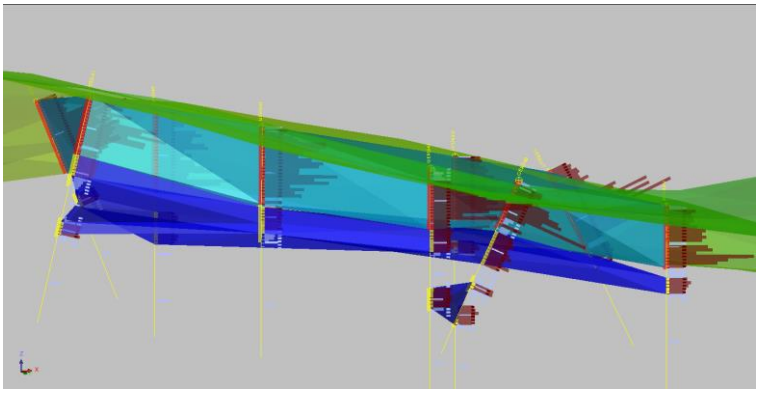
TECHNICAL REPORT

MINERAL RESOURCE ESTIMATE – CORUM COPPER PROJECT

LICENCE 200712071, CORUM PROVINCE, TURKEY



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

For:

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

Effective Date: 05 November 2018

Reference: MCE1-2018-00605

TABLE OF CONTENTS

1 EXECUTIVE SUMMARY 11

2 INTRODUCTION 13

3 RELIANCE ON OTHER EXPERTS 14

4 PROPERTY DESCRIPTION AND LOCATION 14

5 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY 18

6 HISTORY 21

7 GEOLOGICAL SETTING AND MINERALIZATION 21

7.1 GENERAL / REGIONAL 21

7.2 PROPERTY 24

8 EXPLORATION 26

9 DEPOSIT TYPES 31

10 DRILLING 34

11 SAMPLE PREPARATION, ANALYSES AND SECURITY 36

11.1 SAMPLING 36

11.2 DENSITY DETERMINATION 37

11.3 SAMPLE REDUCTION 38

11.4 SAMPLE DISPATCH 39

11.5 SAMPLE PREPARATION 39

11.6 SAMPLE STORAGE 40

11.7 SAMPLE ANALYSIS 40

11.8 SAMPLE SECURITY 42

12 DATA VERIFICATION 42

12.1 SITE VISITS 42

12.2 STANDARD OPERATING PROCEDURES (SOPS) 43

12.3 AVAILABILITY OF DATA 43
12.4 DATA PREPARATION AND MANAGEMENT 44
12.5 DRILLING LOCATION AND ORIENTATION 44
12.6 DRILLING RECOVERY AND DIAMETER 45
12.7 GEOLOGICAL LOGGING 45
12.8 SAMPLING 46
12.9 SAMPLE PREPARATION AND ANALYSIS 47
12.10 DENSITY DETERMINATION 48
12.11 CONFIRMATION OF HISTORICAL DATA ACQUISITION 49
12.12 CONCESSION AREA 49
12.13 DIGITAL TERRAIN MODEL 51
12.14 MINED OUT AREA 51
12.15 DATA QUALITY SUMMARY 51
13 MINERAL PROCESSING AND METALLURGICAL TESTING 52
14 MINERAL RESOURCE ESTIMATES 52
14.1 GEOLOGICAL MODEL 52
14.2 STATISTICAL ANALYSIS 53
14.3 INTERPRETATION OF MINERALIZED ZONES (DOMAINS) 55
14.4 WIREFRAME MODEL 58
14.5 GRADE CAPPING / COMPOSITING / BLOCK MODEL DEFINITION 65
14.6 BULK DENSITY ATTRIBUTION 65
14.7 GEOSTATISTICS / INTERPOLATION METHOD 65
14.8 RESOURCE CLASSIFICATION 65
14.9 MODEL VALIDATION 66
14.1 PRELIMINARY CUT-OFF GRADE ASSUMPTION 67
14.2 ESTIMATE OF MINERAL RESOURCES 68

15 MINERAL RESERVE ESTIMATES 72

16 MINING METHODS 72

17 RECOVERY METHODS 72

18 PROJECT INFRASTRUCTURE 73

19 MARKET STUDIES 73

20 ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT 73

21 CAPITAL AND OPERATING COSTS 73

22 ECONOMIC ANALYSIS 73

23 ADJACENT PROPERTIES 73

24 OTHER RELEVANT DATA AND INFORMATION 73

25 INTERPRETATION AND CONCLUSIONS 74

26 RECOMMENDATIONS 74

27 REFERENCES 75

LIST OF FIGURES

Figure 1. Location of the three mineralized bodies A, B1 and B2 modelled. 12

Figure 2. 3D view to NNW onto the three mineralized bodies A, B1 and B2 modelled. 12

Figure 3. Corum licence area 200712071 (red polygon) is located appr. 200 km to the E of Ankara (Source: Google Maps). 15

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). 15

Figure 5. General view of licence 200712071. 16

Figure 6. View along the valley (Area A) of licence 200712071. 17

Figure 7. View over gossan area (Area B) of licence 200712071. 18

Figure 8. Access from Ankara to Bogazkale (Source: Google Maps). 19

Figure 9. Access from Corum to Bogazkale (Source: Google Maps). 19

Figure 10. Access from Bogazkale to the drilled areas A and B in the licence (Source: Google Maps). 20

Figure 11. Climate data for Corum. 20

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). 22

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). 23

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). 24

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. 25

Figure 16. Stacked maps of chargebility. 27

Figure 17. Stacked maps of resistivity. 28

Figure 18. Outcrop of 1:25 000 scaled governmental geological map H33-D3. 29

Figure 19. Geological map prepared by Avod. 30

Figure 20. Legend for geological map. 30

Figure 21. Example of theoretical cross section and proposed drilling. 31

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..... 32

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. 33

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/). 33

Figure 25. Drill holes of Area A and B. 35

Figure 26. SGR02 - bulk density determination as described by ARGETEST. 38

Figure 27. Steps of sample preparation: Equipment in core shed (Top Left), Crushing (Top Right), Splitting (Bottom Left), Cleaning (Bottom Right). 39

Figure 28: Extract from ARGETEST Catalogue 2017-2018; sample preparation methods..... 40

Figure 29. Extract from ARGETEST Catalogue 2017-2018; multi acid digestion plus ICP finish. 41

Figure 30. Extract from ARGETEST Catalogue 2017-2018; fire assay plus AAS finish. 42

Figure 31. Assay results for CRM OREAS 623 for Cu. 47

Figure 32. Certificate of licence 200712071. 50

Figure 33. Licence (red boundary) covering the mapped and drilled areas. 51

Figure 34. Frequency plots of Cu for interpreted bodies A, B1 and B2..... 55

Figure 35. Location of the three mineralized bodies A, B1 and B2 modelled; blue full line is location of cross section (see Figure 36). 56

Figure 36. 3D view to NNW onto the three mineralized bodies A, B1 and B2 modelled. 56

Figure 37. Cross section trough mineralized body B1 and B2; location of cross section is given in Figure 35. 57

Figure 38. Wireframe A from above and section line (black dashed line; see next figure).... 59

Figure 39. Wireframe A in section (location of section line is given in Figure 38). 60

Figure 40. Wireframe A in 3D view from NNW to SSE. 60

Figure 41. Wireframe B1 from above and section line (black dashed and full line; see next two figures). 61

Figure 42. Wireframe B1 in section (location of black full section line is given in Figure 42). 62

Figure 43. Wireframe B1 in section (location of black dashed section line is given in Figure 42). 62

Figure 44. Wireframe D from above and section line (black dashed and full line; see next figure). 63

Figure 45. Wireframe B2 in section (location of black full section line is given in Figure 44). 64

Figure 46. Wireframe B2 in section (location of black dashed section line is given in figure before; dashed black line). 64

Figure 47. Relationship between Exploration Results, Mineral Resources & Ore Reserves. 66

LIST OF TABLES

Table 1. Overview about inferred resource at a 1 % Cu cut-off grade 13

Table 2. Summary of drill holes 35

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) 36

Table 4. Amount of sample dispatched to ARGETEST for density determination. 37

Table 5. Core recovery within interpreted bodies A, B1 and B2 45

Table 6. Major and minor rocks 46

Table 7. Type and Degree of Mineralisation 46

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 47

Table 9. Deviations of Cu of second split duplicates 48

Table 10. Average bulk density per type of mineralization and interpreted body 48

Table 11. Coordinates limiting the licence area 49

Table 12. Basic statistics of mineralized body A (sulfidic) in Area A (211 samples) 53

Table 13. Basic statistics of mineralized body B1 (sulfidic) in Area B (80 samples) 53

Table 14. Basic statistics of mineralized body B2 (oxidic) in Area B (199 samples) 54

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 58

Table 16. Average densities 65

Table 17. Validation of volumes of wireframes 67

Table 18. Table showing that 125 m assayed interval (125 samples) was excluded from interpretation of mineralization using 1 % Cu cut-off grade..... 67

Table 19. Overview about inferred resource at a 1 % Cu cut-off grade 68

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) 69

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) 70

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) 71

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) 72

DISCLAIMER

This report has been prepared by DMT GmbH & Co. KG (DMT) for the exclusive use of AVOD ALTIN MADENCILIK ENERJI INSAAT SAN. VE TIC. A.S. (hereafter 'Avod' or 'the client') on the basis of instructions, information and data supplied by the client.

No warranty or guarantee, whether expressed or implied, is made by DMT with respect to the completeness or accuracy of any aspect of this document and no party, other than the Client, is authorized to or should place any reliance whatsoever on the whole or any part or parts of the document.

DMT do not undertake or accept any responsibility or liability in any way whatsoever to any person or entity in respect of the whole or any part or parts of this document, or any errors in or omissions from it, arising from negligence or any other basis in law whatsoever. This note may contain "forward looking statements" which are based on assumptions made by DMT. There is no assurance or warranty given that any of the future results or achievements expressed or implied contained will be realized.

Likewise, DMT disclaim liability for any personal injury, property or other damage of any nature whatsoever, whether special, indirect, consequential or compensatory, directly or indirectly resulting from the publication, use or application, or reliance on this document.

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).

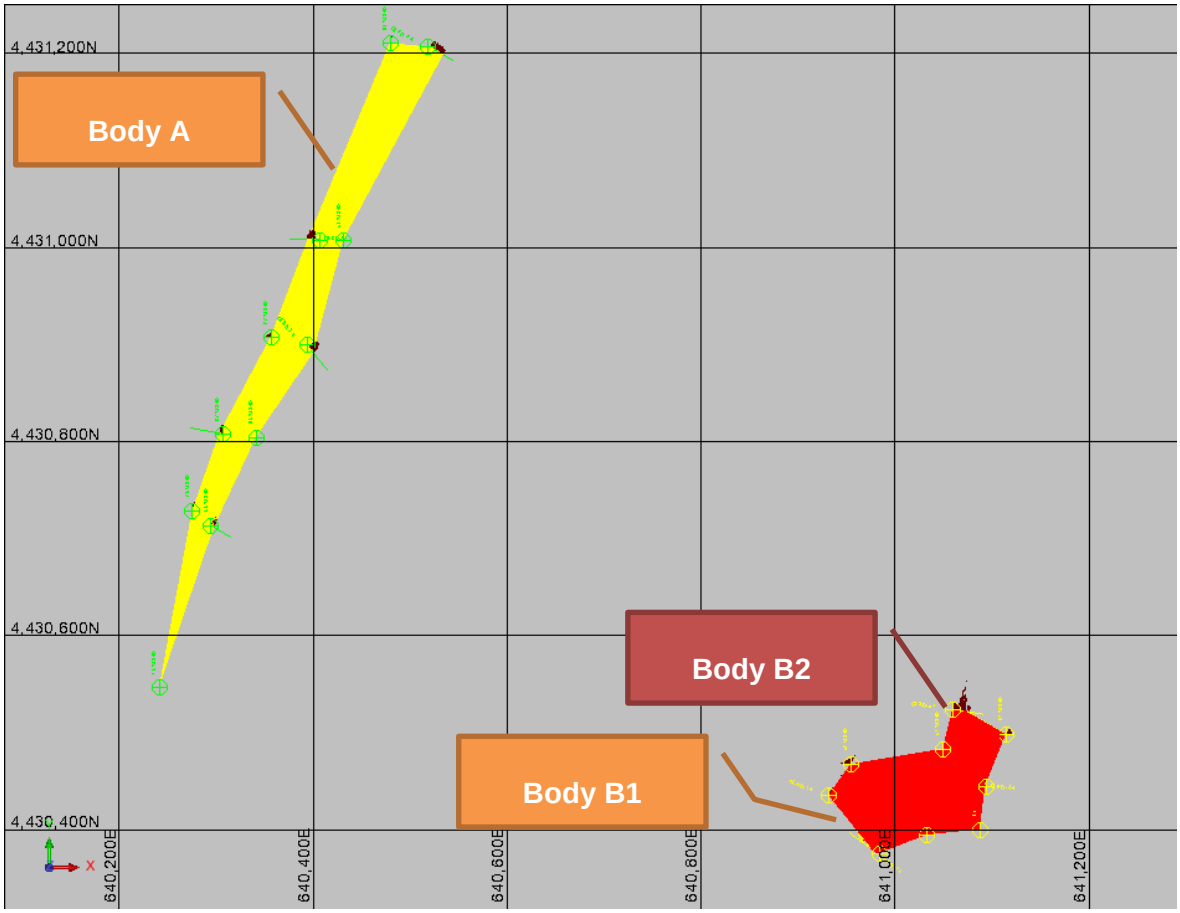


Figure 1. Location of the three mineralized bodies A, B1 and B2 modelled.

