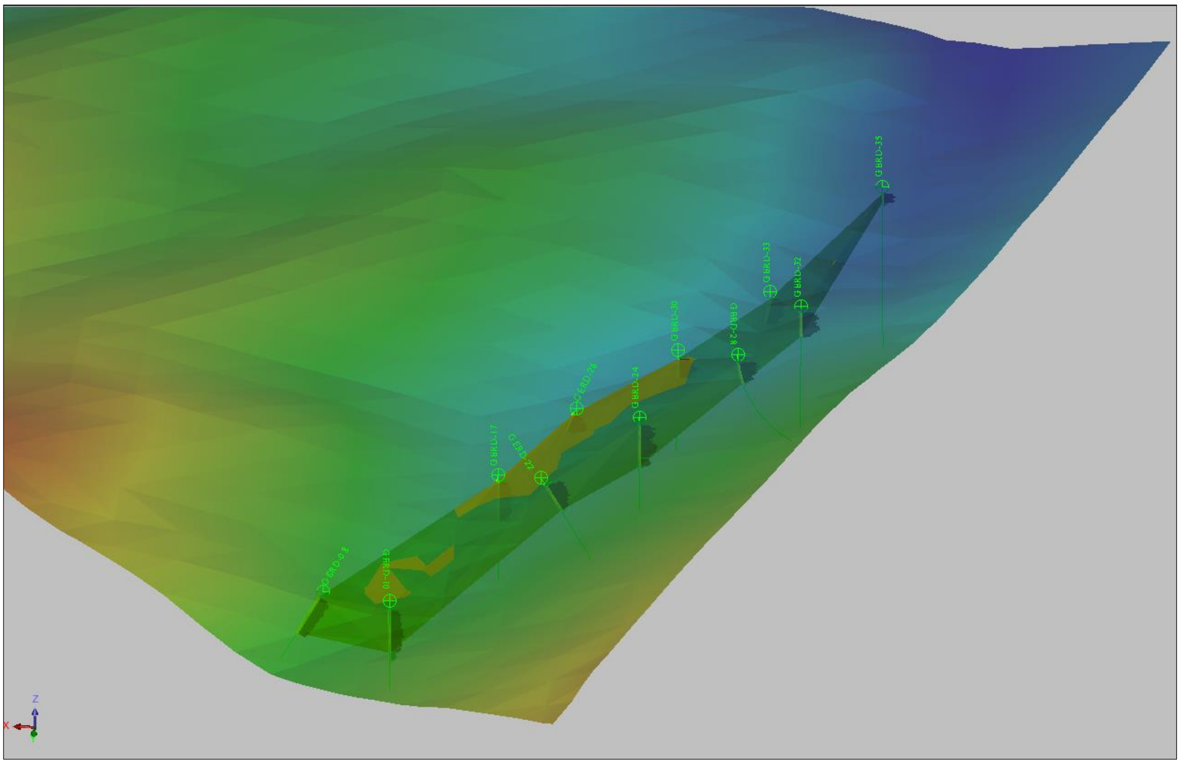


**Figure 40. Wireframe A in 3D view from NNW to SSE.**

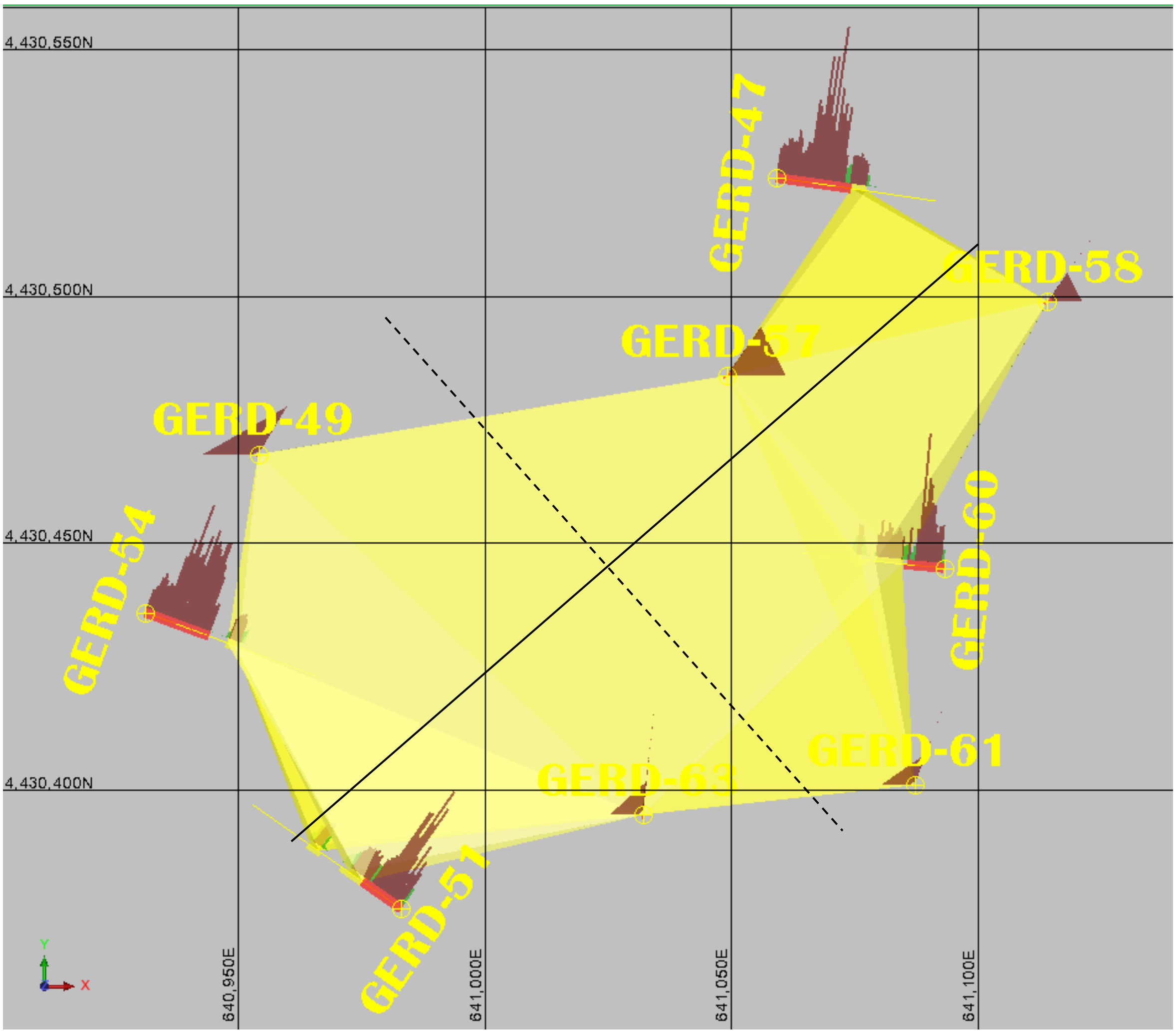



**Figure 41. Wireframe B1 from above and section line (black dashed and full line; see next two figures).**

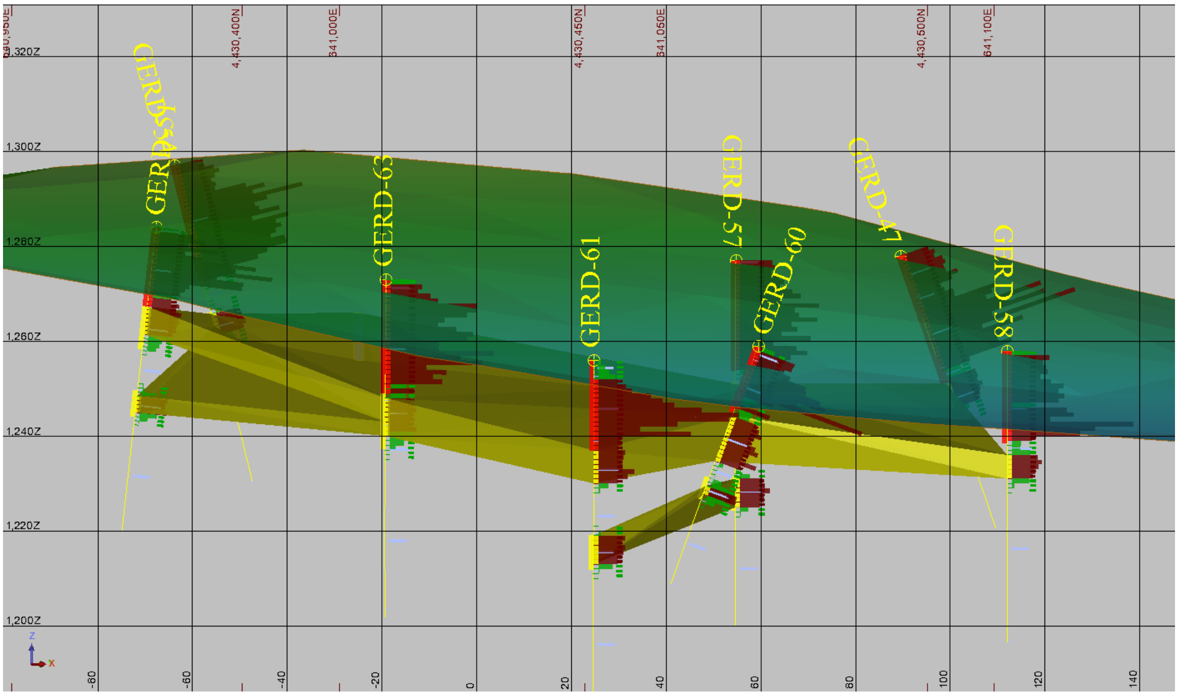



**Figure 42. Wireframe B1 in section (location of black full section line is given in Figure 42).**

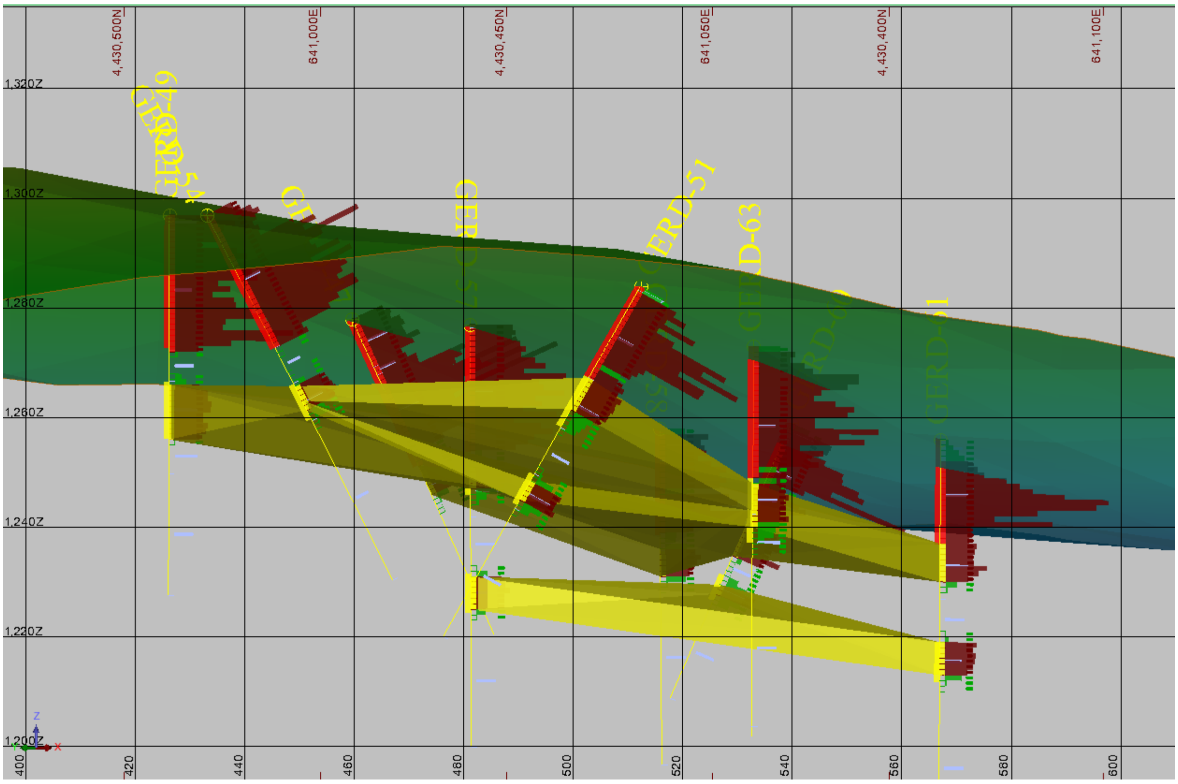



**Figure 43. Wireframe B1 in section (location of black dashed section line is given in Figure 42).**

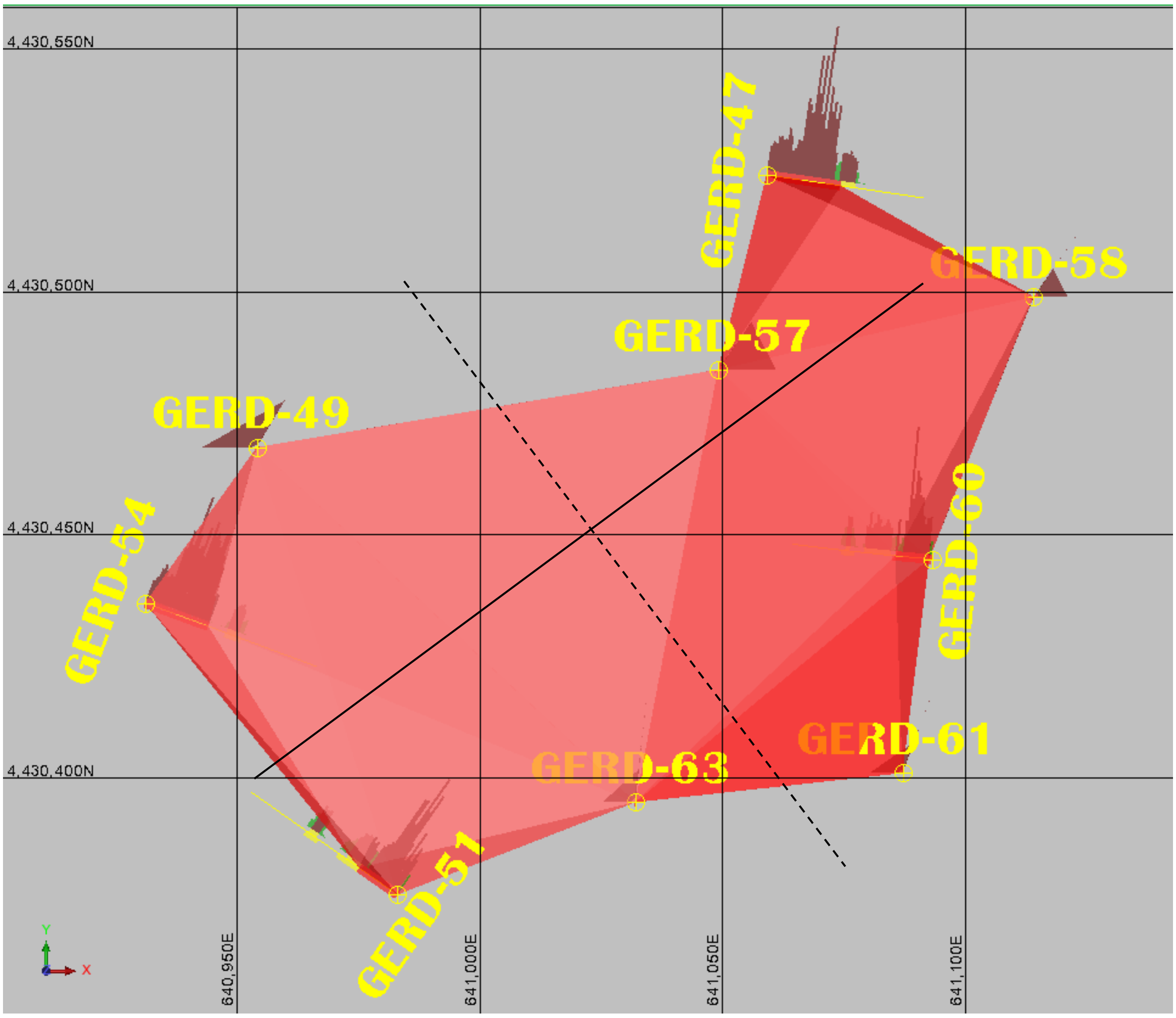



**Figure 44. Wireframe D from above and section line (black dashed and full line; see next figure).**

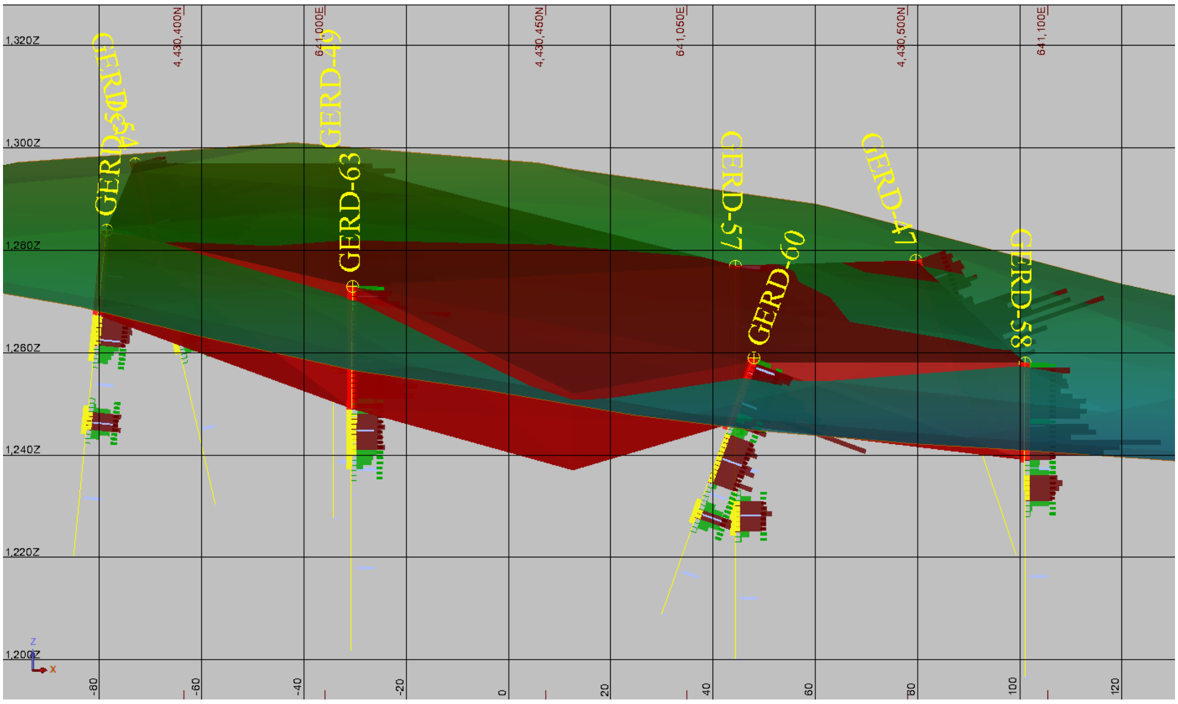


**Figure 45. Wireframe B2 in section (location of black full section line is given in Figure 44).**

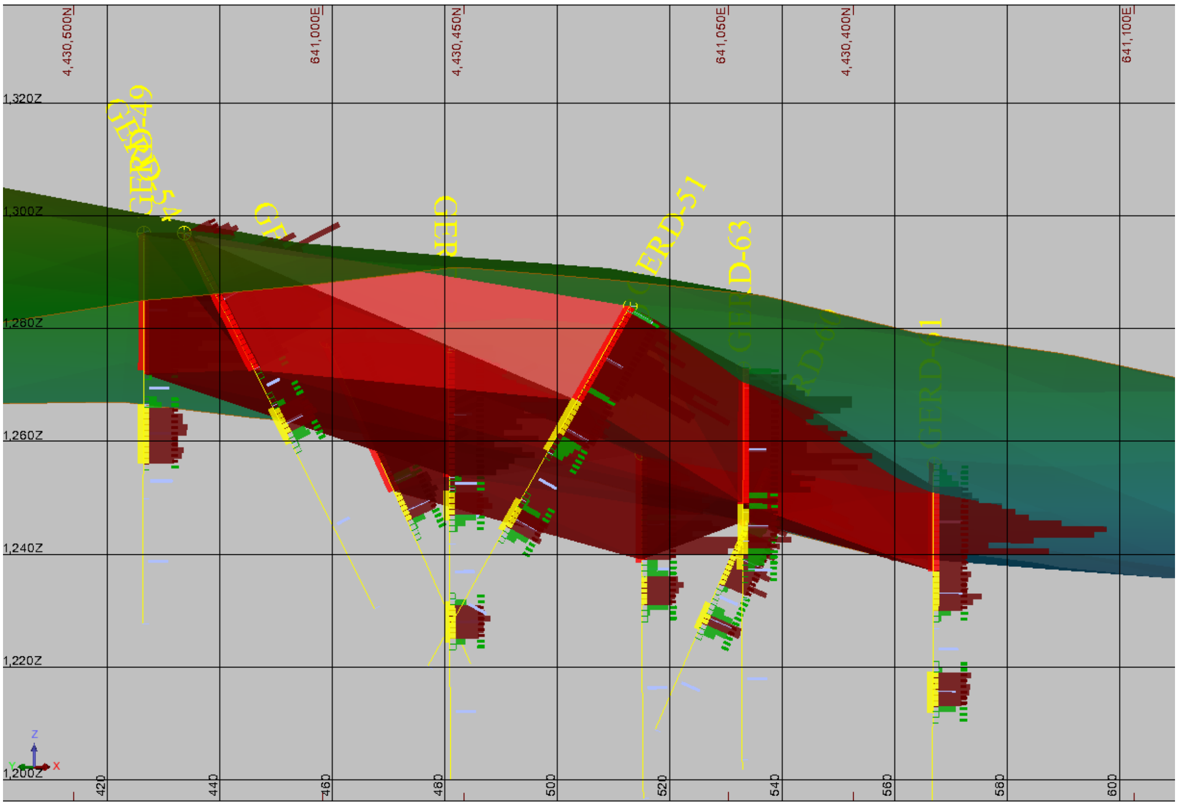


**Figure 46. Wireframe B2 in section (location of black dashed section line is given in figure before; dashed black line).**

## 14.5 GRADE CAPPING / COMPOSITING / BLOCK MODEL DEFINITION

A block model has not been set-up due the early stage of this project. A block model should be done as soon as further investigations clarify the geological structure (geometry and orientation) of the copper mineralization and generate a larger assay data base.

## 14.6 BULK DENSITY ATTRIBUTION

An arithmetic mean of measured densities was attributed to each mineralized body. The results are given in Table 16.

**Table 16. Average densities**

| Area | Interpreted Body | Mineralization | Number of samples | Density Average [t/m³] |
|---|---|---|---|---|
| A | A | Disseminated sulfides in basalt including partly thin layers of massive sulfide | 110 | 3.7 |
| B | B1 | Disseminated sulfides in basalt including partly thin layers of massive sulfide | 54 | 3.5 |
| B | B2 | Mineralization in oxidation | 45 | 2.6 |

