STATEMENT

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Practical and designer experience – 40 years.

Concerning: DRAWING UP OF TERMS OF REFERENCE FOR THE SCOPE AND CONTENT OF THE EIA OF THE PROJECT FOR MINING AND PROCESSING OF AURIFEROUS ORE FROM THE ADA TEPE SECTION OF THE KHAN KRUM DEPOSIT

PART "MINE"

BMM EAD have conducted prospecting and exploration for metal ores and minerals in the Krumovgrad License Area on the basis of Ruling No. 1 dated 09.05.2000 of the Ministry of Economy (ME); The contract for prospecting and exploration dated 12.06.2000, and 4 additional agreements: No. 1 dated 13.06.2003, No. 2 dated 15.03.2005, No. 3 dated 01,06.2005 and No. 4 dated 04.07.2007.

A report on the results from the geological survey for prospecting and assessment of the auriferous ores and reserves in the Khan Krum deposit was submitted to the Ministry of Economy at the end of 2004 describing the following sections – Ada Tepe; Sarnak; Skalak; Kaklitsa and Kapel, in the Krumovgrad exploration area as existing in 01.09.2004.

A commercial discovery was accepted and approved by the Specialised Panel of Experts with a protocol СЕК № НБ - 17/21.04.2005, conditionally named the Khan Krum deposit. BMM EAD were awarded Certificate 0417/28.08.2009 of Commercial Discovery under the Ores and Minerals Act (OMA), which is grounds for the provision of a mining concession under Article 51 of the Ores and Minerals Act.

The awarding of the concession was followed by the development of the overall detailed design.

Therefore, this EIA statement presents the final process-related solutions and the arrangement of the various facilities that ensure maximum utilization of ores and minerals while protecting the environment in accordance with the regulatory provisions effective in the Republic of Bulgaria.

I. GENERAL INFORMATION ABOUT THE OPEN PIT AND ITS FACILITIES AS PRESENTED IN THE TERMS OF REFERENCE FOR THE SCOPE AND CONTENTS OF THE EIA FOR THE MINING AND EXPLORATION OF AURIFEROUS ORE FROM THE ADA TEPE SECTION OF THE KHAN KRUM DEPOSIT

1.1. THE OPEN PIT MINE

1.1.1. Raw materials

The following resources will be utilised in the Ada Tepe section:

- probable reserves (code 122) -1,493 th.t. with gold content of 7.3 g/t and silver content of 4.3 g/t.
- measured reserves (code 331) 7,292 th.t. with gold content of 2.4 g/t and silver content of 1 g/t.
- There is a total of 28,186.6 kg metal gold and 13,943.6 kg metal silver in the ore. The calculated geological resources and reserves were established by 01.09.2004 g of gold content cut-off limit at Кб=0.9 g/t.

1.1.2. Contour of the mine

The contour of the mine includes all auriferous ore established through geological survey. The volume of mined material will be 22- 23 million tons. The ore will be 8-8.5 million tons. There will be about 14.6-15 million tons of overburden.

1.1.3. Productivity of the mine

The annual output of the mine will be 3,000 – 3,500 th.t/year (1,100- 1,300 th.m^3/year) of mined material with 850 – 1,100 th.t/year of ore for concentration. The Mine Waste Management Plan presents a tabular calendar schedule.

The hourly output of the concentrator plant will be 106 to 130 tons.

1.1.4. Operational arrangements

The mining operations will be subject to the arrangements for operations of the plant:

330 business days a year; 8,000 hours per year.

1.1.5. Technology of mining operations in the pit Choosing of the main mining equipment

- drilling
- blasting
- excavator works
- automotive transport

The boreholes will be drilled using one TAMROC – 1100 drilling machine.

With regard to dry boreholes – the explosives that will be used include ANFO, a mixture of ammonium nitrate and 6% of diesel by weight in the upper zone of the ore body and waterproof emulsion will be used for ore mining in the remaining parts.