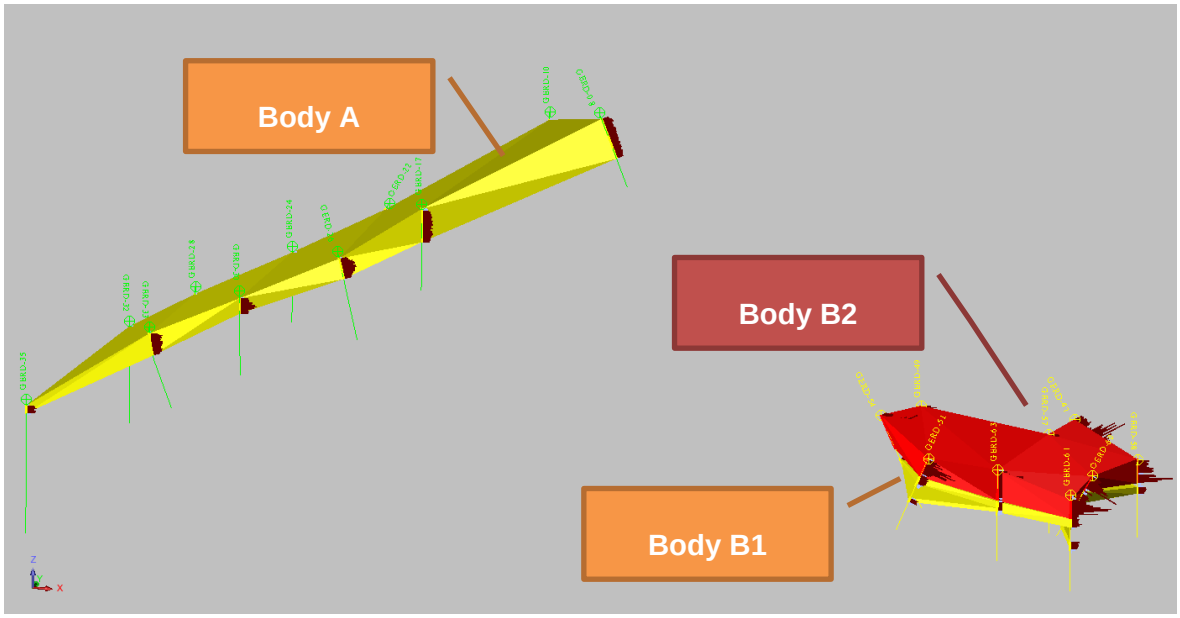


Figure 2. 3D view to NNW onto the three mineralized bodies A, B1 and B2 modelled.

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).

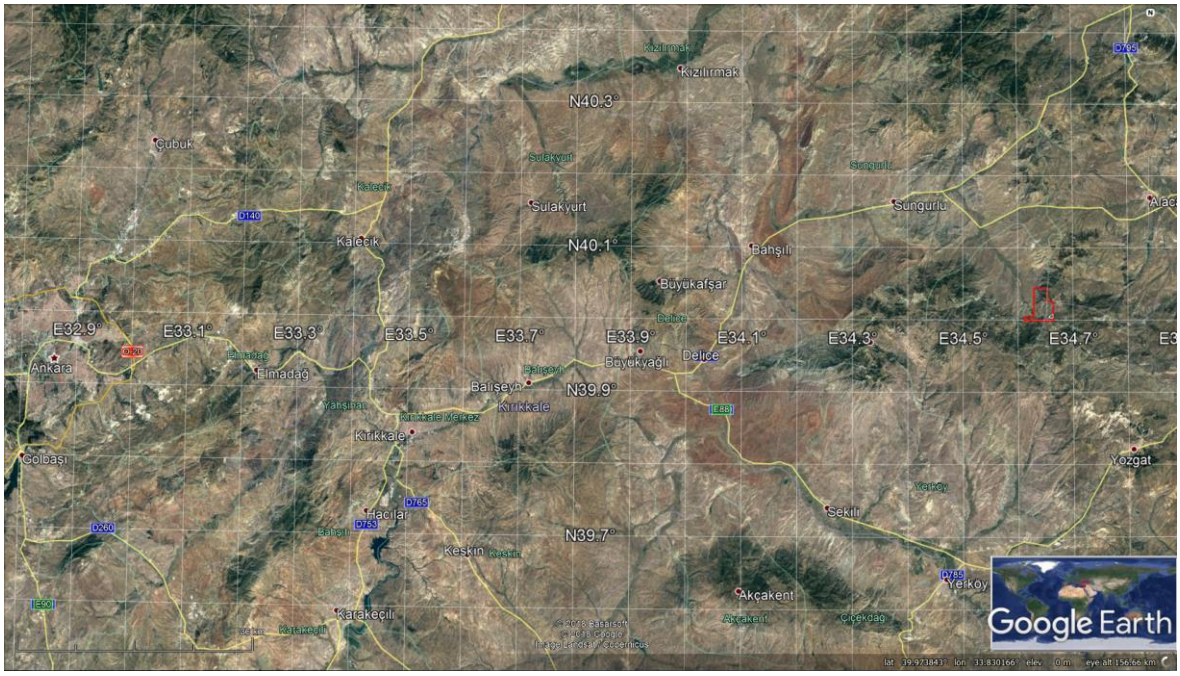


Figure 3. Corum licence area 200712071 (red polygon) is located appr. 200 km to the E of Ankara (Source: Google Maps).

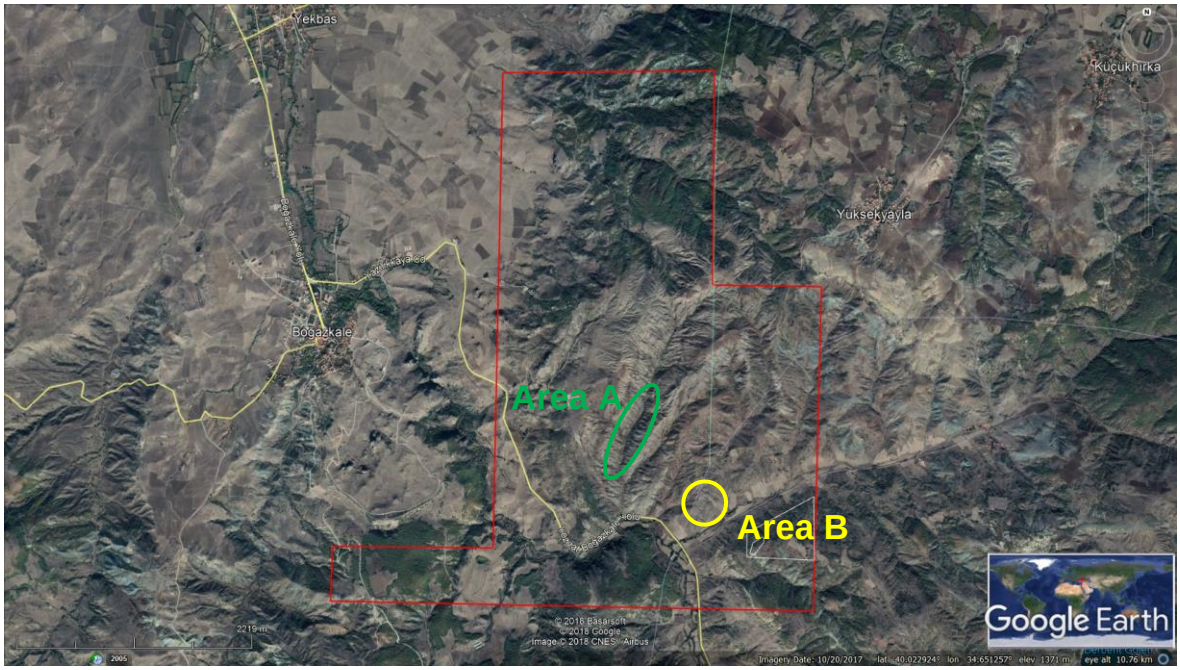


Figure 4. The licence area 200712071 (red line) is located appr. 6 km to the E of the village Bogazkale; areas of drilling activities in green and yellow circle, Area A has sulfidic mineralization starting from some meters below surface, Area B has oxidized mineralization starting directly at surface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

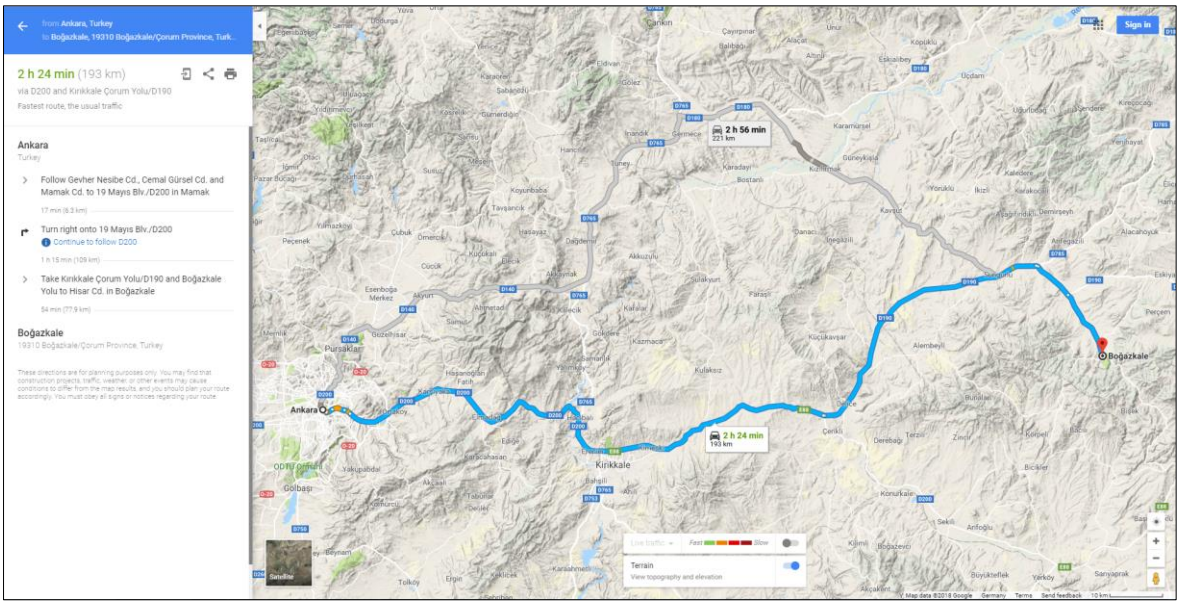


Figure 8. Access from Ankara to Bogazkale (Source: Google Maps).

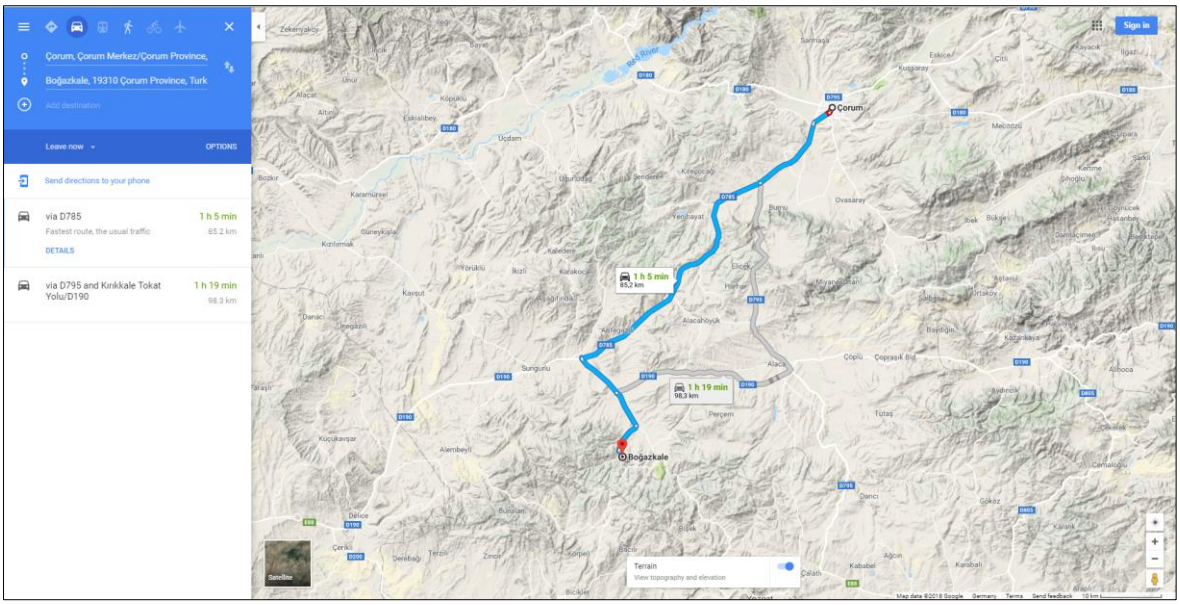


Figure 9. Access from Corum to Bogazkale (Source: Google Maps).

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).

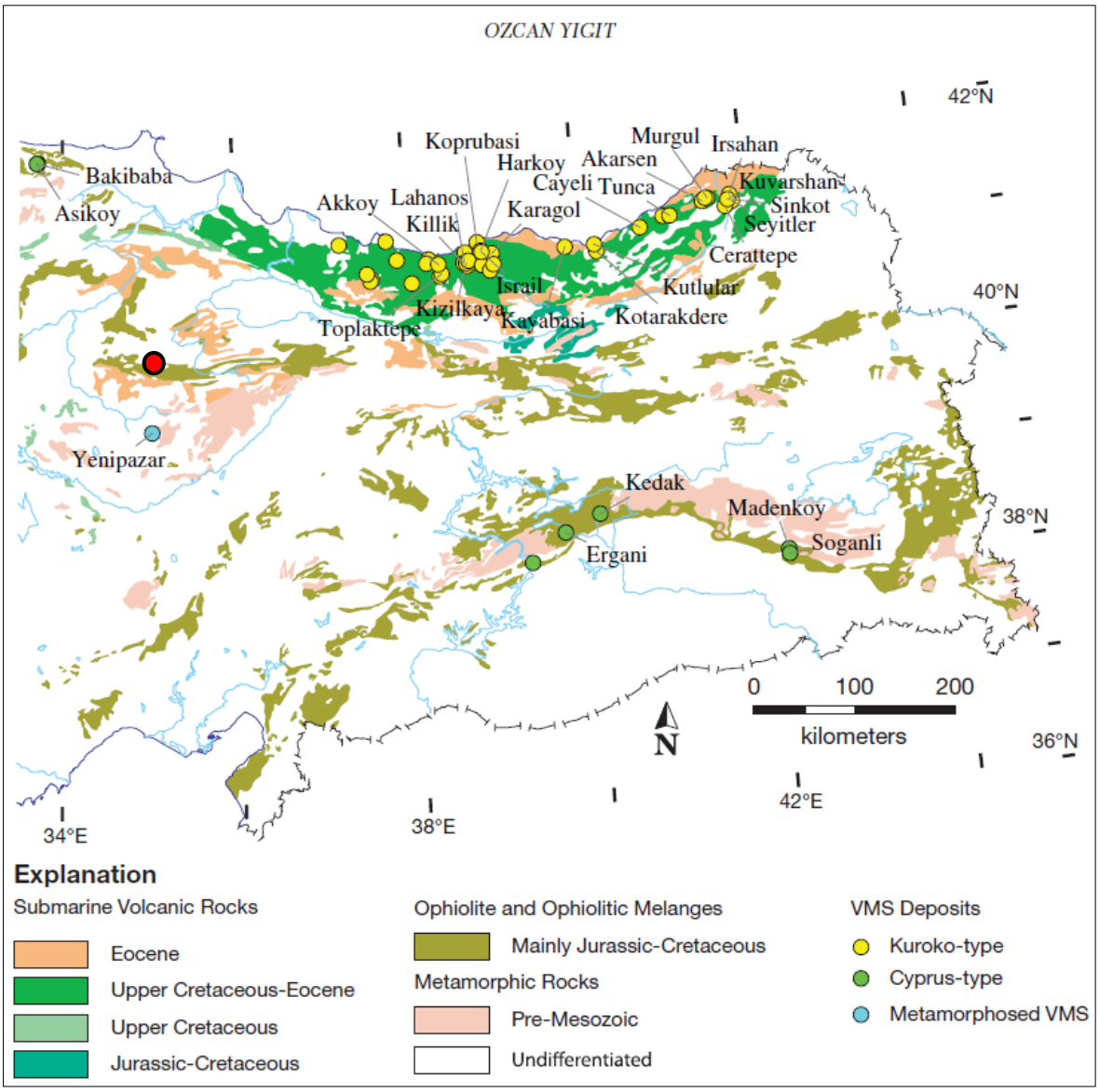


Figure 12. Distribution of the VMS deposits and prospects of Turkey with emphasis on host-rock lithology (Source: Ozcan Yigit, 2009); location of licence area (red point).

