GEOLOGY NOTE

For the results from the check of information for searching geology works executed in block #26 in Sudan

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Introduction

This report was commissioned from „ENERGY 4 EUROPE" LTD, Sofia.
For this purpose the author together with company representatives visited Sudan in the period 14 - 17. 12. 2010.
At the place with the representative of "VARUNMETALS & MINERALS" ltd company, Mr. Mohammed Hassan Gangari, were visited the areas in which in 2004 were carried out preliminary survey work. Bypass routes of the sections which are interesting from an economic perspective were made. New samples from sites that were already sampled before were taken. All samples and routes are determined with GPS, so after that the results can be comparable. A preliminary geological view of opened up rock and mineral types, structural features and tectonic disturbances was carried out. Photographs were taken. The samples taken were processed and forwarded to the National Laboratory "EUROTEST – CONTROL" EAD, Sofia, for quantity determination the content of gold and microscopic description of the joint prepared for this purpose. Processing of results and interpretation of collected information were made by the author of this report and provided to the assignor.

1. Location of the plot.

Concession block № 26 is located in northern Sudan, about 350 km north of the capital - city of Khartoum and about 420 km west from the shores of the Red Sea and the city of Port Sudan.
The area is about 800 km2 and is located on the left along the Nile, between the towns Atbar and Berber. The length of the area on the north - south axis is about 40 km and the east - west about 20 km. Eastern boundary of the area is located near the Nile (2-3 km).

2. Short geological characteristics of the region

The area is part of the southeastern part of the Libyan and Nubian deserts.

The major part of the Sudan territory can be related to the south-western part of Afro-Arabian sheet, where the main subsurface geology elements are: 1) platform mantle; 2) new greenstone Riphean belts; 3) granite-gneissic regions; 4) transition structures from greenstone Riphean belts to granite-gneissic regions (Fig. 2). Areas of virtually general time-through (dating down to Cainozoe) tectonomagmatic activation of ancient formations arc very important elements of the subsurface geology.
Platform mantle includes Pliancrozoic flat complexes, occurring mainly in the central part of Sudan. It is characterized by low auriferousity.

New greenstone Riphean belts, occurring in north-eastern and eastern parts of Sudan, arc the most gold-bearing formations, which is confirmed by numerous ore and gravel deposits, having been developed from 4000 B.C. until now.
Granite-gneissic regions, identified in the central part of Sudan, arc classified as low-auriferous type of Precambrian formations. However, there were discovered and proven recently a number of gold deposits in the similar geologic conditions in the Ukrainian shield, so they can possibly be revealed in Sudan.
Transition structures from greenstone Riphean belts to granite-gneissic regions differ from the latter by intensive manifestations of basic and ultra - basic rock magmatism products and more intensive fold and rupture tectonic manifests, as well as great zones of regional schistosity, and so on. They are characterized by rather high auriferousity and a number of commercial deposits currently under development (namely, at the license block # 11).

3. Historic reference

The first gold on Earth was found in the Arabian desert intermittent wadis, several hundred km far from the territory under research, that is from the block # 26. This is evidenced by archaeological findings of the most ancient golden decorations, revealed in the identified and dated layers of the so-called herzey culture (4100-3900 B.C.) in the Nile valley. The brazen age (3900-2100 B.C.) gold was mint from ore and gravel deposits of Arabian and Nubian deserts. According to G. Kveering, about 700 tons of gold was extracted during this time in this first on Earth auriferous region. The Arab word for gold *(nub}* has given the name to Nubia - "the country of gold". Egyptian Pharaohs concurred the Eastern (Nubian) desert for its gold, and seasonal expeditions gave place to permanent settlements around mining sites.
The second millennium B.C. was the era of the highest prosperity of Arabian-Nubian gold-bearing province. According to G. Kveering, during 900 years of the Bronze Age (2100-1200 B.C.) it was extracted here about 1600 tons of gold. In Ethiopia they mined only 50 tons of gold for the same period of time.
Each Egyptian kingdom started with Nubia conquest, and ended with its loss. In the Middle Kingdom the Arabian-Nubian province development was marked by revelation of many of the gold placers of "miserable country of Kush". New Kingdom (1580-1090 B.C.) was a long-lasted period of ancient Egypt highest flourishing, expressed in the top level culture of gold. All gold-bearing areas of Egypt and Nubia reached their 'greatest development. Further military penetration far into Africa was followed by further gold prospecting: in 1530 B.C. Nubia was conquered again, in 1440 - southern countries up to the Nile 6^{lh} rapids, including the richest placers of the upper Athbara, were joined to Egypt. Penetration far into Nubian desert along Wadi-Allaki, that is to the country of gold Akita, is dated back to 1282 B.C., when gold placer and ore deposits started to be developed intensively.

The Iron Age (1200-30 B.C.) is the closing chapter of the longest period of Ancient Egypt gold, the main supplier of which being Sudan. Starling from the last age of New Kingdom (1200-1090 B.C.) up to the end of Ptolemaic rule (in the 30-s B.C.) in the Nubian district about 500 tons of gold were extracted, and in the adjoining Upper Egyptian district - about 400 tons.
During Middle Ages and up to the middle of last century deep levels of the deposits known from antiquity were developed time and again in Egypt and Sudan, but remained insignificant.
On the basis of the above the following conclusions can be made:
Gold has been extracted from rich placers and ore deposits containing do/tens grams of gold per ton.
The total depth of extraction hardly ever went lower than 40-50 m.
Thus, reserves of gold in ledge ores in the northern part of Sudan at higher levels can reach as much as thousands tons. Therefore, the expediency and methods of geological prospecting and revision of this region must be carefully weighed and considered.

4. Short geological characteristics of bl. 26

The block is represented primarily by the prospect area (ore field) Abu Khasus.
The prospective area of Abu-Khasus was identified on the basis of the following features:
wide manifestations of gold-bearing pink and red quartz;
intensive development of ruptured tectonics;
intensive development of granitization products; in the central part of the territory there is
an ancient granitoid intrusion;
wide evidence of ancient gold-diggers' work.
Crystalline schists play an active role in the subsurface geology of the area They are divided into several levels spread in sub-meridian directions. In western and central parts there arc quartz-feldspar-mica formations, generally more or less granitized. Further to the cast the quartzite monomineral crystalline schists with biotite-muscovire packs. Small amphibolite bodies can be seen all over the territory.
Ruptured tectonics is manifested very intensively. Virtually the whole prospective area is crossed by a mighty over 3 km meridian ruptures zone. Over 10 branches of different structure and history can be identified here: 1) breccia zone; 2) silicification and quartz veins zone; 3) separate ruptures, cured by pegmatite dikes. There can be possibly found the same mighty zone of latitudinal ruptures.
Hydrothermal metamorphism of the enclosing rocks is manifested in silicification, sericitization, biotitization, muscovitization, epidotization, ferritizing (at the account of ingrained pyrite oxidation), and less frequent pyritization itself.
Geologic-structural position of the prospective area is determined by two main factors: it is a point of crossing of two mighty rupture zones having as minimum regional significance; granite intrusion in the central part of the area, the

composition, structure, age, and a number of other features of which show its possible gold ore productivity.
Proper gold-bearing zones of silicification and quartz veins picked in south-eastern exocontact of the granite intrusive massive.
The ore material composition is quite simple. In fact, all of the studied varieties arc of gold-quartz low-sulphite type. Sulphite content is 1 to 3 %, on the surface at the oxidation zone they are represented, mainly, by ferric oxides and hydroxides - haematite, goethite, and limonite . Occasionally in ground material and polished sections there can be found pyrite.
Gold is mainly confined in most ferritizcd (pyritized) varieties of quartz.
In Abu-Khasus ore body an ore center can be identified consisting of three sites: *Prospectors', Prospectors'-Eastern* and *Faulted;* a separate site of Om-Odun is located to the north-east of it.