## 14.7 GEOSTATISTICS / INTERPOLATION METHOD

Geostatistics and data interpolation have not been done to date due the early stage of this project.

## 14.8 RESOURCE CLASSIFICATION

The definitions for resource categories used in this report are consistent with the JORC Code 2012, the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, 2012 Edition.

Under the JORC classification system, a Mineral Resource is defined as:

> *…"a concentration or occurrence of natural, solid, inorganic or fossilised organic material in or on the Earth's crust in such form and quantity and of such grade or quality that it has reasonable prospects for economic extraction.*
>
> *"The location, quantity, grade or quality, continuity and other geological characteristics of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling."*

Generally, resources are classified into Measured, Indicated and Inferred categories based upon geological knowledge and confidence (Figure 47). Mineral resources are not mineral reserves and do not have demonstrated economic viability. Further studies are required to investigate the modifying factors to convert the resource into a reserve.

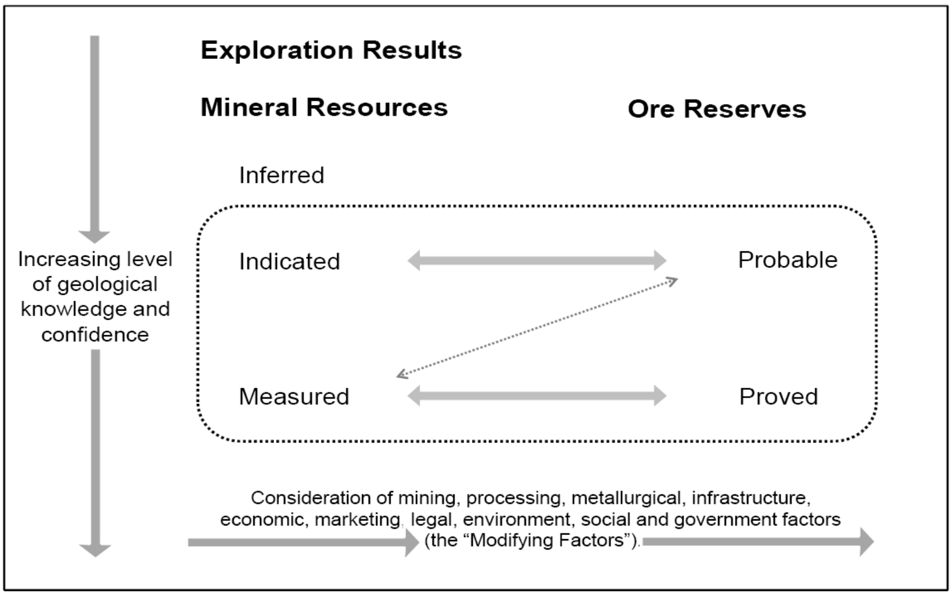



**Figure 47. Relationship between Exploration Results, Mineral Resources & Ore Reserves.**

Resource classification is based on the confidence in the estimate regarding mainly geometry of the orebody and grade continuity.

The interpreted wireframes are based on geological logging, density data and chemical data. Even if the the geological structure of the copper mineralization needs to be investigated in more detail, a rough estimate on geological and grade continuity can be made. In consequence the wireframes can be classified as inferred resource.

Avod's Corum project is still an early stage project, however with very promising results from drilling. DMT's experience in the geological setting of volcanogenic massive sulphide deposits shows that these can be complex and need detailed investigations on thickness, mineral composition and spatial distribution.