The blasting materials will be provided by a specialised company. They will be transported as benign products from the plant in a special truck. This vehicle will deliver the products to the pit blast area, where they will be mixed to form explosives and immediately poured into the blast holes.

The project foresees 100 firing series per year, or two per week. Explosives to be used per one firing series is 7,000 kg – around 700 t per year.

A 120 t back-hoe excavator will be used to load the ore for flotation, the low-grade ore and the overburden.

Up to 5 dump trucks with a 50 t capacity each will be used to haul the ore to the process plant, and the low-grade ore and the overburden to external stockpiles.

Auxiliary mining equipment: bulldozer, grader, water tank truck, light off-road vehicles etc.

Depending on the hourly output rate (106 – 130 t/h), the ore from the mine will be stockpiled on the ROM pad in front of a feed hopper for crushing. From there the ore will be delivered by a front loader to a jaw crusher, whose production capacity will be 200-250 tph, and whose discharge end diameter will be 150mm.

1.1.6. System of operation

The work bench will be 2.5 m high. Perhaps it was set at that level on the basis of the cut-off grade or in order to minimise ore dilution during mining.

1.1.7. Term of operation

The term of operation at the annual ore output rate set at 850 – 1,100 th.t/year, will be approximately 8 years.

I.2. STOCKPILE WORKS – DISPOSAL OF MINE WASTE

Two alternatives for disposal of the process plant waste (tailings) are proposed:

Option 1

The ore will be reduced in the process plant to 40 µm, and the tailings will be consolidated to 56% solids. The tailings will be mixed with the overburden and will be disposed of externally to form joint stockpile. This stockpile will be configured as a waste rock stockpile, with terraces etc.

It will be named Integrated Facility for Mine Waste (IMWF) – in short: “The Facility”.

Option 2

Two independent facilities will be constructed: a waste rock stockpile and a tailings management facility.

The rock stockpile will be established on the southern slope downstream of the process site above the Krumovitsa River floodplain, i.e. its location is the same as in Option 1.

The TMF will be established in a location west of the Koldjik valley site. The projected TMF capacity is approximately 8.5 million tons of tailings ensuring 10 years of operation at a throughput rate of approximately 0.85 tons per annum.

The negative attitude by the population toward the TMF which had, during the former EIA hearing, to be established also in the Kaldzhik valley means that currently Altrernative 2 is not preferred.

It should be noted that at the time the tailings were to be disposed of after ore processing in a cyaniding process.

In that case Option 1 was given preference. The facility will be established 3 km south of the town of Krumovgrad, on the southern slope below the plant site, above the Krumovitsa River floodplain, some 150 m from the river. The footing of the structure is at an elevation of approximately 280 m. The lowest point of the facility, which is at the drainage chambers in the toe of the slope is 10 m above the highest registered level of the river. The facility will reach an altitude above sea level of 450 m, or approximately 15 m above the highest elevation of the natural terrain. Its design capacity is 14 million m^3, The tailings and the waste rock will be disposed of in the mine itself during the final year of mine operations. At the end of its life, the facility will be 170 m high. The facility and the mine will accommodate the entire volume of overburden and tailings from the Ada Tepe section.

In general, the overburden and the consolidated tailings will be disposed of jointly, and the rainfall that infiltrates into the facility and the water expelled from the tailings will be collected at the toe of the facility and added to the return water for the process plant.

The facility will be developed in stages from the bottom up, starting at the toe. Embankments will be made using overburden to form cells in which the tailings consolidated to 56% solids will be discharged. The embankments will be 10 m high. A period of time will be required for consolidation (dewatering) of the tailings. The consolidation time can be shortened if the tailings are discharged into the cells from a height of up to 2 m. Once the tailings is consolidated in one area (layer), the construction of new cells will be started and the process will be repeated.