5. Executed searching and surveying works up to the moment

In the autumn of 2004 (from 04.10 to 09.11 2004) a group of *InterbiicliuonUizh* CJSC specialists conducted familiarization work in Northern Sudan, as well as reconnaissance exploration and prospecting of the block # 26 (Fig. 1).

Block # 26 investigations included:

- Motor reconnaissance exploration with prospective ore-bearing rocks description and testing;
- Abu Khasus area subsurface geology investigation: rock complexes, folds, fault fissures, vein bodies, geomorphology features, etc.;
- Furrow and point-dotted testing of quartz veins and hydrothermally modified rocks in ledge rock outcrops, as well as wadi schlich testing with prospect holes and bore pits digging.

Field work volumes are given in Table 1.

Table 1. Field work volumes

#.	Entries	Measurement units	Volume	Note
i	Exploration car routes	km	2100	
2	Ledge rock furrow sampling	sample	126	
3	Furrow schlich sampling from prospect holes and bore pits	sample	84	
4	Schlich samples and nporoiiOMCK sluicing	sample	136	

5	Schlich and concentrate binocular examination, metal content determination	schlich,	84	

Field materials were tested at the Geological Service of Ukraine specialized laboratories. The work volumes are given in Table 2.

6. Valuation of the predicted gold resources

The estimated gold deposits have been evaluated for different sections in the category P2 - estimated resources (Russian classification of reserves), where the margin of error is + 80%.

6.1. In the Prospectors area, the estimated resources are evaluated on the basis of the sampled ore mass in the central place of an area of 200x1000 m, where the frequency of the area (section) of the housing is inclined at less than 2% of the width of the area. Accordingly, the rock mass of the ore bodies at depth of 100 m is calculated using the following formula:

Width - 200 m
Length - 1000 m
Correction factor of the total area (total horizontal power of the ore veins - 2% of the power of the zone), KK = 0.02
Depth - 100 m
Volumetric Weight - 2.7 t/m3

V = 200 x 1000 x 0.02 x 100 x 2.7 = 1.08 million tons

The average metal content is calculated by following the method of weighted average (of content and power) of all productive quartz veins of pink and red quartz:

$$Sф = \frac{\Sigma S}{\Sigma M} = 16.3 \text{ g / t}$$

Weighted average metal content seems somewhat exaggerated in the intuitive assessment and provisionally accepted value of 10 g / t. Then the expected gold resources at Prospectors will be:

1.08 million tons x 10.0 g / t = 10.8 t

6.2. Estimated resources Prospectors - eastern can be evaluated in the same way. Productive area of 200 x 900 m was marked in the center of the site (field), where 2% of the productive development of quartz estimated, the average metal content is defined based on analysis of performance quartz and refers to 100 m depth.

V = 200 x 900 x 100 x 0.02 x 2.7 = 0.97 million tons

The average metal content:

SF = (0.8 +1.15 +0.6 +0.97 +1.27 +8.6 +4.4 +10.2 +2.5): 9 = 3.38 g / t

Evaluation of gold resources: **0.97 million tons x 3.38 g / t = 3.3 t**

Therefore, total estimated resources of the P2 class at a depth of 100 meters is estimated at 2 million tons ore, 14.1 tons of gold with an average content of 7 g / t. It is assumed that such an assessment can be confirmed and even increased to 19-20 t only through a comprehensive geological study and with the proviso that additional ore bodies extend to not less than 1.400 m (25% of the expected ranges of the ore zones) with an average gold content above 25 g / t will be detected in the area. Taking into account the data obtained before, such contents are quite likely.
The potential for additional proof of ore minerals and findings in the licensed block № 26 can be measured on the basis of similar geological-structural positions, which are characterized by the following features: 1) development of granitizing zones, 2) intense manifestations of tectonic rupture, 3) presence of hydrothermal metamorphism - silification - products.

Apart from the two areas, the expected resource can be predicted and assessed in P2 class on the same features / characteristics that were used as the basis for identification of two places: Om-Odun and Foultid. Their mineral potential is estimated at 14 tons.
The potential of Placer gold, within the same ore field is estimated at 150-200 kg., with an average of 1 g/m3.
The mineral potential of the territory of Sudan is estimated based on the following: Nubian (Eastern) Desert in the north-eastern part of Sudan has given 1.000 to 1.500 tons of gold in ancient times (see Section 1). Ancient mining excavations rarely reached 40 m depth; according to S.D. Cher.
Three quarters of that gold was extracted from the ledge rocks (vein rocks), which makes about thousands of tons of gold with a concentration> = 20 g / t (Hebeit, Al Seed, Baram data field). About 80% of gold remains intact at a depth between 40 and 200 meters, which makes about 4,000 tons. With the coefficient of adjustment (reduction) of 0.6, we can expect no less than 2,000 tons of gold in high contents - up to 20 g / t.
The analysis of mineral-growing (genetic) map (see Figure 2) shows that the considered deposits relate to the geological conditions of the late Protozoic greenstone belts. The transitional zone to the granite-gneiss structures, where mining activities are currently taking place are a rich gold reserve of the total potential of Sudan. On this basis, we can evaluate the expected gold resources of the country to many thousands of tons and the development potential of this gold mining will significantly increase.

6. 3. Geologic description of the P2 category predicted resources

The predicted resources are characterized on the basis of the best studied *Prospectors'* site; according to the preliminary investigation, the rest of the sites are its total analogues.
1. *Ore-bearing conditions* are formed by ore bodies development in granitized crystalline schists (over amphibolites).
2.Stnictural-lithologic control depends on meridian and altitudinal rupture faults, as well as flat schistosity zones concordant with the enclosing rocks.
Flat low-thickness veins and sleep-grade veins and vein zones are the *morphologic types of ore bodies.*
Material composition of ores includes: quartz - up to 85-87%, enclosing rock debris up to 3-4%, ferric oxide - up to 2-3%, native gold.
By size gold can be divided into large (-1-0,1mm) - 20-30%, small (from -0,1 mm to 20-30 micron) - 40-50%, small and dispersed (less than 20 micron) - 20-30%. With the growth of gold content the amount of large gold increases. Gold alloy as measured on a touchstone is about 950-970.
Ore-dressing technology is preliminary assessed on the basis of the ore concentratibility as the gravitation one.
Gravitation technology of gold-bearing ores dressing allows to get rich concentrates (up to 2-2.5 kg/t) with 70-80% extraction. With more than 10 g/t gold content ores their tails will contain first g/t, so gold from those must be extracted following hydrometallurgical methods (cyaniclation by heap or vat leaching).