## 14.9 MODEL VALIDATION

Model validation is done in order to show that wireframed volumes meet basic geometric parameters based on drilling results and the interpretation methodology. These basic geometry parameters include average drilled thickness, length of outcrop, which is currently interpreted on the extension in the drill holes, and, finally, inclined length from surface to bottom of wireframe. It is also noted that, at this stage, it is not clear, how the holes are orientated with regards to the orientation of the copper mineralized bodies, which could affect thicknesses.

**Table 17. Validation of volumes of wireframes**

| Mineralized Body | Volume of Wireframes [m³] | Longest extent, length along assumed strike | Second longest extent, length along assumed dip | Third longest extent, assumed thickness | Volume of control |
|---|---|---|---|---|---|
| A (sulfidic) | 441 775 | 700 | 35 | 19 | 465 500 |
| B1 (sulfidic) | 93 517 | 160 | 90 | 7 | 100 800 |
| B2 (oxidized) | 305 317 | 160 | 90 | 22 | 316 800 |

## 14.1 PRELIMINARY CUT-OFF GRADE ASSUMPTION

Following JORC requirements and considering potential economic viability a cut-off grade was applied to constrain the estimated mineral resources.

A reporting cut-off grade of 1 % Cu was assumed on the benchmarking of similar projects, but is not based on a financial model specific for this project

Using this cut-off grade predominantly only the samples from the hanging and footwall host rock is excluded from the interpreted mineralized intersections and wireframe. From 615 samples 125 samples were excluded which meets the approach of appr. 2 samples each in hanging and footwall contact; 4 samples multiplied by 33 interpreted intersections results to 132 samples. None of the samples within the interpreted mineralized intersection drops significantly below this 1 % Cu cut-off grade.