The face (outer) side of the final facility will comprise 10 m high terraces with 5 m wide berms between them. The outer side will be filled with rockfill from the mine. The angle (slope) of the batter of a 10 m high step will be 21.8° (2.5

horizontal : 1 vertical). The batter of the facility will be built in stages using rockfill. These embankments will ensure the containment of the consolidated tailings. To prevent tailings being carried through the outer mine rock berm, a filter system will be placed on these berms. The filter system will comprise a drainage layer and/or geotextile. The drainage layer will be constructed from crushed rock. Addition of cement to the tailings may also facilitate their consolidation. The cement will amount to approximately 1% of the tons of processed ore.

The rockfill will be used to form a series of steps in the facilities and on the batter slopes, to ensure structural stability and draining of the water from the facility.

The low-grade oil stockpile will be established near the process plant. It will comprise a conventional stockpile with spreading of the material by bulldozer.

1.3. SITE ARRANGEMENT – LOCATION OF THE SITES (GENERAL LAYOUT)

The location of the sites (general layout) under Option 1 is presented in a drawing – Annex №

The total area required for the implementation of the project is as follows:

Option 1 – approximately 98 ha, including:

- the open pit mine (Ada tepe) – 17 ha
- a ROM ore pad – 3 ha
- a low-grade ore stockpile – 10 ha
- a process plant – 6 ha
- An Integrated Mine Waste Facility (IMWF) – 41 ha
- A soil and sub-soil material stockpile – 3 ha
- a retention pond (close to the open pit) and two collecting sumps (at the toe of the Integrated Mine Waste Facility) – 4 ha
- roads – 12 ha
- an abstraction well

Auxiliary facilities

- a fuel storage area
- a reagents store
- a carwash
- roads

The areas envisaged are forest areas and are included in the future concession.

Option 2 – approximately 158 ha, including:

- the open pit mine (Ada tepe) – 17 ha

- a ROM ore pad – 3 ha
- a low-grade ore stockpile – 10 ha
- A facility for the production of gold-silver concentrate (Process Plant) – 6 ha
- a flotation tailings management facility – 45 ha;
- a waste rock stockpile – 44 ha
- a soil and sub-soil material stockpile – 5 ha
- a retention pond and collecting sumps – 4 ha;
- roads – 15 ha
- a micro dam – 7 ha

The areas envisaged are forest areas and are included in the future concession.

Regarding the technology for mining and processing of auriferous ore from the Ada Tepe section and its various sub-projects, the paper contains various sections determining the parameters of the factors affecting the environment and human health (air, water, soil, occupational environment, flora, fauna, cultural values, protected areas etc.)

1.4. HYGIENE PROTECTION DISTANCES

The settlements near the Facility, at a hygiene protection distance of less than 1,000 m and which are subject to coordination with the Ministry of Healthcare in accordance with Regulation 7 of the Ministry of Healthcare, SG 46/1992 are:

- north – 636 m from Chobanka 1, 359 m from Chobanka 2;
- southwest – 979 m from the village of Sinap
- east – 455 m from the village of Kapel
- northeast – 757 m from the village of Pobeda;

All other hamlets included in the villages of Ovchari, Sarnak, Kaklitsa, Skalak etc. are at a distance of more than 1,000 m.

The town of Krumovgrad and its residential quarter of Izgrev are approximately 3,000 m away from the Facility.

1.5. SOCIAL EFFECT FROM THE IMPLEMENTATION

At the projected annual output rate of the process plant of 850 thousand tons of ore and approximately 3,000 thousand tons of mined material, the Ada Tepe section will be in operation for 8 – 8.5 years. Approximately 200 – 220 workers will be employed in the production process.

Provision for 1.5 years of construction prior to the operation and approximately 3 years for closure (rehabilitation, area restoration) are made.

II. ANALYSIS AND CONSIDERATION OF THE PROPOSED TECHNOLOGY

II.1. THE OPEN PIT

II.1.1. Raw materials

The calculated geological resources and reserves were established by 01.09.2004 g of gold content cut-off limit at K_6=0.9 g/t. At that time the price of gold was lower than 400 USD/oz.