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

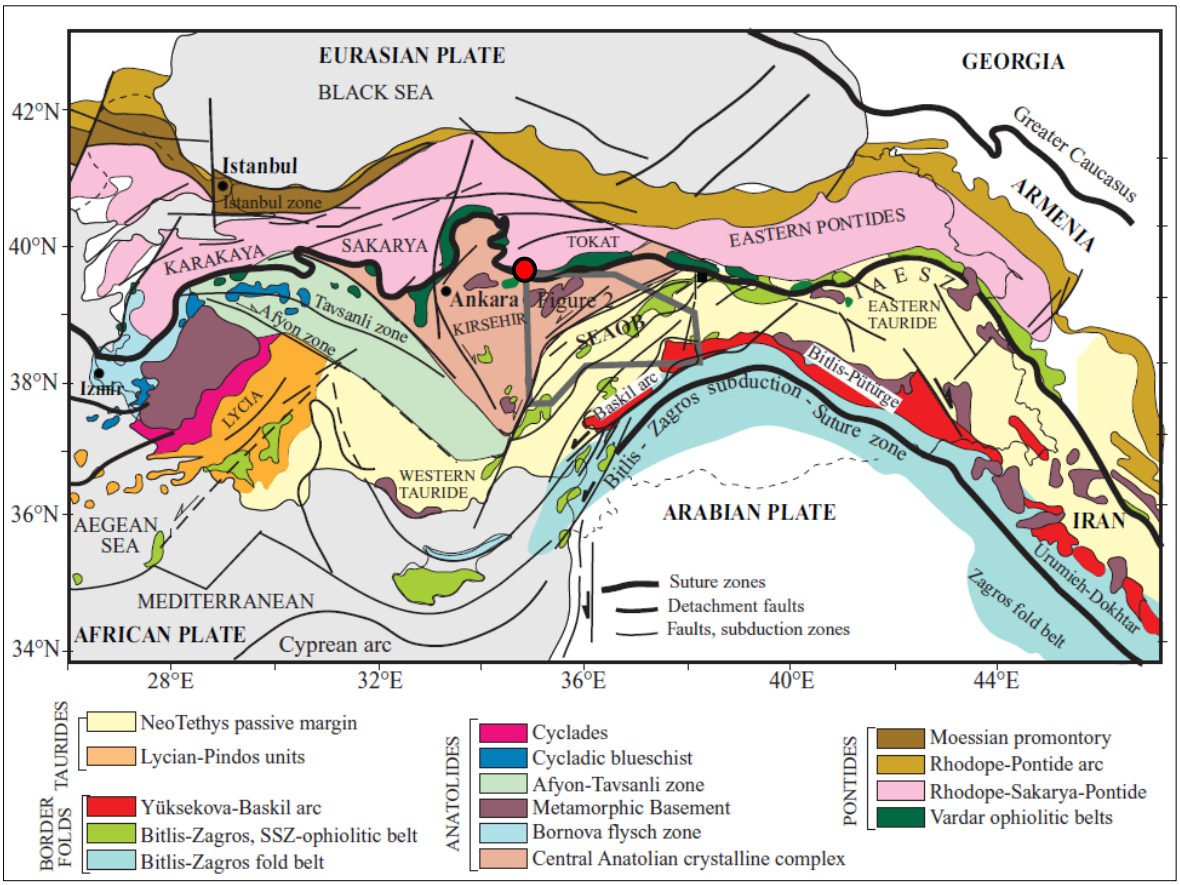


Figure 13. Tectonic map of western Tethys showing main tectonic units and mineral deposits. Simplified and modified from Stampfli et al. (1998), Stampfli (2001), Jolivet et al. (1994), and Kaymakçi and Kus¸cu (2007). Abbreviations: IAESZ = Izmir- Ankara-Erzincan suture zone, SEAOB = Southeastern Anatolian 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.

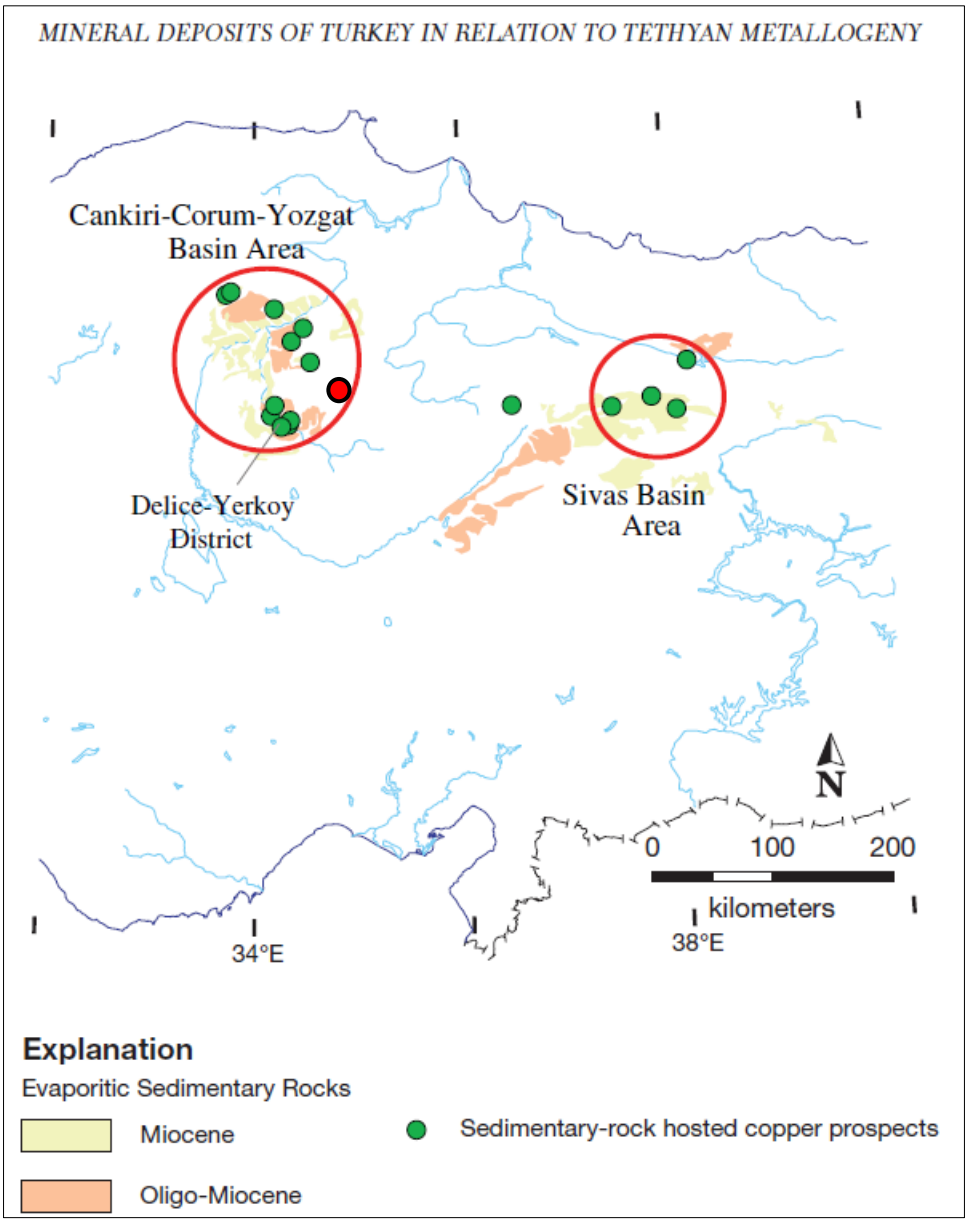


Figure 14. Distribution of the sedimentary-rock hosted copper prospects of Turkey with emphasis on host-rock lithology (Source: Ozcan Yigit, 2009); location of licence area (red point).

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.

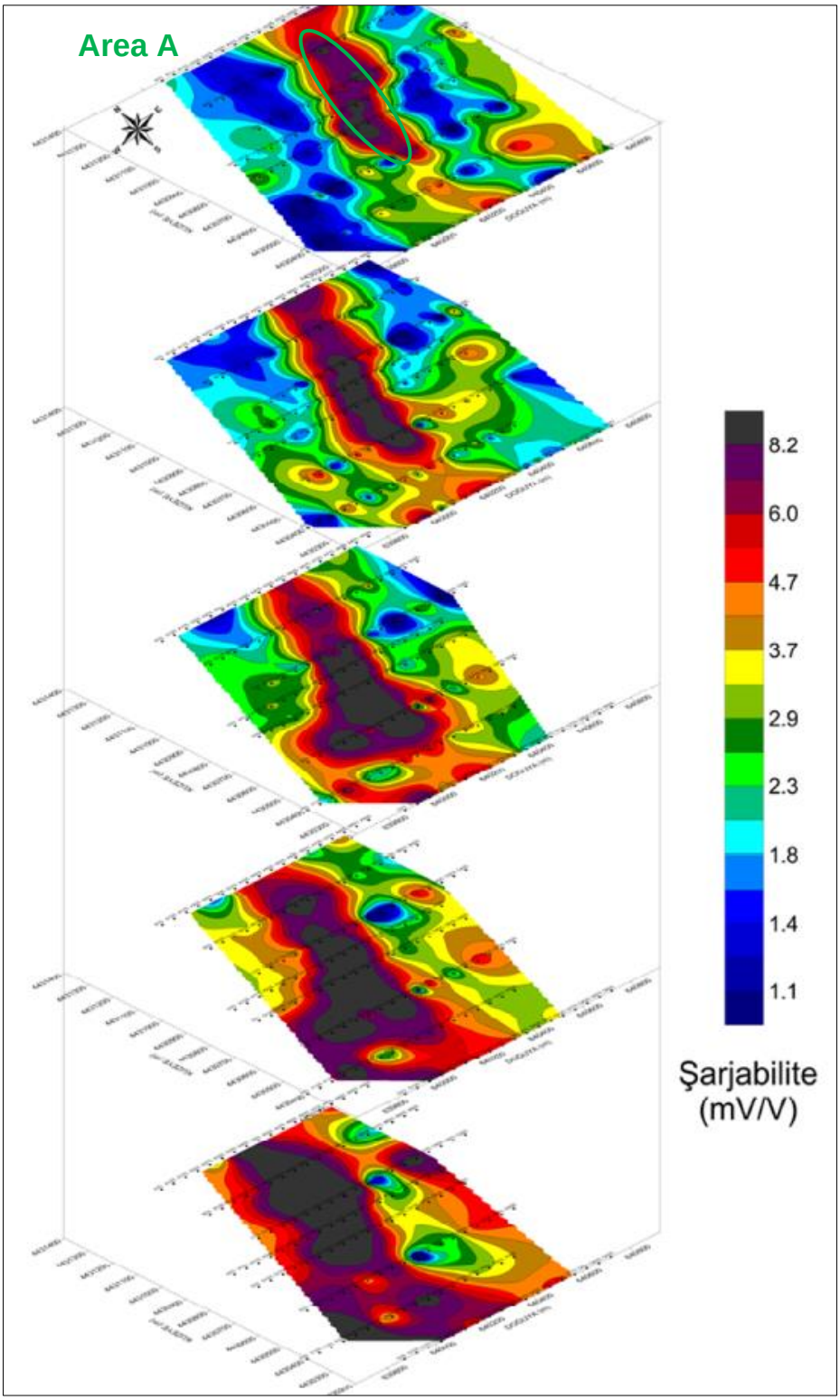


Figure 16. Stacked maps of chargebility.

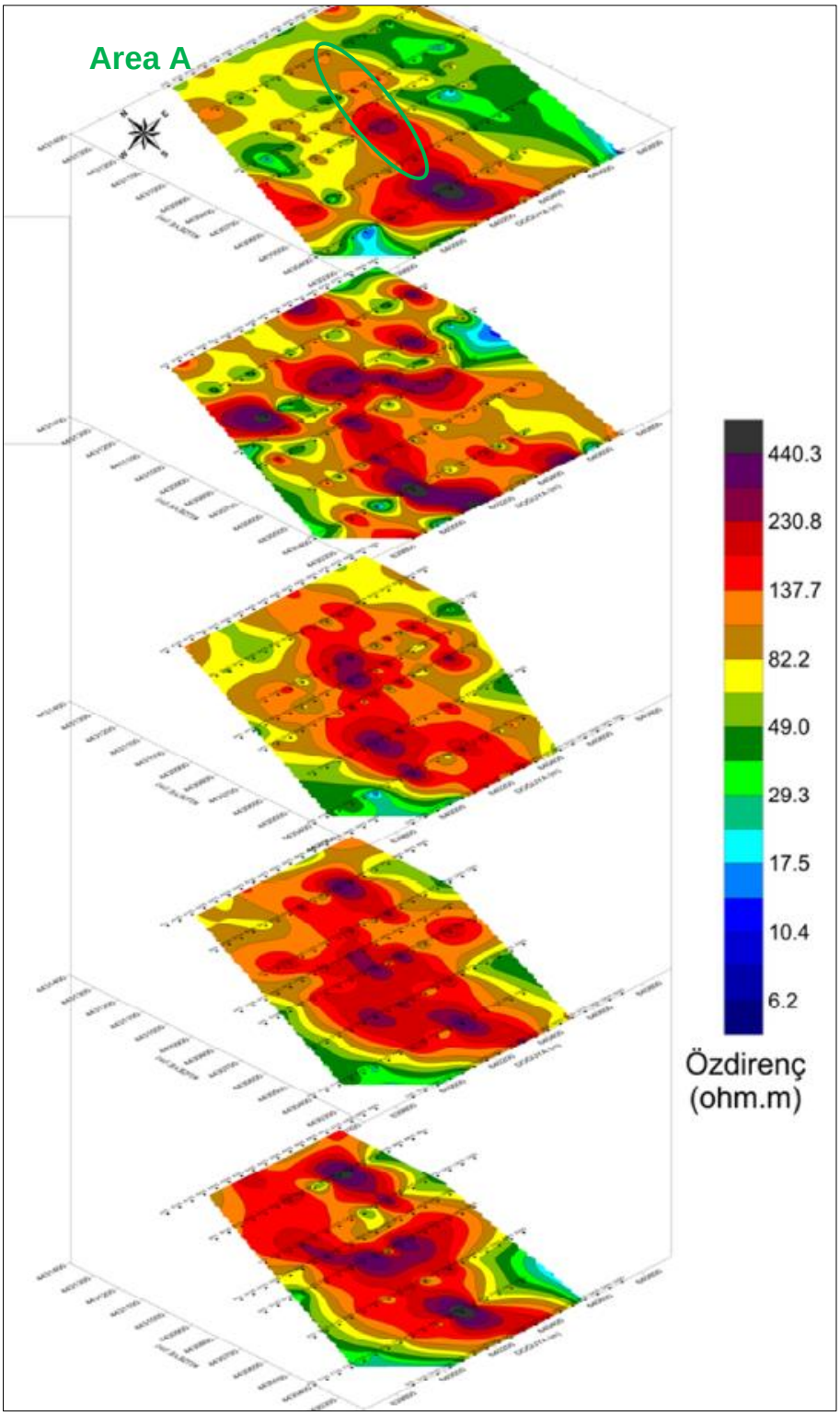


Figure 17. Stacked maps of resistivity.