**Table 18. Table showing that 125 m assayed interval (125 samples) was excluded from interpretation of mineralization using 1 % Cu cut-off grade.**

| Area | Hole ID | Assayed interval [m] | Assayed interval not interpreted as mineralization | Assayed interval interpreted as mineralization [m] | Body A | Body B1 | Body B1 |
|---|---|---|---|---|---|---|---|
| **A** | GERD-08 | 37 | 5 | 32 | 32 | | |
| **A** | GERD-10 | 37 | 9 | 28 | 28 | | |
| **A** | GERD-17 | 29 | 3 | 26 | 26 | | |
| **A** | GERD-22 | 23 | 5 | 18 | 18 | | |
| **A** | GERD-24 | 31 | 4 | 27 | 27 | | |
| **A** | GERD-26 | 20 | 4 | 16 | 16 | | |
| **A** | GERD-28 | 19 | 6 | 13 | 13 | | |
| **A** | GERD-30 | 16 | 4 | 12 | 12 | | |
| **A** | GERD-32 | 20 | 4 | 16 | 16 | | |
| **A** | GERD-33 | 21 | 4 | 17 | 17 | | |
| **A** | GERD-35 | 10 | 4 | 6 | 6 | | |
| **SUBTOTAL A** | | **263** | **52** | **211** | **211** | **0** | **0** |
| **B** | GERD-47 | 41 | 4 | 37 | | 6 | 31 |
| **B** | GERD-49 | 39 | 4 | 35 | | 10 | 25 |
| **B** | GERD-51 | 41 | 12 | 29 | | 10 | 19 |
| **B** | GERD-54 | 42 | 9 | 33 | | 5 | 28 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **B** | GERD-57 | 43 | 10 | 33 | | 10 | 23 |
| **B** | GERD-58 | 30 | 6 | 24 | | 5 | 19 |
| **B** | GERD-60 | 39 | 11 | 28 | | 13 | 15 |
| **B** | GERD-61 | 39 | 11 | 28 | | 13 | 15 |
| **B** | GERD-63 | 38 | 6 | 32 | | 8 | 24 |
| **SUBTOTAL A** | | **352** | **73** | **279** | **0** | **80** | **199** |
| **TOTAL** | | **615** | **125** | **490** | **211** | **80** | **199** |

## 14.2 ESTIMATE OF MINERAL RESOURCES

This estimate is based on wireframes modelled based on results of geological logging, assays and densities of 20 drill holes, which intersected copper mineralization. These wireframes are envelopes of copper mineralization.

No block model has been done due to early stage of the project.

Several Cu cut-off grades were applied to the resource database and corresponding average grades were calculated. The portion of the assayed intervals was set in correspondence to the volume of wireframe, which again was used to calculate a bulk tonnage using an average density. The results of the grade-tonnage relationships are given in the following tables.

Based on the constraints described above DMT categorizes the resource as inferred.

**Following JORC requirements and considering potential economic viability a 1 % Cu cut-off grade might be assumed based on mining activities and grades in Turkey, which yields an inferred resource of 2.7 Mt at a grade of 2.0 % Cu (Table 19).**

**Table 19. Overview about inferred resource at a 1 % Cu cut-off grade**

| Category | Area | Body ID and Type of mineralization | Cu Grade [%] | Tonnage [Mt] |
|---|---|---|---|---|
| Inferred | Area A | Body A (sulfidic body in area A) | 1.7 | 1.6 |
| Inferred | Area B | Body B1 (sulfidic body in area B) | 1.4 | 0.3 |
| Inferred | Area B | Body B2 (oxidized body in area B) | 2.9 | 0.8 |
| Total Inferred | Area A+B | All three bodies A (sulfidic), B1 (sulfidic) and B2 (oxidized) | 2.0 | 2.7 |

The following tables Table 20 to Table 23 show sensitivity of mineralized tonnage and average Cu grade at several Cu cut-off grades.

**Table 20. Sensitivity of mineralized tonnage and average Cu grade at several Cu cut-off grades comprising all three bodies A (sulfidic), B1 (sulfidic) and B2 (oxidized); the inferred resource was defined at an assumed 1% Cu cut-off grade (see green line)**

| Cut-off Cu [%] | Assayed meters [m] | Wireframe volume [m³] | Cu [%] | Tonnage [Mt] |
|---|---|---|---|---|
| 0.0 | 490 | 840 609 | 1.96 | 2.76 |
| 0.1 | 490 | 840 609 | 1.96 | 2.76 |
| 0.2 | 490 | 840 609 | 1.96 | 2.76 |
| 0.3 | 490 | 840 609 | 1.96 | 2.76 |
| 0.4 | 490 | 840 609 | 1.96 | 2.76 |
| 0.5 | 489 | 839 075 | 1.97 | 2.75 |
| 0.6 | 489 | 839 075 | 1.97 | 2.75 |
| 0.7 | 488 | 837 540 | 1.97 | 2.75 |
| 0.8 | 486 | 834 472 | 1.97 | 2.74 |
| 0.9 | 484 | 831 403 | 1.97 | 2.73 |
| **1.0** | **473** | **812 095** | **2.00** | **2.67** |
| 1.1 | 457 | 788 425 | 2.03 | 2.59 |
| 1.2 | 437 | 758 767 | 2.06 | 2.49 |
| 1.3 | 400 | 697 043 | 2.14 | 2.27 |
| 1.4 | 363 | 633 276 | 2.23 | 2.05 |
| 1.5 | 310 | 541 215 | 2.37 | 1.72 |
| 1.6 | 269 | 468 902 | 2.52 | 1.47 |
| 1.7 | 239 | 413 899 | 2.64 | 1.28 |
| 1.8 | 211 | 362 160 | 2.79 | 1.10 |
| 1.9 | 191 | 327 730 | 2.89 | 0.99 |
| 2.0 | 174 | 296 053 | 3.00 | 0.89 |
| 2.1 | 155 | 259 069 | 3.16 | 0.76 |
| 2.2 | 138 | 225 155 | 3.35 | 0.64 |
| 2.3 | 130 | 210 083 | 3.44 | 0.59 |
| 2.4 | 117 | 185 662 | 3.62 | 0.51 |
| 2.5 | 109 | 171 710 | 3.73 | 0.46 |
| 2.6 | 98 | 152 036 | 3.91 | 0.40 |
| 2.7 | 95 | 146 873 | 3.96 | 0.39 |
| 2.8 | 84 | 129 437 | 4.13 | 0.34 |
| 2.9 | 79 | 121 766 | 4.21 | 0.32 |
| 3.0 | 75 | 115 629 | 4.28 | 0.30 |

**Table 21. Sensitivity of mineralized tonnage and average Cu grade at several Cu cut-off grades for body A (sulfidic body in area A); the inferred resource was defined at an assumed 1% Cu cut-off grade (see green line)**

| Cut-off Cu [%] | Assayed meters [m] | Wireframe volume [m³] | Cu [%] | Tonnage [Mt] at density of 3.7 t/m³ |
|---|---|---|---|---|
| 0.0 | 211 | 441 775 | 1.69 | 1.63 |
| 0.1 | 211 | 441 775 | 1.69 | 1.63 |
| 0.2 | 211 | 441 775 | 1.69 | 1.63 |
| 0.3 | 211 | 441 775 | 1.69 | 1.63 |
| 0.4 | 211 | 441 775 | 1.69 | 1.63 |
| 0.5 | 211 | 441 775 | 1.69 | 1.63 |
| 0.6 | 211 | 441 775 | 1.69 | 1.63 |
| 0.7 | 211 | 441 775 | 1.69 | 1.63 |
| 0.8 | 211 | 441 775 | 1.69 | 1.63 |
| 0.9 | 211 | 441 775 | 1.69 | 1.63 |
| **1.0** | **206** | **431 306** | **1.71** | **1.60** |
| 1.1 | 203 | 425 025 | 1.71 | 1.57 |
| 1.2 | 197 | 412 463 | 1.73 | 1.53 |
| 1.3 | 179 | 374 776 | 1.78 | 1.39 |
| 1.4 | 158 | 330 808 | 1.84 | 1.22 |
| 1.5 | 129 | 270 090 | 1.92 | 1.00 |
| 1.6 | 105 | 219 841 | 2.01 | 0.81 |
| 1.7 | 87 | 182 154 | 2.08 | 0.67 |
| 1.8 | 70 | 146 560 | 2.17 | 0.54 |
| 1.9 | 62 | 129 811 | 2.21 | 0.48 |
| 2.0 | 52 | 108 873 | 2.26 | 0.40 |
| 2.1 | 38 | 79 561 | 2.33 | 0.29 |
| 2.2 | 24 | 50 249 | 2.44 | 0.19 |
| 2.3 | 19 | 39 781 | 2.49 | 0.15 |
| 2.4 | 11 | 23 031 | 2.58 | 0.09 |
| 2.5 | 8 | 16 750 | 2.64 | 0.06 |
| 2.6 | 3 | 6 281 | 2.80 | 0.02 |
| 2.7 | 2 | 4 187 | 2.88 | 0.02 |
| 2.8 | 1 | 2 094 | 3.05 | 0.01 |
| 2.9 | 1 | 2 094 | 3.05 | 0.01 |
| 3.0 | 1 | 2 094 | 3.05 | 0.01 |

**Table 22. Sensitivity of mineralized tonnage and average Cu grade at several Cu cut-off grades for body B1 (sulfidic body in area B); the inferred resource was defined at an assumed 1% Cu cut-off grade (see green line)**

| Cut-off Cu [%] | Assayed meters [m] | Wireframe volume [m³] | Cu [%] | Tonnage [Mt] at density of 3.5 t/m³ |
|---|---|---|---|---|
| 0.0 | 80 | 93 517 | 1.35 | 0.33 |
| 0.1 | 80 | 93 517 | 1.35 | 0.33 |
| 0.2 | 80 | 93 517 | 1.35 | 0.33 |
| 0.3 | 80 | 93 517 | 1.35 | 0.33 |
| 0.4 | 80 | 93 517 | 1.35 | 0.33 |
| 0.5 | 80 | 93 517 | 1.35 | 0.33 |
| 0.6 | 80 | 93 517 | 1.35 | 0.33 |
| 0.7 | 80 | 93 517 | 1.35 | 0.33 |
| 0.8 | 80 | 93 517 | 1.35 | 0.33 |
| 0.9 | 80 | 93 517 | 1.35 | 0.33 |
| **1.0** | **79** | **92 348** | **1.35** | **0.32** |
| 1.1 | 72 | 84 165 | 1.38 | 0.29 |
| 1.2 | 60 | 70 138 | 1.43 | 0.25 |
| 1.3 | 46 | 53 772 | 1.48 | 0.19 |
| 1.4 | 33 | 38 576 | 1.54 | 0.14 |
| 1.5 | 18 | 21 041 | 1.62 | 0.07 |
| 1.6 | 7 | 8 183 | 1.74 | 0.03 |
| 1.7 | 4 | 4 676 | 1.81 | 0.02 |
| 1.8 | 2 | 2 338 | 1.89 | 0.01 |