It is unclear how the cut-off grade of 0.9 g/t was derived. This is the content which will, at a given price of the final product, cover the processing costs and will produce a marketable product. K_6 is the basis for calculation of reserves in the resource contour and of the geological average content of mineable ore (industrial ore).

- What are the current quantity and quality of the ore?
- Are there any changes in quantity and quality of the measured resources (code 331)?
- How was the low-grade ore defined? What is the lower boundary for the cut-off grade for low-grade ores?
- On the basis of this, how much is the overburden?
- What are the tentative quantities of ore from the other sections – Sarnak etc.?

The current gold price is higher than 1,000$/oz (1,300$/oz). The current price allows for reduction of the cut-off grade which will result in processing of additional amounts of ore, increase the operation period and, even, for an economically less viable arrangement of sub-projects to ensure environmental improvements.

II.1.2.Productivity of the mine

What was the basis used in determining the annual output rate of the process plant with only 8 years of operation life?

How were the mining and technical conditions during the mining operations evaluated using the parameters of the system of operation?

Is this period sufficient for creating a livelihood for the local population?

II.1.3.System of operation

The old project envisaged mining operation with a step height of 2.5 m. Probably this height is intended to minimise ore dilution during mining.

What is the horizontal situation (by area)? What areas will be cleared of overburden to open up the auriferous ore areas (blocks)?

What is the minimal area from which the blasted ore will be delivered to the process plant?

Will there be any losses during mining?

What is the optimistic dilution expected during mining? What will be the content of gold in ore fed to the plant for processing?

II.1.4.Technology of mining operations in the pit

The main mining machinery envisaged for mining of 3,000 t of ore per year is insufficient.

- drilling

The TAMROC -1100 drill would not be suitable for operation on 2.5 m high steps because it bores 89-140 mm wide holes. A 1 linear meter long hole accommodates large quantities of explosives generating high blasting energy and large amounts of flyrock.

For a step height of 2.5 m the borehole network will, most likely, be 1.5 m x 1.5 m; The yield from 1 linear meter will be 1.9 m^3/lm – 5-5.2 t/lm. The required length of boreholes in linear meter will be: 3000000 t: 5 t/lm 580,000 lm/year (193.3 thousand boreholes/year). The annual output rate of the borehole is approximately 100-120 thousand lm/year for a use of approximately 5,000 h/year. A minimum of 5 drills will be required.

- blasting

The proposed blasting arrangement at 100 blasts per year with a depth per borehole of 3 linear meter would require charging of approximately 1,900 boreholes. Assuming that a drill with a 64 mm borehole is diameter is used, the annual consumption of explosives will vary between 725 and 1,050 t/year averaging at 870 t/year, or 8.7 t per 1 blasting or 18 t per week.

I believe that this volume of work will be difficult to organise in view of the mining and technical conditions.

The mining and technical conditions could be improved by increasing the step height to, for example, 5 m. The borehole diameter will be increased. The borehole network will also increase, perhaps at 2.5 m by 2.5 m. The mined quantities will be 15-16 t/lm. The volume of drilling and blasting operations (DBO) will be reduced. The required borehole length in linear meters will be 3,000,000 t.15.5 t/lm = 194,117 lm/year (35.3 thousand boreholes/year). A TAMROC - 1100 drill with a diameter of 89 mm will be used. A minimum of 2 drills will be required.

It should be noted that as the step height increases (5 m, for example), the blasting operations will lead to the merging of 2 horizons of 2.5 m each and this will increase the percentage of ore dilution. It is unclear whether the cut-off grade specifies the work step height during mining.

- excavator works

A backhoe excavator with approximate bucket volume of 10-12 m^3 will be used. In our mines excavators with the same bucket volume but with a flat bucket is used in 15 m high steps 330 days per year in 3 shifts per day to produce 3,000-3,500 t/year. It should be noted that the mining will be carried out in not more than 4,500-5,000 hours/year. The remaining hours will be used for filling up of fuel, maintenance, emergency downtime and stopping of operations for blasting.