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.

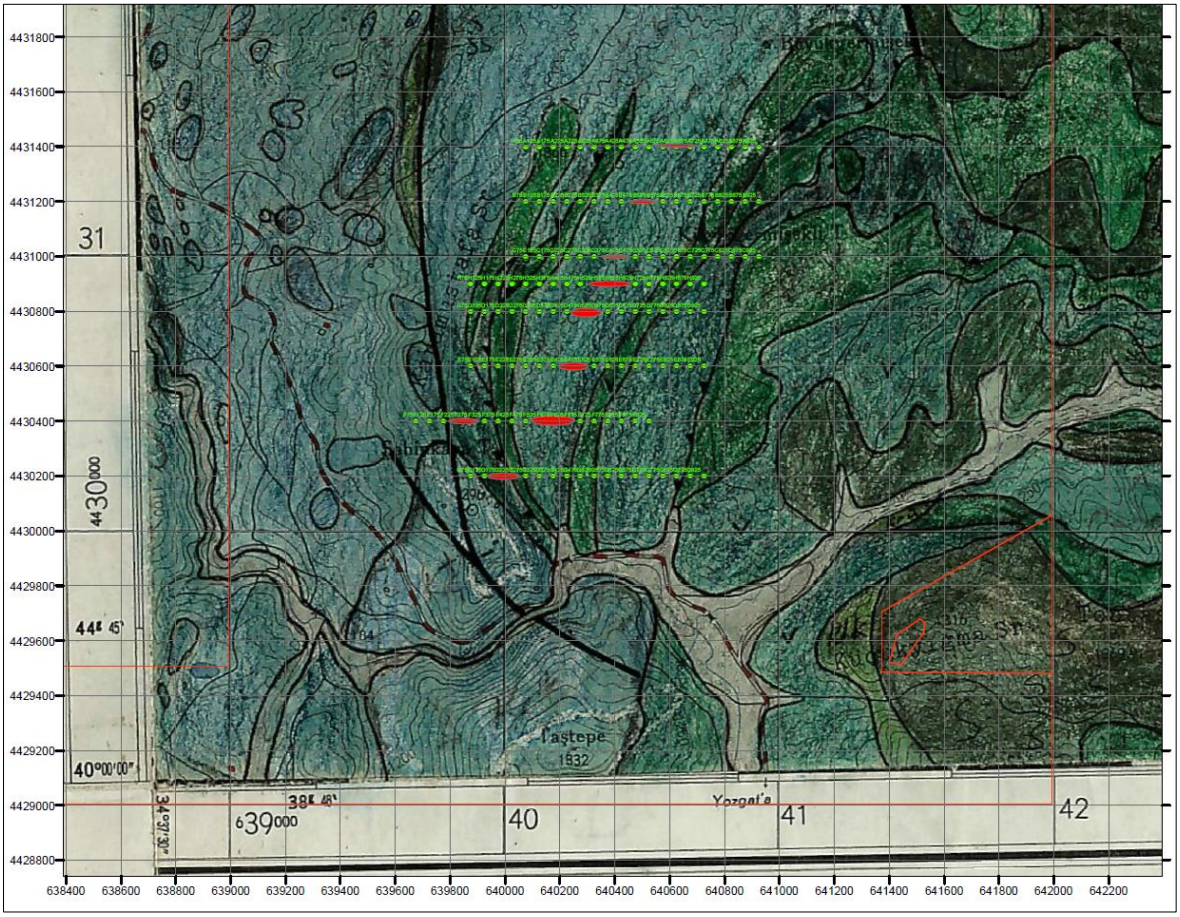


Figure 18. Outcrop of 1:25 000 scaled governmental geological map H33-D3.

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.

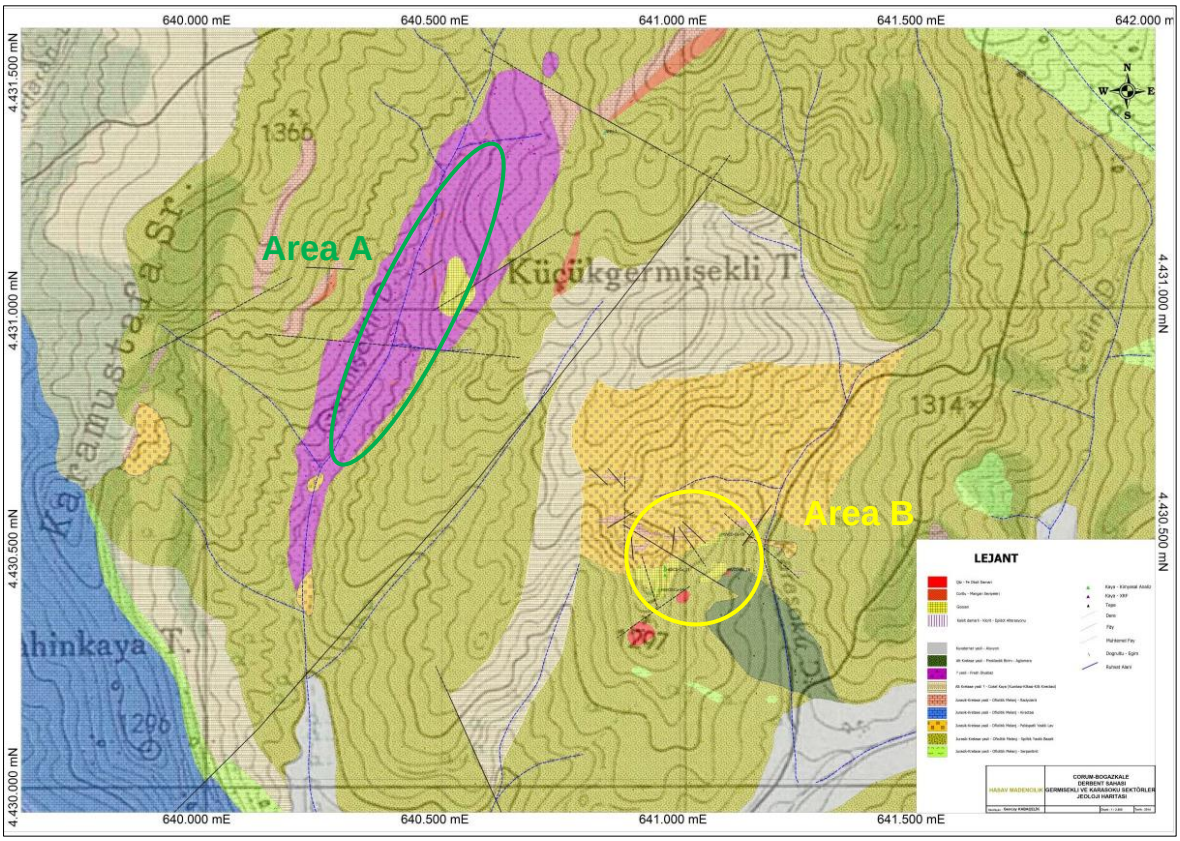


Figure 19. Geological map prepared by Avod.

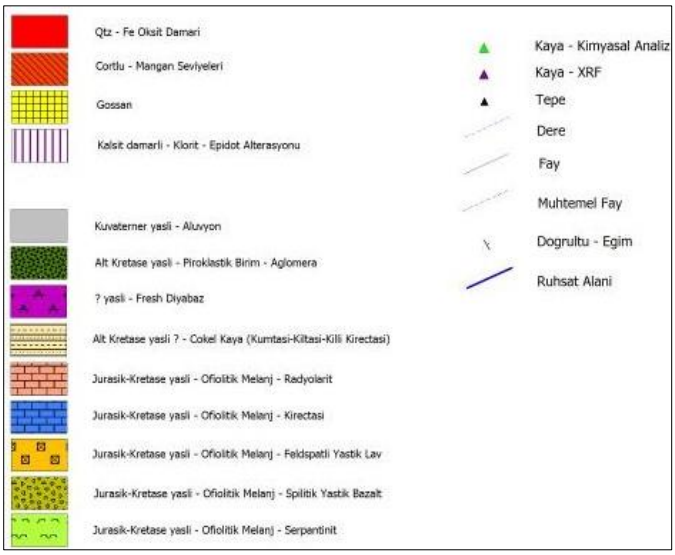


Figure 20. Legend for geological map.

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).

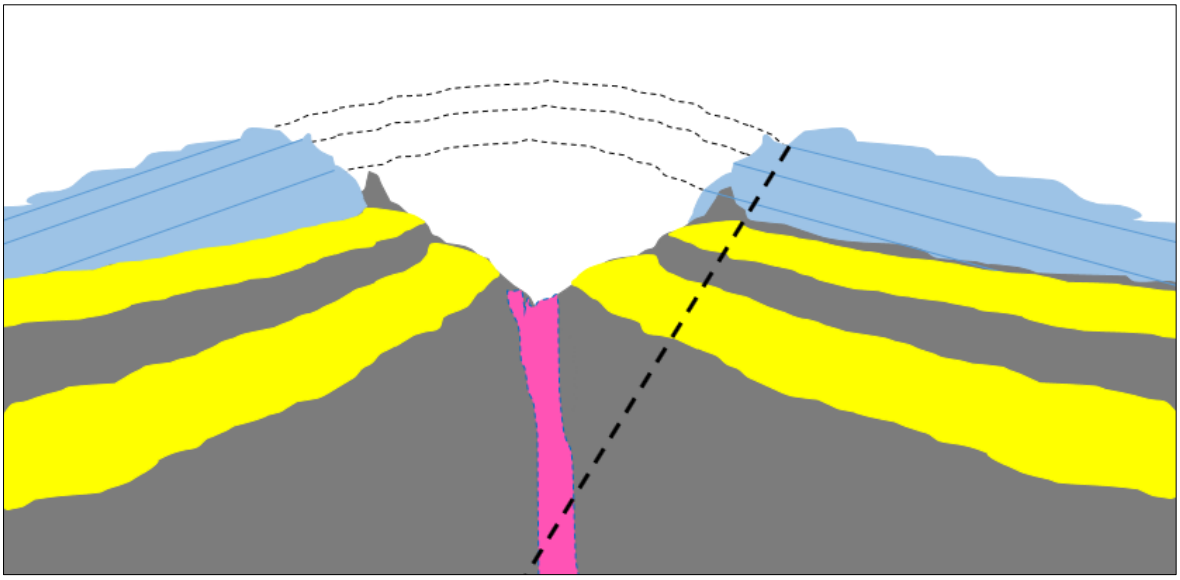


Figure 21. Example of theoretical cross section and proposed drilling.

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.

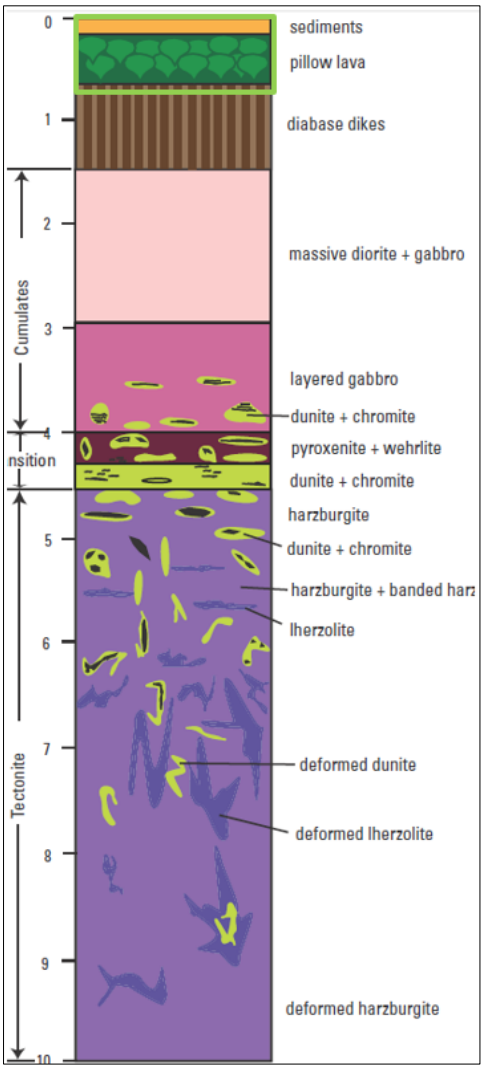
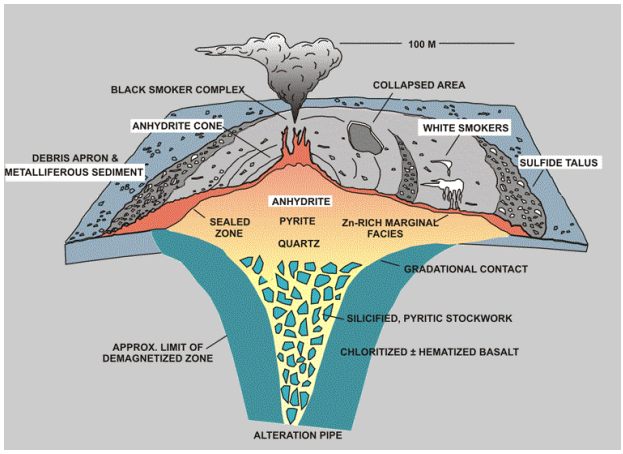


Figure 22. Typical lithological column of an ophiolite sequence (source USGS). The green square indicates the interpreted stratigraphic position of the lithologies of interest for licence 200712071.