7. Reconnaissance and check of the available information

At the current stage (14-17 December 2010) in Sudan was made a preliminary check of the available information. For this purpose a visit to the territory of Block #26 was arranged.
The reconnaissances and sample taking were limited to one day.
Most of the already checked places were surveyed again, namely: *Prospectors*, *Prospectors – Eastern*, and *Faulted.*
Within the limits of Abu Khasus 55.5 km were visited and an area of 52.8 km was surveyed. The volume and type of the executed surveying works are given in Table 2.

Table 2

№	Entries	Measurement units	Volume
1	Exploration car routes	km	55
2	Samples of rocks	qty.	14
3	Atomic - absorption analysis	qty.	14
4	Selection analysis	qty.	2
5	Binocular examination of schlichs	qty.	3

Rock samples from 14 points were taken, from several prospective areas. Samples were taken from two sections of alluvial deposits on the surface made of gravel and tiny fractions - sand. These sections are formed by the weathering of rocks on the surface and creating conditions for the formation of deposit for gold of spilled type (Placer gold, pic. 7 and 8)). The power of these sections is set to 2-3 m.

Excavations were carried out on all plots from which samples were taken and even industrial quantities of previous and amateur prospectors. (See photographs).

The scale of these amateur digging are best visible in the plot Girgira (photo. 3 and 4)



Photo 1



Photo 2

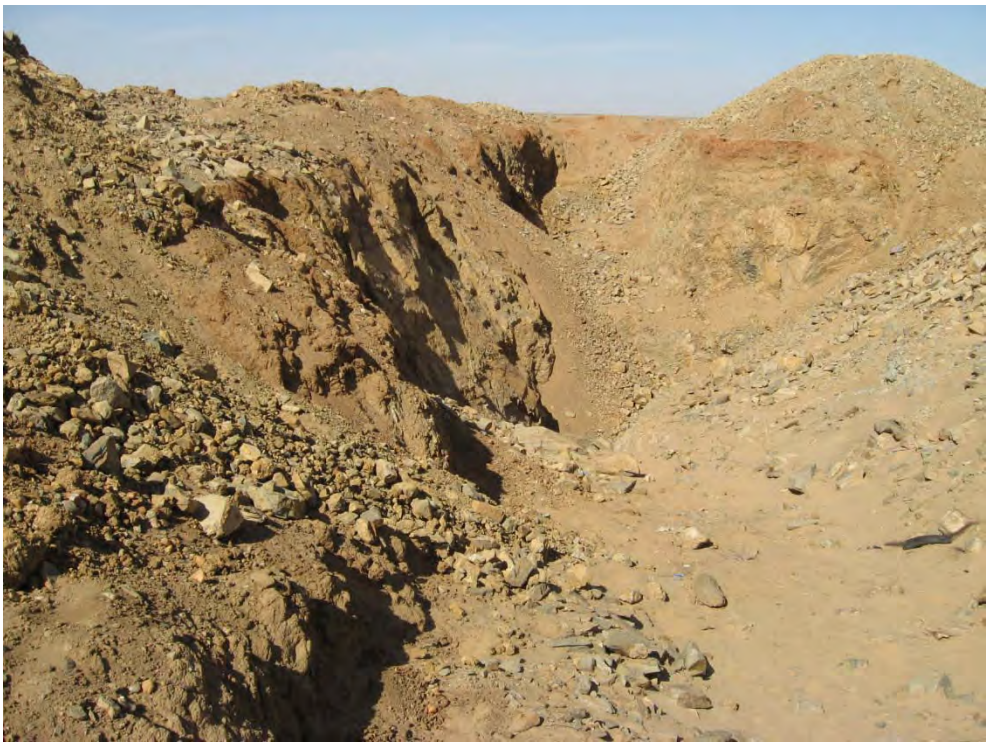


Photo 3



Photo 4



Photo 5



Photo 6



Photo 7



Photo 8

From reconnaissance of undersurface geological, geomorphological, mineralogical and lithological findings and also after learning of the information provided it can be concluded that this is a region of ancient rock formations, rocks of Proterozoic age – granites and granitoids. On the exocontact of this intrusion the rocks are hydrothermally altered and sulphide-rich solutions had impregnated the rocks (there are traces of mass pyritization). As a result of surface exogenous processes - under the influence of precipitation and temperature in the upper part of the bodies the sulfides are decomposed, and the iron minerals are oxidized and transferred into other mineral forms - limonite, goethite, hematite, which form the reddish color of the rocks on the surface. Carriers of the pyrite minerals and now of the gold deposits, are the quartz veins that slash granites. The thickness of the quartz veins varies from a few centimeters to 0.4 - 0.5 m. (Photo 6). The veins are not single but in a system (Alteration of dwellings) with power up to 4-5 m.
In the so-called placer fields, the gold in the form of native gold particles - with dimensions of several microns to 0.1 - 0.3 mm was redeposited after weathering and crushing of the subsurface rocks and is concentrated in the bottom of the weathering layer.

Comparative table

Table 3

New sample, №	Old sample, № (name of area)	New sample, Au content, g/t		Old sample, Au content, g/t
		AAS	Пробирен	
2	057	1.83	-	5.004
3	007	3.58	-	7.722
4	-	1.38	-	-
6	(Placer gold)	Missing	-	
6.1	(Placer gold)	< 0.05	-	-
6.2	(Placer gold)	0.10	-	-
6.3	(Placer gold)	0.15	-	-
7	002, (Girgira)	1.80	-	20.574
9	034	1.48	-	39.609
10	-	~ 19.6	17.6	-
11	081	~ 78.5	77.2	46.980
12	083	0.36	-	4.059
12 б	084	3.34	-	80.595
13	(Placer gold)	0.07	-	1.2 г/м^3

The taken samples were given for laboratory and chalcographer research in the national laboratory "EVROTEST – CONTROL" LTD., Sofia.

14 samples were analyzed through atom absorption analysis (with equipment VARIAN SPECTR AA 55B) which a contemporary method for determination of gold with high accuracy. The samples with higher content were repeated on another method which most accurate for quantitative determination of high contents – selection analysis (table 3). Thus was confirmed the determined high content of gold in samples 10 and 11.
In all samples except sample 11 the data is very different (in some cases tens of times) from the present results.
From the ore minerals the following are present: –
pyrite, chalcopyrite, magnetite and hematite. None of the samples is showing the presence of nugget. Of the non ore minerals the following are present: quartz, mica, amphibole, feldspar, ilmenite, carbonates and other rock forming minerals.
The structure of the primary and secondary ore minerals was defined – primary: Hypidiomorphic granular – for pyrite, secondary: zone and concentric zonal – for the iron hydroxides.
The mineral paragenesis and the order of sedimentation cannot be determined because of the lack of ore minerals.

Conclusion

In conclusion, after a comparison of the results of the stages of survey we can summarize the following:
It is indeed a potential ore area in which places with industrial concentration of gold are located.
The content of gold from identical areas but form different samples are not confirmed in order of tens of times.
anyway the received results are enough for an interest to license block 26, because content above 1g/t are industrial and here we have samples exceeding several to tens of times this content (samples 2, 3, 12b, 10 and 11).

Conclusions and recommendations

The conclusions which can be made at this stage are:

1. Until now only subsurface surveys are made.
2. With this volume and method it is not possible to determine the final industrial potential of ore field ABU KHASUS.
3. An ore area is located and with searching works the most perspective places in it are located.
4. The general geological characteristic of the area is determined.
5. The mineralogical composition, the type of presence and the content of gold in deep are not clear.
6. The genesis of the ore mineralizations is not clear.