In such case and, also, for technical reasons, mining in the pit should not be carried out using only one excavator, for the following reasons:

- The excavators will be used for only 55%-60% of the 8000 hours per year envisioned for the operation, or the excavator operations in the mine will be shorter by almost a half.

  Since the excavator will also be used for removal of overburden, which is irregular in space and its volume is 2 times higher than that of the ore, it is impossible to specify the size of the ROM pad upstream of the crusher.

- The jaw crusher was sized for the hourly output rating and not in consideration of the size of the largest piece coming from the mine. What I mean is that in the case of a 2.5 m high face the blasted material will be generally small but the large bucket of the excavator will lift also large pieces of ore which will be oversize for the crusher. The percentage of oversize pieces will be high.
- Concerning the technology, one excavator cannot ensure blending of the ore or a steady flotation process over a period of time.

Therefore, I believe the following is advisable:

- The mining operations in the pit should be carried out using 4 excavators with 3-4 m^3 buckets of which at least 2 will blend the ore and the others will strip the overburden. In this manner the mining operations will be synchronized with the operations of the process plant.
- It can be seen that the use of 2.5 m high steps allows for a very high dynamics of the mining operations, concentration of mechanical equipment, deterioration of the mining and technical conditions because the number of mining areas will increase requiring more road connections etc. Therefore, the ore production rate should be reduced to around 500 th.t./year and the overburden stripping should be reduced to 1,000 t/year, i.e. the mined material should be approximately 1,500-2,000 th.t/year, or the height of the steps should be increased to, for example, 5 m, with a process plant output capacity of around 500 th.t/year.
- It would be advisable that the Ada Tepe mine should be developed in two independent sections – a northern and a southern one – operated simutaneously, but this can be established after the mine development graphics are prepared.
- It would be best to supply ore from some of the adjacent sections too.

- automotive transport

In the case of one-excavator operation in the mine the required number of haul trucks should be recalculated for the hourly output rate of the excavator because it will operate approximately 4,500-5,000 hours/year. The number of haul trucks will increase. Also, if the excavator stops, everything else will stop.

II.2. STOCKPILE WORKS – DISPOSAL OF MINE WASTE

Option 1

- The facility construction technology is more of an experiment. If this technology is all that topical, it would have been used in most mines around the world.
- In fact, it is unclear how the overburden stripping and tailings related operations will be accommodated with their different volumes.
- This technology depends on the availability of horizontal stockpile areas, on the effectiveness of drainage and on the time required for consolidation (dewatering and drying). It should be noted that the length of this time is unknown. In reality, the tailings volume should be reduced by about 40%.
- The Mine Waste Management Plan (page 52) states that the facility will be raise at an approximate rate of 10 m per month at the beginning of the operations. This refers to the 1st year of operation when the ore will be processed at a rate of 1,110 th.t/year. Operations during this time will be carried out at the base of the facility where the disposal area is the smallest. It is unclear how much time would be needed for a 10 m layer to consolidate and ensure stability of the facility. The horizontal area in the facility during the first years of operation will be insufficient for disposal of the tailings from as low as 2 m.
- It is unclear whether any cement would be used to solidify the tailings. The required amount of cement would be 8,500 t/year (1% of 850,000 t/year). If things do not work out, operations may have to be discontinued.
- The embankments on which trucks will move will have to be at least 20 m wide to allow passing and manoeuvring of trucks for unloading. A 2 km long and 28 – 20 m wide road would be required to allow access for the trucks to the initial cells. Transporting distances would increase to 1.8 0 2 km during the first years of operation which would require delivery of more trucks.
- How will the tailings consolidation cells be covered to prevent entry of sudden storm events?
- The tailings will be disposed of into the pit bowl during the final year of operation. Where will the additional return water required for the process plant be sourced from during this time?
- By the end of operations the facility will reach an approximate height of 170 m. Its stability was established with the SLOPE/W software using the Morgenstein-Price method. Some experts use the same software for calculations using the Fellenius method. The Bihop method was also used. With a height of 170 m the facility imposes serious responsibilities and although the estimates indicate a

safety ratio above the minimum admissible levels (K_C = 1.35), calculations are required by an independent institution such as the University of Architecture, Civil Engineering and Geodesy etc.