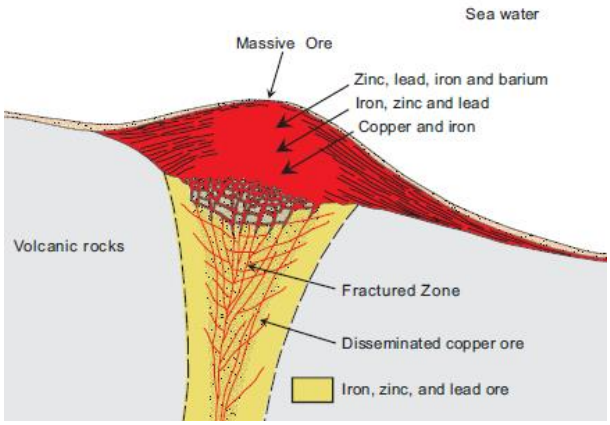


Figure 23. Typical cross-sections through volcanic massive sulphide deposits (sources: USGS & web). Note: Vertical and lateral zonation (Cu, Zn, Pb, Fe, Mn, Ba), demagnetization and alteration. Laterally the ore-equivalent layer may develop into cherts.

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

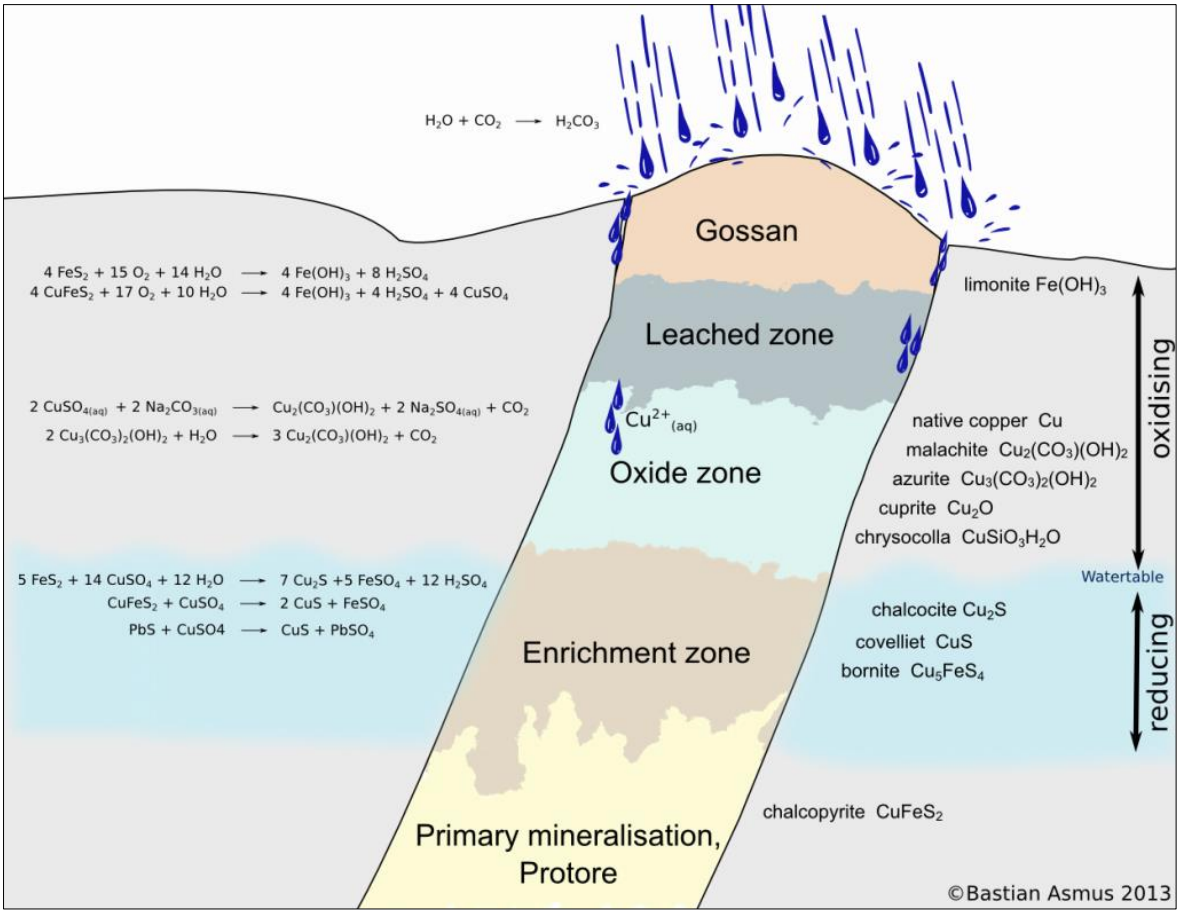


Figure 24. Schematic view of a sulphide vein. You can see the oxidation zone, consisting of the gossan, the leached zone and the oxidised zone. The reducing zone consists of the enrichment zone and the area of primary mineralization. Significantly modified after Evans (1992) and Ottaway (1994) (Source: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

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

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:

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

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:

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

(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.

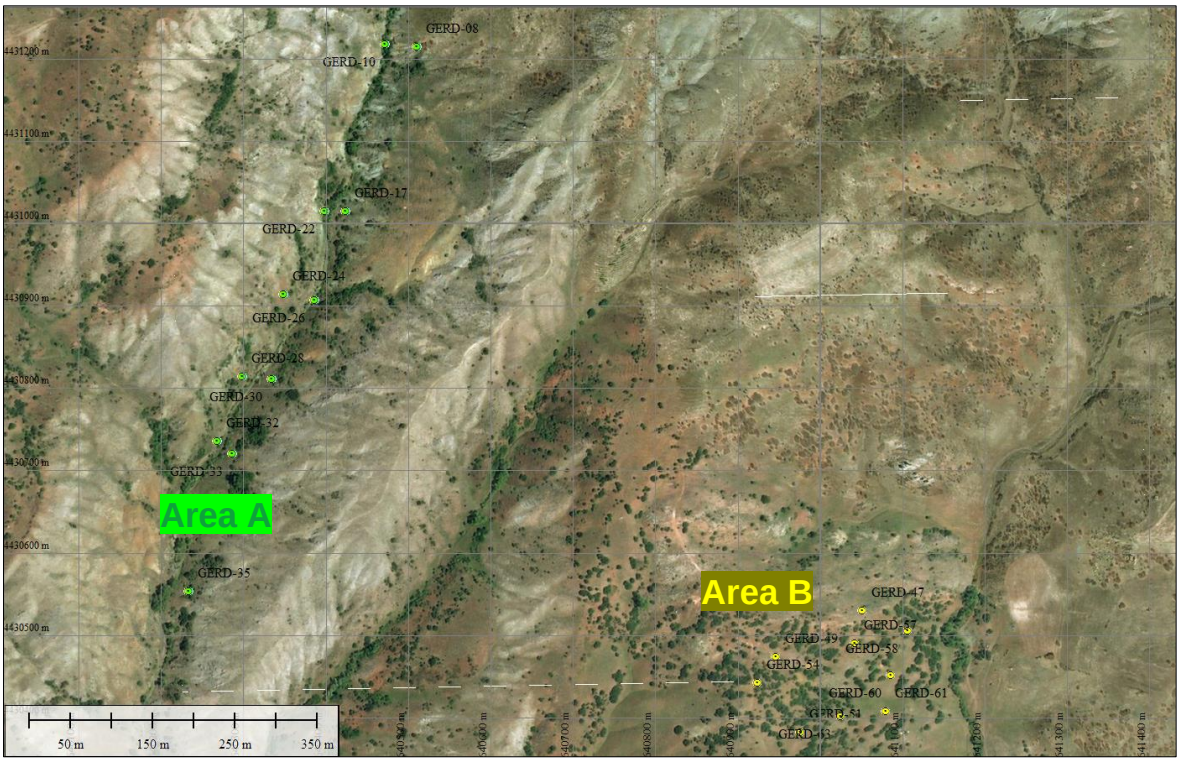


Figure 25. Drill holes of Area A and B.

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:

- $\text{Density} = \text{Weight}_{\text{SampleDry}} / \text{Volume}_{\text{Replaced Water}}$

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, representiveness 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.*

		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 20th 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.

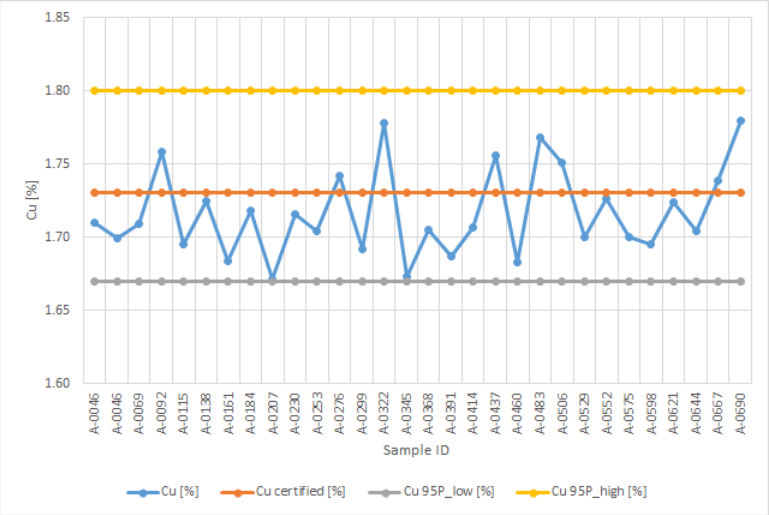


Figure 31. Assay results for CRM OREAS 623 for Cu.

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.

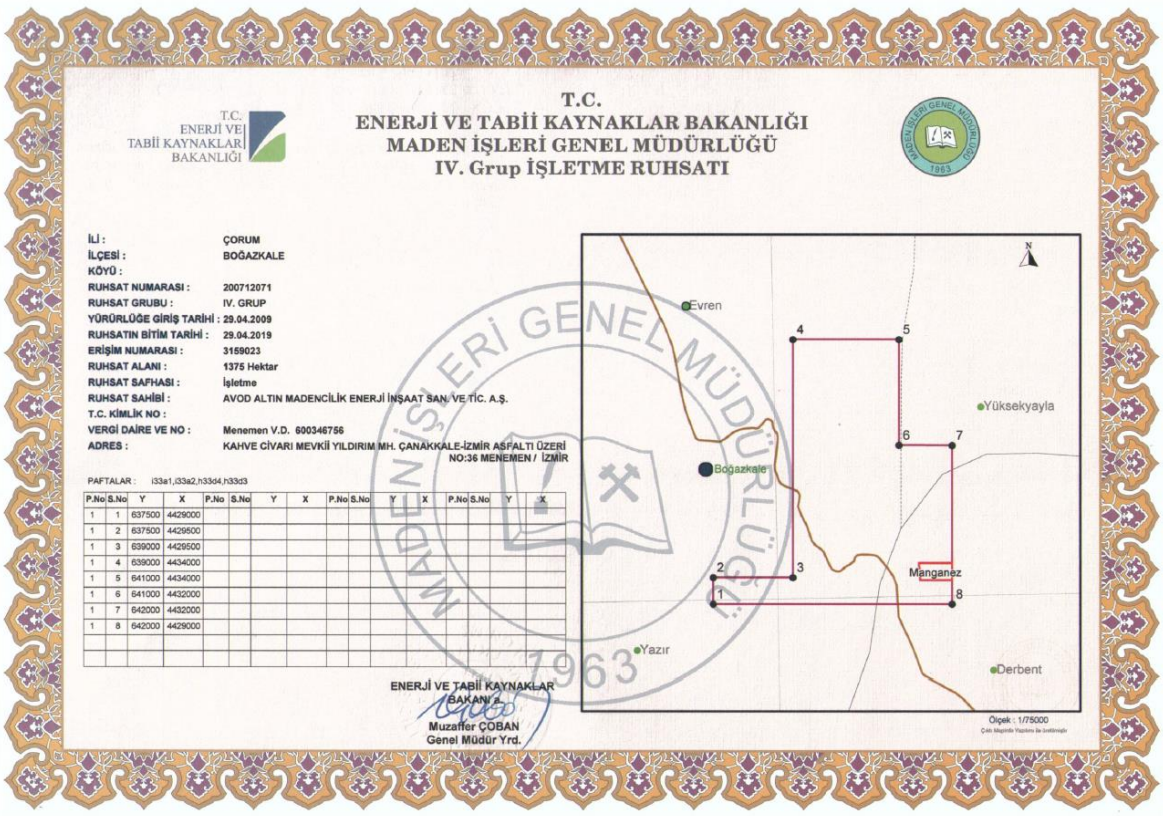
12.12 CONCESSION AREA

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

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.

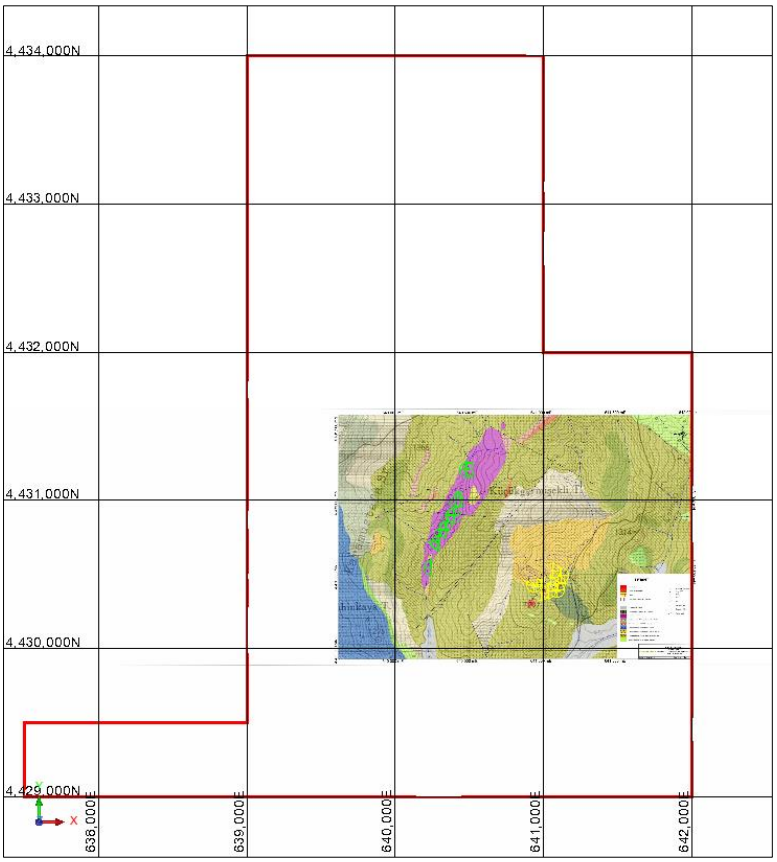


Figure 33. Licence (red boundary) covering the mapped and drilled areas.