7. There is no enough data for quantitative determination of the volume and content of ore in the field.

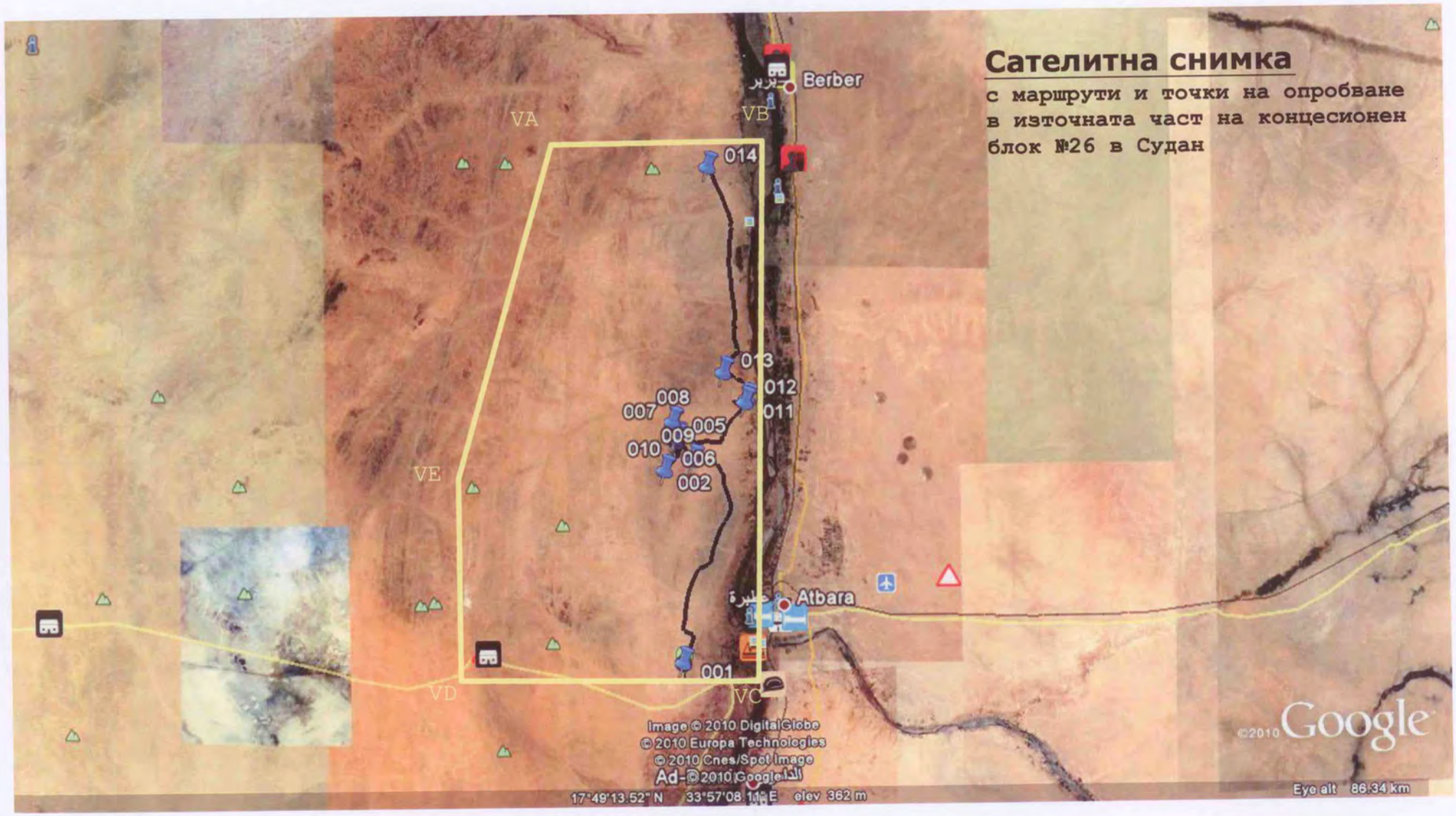
In relation with this the following recommendations can be made:

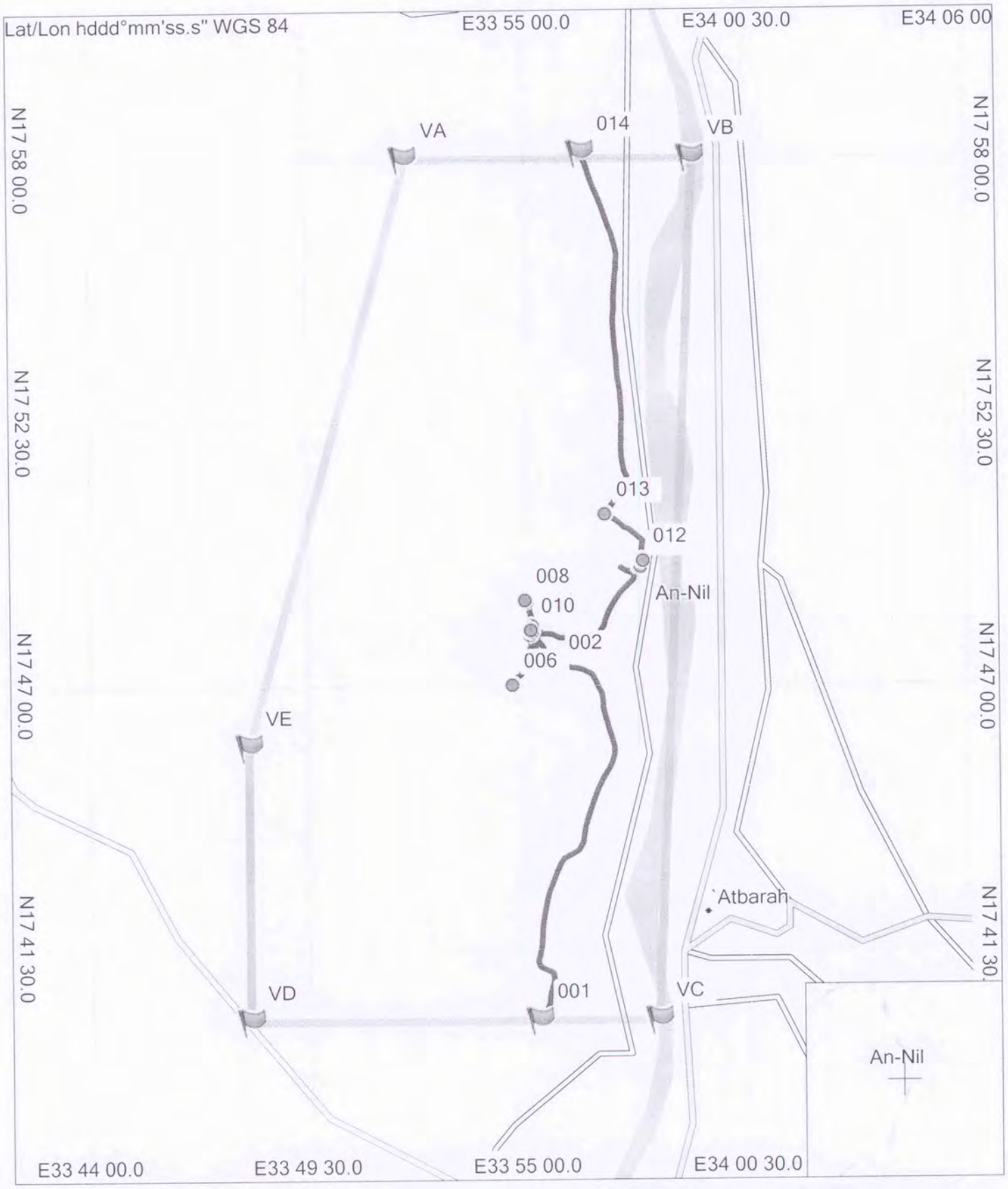
1. A detailed geological survey with boring in the most perspective areas with calculation of the reserves of gold bearing ore should be made.
2. The mineral composition of the ore in depth of 100 m should be determined.
3. A technological sample should be taken and semi industrial surveys for the extraction of the gold from the ore should be made.
4. A technological and techno-economic evaluation of the possibility of future gold mining should be made.