**Table 23. Sensitivity of mineralized tonnage and average Cu grade at several Cu cut-off grades for body B2 (oxidized body in area B); the inferred resource was defined at an assumed 1% Cu cut-off grade (see green line)**

| Cut-off Cu [%] | Assayed meters [m] | Wireframe volume [m³] | Cu [%] | Tonnage [Mt] at density of 2,6 t/m³ |
|---|---|---|---|---|
| 0.0 | 199 | 305 317 | 2.78 | 0.79 |
| 0.1 | 199 | 305 317 | 2.78 | 0.79 |
| 0.2 | 199 | 305 317 | 2.78 | 0.79 |
| 0.3 | 199 | 305 317 | 2.78 | 0.79 |
| 0.4 | 199 | 305 317 | 2.78 | 0.79 |
| 0.5 | 198 | 303 783 | 2.80 | 0.79 |
| 0.6 | 198 | 303 783 | 2.80 | 0.79 |
| 0.7 | 197 | 302 248 | 2.81 | 0.79 |
| 0.8 | 195 | 299 180 | 2.83 | 0.78 |
| 0.9 | 193 | 296 111 | 2.85 | 0.77 |
| 1.0 | 188 | 288 440 | 2.90 | 0.75 |
| 1.1 | 182 | 279 235 | 2.96 | 0.73 |
| 1.2 | 180 | 276 166 | 2.98 | 0.72 |
| 1.3 | 175 | 268 495 | 3.03 | 0.70 |
| 1.4 | 172 | 263 892 | 3.06 | 0.69 |
| 1.5 | 163 | 250 084 | 3.15 | 0.65 |
| 1.6 | 157 | 240 878 | 3.21 | 0.63 |
| 1.7 | 148 | 227 070 | 3.30 | 0.59 |
| 1.8 | 139 | 213 262 | 3.40 | 0.55 |
| 1.9 | 129 | 197 919 | 3.53 | 0.51 |
| 2.0 | 122 | 187 179 | 3.62 | 0.49 |
| 2.1 | 117 | 179 508 | 3.68 | 0.47 |
| 2.2 | 114 | 174 905 | 3.72 | 0.45 |
| 2.3 | 111 | 170 302 | 3.76 | 0.44 |
| 2.4 | 106 | 162 631 | 3.83 | 0.42 |
| 2.5 | 101 | 154 960 | 3.90 | 0.40 |
| 2.6 | 95 | 145 754 | 3.98 | 0.38 |
| 2.7 | 93 | 142 686 | 4.01 | 0.37 |
| 2.8 | 83 | 127 343 | 4.16 | 0.33 |
| 2.9 | 78 | 119 672 | 4.24 | 0.31 |
| 3.0 | 74 | 113 535 | 4.31 | 0.30 |

# 15 MINERAL RESERVE ESTIMATES

This is an early stage project and no mineral reserve estimate has been done.

# 16 MINING METHODS

This is an early stage project and no study on mining methods has been done.

# 17 RECOVERY METHODS

This is an early stage project and no study on recovery methods has been done.

# 18 PROJECT INFRASTRUCTURE

This is an early stage project and no study on the project infrastructure has been done.

# 19 MARKET STUDIES

This is an early stage project and no market study has been done.

# 20 ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT

This is an early stage project and no environmental studies have been done.

# 21 CAPITAL AND OPERATING COSTS

This is an early stage project and no studies on capital and operating costs have been done.

# 22 ECONOMIC ANALYSIS

This is an early stage project and no economic studies have been done.

# 23 ADJACENT PROPERTIES

Exploration activities of adjacent properties have not been considered.

# 24 OTHER RELEVANT DATA AND INFORMATION

No other relevant data and information is available.

# 25 INTERPRETATION AND CONCLUSIONS

The results of geological logging confirm the continuity of copper mineralization at 2 areas. In total, three wireframes were modelled, one for sulfidic mineralization in area A and each for sulfidic and oxidic material in area B.

Several Cu cut-off grades were applied to the resource database and corresponding average grades were calculated. The portion of the assayed intervals was set in correspondence to the volume of wireframe, which again was used to calculate a bulk tonnage using an average density. Finally, grade-tonnage sensitivity tables have been produced for each of the wireframes and overall.

Following JORC requirements and considering potential economic viability a cut-off grade was applied to constrain the estimated mineral resources. A reporting cut-off grade of 1 % Cu was assumed on the benchmarking of similar projects, but is not based on a financial model specific for this project

**Based on this 1 % Cu cut-off grade a total inferred resource of 2.7 Mt at a grade of 2.0 % Cu can be reported.**

The reader should note, that mineral resources are not mineral reserves and do not have demonstrated economic viability. Further investigations should be done to understand the geological and structural framework. Such an understanding is, however, crucial to upgrade the inferred resource to indicated or measured resource. Then further studies should investigate the modifying factors to convert these indicated or measured resource into a reserve.

# 26 RECOMMENDATIONS

Following the above given conclusion, DMT recommends to do the following work.

- Extension of geological mapping and prospecting in the surrounding of the discoveries
- Extension of geophysical ground surveying with focus on IP and/or electro-magnetics (EM).
- Infill and extension drilling to close mineralization along strike and down-dip and increase the resources.
- Improve on understanding of the orientation and structure of the copper mineralization.
- Produce a block model and transform some of the resources into a higher category in preparation of a detailed economic assessment.
- Clarification of location and extent of historic underground mining activities and production.

- Detailed survey of morphology and production of a digital terrain model covering the area of resource and potential mining activities.
- Investigation on mineral composition; electron microprobe analysis on copper samples from disseminated and massive sulfide and oxidized mineralization.
- Processing tests for sulfidic and oxidized mineralization using bulk composite sample for each mineralization type to be prepared from retain samples from drilling.

# 27 REFERENCES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I. Uysal, M. B. Sadiklar, M. Tarkian, O. Karsli, and F. Aydin (2005) Mineralogy and composition of the chromitites and their platinum-group minerals from Ortaca (Mugla-SW Turkey): evidence for ophiolitic chromitite genesis. Mineralogy and Petrology (2005) 83: 219–242

# Preliminary Economical Assessment of Corum Copper Project, License 200712071

For: AVOD ALTIN MADENCILIK ENERJI INSAAT SAN. VE TIC. A.S.

Date: 05.11.2018

Prepared by: Dipl.-Ing. Dirk H. Wagner

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# 1 Introduction

AVOD ALTIN MADENCILIK ENERJI INSAAT SAN. VE TIC. A.S. (AVOD) is exploring a copper deposit in the Corum province of Turkey.

An initial drilling program has been finalized and a geological model and an initial resource estimate has been prepared. On the basis of this initial resource estimate a preliminary economical assessment should be prepared.

AVOD contracted Dirk H. Wagner Mining Consulting (DHWMC) for preparing the preliminary economical assessment.

# 2 Waste Volume

The deposit consists of 2 orebodies. Orebody A and orebody B. Orebody B is divided in an upper oxidized part and a lower part with sulphide ores. Orebody A consists only of sulphide ores.

The orebodies are massive. Orebody B reaches the surface, while orebody A occurs at around 5 to 6 m depth. Therefore, open pit method has been selected as mining method.

The slope areas are the major source for waste rock. Slopes need to be created to be able to mine the orebodies.

Based on the footprint of the orebodies and assuming an overall slope angle of 40° the waste to be removed from the slope areas has been calculated. As depth the lowest encountered orebody elevation has been used. For orebody A the top waste above the orebody has also been calculated.

Total waste volume was calculated as 2.15 million m³. Assuming a waste density of 2.5 t/m³ the total waste tonnage would amount to

**5.38 million t waste,**

# 3 Production Plan

Currently a resource estimate with inferred resources only exists. In order to get to a realistic production scenario following factors have been applied to the resource:

Overall resource recovery: 90%

Production losses: 5%

Dilution orebody A: 10%

Dilution orebody B 5%

Overall resource recovery has been applied to consider the fact that usually not all ore of a deposit can be mined economically. During production some ore will be lost (trucked to waste dump for instance). This loss is being considered by the production loss factor. Dilution is not mineralized material which is mined as ore and trucked to the processing plant. For orebody A, a long and narrow orebody, a dilution of 10% has been considered. For orebody B, which has less contact zones with not mineralized areas, a dilution factor of only 5% has been applied.

*Table 1 – Mineable Resource*

| | | t | %Cu |
|---|---|---|---|
| **Resource** | A | 1,600,000 | 1.7 |
| | B1 | 300,000 | 1.4 |
| | B2 | 800,000 | 2.9 |
| **Total** | | **2,700,000** | **2.0** |
| Resource Recovery | 90% | | |
| | | | |
| Production Losses | 5% | | |
| Dilution A | 10% | | |
| Dilution B | 5% | | |
| **Mineable Resource** | A | 1,505,000 | 1.55 |
| | B1 | 269,000 | 1.33 |
| | B2 | 718,000 | 2.76 |
| **Total** | | **2,492,000** | **1.87** |
| thereof | | | |
| Sulfide Ore | | 1,774,000 | 1.51 |
| Oxide Ore | | 718,000 | 2.76 |

Applying the above stated factors results in a "mineable" resource of around 2.5 million t @ 1.87 % Cu. Overall stripping ratio (waste : ore) 2.2 t:t.