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)

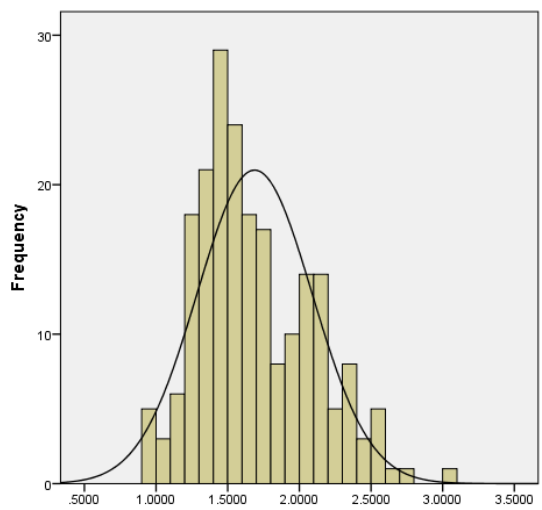
		Cu [%]	Pb [%]	Zn [%]	Fe [%]	S [%]	Au [ppm]	Ag [ppm]
Mean		**1.35**	**0.00**	**0.08**	**17.97**	**12.97**	**0.02**	**0.92**
Std. Error of Mean		0.02	0.00	0.02	0.44	0.41	0.00	0.10
Std. Deviation		0.20	0.00	0.22	3.92	3.69	0.02	0.87
Minimum		0.98	0.00	0.01	11.02	6.31	0.00	0.00
Maximum		1.90	0.00	1.81	29.60	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)

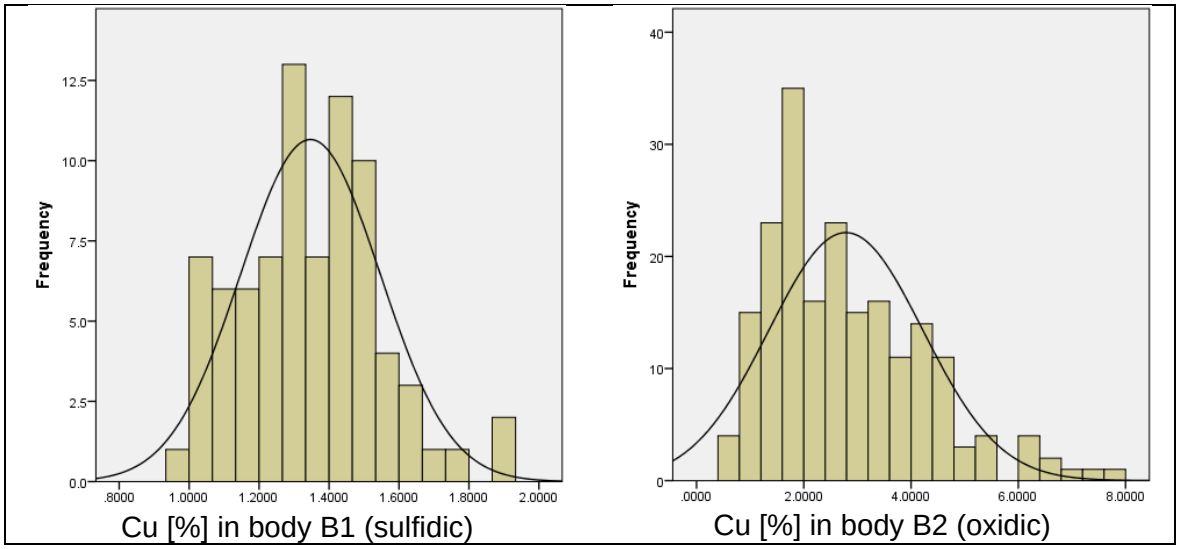


Figure 34. Frequency plots of Cu for interpreted bodies A, B1 and B2.

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.

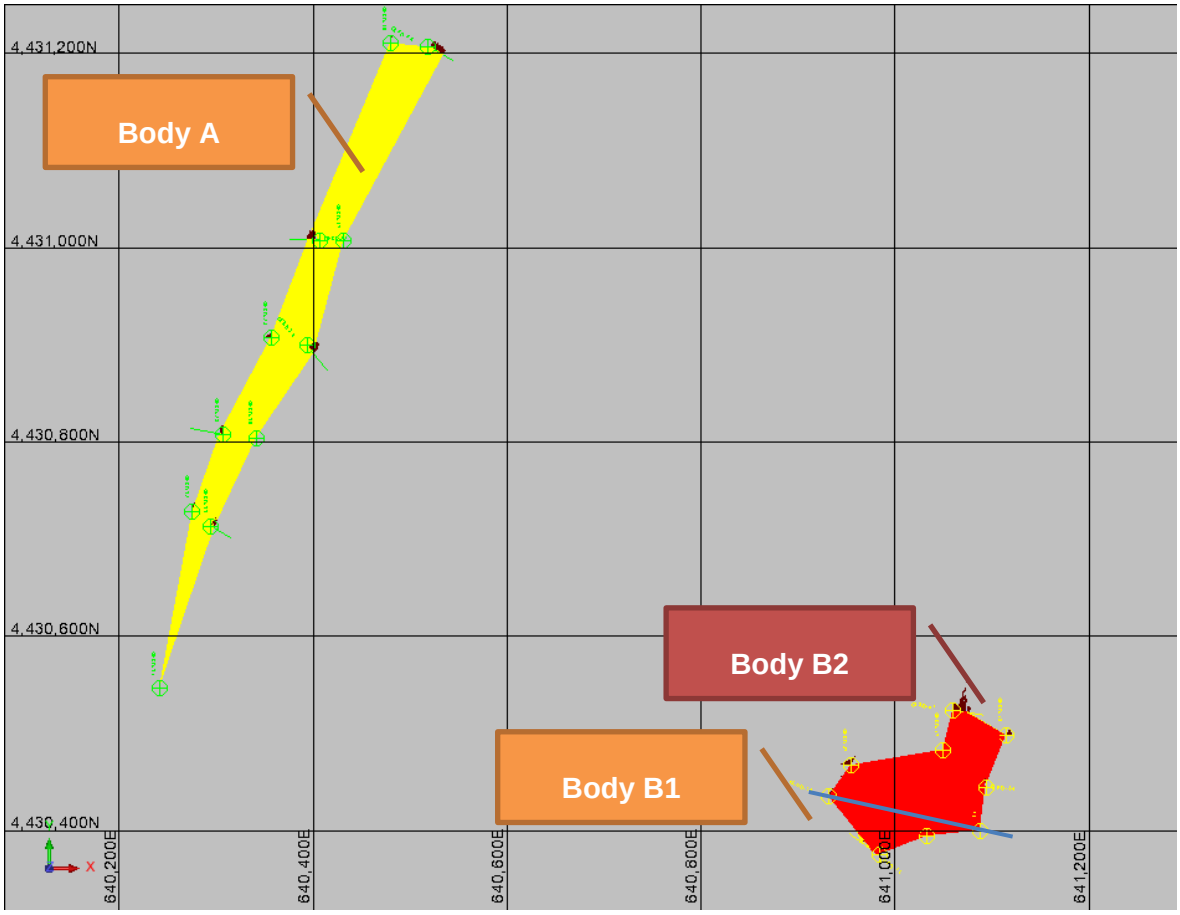


Figure 35. Location of the three mineralized bodies A, B1 and B2 modelled; blue full line is location of cross section (see Figure 36).

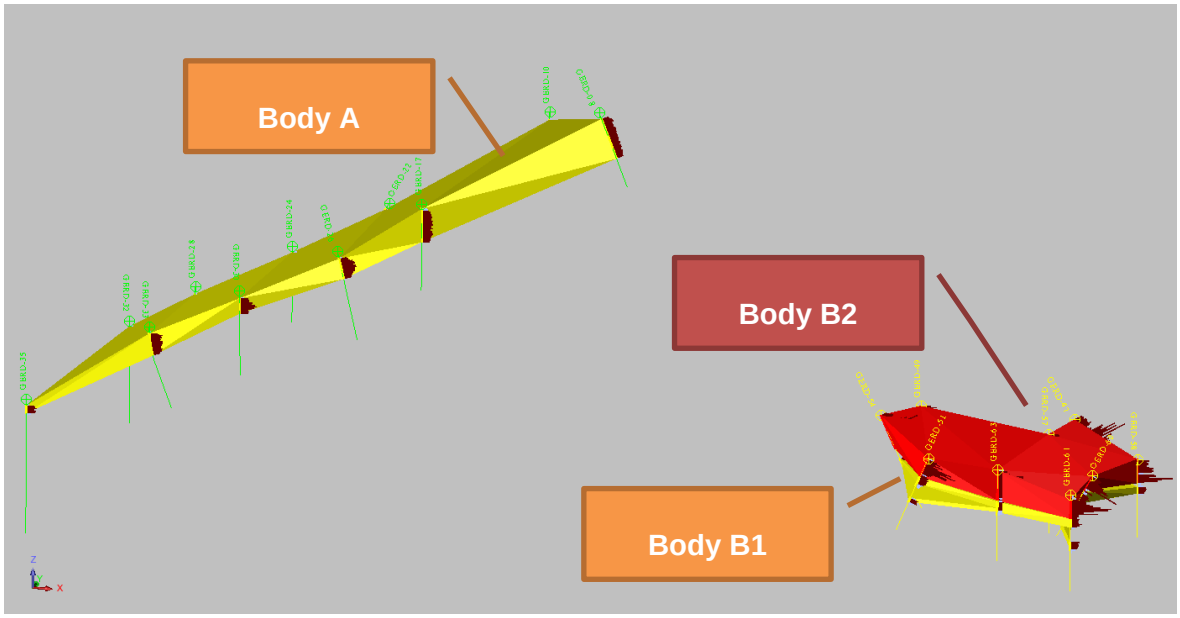


Figure 36. 3D view to NNW onto the three mineralized bodies A, B1 and B2 modelled.

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.

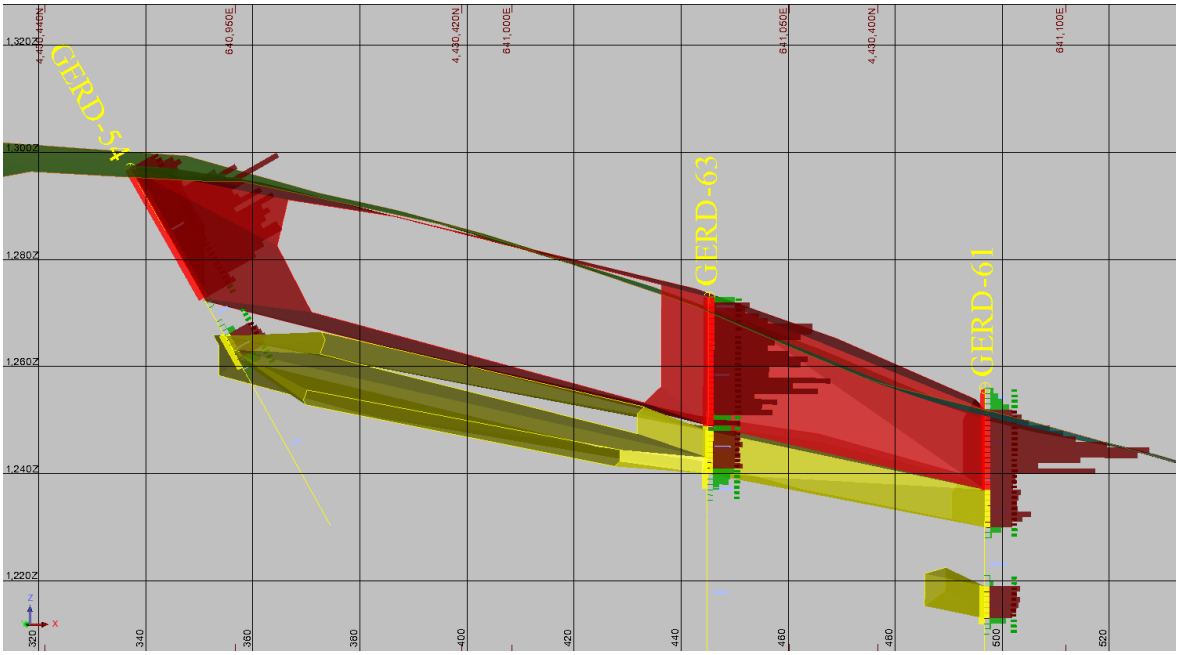


Figure 37. Cross section trough mineralized body B1 and B2; location of cross section is given in Figure 35.

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.

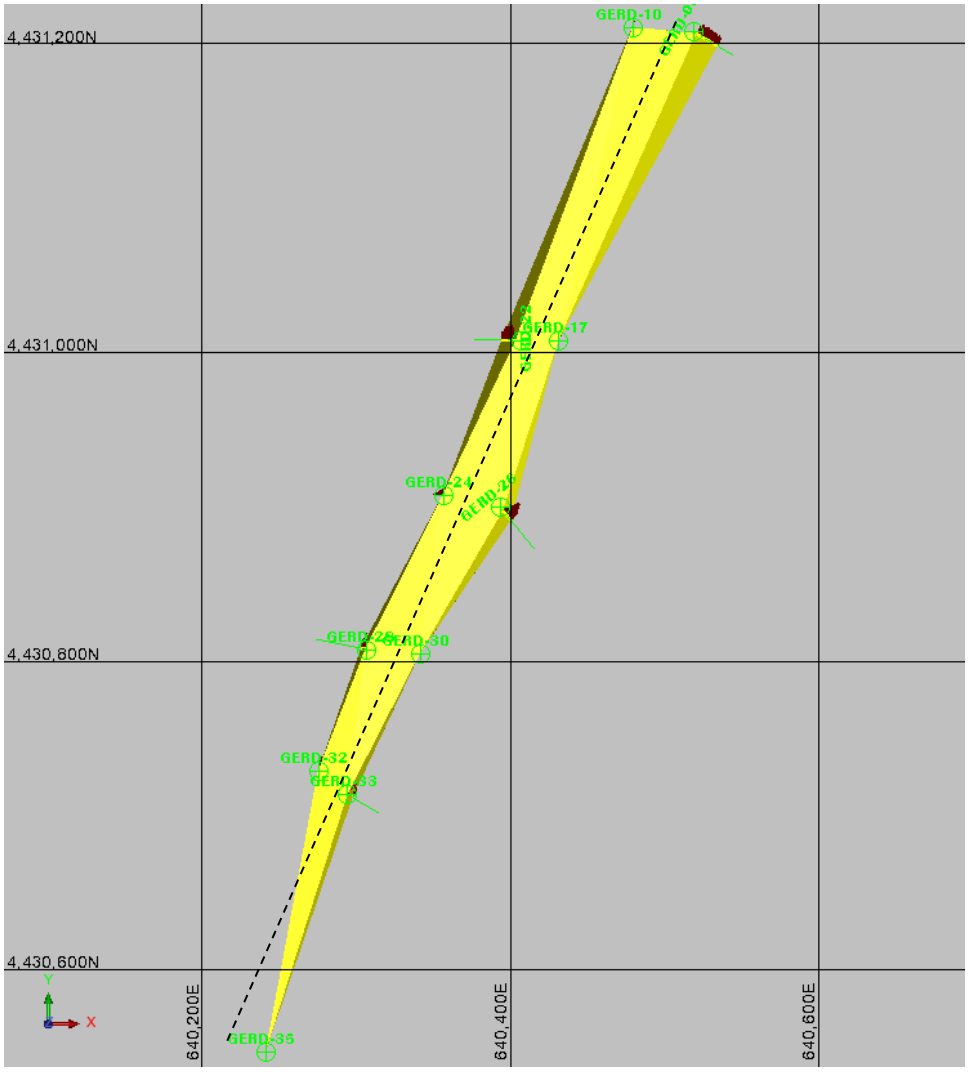


Figure 38. Wireframe A from above and section line (black dashed line; see next figure).