Only then the next stage can be developed – construction of mine (quarry) and installation for processing of the ore.

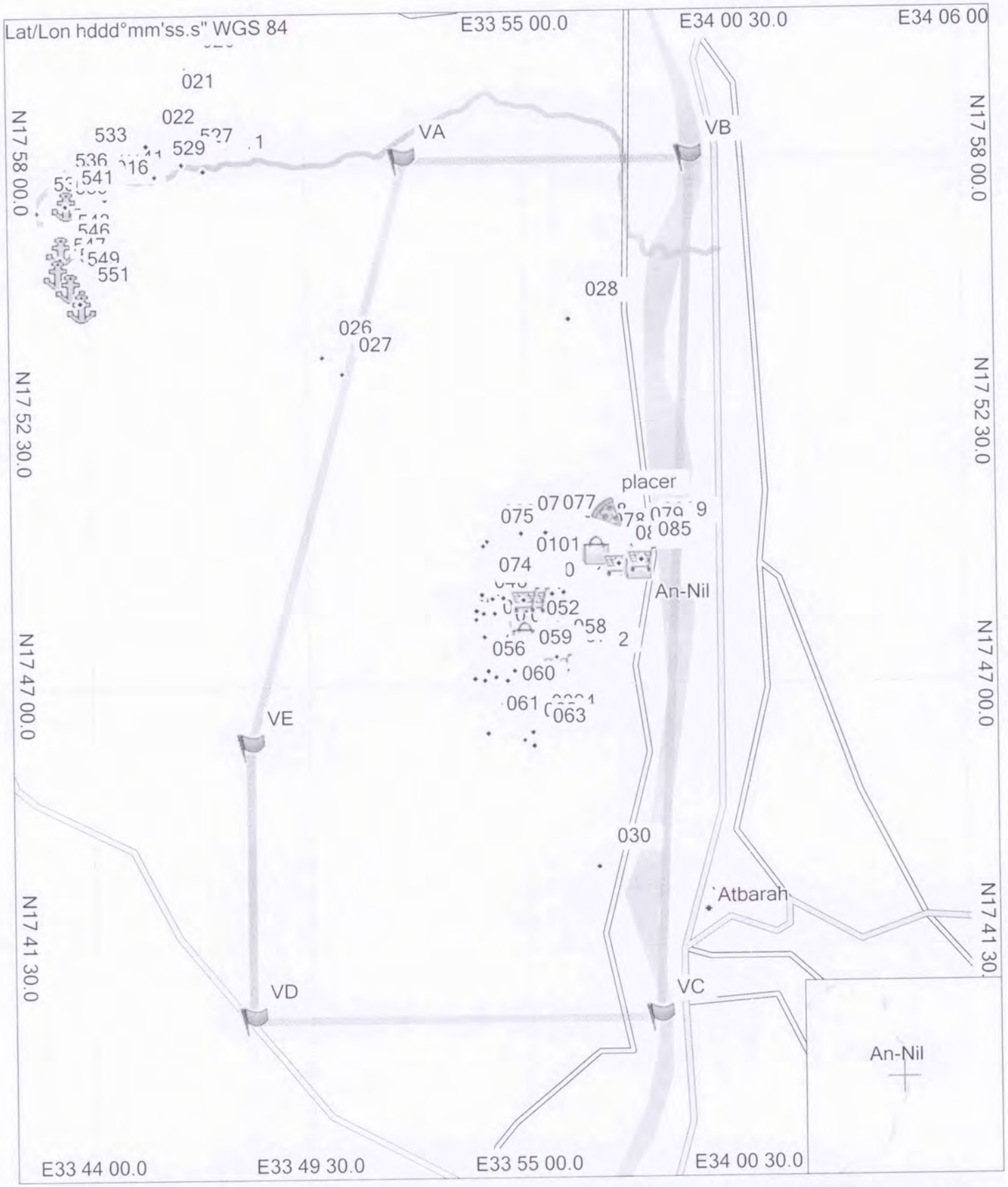
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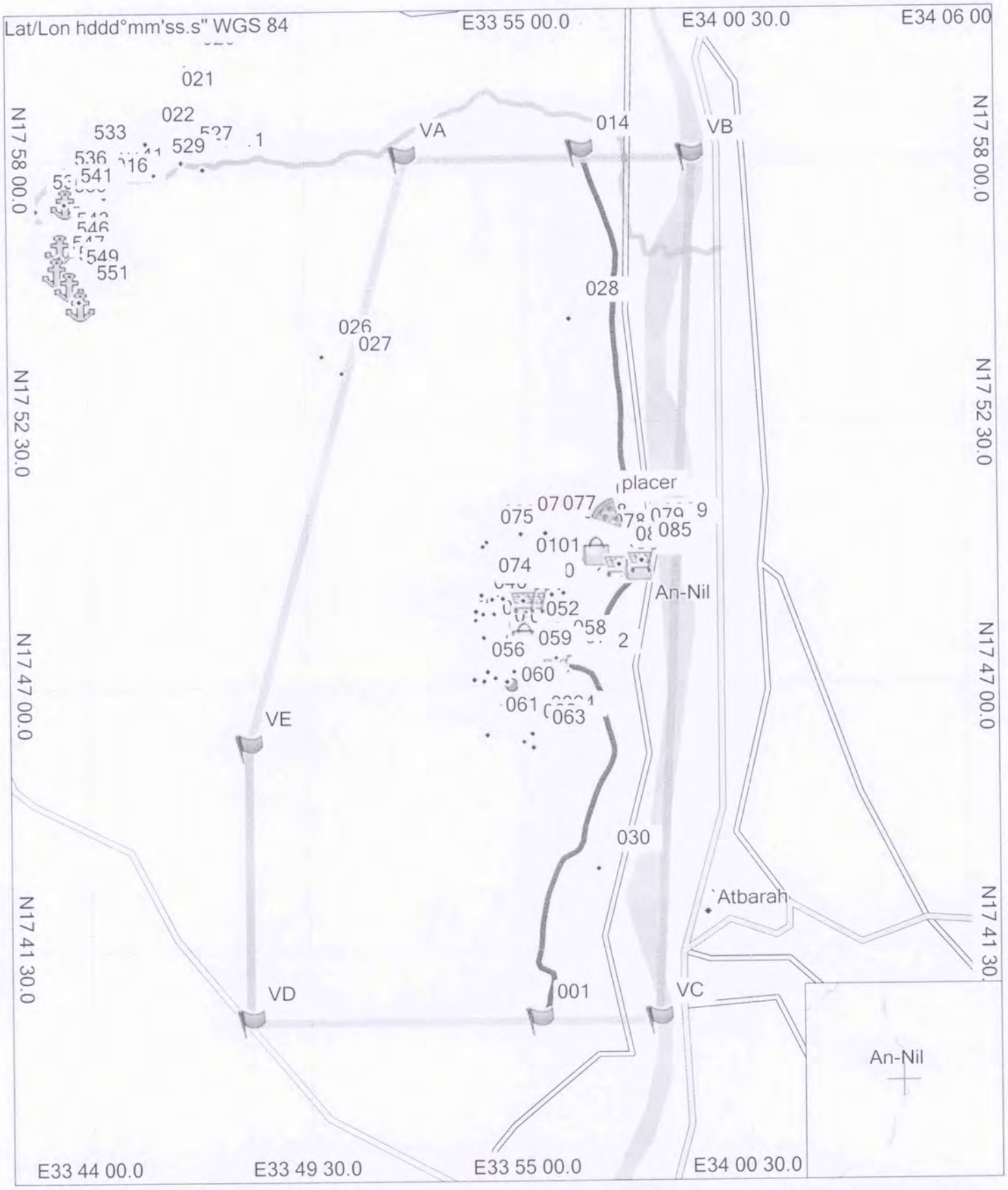
/Eng. Angel Karagjozov/