A lifetime of the project of 10 years has been assumed. This is long enough to justify the investment in a processing plant. Accordingly, the annual production rate amounts to 250,000 t of ore.

Table 2 shows the production plan. The removal of waste in year -1 is for removing the top waste above orebody A. For the following years equal ore production and waste removal volumes have been assumed.

*Table 2 – Production Plan*

| | Year | -1 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Mine Production** | | | | | | | | | | | | | |
| Sulfide Ore | t | | 177,400 | 177,400 | 177,400 | 177,400 | 177,400 | 177,400 | 177,400 | 177,400 | 177,400 | 177,400 | 1,774,000 |
| Cu-Grade | % | | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| Oxide Ore | t | | 71,800 | 71,800 | 71,800 | 71,800 | 71,800 | 71,800 | 71,800 | 71,800 | 71,800 | 71,800 | 718,000 |
| Cu-Grade | % | | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 |
| **Total Ore** | **t** | | **249,200** | **249,200** | **249,200** | **249,200** | **249,200** | **249,200** | **249,200** | **249,200** | **249,200** | **249,200** | **2,492,000** |
| **Cu-Grade** | **%** | | **1.9** | **1.9** | **1.9** | **1.9** | **1.9** | **1.9** | **1.9** | **1.9** | **1.9** | **1.9** | **1.9** |
| Waste | t | 368,000 | 501,000 | 501,000 | 501,000 | 501,000 | 501,000 | 501,000 | 501,000 | 501,000 | 501,000 | 501,000 | 5,378,000 |
| Stripping Ratio | t:t | | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.2 |

# 4 Production Approach

The current mine life is 10 years. Mining activities will be outsourced to a contractor. The contractor will carry out following tasks:

- Waste drilling and blasting
- Waste loading
- Waste haulage
- Ore drilling and blasting
- Ore loading
- Ore haulage

Due to the low production of maximum 2.100 t per day material (waste and ore) normal sized equipment available from civil construction contractors will be sufficient for the operation.

AVOD will engage a minimum team of engineers and technicians to monitor the contractor work.

For processing the construction of a processing plant at the site is currently considered. The majority of the ore is sulphide ore and such ore is typically being concentrated by a flotation process. The oxide portion probably needs a special treatment in order to be able to get a reasonable recovery in a flotation plant. However, since the portion of oxide ore is relatively low it would not make sense to construct a separate processing unit for the oxide ore.

Future processing tests will show if the processing approach selected for this report is a viable option.

# 5 Operating Cost

Cost estimate is based on experience from other similar projects, information received from AVOD and estimates of DHWMC. Applied exchange rate is 5.5 TRY/USD

## 5.1 Mining

Mining cost is based on DHWMC experience from other hard rock projects in Turkey. It is assumed that mining will cost 1.65 USD per $m^3$ of rock. This translates into 3.63 TRY/t cost for waste mining (2.5 $t/m^3$ density), 2.48 TRY/t for sulphide ore mining (3.66 $t/m^3$ density) and 3.49 TRY/t for oxide ore mining (2.6 $t/m^3$ density).

## 5.2 Owner's Team

The owner's team consists of:

- 1 Manager @ 150,000 TRY/a
- 2 Assistants @ 70,000 TRY/a per assistant
- 3 Clerks @ 70,000 TRY/a per clerk
- 5 Helpers/Workers @ 50,000 TRY/a per helper

Total cost amounts to 750,000 TRY per year.

### 5.3 Processing Cost

Processing cost is based on DHWMC experience from other hard rock projects in Turkey and has been adjusted to reflect the size of the operation. Total cost of 15 US$/t or 82.5 TRY/t has been applied.

### 5.4 General & Administration

An amount of 550,000 TRY per year has been considered for all other general and administration cost of the operation.

### 5.5 Licence Fee

For retaining the licence, a fee of around 40,000 TRY has to be paid per year. The number has been provided by AVOD.

### 5.6 Contingency

The project is still in an early stage and therefore a contingency of 10% has been applied to the operating cost.

## 6 Capital Expenditure

### 6.1 Mining Equipment

Due to the contractor mining concept no capital expenditures for mining equipment are considered.

### 6.2 Further Studies

Further studies need to be carried out to improve the accuracy of the economical evaluation. Processing tests are required to identify the best processing scheme for the deposit. The cost of the processing tests has been estimated to 2 million TRY.

Based on the processing tests a Feasibility Study should be prepared. The Feasibility Study would also serve as basis for financing. Estimated cost for the feasibility Study is 3 million TRY.

### 6.3 Infrastructure

The infrastructure needs to be prepared for the mining activity and the processing plant. 800,000 TRY for road preparation has been provided. For other infrastructure (water supply, power line, etc.) a total of 2,600 TRY has been considered. Both values are estimates.

### 6.4 Pre-Stripping

Before start of production some initial waste removal has to be carried out to reach the orebody. It has been assumed that the waste material lying above orebody A has to be removed. This work will cost 1.3 million TRY.

### 6.5 Processing Plant

The capital expenditure of the processing plant has been estimated based on information from a cost estimating handbook. An amount of 20 million US$ or 110 million TRY seems to be reasonable for a plant with an annual capacity of 250,000 t of ore.

For replacements or repairs in the plant a provision of 2 million TRY per year has been included in the capital estimate.

### 6.6 Owner's cost

Salary of the project team and all other expenses for administration of the project needs to be capitalized prior to production. An amount of 1.5 million TRY for each pre-production year has been provided for this purpose.

### 6.7 Others

Any other capital expenditure will be covered by the position others, for which an amount of 1 million TRY per year has been included in the estimate.

### 6.8 Contingency

The project is still in an early stage and therefore a contingency of 10% has been applied to the capital expenditure.

## 7 Cash Flow

All above estimates have been summarized in a Cash-Flow Calculation (see Table 3).

Following numbers indicate the performance of the project:

| | |
|---|---|
| *Project lifetime:* | 2 years preproduction + 10 years production |
| *Revenues:* | 174 million USD (958 million TRY) |
| *Operating Cost:* | 49 million USD (268 million TRY) |
| *Capital Expenditures:* | 30 million USD (164 million TRY) |
| ***Cash Flow before taxes:*** | **96 million USD (525 million TRY)** |
| *Internal Rate of Return* | 39% |
| *Pay Back Period* | 4.1 years |