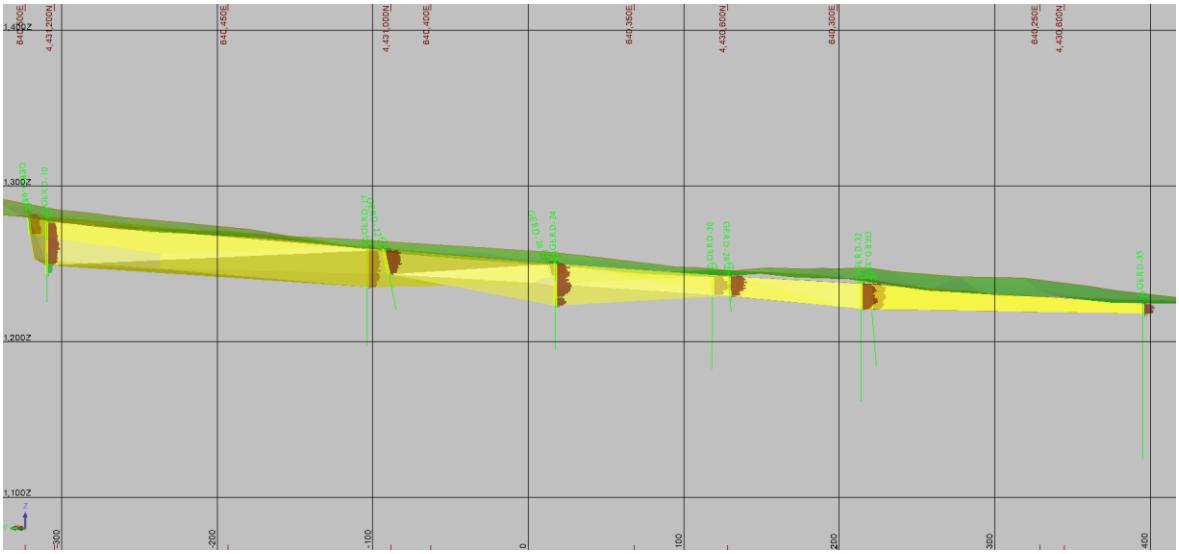


Figure 39. Wireframe A in section (location of section line is given in Figure 38).

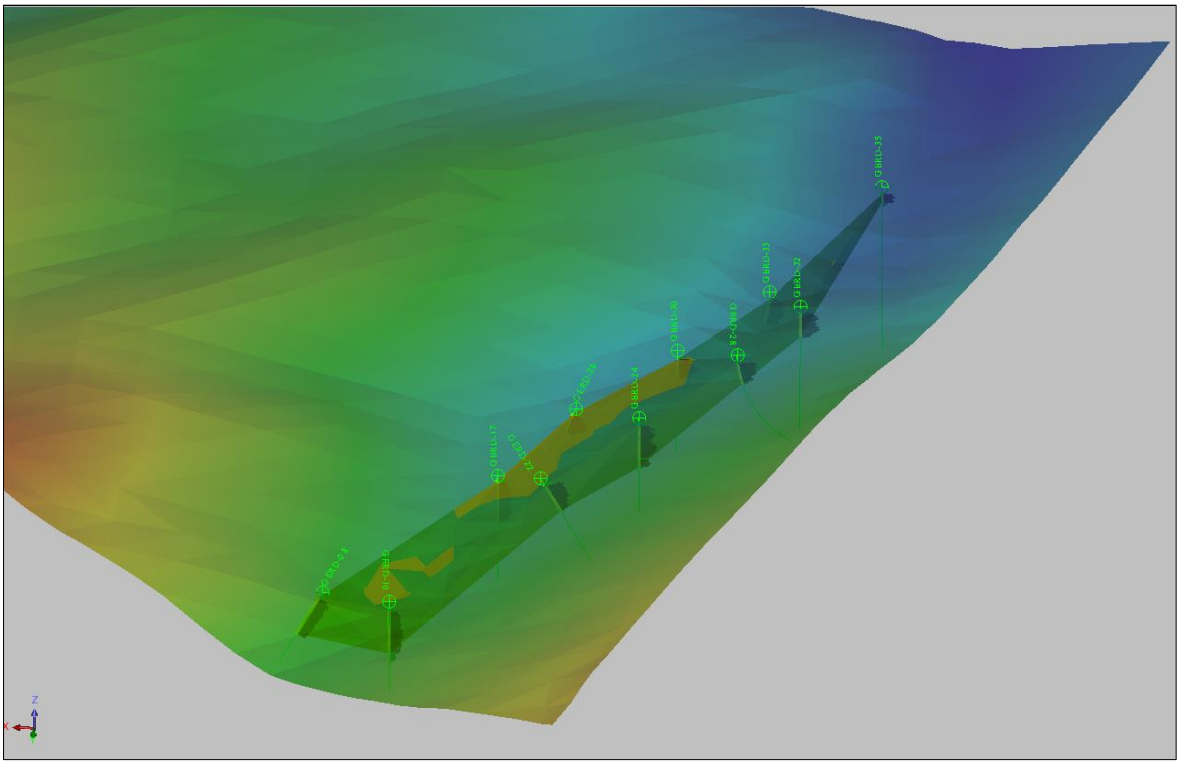


Figure 40. Wireframe A in 3D view from NNW to SSE.

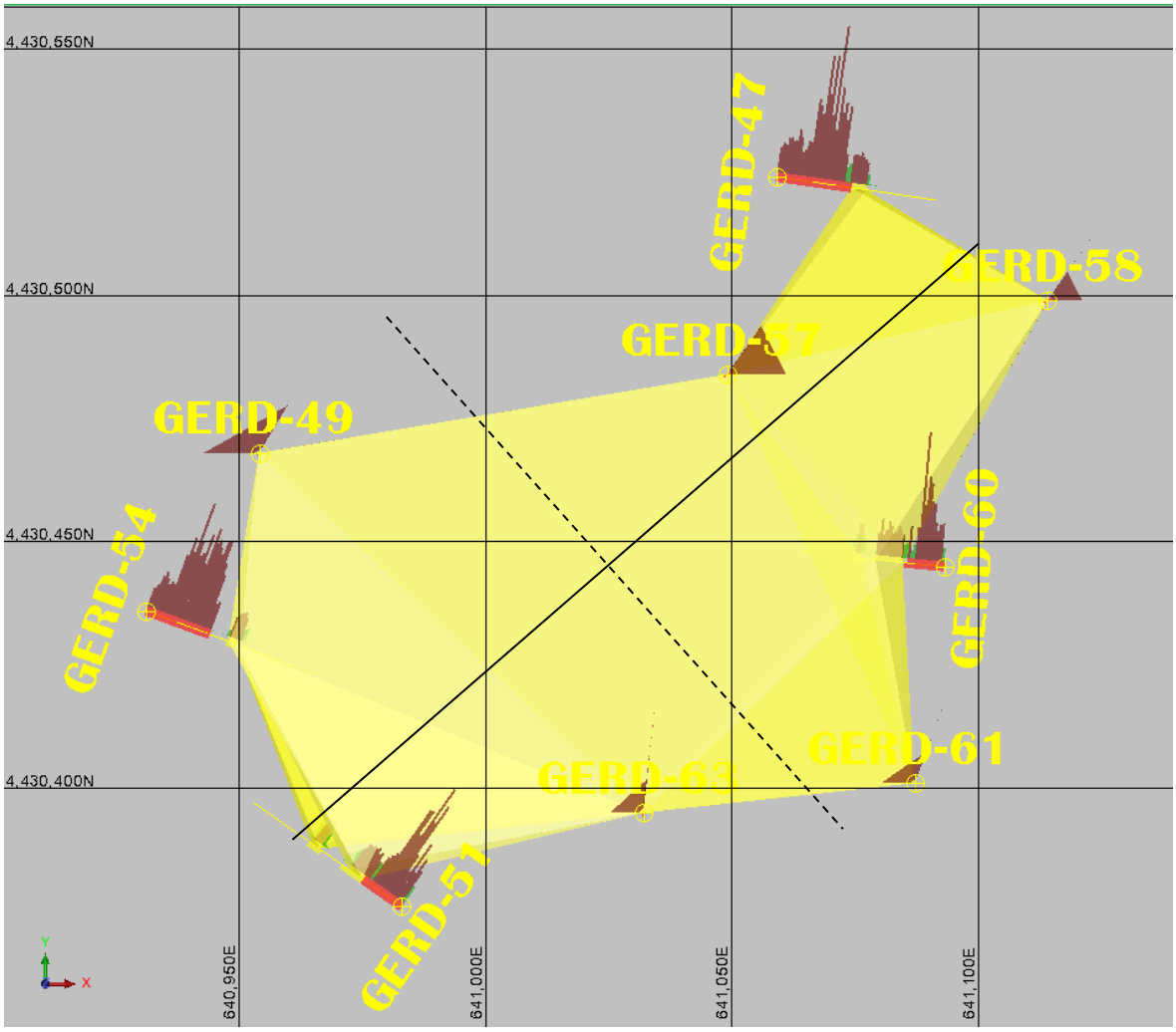


Figure 41. Wireframe B1 from above and section line (black dashed and full line; see next two figures).

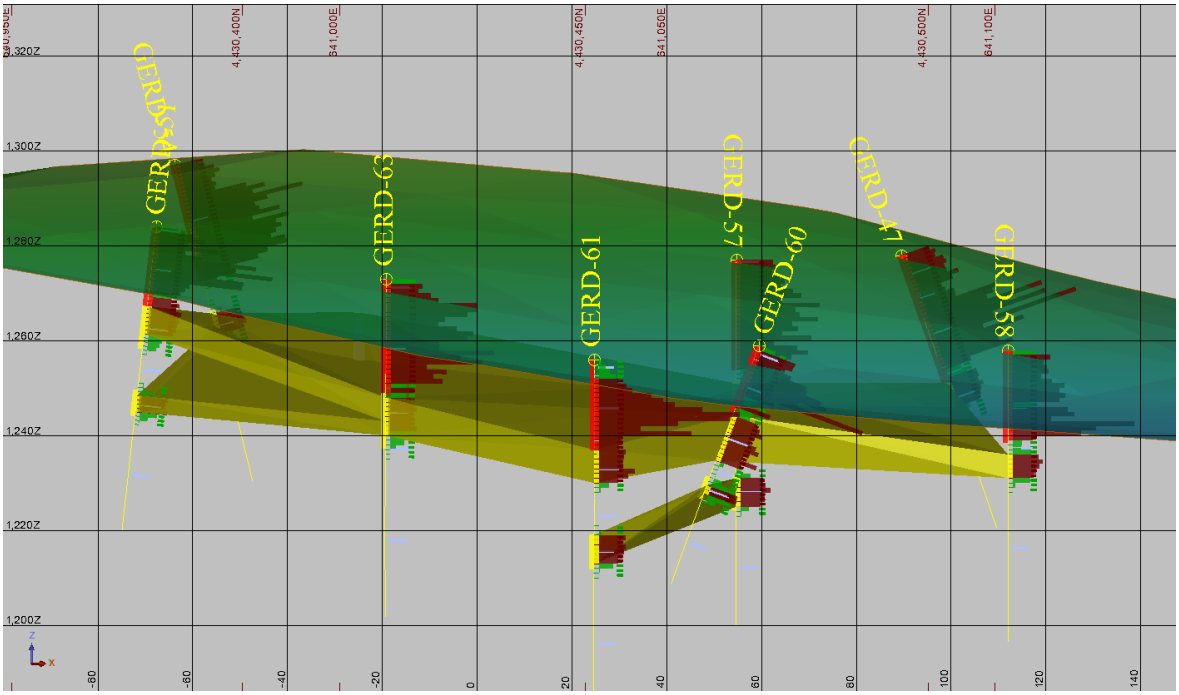


Figure 42. Wireframe B1 in section (location of black full section line is given in Figure 42).

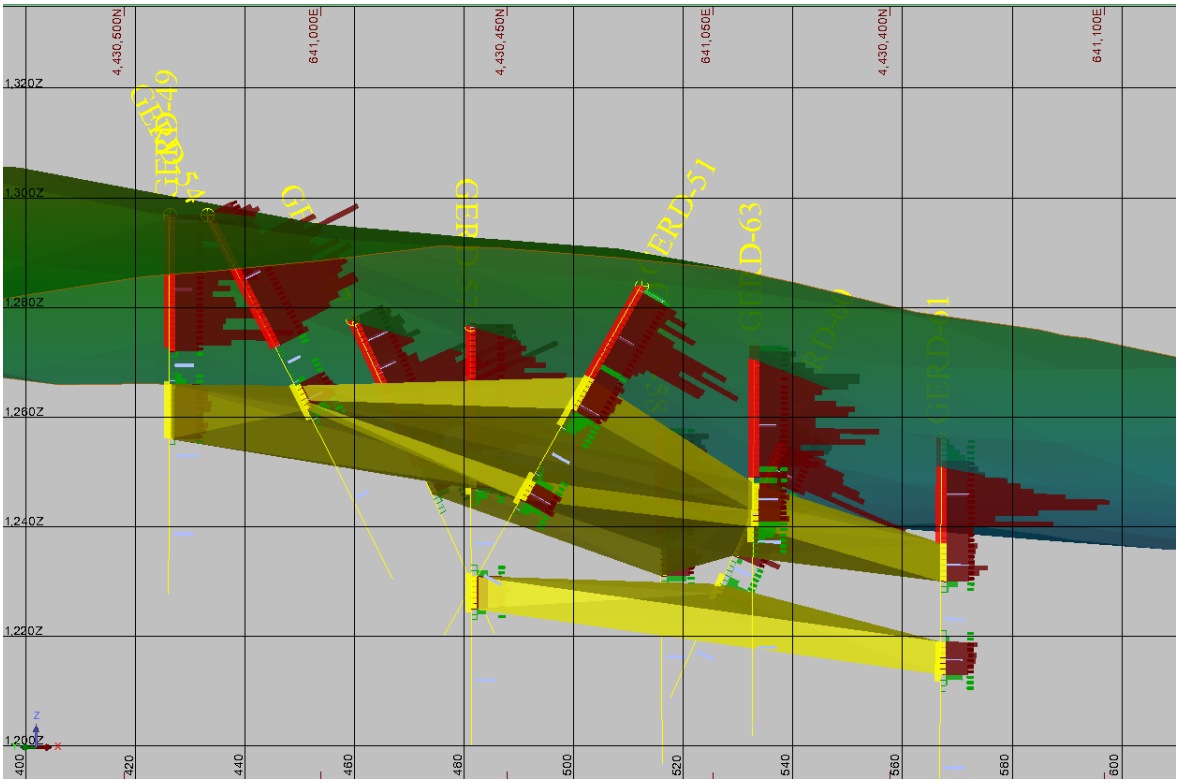


Figure 43. Wireframe B1 in section (location of black dashed section line is given in Figure 42).