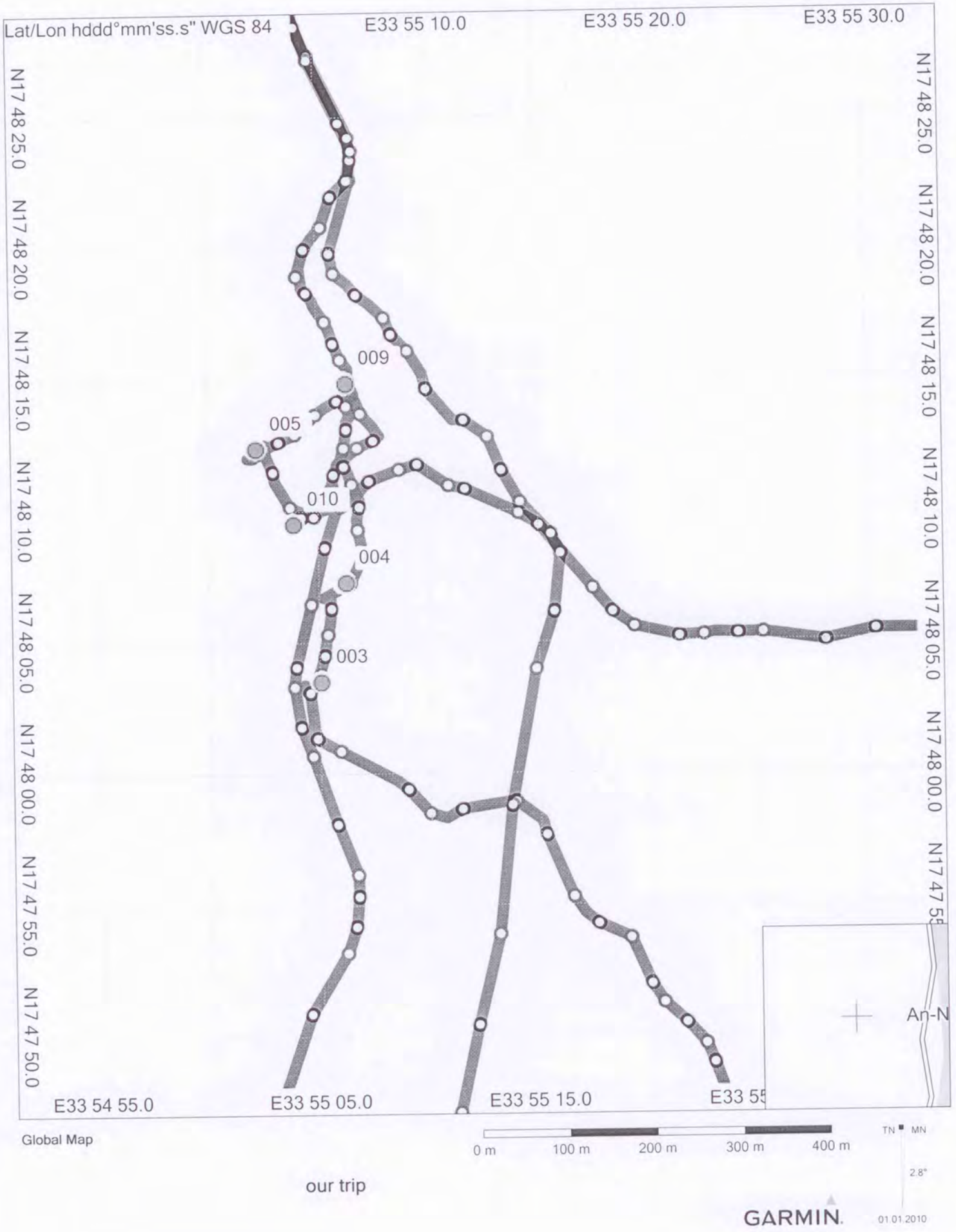

Сателитна снимка
с маршрути и точки на опробване в източната част на концесионен блок №26 в Судан
Berber
VA
VB
VC
VD
VE
014
013
012
011
008
007
005
009
010
006
002
001
Atbara
Image © 2010 DigitalGlobe
© 2010 Europa Technologies
© 2010 Cnes/Spot Image
Ad-© 2010 Google
17°49'13.52" N 33°57'08.11" E elev 362 m
©2010 Google
Eye alt 86.34 km