*Table 3 – Cash Flow Calculation*

| Exchange Rate | 5.5 | TRY/USD | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Year | -2 | -1 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Total |
| **Mine Production** | | | | | | | | | | | | | | | |
| Sulfide Ore | | t | | | 177,400 | 177,400 | 177,400 | 177,400 | 177,400 | 177,400 | 177,400 | 177,400 | 177,400 | 177,400 | 1,774,000 |
| Cu-Grade | | % | | | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| Oxide Ore | | t | | | 71,800 | 71,800 | 71,800 | 71,800 | 71,800 | 71,800 | 71,800 | 71,800 | 71,800 | 71,800 | 718,000 |
| Cu-Grade | | % | | | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 |
| **Total Ore** | | **t** | | | **249,200** | **249,200** | **249,200** | **249,200** | **249,200** | **249,200** | **249,200** | **249,200** | **249,200** | **249,200** | **2,492,000** |
| **Cu-Grade** | | **%** | | | **1.9** | **1.9** | **1.9** | **1.9** | **1.9** | **1.9** | **1.9** | **1.9** | **1.9** | **1.9** | **1.9** |
| Waste | | t | | 368,000 | 501,000 | 501,000 | 501,000 | 501,000 | 501,000 | 501,000 | 501,000 | 501,000 | 501,000 | 501,000 | 5,378,000 |
| Stripping Ratio | | t:t | | | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.2 |
| **Concentrate Production** | | | | | | | | | | | | | | | |
| Recovery Sulfide Ore | | % | | | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | |
| Recovery Oxide Ore | | % | | | 70% | 70% | 70% | 70% | 70% | 70% | 70% | 70% | 70% | 70% | |
| Concentrate Cu-Grade | | % | | | 25% | 25% | 25% | 25% | 25% | 25% | 25% | 25% | 25% | 25% | |
| Concentrate | | dmt | | | 13,606 | 13,606 | 13,606 | 13,606 | 13,606 | 13,606 | 13,606 | 13,606 | 13,606 | 13,606 | 136,063 |
| **Revenue** | | | | | | | | | | | | | | | |
| Concentrate at smelter (0,2% losses) | | dmt | | | 13,579 | 13,579 | 13,579 | 13,579 | 13,579 | 13,579 | 13,579 | 13,579 | 13,579 | 13,579 | 135,790 |
| Cu Price | | USD/lb | | | 2.84 | 2.84 | 2.84 | 2.84 | 2.84 | 2.84 | 2.84 | 2.84 | 2.84 | 2.84 | |
| Cu Grade Deduction | | | | | 1.00% | 1.00% | 1.00% | 1.00% | 1.00% | 1.00% | 1.00% | 1.00% | 1.00% | 1.00% | |
| Payable Cu | | 000 lb | | | 7,185 | 7,185 | 7,185 | 7,185 | 7,185 | 7,185 | 7,185 | 7,185 | 7,185 | 7,185 | 71,848 |
| Treatment Charge (TC) | | USD/t | | | 85.0 | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 | |
| Refining Charge (RC) | | USD/lb | | | 0.085 | 0.085 | 0.085 | 0.085 | 0.085 | 0.085 | 0.085 | 0.085 | 0.085 | 0.085 | |
| Transport & Insurance | | USD/dmt | | | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | |
| **Total Revenue** | | **000 USD** | | | **17,418** | **17,418** | **17,418** | **17,418** | **17,418** | **17,418** | **17,418** | **17,418** | **17,418** | **17,418** | **174,178** |
| | | 000 TRY | | | 95,798 | 95,798 | 95,798 | 95,798 | 95,798 | 95,798 | 95,798 | 95,798 | 95,798 | 95,798 | 957,979 |
| **Operating Cost** | | | | | | | | | | | | | | | |
| Waste Mining (Contr.) | 3.63 TRY/t | 000 TRY | | | 1,819 | 1,819 | 1,819 | 1,819 | 1,819 | 1,819 | 1,819 | 1,819 | 1,819 | 1,819 | 18,186 |
| Sulfide Mining (Contr.) | 2.48 TRY/t | 000 TRY | | | 440 | 440 | 440 | 440 | 440 | 440 | 440 | 440 | 440 | 440 | 4,399 |
| Oxide Mining | 3.49 TRY/t | 000 TRY | | | 251 | 251 | 251 | 251 | 251 | 251 | 251 | 251 | 251 | 251 | 2,506 |
| Owner's Team for Mining | 750000 TRY/a | 000 TRY | | | 750 | 750 | 750 | 750 | 750 | 750 | 750 | 750 | 750 | 750 | 7,500 |
| Processing cost | 82.50 TRY/t | 000 TRY | | | 20,559 | 20,559 | 20,559 | 20,559 | 20,559 | 20,559 | 20,559 | 20,559 | 20,559 | 20,559 | 205,590 |
| G&A | 550000 TRY/a | 000 TRY | | | 550 | 550 | 550 | 550 | 550 | 550 | 550 | 550 | 550 | 550 | 5,500 |
| License Fee | | 000 TRY | | | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 400 |
| Contingency | 10 % of Total | 000 TRY | | | 2,441 | 2,441 | 2,441 | 2,441 | 2,441 | 2,441 | 2,441 | 2,441 | 2,441 | 2,441 | 24,408 |
| **Total** | | **000 TRY** | | | **26,849** | **26,849** | **26,849** | **26,849** | **26,849** | **26,849** | **26,849** | **26,849** | **26,849** | **26,849** | **268,489** |
| | | 000 USD | | | 4,882 | 4,882 | 4,882 | 4,882 | 4,882 | 4,882 | 4,882 | 4,882 | 4,882 | 4,882 | 48,816 |
| | | USD/t | | | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
| **Capital Expenditures** | | | | | | | | | | | | | | | |
| Processing Tests | | 000 TRY | 2,000 | | | | | | | | | | | | 2,000 |
| Feasibility Study | | 000 TRY | 3,000 | | | | | | | | | | | | 3,000 |
| Road Preparation | | 000 TRY | 800 | | | | | | | | | | | | 800 |
| Other Infrastructure (Power line, etc.) | | 000 TRY | 1500 | 1,100 | | | | | | | | | | | 2,600 |
| Pre-Stripping | | 000 TRY | | 1,336 | | | | | | | | | | | 1,336 |
| Processing Plant | | 000 TRY | 55,000 | 55,000 | | | | | | | | | | | 110,000 |
| Ongoing Capital | | 000 TRY | | | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 1,500 | 500 | 18,000 |
| Owner's Cost | | 000 TRY | 1,500 | 1,500 | | | | | | | | | | | 3,000 |
| Others | | 000 TRY | | | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 750 | 500 | 250 | 8,500 |
| Contingency | 10 % of Total | 000 TRY | 6,380 | 5,894 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 275 | 200 | 75 | 14,924 |
| **Total** | | **000 TRY** | **70,180** | **64,829** | **3,300** | **3,300** | **3,300** | **3,300** | **3,300** | **3,300** | **3,300** | **3,025** | **2,200** | **825** | **164,159** |
| | | 000 USD | 12,760 | 11,787 | 600 | 600 | 600 | 600 | 600 | 600 | 600 | 550 | 400 | 150 | 29,847 |
| **Cash Flow before taxes** | | | | | | | | | | | | | | | |
| **Annual** | | **000 TRY** | **-70,180** | **-64,829** | **65,649** | **65,649** | **65,649** | **65,649** | **65,649** | **65,649** | **65,649** | **65,924** | **66,749** | **68,124** | **525,330** |
| | | 000 USD | -12,760 | -11,787 | 11,936 | 11,936 | 11,936 | 11,936 | 11,936 | 11,936 | 11,936 | 11,986 | 12,136 | 12,386 | 95,515 |
| Acc. | | 000 TRY | -70,180 | -135,009 | -69,360 | -3,711 | 61,937 | 127,586 | 193,235 | 258,884 | 324,533 | 390,457 | 457,206 | 525,330 | |
| | | 000 USD | -12,760 | -24,547 | -12,611 | -675 | 11,261 | 23,198 | 35,134 | 47,070 | 59,006 | 70,992 | 83,128 | 95,515 | |
| **IRR** | **39%** | | | | | | | | | | | | | | |

Brilon, 05.11.2018,

# ANNEX 1

# CV Dirk H. Wagner

# CV Dirk Wagner

as of 01.07.2018

Briloner Tor 29
59929 Brilon, Germany

E-Mail: dirk@dhwmc.com

Mobile: +49 175 357 4442
Phone: +49 2961 744424
Fax: +49 2961 744412

Dirk H. Wagner Mining Consulting

**Curriculum Vitae**

| | |
|---|---|
| **Name of Firm** | Dirk H. Wagner Mining Consulting |
| **Name of Expert** | **Dirk Wagner** |
| **Date of Birth** | 1965 |
| **Country of Citizenship / Residence** | Germany |

**Professional Education:**

| | |
|---|---|
| **Institution** | **Technical University Berlin /Germany** |
| Date | 1986 – 1992 |
| Degree / Diploma | Diploma in Mining Engineering |

## Employment Record:

| Period | Employing Organisation, title/position, Contact Info |
|---|---|
| From 2016 to present | **self employed** |
| From 2011 to 2015 | **DMT Consulting GmbH**<br>**Essen / Germany**<br>**Senior Project Manager** |
| From 2008 to 2011 | **Bucyrus Europe GmbH**<br>**Saarbrücken / Germany**<br>**Senior Project Manager** |
| From 2000 to 2008 | **IMC Montan Consulting**<br>**Essen/ Germany**<br>**Senior Project Manager** |
| From 1992 to 2000 | **Sachtleben Bergbau Services GmbH**<br>**Lennestadt / Germany**<br>**Project Engineer, Mine Planning Department** |

## Membership in Professional Societies:

Ring Deutscher Bergingenieure e.V. (Society of German Mining Engineers), GDMB, SME

## Language Skills:

| | speaking | reading | writing |
|---|---|---|---|
| **German** | | Mother Tounge | |
| **English** | Excellent | Excellent | Excellent |
| **Russian** | Good | Very Good | Average |

## Other Skills / Training / Specialised Education:

Data Processing: MS Office, MS Project, MS Access, Basic Datamine Knowledge

## Key Qualifications:

- Technical and economic evaluation of underground mining projects and open-pit mining projects
- Project management
- Evaluation of tender documents
- Supervision of underground mines

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## Countries of Work Experience:

Argentina, Australia, Brazil, China, Colombia, Czech Republic, Estonia, Ethiopia, Finland, Georgia, India, Ireland, Kazakhstan, Mali, Mongolia, Poland, Russia, Spain, Turkey, Ukraine, USA, Venezuela, Vietnam, Zimbabwe

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## Professional Experience Record:

**Thar Coal Mine Block 2, Pakistan**

| | |
|---|---|
| **Year, Country** | June 2018, Pakistan |
| **Client** | DMT |
| **Services** | Due Diligence on cost part and contractual issues |
| **Position in Project** | Senior Expert |

**Mugla Chromite Project, Turkey**

| | |
|---|---|
| **Year, Country** | February 2018, Turkey |
| **Client** | Hasat BNO Grup |
| **Services** | Preliminary Cost and Production Schedule |
| **Position in Project** | Project Manager |

**Ibrice Maden, Turkey**

| | |
|---|---|
| **Year, Country** | December2017 - February 2018, Turkey |
| **Client** | Ibrice Maden |

| Professional Experience Record: | |
|---|---|
| **Services** | Preliminary Economical Assessment of Malkara project |
| **Position in Project** | Project Manager & Financial Expert |

**Wassoul'Or, Mali**

| | |
|---|---|
| **Year, Country** | September/October 2017, Mali |
| **Client** | Pearl Gold AG |
| **Services** | Review and evaluation of open pit gold operations |
| **Position in Project** | Financial Expert & Mining Engineer |

**Rich Metals Group, Georgia**

| | |
|---|---|
| **Year, Country** | August/September 2017, Georgia |
| **Client** | Bank of Georgia |
| **Services** | Lenders Engineer Due Diligence, review of copper and gold mines open pit and underground, long term mine plans, gold processing facilities |
| **Position in Project** | Cost Engineer & Mining Engineer |

**Coal Mining Company, Eastern Europe**

| | |
|---|---|
| **Year, Country** | January/February 2017, Eastern Europe |
| **Client** | Undisclosed |
| **Services** | Technical Due Diligence incl. operating cost assessment as preparation for a bid |
| **Position in Project** | Project Manager, Cost Engineer |

**Clara Mine, Wolfach, Germany**

| | |
|---|---|
| **Year, Country** | Since 2016, Germany |
| **Client** | Sachtleben Minerals |
| **Services** | Advisor of the Management Board, Support in:<br>- updating of reporting system<br>- preparation of life of mine plan (LOMP)<br>- preparation of economic studies<br>- monitoring of strategy process |
| **Position in Project** | Senior Advisor |