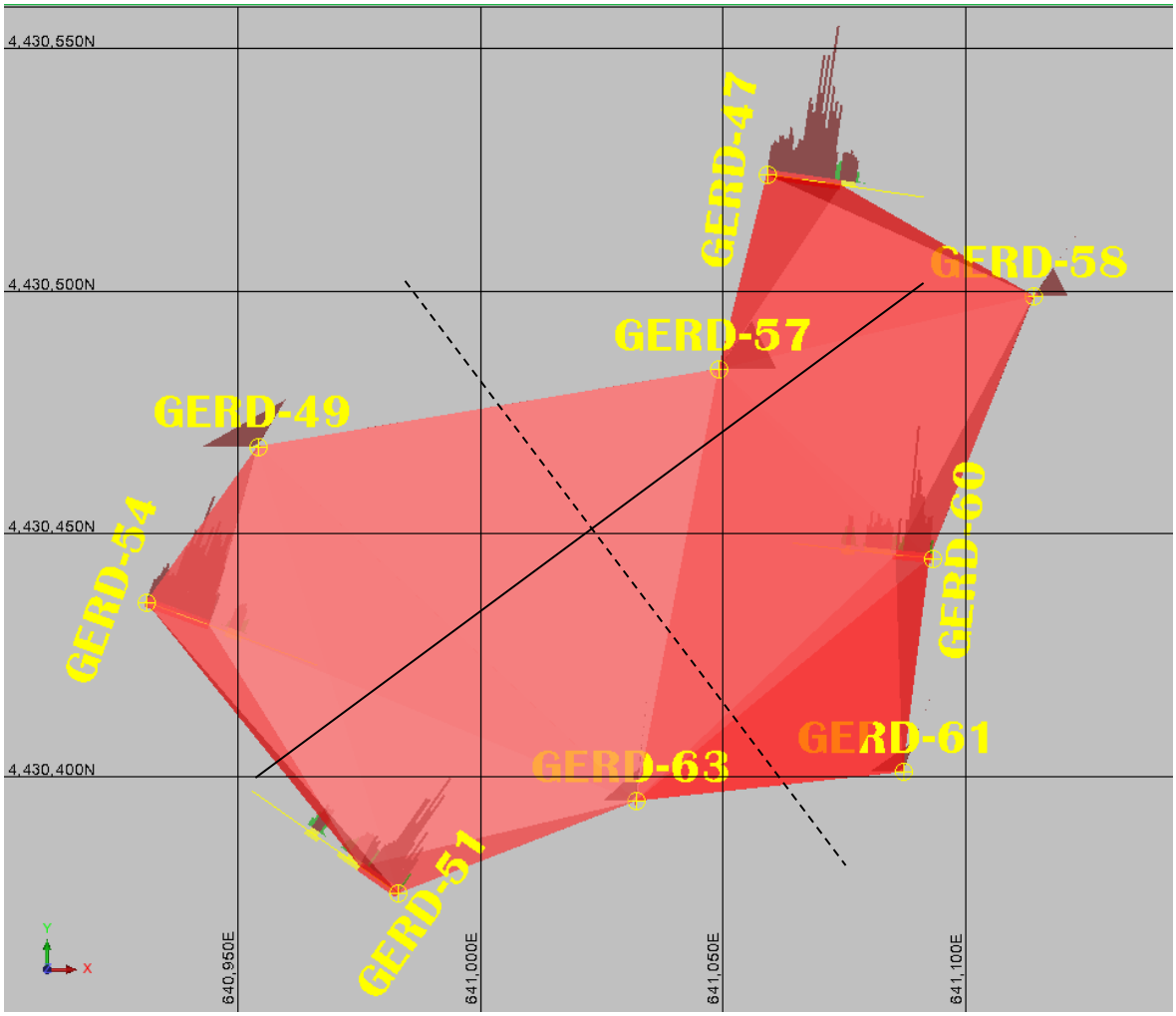


Figure 44. Wireframe D from above and section line (black dashed and full line; see next figure).

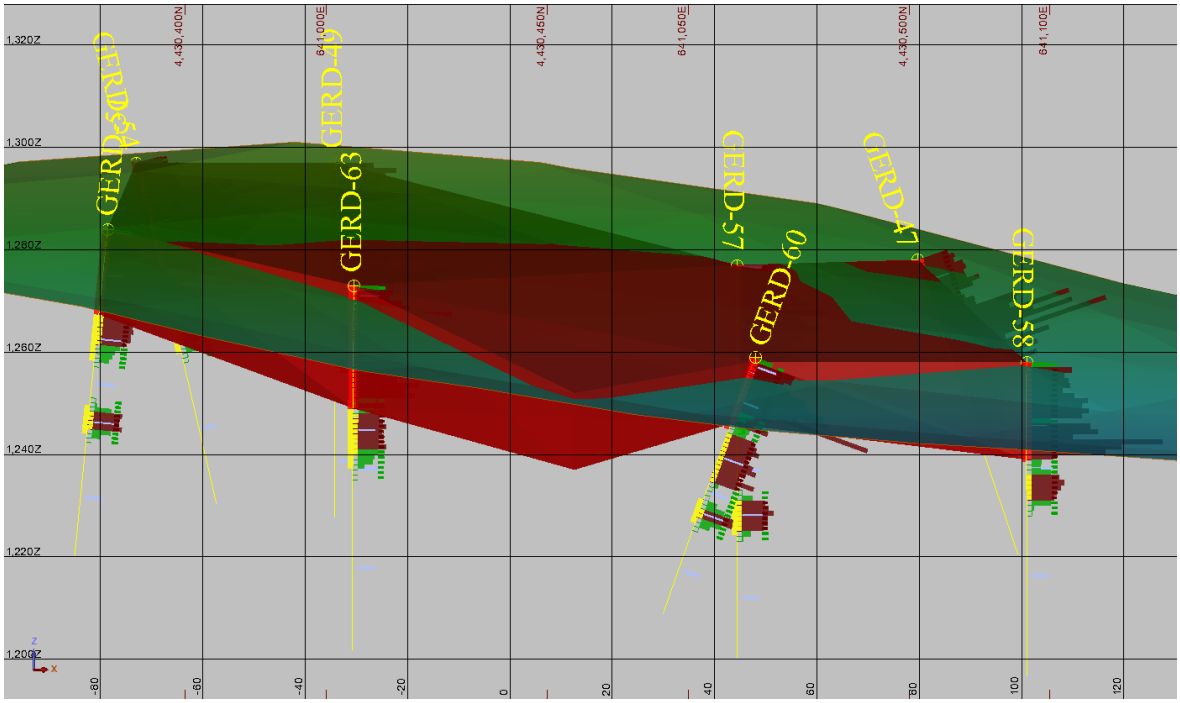


Figure 45. Wireframe B2 in section (location of black full section line is given in Figure 44).

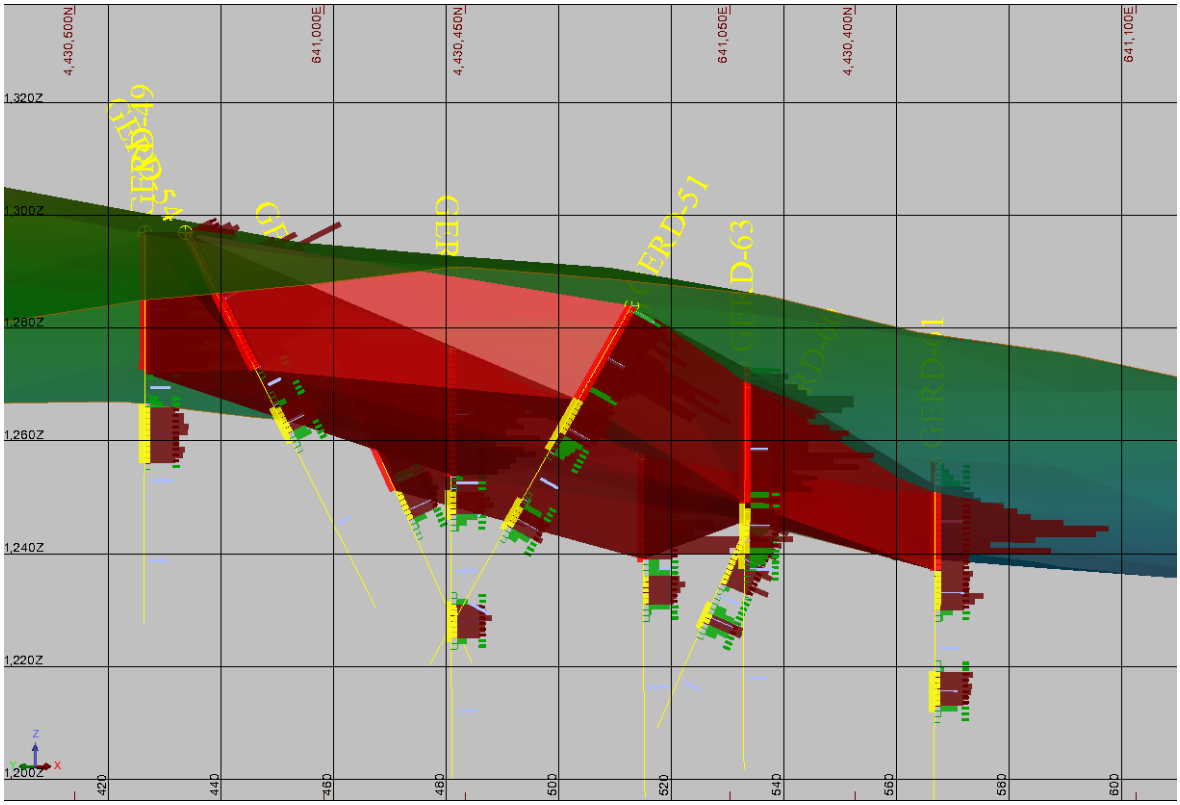


Figure 46. Wireframe B2 in section (location of black dashed section line is given in figure before; dashed black line).

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.

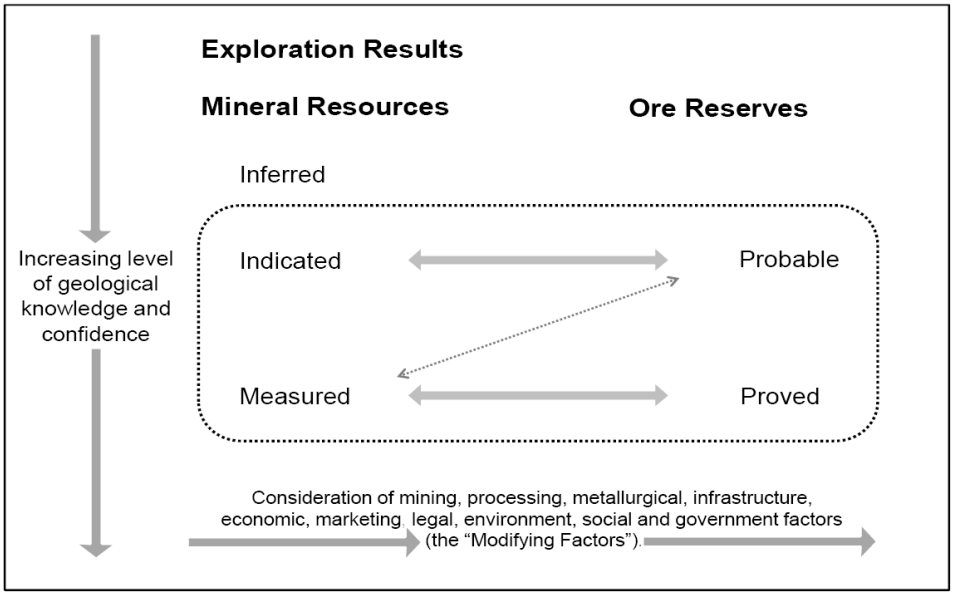


Figure 47. Relationship between Exploration Results, Mineral Resources & Ore Reserves.

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

Ozcan Yigit (2009) Mineral Deposits of Turkey in Relation to Tethyan Metallogeny: Implications for Future Mineral Exploration. Economic Geology (2009) 104 (1): 19-51.

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

Dirk H. Wagner
Mining Consulting

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

Table of Contents

1 Introduction 4
2 Waste Volume 4
3 Production Plan 4
4 Production Approach 6
5 Operating Cost 6
5.1 Mining 6
5.2 Owner's Team 6
5.3 Processing Cost 7
5.4 General & Administration 7
5.5 Licence Fee 7
5.6 Contingency 7
6 Capital Expenditure 7
6.1 Mining Equipment 7
6.2 Further Studies 7
6.3 Infrastructure 7
6.4 Pre-Stripping 7
6.5 Processing Plant 7
6.6 Owner's cost 8
6.7 Others 8
6.8 Contingency 8
7 Cash Flow 8

List of Tables

Table 1 – Mineable Resource 5
Table 2 – Production Plan 5
Table 3 – Cash Flow Calculation 9

List of Annexes

Annex 1 – CV of Dirk H. Wagner

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 m^3. Assuming a waste density of 2.5 t/m^3 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

Dirk H. Wagner
Mining Consulting

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

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** **Essen / Germany** **Senior Project Manager**
From 2008 to 2011	**Bucyrus Europe GmbH** **Saarbrücken / Germany** **Senior Project Manager**
From 2000 to 2008	**IMC Montan Consulting** **Essen/ Germany** **Senior Project Manager**
From 1992 to 2000	**Sachtleben Bergbau Services GmbH** **Lennestadt / Germany** **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

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

---

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: - updating of reporting system - preparation of life of mine plan (LOMP) - preparation of economic studies - 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

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