Lat/Lon hddd°mm'ss.s" WGS 84
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E34 06 00
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N17 52 30.0
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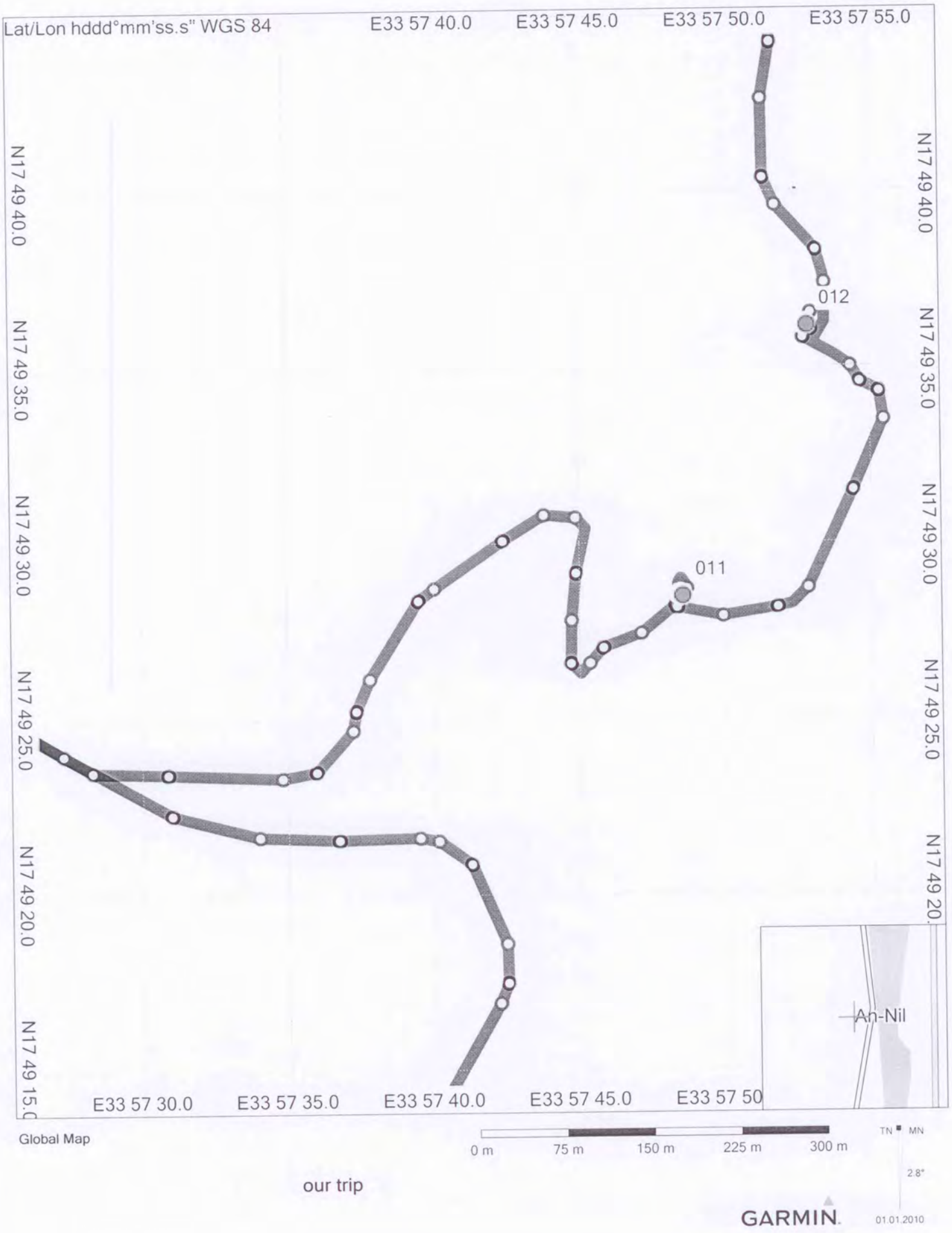
our trip


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01.01.2010

our trip


Lat/Lon hddd°mm'ss.s" WGS 84
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E33 57 45.0
E33 57 50
Global Map
0 m
75 m
150 m
225 m
300 m
TN
MN
2.8°
GARMIN
01.01.2010

our trip

ДИРЕКЦИЯ ИЗПИТВАТЕЛНА ЛАБОРАТОРИЯ
КЪМ ЕВРОТЕСТ-КОНТРОЛ ЕАД
София 1797, бул. „Г. М. Димитров" № 16 , тел. (02) 9651-600; тел./факс (02) 8720 596 ; www.eurotest-control.bg, E-mail:lgi@inet.bg

Сертификат за одобрение по ISO 9001/2008 No. SOF0207186 LRQA

Отдел „Химични изследвания"

Протокол № 6.1 – 014 / 14.01.2011 г.

Възложител: „Нелко 22" ООД
Обект: Судан – концесионен блок 26
Вид и брой проби: скални – 13 броя.
Заявка: вх. № 2058 / 21.12.2011 г.

Резултати от химичен анализ

Лаб. №	Проба №	Au – AAS g/t	Au – пробирен g/t
14079	2	1.83	-
14080	3	3.58	-
14081	4	1.38	-
14082	6	липсва	-
14083	6.1	<0.05	-
14084	6.2	0.10	-
14085	6.3	0.15	-
14086	7	1.80	-
14087	9	1.48	-
14088	10	~ 19.6	17.6
14089	11	~ 78.5	77.2
14090	12	0.36	-
14091	$12^б$	3.34	-
14092	13	0.07	-

Извършил анализа:.....
инж. С. Михайлова

.....
инж. Р. Маркова

Ръководител отдел:.....
А. Райчева

Приложение към Протокол № 6.1 – 014 / 14.01.2011 г.

Резултати от контролните измервания за AAS анализ

Лаб. №	Проба №	Au g/t
1111k	FMS-2	1.12
FMS-2	Серт. ст.	1.011

Метролог:.....
Н. Михайлов

ДИРЕКЦИЯ ИЗПИТВАТЕЛНА ЛАБОРАТОРИЯ
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Сертификат за одобрение по ISO 9001/2008 No SOF0207186LRQA

Протокол No.	6.2-1/14/13.01.2011 г.
Входящ No.	2058/21.12.2010 г
Възложител:	„Нелко 22" ООД
Лабораторен No.	4365л
Обект:	Судан
Участък:	Концесионен блок 26
Проба No.	9
Място на вземане:	-
Полево определение:	-

ХАЛКОГРАФСКО ОПИСАНИЕ

I. ВИЗУАЛЕН СЪСТАВ НА РУДАТА: Визуално не се наблюдава първична рудна минерализация. По пукнатини, пори и петнесто в плътния, млечнобял кварц, от който е изработен полирания образец са проникнали железни хидроксиди, оцветявайки кварца в ръждивочервеникаво.

II. ТЕКСТУРА НА РУДАТА: впръслечна

III. МИНЕРАЛЕН СЪСТАВ:

а) рудни минерали Количеството на рудните минерали попаднали в полираната повърхност е около 1%.

- главни: -

- второстепенни: -

- спорадични: пирит

Пирит. Пиритът се наблюдава в субмикроскопични индивиди със заоблени очертания с размери от 0.01 до 0.04 mm впръснати неравномерно сред кварцовата вместваща маса. По-едра генерация пирит с размери на зърната от 0.04 до 0.60 mm е напълно псевдоморфно заместена от железни хидроксиди. Железните хидроксиди заемат първичните автоморфни и хипидиоморфни очертания на променения сулфид.

- вторични: железни хидроксиди

Железни хидроксиди. Железните хидроксиди са образувани в зоната на окисление за сметка на псевдоморфно заместване на пирит. Агрегатите и индивидите от железни хидроксиди са със зонален и концентричнозонален строеж. Процесът на заместване е бил доста интензивен, защото почти не са запазени реликти от пирита сред агрегатите от железни хидроксиди. По оптични показатели железните хидроксиди могат да бъдат

отнесени към групата гьотит-хидрогьотит. Железни хидроксиди също са преотложени по пукнатини и пори в кварца, оцветявайки го петнесто в ръждивожълтеникаво.

б) нерудна маса

- скална: Образецът, от който е изготвен полирания препарат е от плътен млечнобял кварц оцветен петнесто от диспергирани или проникнали по пукнатини железни хидроксиди.