## Professional Experience Record:

**Aguas Tenidas Mine**

| | |
|---|---|
| **Year, Country** | 2016, Spain |
| **Client** | DMT |
| **Services** | Fatal Flaw Analysis |
| **Position in Project** | Mining Expert |
| **Input** | Review of mine plans and operations of 3 underground ore mines |

**Vozkhod Oriel Chromite Mine**

| | |
|---|---|
| **Year, Country** | 2014 - 2015, Kazakhstan |
| **Client** | Yilmaden |
| **Services** | JORC Reserve review, Geotechnical Investigations, Health and Safety Audit preparation to support financing process. Owner's engineer |
| **Position in Project** | Project Manager |
| **Input** | Project Management, Peer Review |

**Kalkim Lead-Zinc Mine**

| | |
|---|---|
| **Year, Country** | 2014 - 2015, Turkey |
| **Client** | CVK Maden |
| **Services** | Resource Estimate for a Lead Zinc Mine |
| **Position in Project** | Project Manager |
| **Input** | Project Coordination, Peer Review |

**Merzifon Underground Lignite Deposit**

| | |
|---|---|
| **Year, Country** | 2013 – 2015, Turkey |
| **Client** | Gürmin Enerji |
| **Services** | Resource Estimate, Preliminary Economic Assessment and Gas Drainage concept for the Amasya / Merzifon Project of Gürmin Enerji |
| **Position in Project** | Project Manager |
| **Input** | Project management, Preliminary Mine planning, Economic Assessment |

## Professional Experience Record:

**Zonguldak  Baglik-Inagzi Underground Coking Coal Project**

| | |
|---|---|
| **Year, Country** | 2013 – 2015 |
| **Client** | Soma Holding |
| **Services** | Resource Estimate, Preliminary Economic Assessment and Gas Drainage Concept for the Zonguldak Project of Soma Kömür |
| **Position in Project** | Project Manager |
| **Input** | Project Management, mine planning, economic assessment, peer review of other chapters |

**Gökirmag Copper Project**

| | |
|---|---|
| **Year, Country** | 2013 – 2015 |
| **Client** | Asya Maden |
| **Services** | Feasibility Study on the Gökirmak Copper Project in Northern Turkey |
| **Position in Project** | Project Manager |
| **Input** | Project management, mine planning, cost calculation, cash flow modelling |

**Soma Eynez Lignite Deposit**

| | |
|---|---|
| **Year, Country** | 2013, Turkey |
| **Client** | Undisclosed |
| **Services** | Due Diigence on an underground coal mining project in Soma area |
| **Position in Project** | Project Manager |
| **Input** | Project coordination, review of Mine Plan, production plan and economic evaluation |

**Camlik, Goynukoren and Pulluca silver deposits**

| | |
|---|---|
| **Year, Country** | 2012- 2013, Turkey |
| **Client** | Yildizlar Holding |
| **Services** | Preparation of Technical Report according to NI43-101 for Eti Gümüs Silvermine, Pit Optimization |
| **Position in Project** | Project Manager |

| | |
|---|---|
| **Input** | Project management, pit optimization, mine planning, equipment selection, economic evaluation |

**Komorovskoje gold mine**

| | |
|---|---|
| **Year, Country** | 2012, Kazakhstan |
| **Client** | Kazzinc |
| **Services** | Investigation of In-Pit Crushing and continuous haulage systems for Komorovskoye open pit. |
| **Position in Project** | Project Manager |
| **Input** | Project management, cost calculation, mine planning |

**Paz del Rio Coal Mine**

| | |
|---|---|
| **Year, Country** | 2011 – 2012, Colombia |
| **Client** | Votorantim |
| **Services** | Underground Part of Prefeasibility Study for underground coal mine project |
| **Position in Project** | Mining Engineer |
| **Input** | Mine Planning, equipment selection |

**La Mancha Resources**

| | |
|---|---|
| **Year, Country** | 2012, Australia |
| **Client** | Societe Generale |
| **Services** | Due Diligence on an underground and an open pit Gold Mine |
| **Position in Project** | Mining Engineer |
| **Input** | Review of mine plans, review of operations, review of costs |

**Banphu Nickel mine**

| | |
|---|---|
| **Year, Country** | 2012 Vietnam |
| **Client** | Pala Investment |
| **Services** | Due Diligence on Underground Nickel Mine |
| **Position in Project** | Mining Engineer |
| **Input** | Review of operations, review of costs, review of Life of Mine Plan |

**Dijon Mining**

| | |
|---|---|
| **Year, Country** | 2011, Tajikistan |
| **Client** | DION |
| **Services** | Assessment of a small scale underground mine |
| **Position in Project** | Project Manager |
| **Input** | Review of underground coal mining project |

**Mibrag Lignite Open Pit**

| | |
|---|---|
| **Year, Country** | 2011, Germany |
| **Client** | Undisclosed |
| **Services** | Competent Persons Report on Coal assets of a German Company |
| **Position in Project** | Economic Expert |
| **Input** | Review of cost, review of business plans |

**Tuncbilek underground lignite mine**

| | |
|---|---|
| **Year, Country** | 2010 – 2014, Turkey |
| **Client** | TKI |
| **Services** | Engineering Assistance, Review of FS on Tuncbilek deposit |
| **Position in Project** | Project Manager |
| **Input** | Supervision of Turkish Consultants, Mine Planning, Project Coordination (Serbian, Turkish and German team members) |

**Soma Eynez Underground coal project**

| | |
|---|---|
| **Year, Country** | 2010, Turkey |
| **Client** | Demir Export |
| **Services** | Engineering Assistance on Tender preparation for Cayirhan Tender including mine planning. |
| **Position in Project** | Project Manager |
| **Input** | Review of mine plan, review of engineering, preparation of cost schedules |

**KTK 7/8 coal mining project, SCCL**

| | |
|---|---|
| **Year, Country** | 2010, India |
| **Client** | Indu Projects |
| **Services** | Equipment Proposal Preparation, including mine planning |
| **Position in Project** | Project Manager |
| **Input** | Proposal coordination, mine planning |

**Eniseyskaja Coal Mining Project**

| | |
|---|---|
| **Year, Country** | 2009, Russia |
| **Client** | EPK |
| **Services** | Pre-Feasibility Study on application of slice mining |
| **Position in Project** | Project manager |
| **Input** | Project Coordination, Mine Planning, economic evaluation |

**Komorovskoye Coal Mine**

| | |
|---|---|
| **Year, Country** | 2008, Russia |
| **Client** | Undisclosed |
| **Services** | Due Diligence Report on an underground Coal mine |
| **Position in Project** | Senior Mining Expert |
| **Input** | Review of mining plans and operations, review of mining costs |

**Sapadnij Kamys**

| | |
|---|---|
| **Year, Country** | 2008, Kazakhstan |
| **Client** | Undisclosed |
| **Services** | Reserve assessment for Manganese projects |
| **Position in Project** | Senior Mining Expert |
| **Input** | Review of Mine plan, review of mining cost, review of operations |

**Eurasia Gold**

| | |
|---|---|
| **Year, Country** | 2008, Kazakhstan |
| **Client** | Kazakhmys |
| **Services** | Reserve assessment for all operations of "Kazakhmys Gold" |
| **Position in Project** | Senior Mining Expert |
| **Input** | Review of mining operations, review of mining cost, review of life of mine plan |

**Cerattepe Copper Mine Project**

| | |
|---|---|
| **Year, Country** | 2007/8, Turkey |
| **Client** | CBI (Cayeli Bakir) |
| **Services** | EPCM Project on an underground copper mine |
| **Position in Project** | Project Manager |
| **Input** | Project coordination, supervision of surface civil construction, specification of works, tender preparation |

**MSOL Gold Mines**

| | |
|---|---|
| **Year, Country** | 2007, Brazil |
| **Client** | Undisclosed |
| **Services** | Due Diligence on several small gold mining operations in Brazil |
| **Position in Project** | Senior Mining Expert |
| **Input** | Review of Mining operations, review of life of mine plan, review of costs |

**Burnstone Gold Project**

| | |
|---|---|
| **Year, Country** | 2007, South Africa / USA (Nevada) |
| **Client** | Undisclosed |
| **Services** | Due diligence on two gold mining projects |
| **Position in Project** | Senior Mining Expert |
| **Input** | Review of Mining operations, review of life of mine plan, review of costs |

**San Jose Mine**

| | |
|---|---|
| **Year, Country** | 2006, Argentina |
| **Client** | Hochschild PLC |
| **Services** | Reserve Evaluation San Jose gold Mine |
| **Position in Project** | Project Manager |
| **Input** | Review of reserve Estimate, review of modifying factors |

**DTEK Coal Mines**

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|---|---|
| **Year, Country** | 2006, Ukraine |
| **Client** | DTEK |
| **Services** | Optimisation of underground coal mines and methane utilization of 11 underground coal mines. |
| **Position in Project** | Dep. Project Manager |
| **Input** | Project Coordination |

**Aguas tenidas Mine**

| | |
|---|---|
| **Year, Country** | 2005/06, Spain |
| **Client** | Investec Bank |
| **Services** | Due Dilligence for a Polymetallic Project in Spain |
| **Position in Project** | Senior Mining Engineer |
| **Input** | Review of Feasibility Study, review of economic model and mine planning |

**JSW coal mines**

| | |
|---|---|
| **Year, Country** | 2005, Poland Upper Silesia |
| **Client** | World Bank |
| **Services** | Efficiency improvement of selected Polish hard coal mines |
| **Position in Project** | Senior Mining Engineer |
| **Input** | Review of Mining Operations, review of mine efficiency |