- асоцииращи жилни минерали: -

IV. СТРУКТУРА НА РУДНИТЕ МИНЕРАЛИ: първични: хипидиоморфнозърнеста за пирит; **вторични:** зонална и концентрично зонална – за железни хидроксиди;

V. МИНЕРАЛНИ ПАРАГЕНЕЗИ И РЕД НА ОТЛАГАНЕ: неясни поради оскъдната рудна минерализация;

Видимо самородно злато не се наблюдава в изследваната полирана повърхност.

Извършил анализа:.....
/ В. Стаматова /

Ръководител отдел:.....
/ инж. Хр. Станчев /

ДИРЕКЦИЯ ИЗПИТВАТЕЛНА ЛАБОРАТОРИЯ

КЪМ ЕВРОТЕСТ-КОНТРОЛ ЕАД

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Сертификат за одобрение по ISO 9001/2008 No SOF0207186LRQA

Протокол No.	6.2-1/15/13.01.2011 г.
Входящ No.	2058/21.12.2010 г
Възложител:	„Нелко 22" ООД
Лабораторен No.	4366л
Обект:	Судан
Участък:	Концесионен блок 26
Проба No.	10
Място на вземане:	-
Полево определение:	-

ХАЛКОГРАФСКО ОПИСАНИЕ

I. ВИЗУАЛЕН СЪСТАВ НА РУДАТА: Макроскопски, образецът от който е изработена полираната пластина е от силно променена, ронлива, песъчлива маса, състояща се от кварцови късчета с размери от 1-2 mm до 2-3 cm, със заоблени и по рядко с ръбести очертания, споени от дребнозърнеста маса състояща се главно от кварц, слюди и по-рядко карбонати и др. Късовете и спойката са пропити от железни хидроксиди, които придават ръждивожълткеникав цвят на скалата. По обветрени повърхности на образеца се откриват налепи от манганови хидроксиди. Визуално не се наблюдава първична рудна минерализация.

II. ТЕКСТУРА НА РУДАТА: впръслечна, гнездовидна

III. МИНЕРАЛЕН СЪСТАВ: Първична рудна минерализация се открива в късчетата от кварц. Количеството на първичните и вторичните рудни минерали е общо 2%.

а) рудни минерали

- главни: -

- второстепенни: -

- спорадични: пирит, халкопирит, магнетит, хематит;

Пирит. Пиритът се наблюдава в редки субмикроскопични впръслеци с неправилни очертания с размери на индивидите от 0.01 до 0.03 mm, предимно в самостоятелни агрегати и по-рядко в асоциация с халкопирит и магнетит. Пиритът е неравномерно впръснат в кварцовите късчета и липсва в ронливата кварц-слюдена спойка на скалата. По-едра генерация пирит с размери на индивидите до 1-2 mm е напълно заместена от железни хидроксиди.

Халкопирит. Халкопиритът е представен в много оскъдно количество в полираната повърхност на препарата. Открива се в субмикроскопични агрегати с размери от 0.01 до

0.04 mm, предимно в асоциация с пирит и магнетит, рядко се наблюдава в самостоятелни агрегати сред кварцовите късчета и не се наблюдава в спойката на скалата.

Магнетит и хематит. Двата минерала се наблюдават в единични агрегати, предимно в асоциация с пирит и халкопирит и железни хидроксиди, сред кварцовите късчета. Агрегатите им са с алотриоморфни неправилни очертания с размери от 0.01 до 0.05 mm.

- вторични: железнни хидроксиди;

Железни хидроксиди. Те преобладават по количество сред останалите рудни минерали. Образувани са в зоната на окисление на първичната сулфидна минерализация, като са заместили напълно първичния железен сулфид, заемайки неговите кристални очертания. Процесът на псевдоморфно заместване е бил интензивен и е довел до напълно излужване на първичния сулфид. Запазени са кухини на излужване в централните части на агрегатите от железни хидроксиди. Агрегатите на железните хидроксиди са със зонален, концентричнозонален и коломорфен строеж.

б) нерудна маса

- скалпа: Образецът е от силно ронлива песъчлива скала, пигментирана в жълточервеникаво от диспергирани железни хидроксиди.

- асоцииращи жилни минерали: -

IV. СТРУКТУРА НА РУДНИТЕ МИНЕРАЛИ: първични: хипидиоморфнозърнеста – за пирит; алотриоморфнозърнеста – за магнетит, хематит и халкопирит;

V. МИНЕРАЛНИ ПАРАГЕНЕЗИ И РЕД НА ОТЛАГАНЕ: неясни поради оскъдния минерален състав на рудната маса;

Видимо самородно злато не се наблюдава в изследвания образец.

Със стеромикроскоп е изследвана също разтрошената, раздробена фракция получена след изработването на аншлифа. Бяха установени следните минерали: кварц, слюди, амфиболи, хлорит, фелдшпати, илменит, хематит, магнетит, халкопирит, карбонати и др. скалообразуващи минерали. Самородно злато не беше установено.

Извършил анализа:.....
/ В. Стаматова /

Ръководител отдел:.....
/ инж. Хр. Станчев /

ДИРЕКЦИЯ ИЗПИТВАТЕЛНА ЛАБОРАТОРИЯ

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Сертификат за одобрение по ISO 9001/2008 No SOF0207186LRQA

Протокол No.	6.2-1/16/13.01.2011 г.
Входящ No.	2058/21.12.2010 г
Възложител:	„Нелко 22" ООД
Лабораторен No.	4367л
Обект:	Судан
Участък:	Концесионен блок 26
Проба No.	12б
Място на вземане:	-
Полево определение:	-

ХАЛКОГРАФСКО ОПИСАНИЕ

I. ВИЗУАЛЕН СЪСТАВ НА РУДАТА: Визуално не се наблюдава първична рудна минерализация. Образецът, от който е изготвен полирания препарат е от млечнобял, плътен, слабо тектонизиран халцедоновиден кварц. По пукнатини и микропукнатини в кварца са проникнали железни хидроксиди.

II. ТЕКСТУРА НА РУДАТА: впръслечна

III. МИНЕРАЛЕН СЪСТАВ: Количеството на вторичните рудни минерали попаднали в полираната повърхност е под 1%.

а) рудни минерали Първична рудна минерализация не се наблюдава.

- **главни: -**
- **второстепенни: -**
- **спорадични: -**
- **вторични: железни хидроксиди;**

В полираната повърхност на препарата се наблюдават три агрегата от железни хидроксиди с размери от 0.1 до 0.4 mm със зонален и концентричнозонален строеж. Те са неравномерно впръснати в плътната, млечнобяла кварцова маса и са образувани като пълни псевдоморфози по първичен сулфид, най-вероятно по пирит. Железните хидроксиди са отложени също в зони на напукване. Диспергирани са по пори в кварца, като го пигментират в отделни участъци в ръждивочервеникаво.

б) нерудна маса

- **скална:** млечнобял, плътен, халцедоновиден кварц;
- **асоцииращи жилни минерали: -**

IV. СТРУКТУРА НА РУДНИТЕ МИНЕРАЛИ: вторични: зонална и концентричнозонална – за железни хидроксиди;

V. МИНЕРАЛНИ ПАРАГЕНЕЗИ И РЕД НА ОТЛАГАНЕ: неясни

Самородно злато в изследваната полирана повърхност не се наблюдава.

Извършил анализа:.....
/ В. Стаматова /

Ръководител отдел:.....
/ инж. Хр. Станчев /