- The level of the Richter scale to which the seismic stability calculations (pseudostatic stability K = 1.01) correspond is unclear. Do they cover the 8 and 9 degree requirements? It is important that the mining operations in the pit would involve blasting. It is possible that the regulated seismicity in the Krumovgrad region is lower. This must be checked.
- No isolating liner is envisaged under the facility. It would be advisable to build the liner as a clayey cushion on the steep terrain.
- No sediment-flow retention pool is envisaged at the toe of the facility. Perhaps it is not required.
- There is no evidence, such as an annex, that the facility will be established over an area devoid of ore.
- Only the overburden and tailings from the Ada Tepe section will be disposed of into the Facility. No spare volume will be available.

Option 2

The TMF in the Koldhik valley will have a capacity of 8.5 million tons and will have no spare volume available. No stability calculations are available. No information about the presence of ore in the base is available.

II.3. TIME SCHEDULE FOR THE MINING OPERATIONS

The Mine Waste Management Plan, page 46, includes a tabulated time schedule for the mining operations. The average amount of material mined during the first 6 year will be 3-3.6 m.t./year and will include 2 – 2.8 m.t./year of overburden. A 1.1 m.t./year of material will be mined and processed between the first and third years, subsequently averaging at 0.85 m.t./year up to the 7^{th} year. The eighth year will be a year of abatement where 1 m.t./year of material that includes 0.5 m.t. of ore will be mined.

General practice has shown that streamlining and attuning of the process to the quantity and quality of ore extracted from the mine occurs during the first 1-1.5 years of operation. Therefore, the annual output rate of the Process Plant (the amount of processed ore) will be lowered intentionally. This period is referred to as “utilization of capacities”. In our case some of the gold may be released into the waste.

It is illogical that the output capacities of the plant will be maximised (1,100 th.t./year) during the initial years with subsequent reduction down to 850 th.t./year, or by 23%.

II.4. SITE ARRANGEMENT – LOCATION OF THE SITES (GENERAL LAYOUT)

Archaeological digs are conducted in the pit area for protection of the cultural heritage. The mineralization is there and cannot be relocated. It should be noted that almost each “fort” in our country is history.

Option 1 of the paper presents a detailed Mine Waste Management Plan.

This creates the feeling that the preferred option is Option 1 where the Facility will be constructed at the sloping area above the Krumovitsa River floodplain.

Considering the danger of pollution along the Krumovitsa River floodplain, I believe this area to be unsuitable for the Facility for the following reasons:

- Page 38. ...The project area is located in the left part of the watershed area of the mid-stream portion of Krumovitsa River, which is a right-hand tributary of the Arda River in the stretch between the Studen Kladenets and Ivailovgrad water reservoirs. The rivers Kesebir, Doldjik Dere, Elbasan and Krumovitsa are category II determined with Order RD- 272/03.05.2001 of the Minister of Environment and Watere.
- Page 15 vol. III.2.1.1.3 of the Mine Waste Management Plan. The average multi-annual flow of the Krumovitsa River in the studied sections is 0.85 m^3sec – 850 l/sec. The Krumovitsa River is recharged by atmospheric precipitation and snow. **The Krumovitsa River is among Bulgaria’s most abundant rivers.** Despite the low-mountainous and rolling terrain, the high availability of water is due to substantial annual precipitation at 800 mm and to the speed of surface runoff entering the river. The high peaks and parameters of the high water levels in this area are significant. The Krumovitsa River course is one of the most torrential tributaries of the Arda River. This is caused by the location of the river among relatively low watershed areas from which precipitation masses enter. **High water is caused by widespread and frequently intensive rain fall.**

The floodplain of the river is wide and farming is carried out in certain parts of it. The water from the river is used as irrigation water.

Practice in Bulgaria shows that torrential precipitation always creates local slides and deep ravines on high stockpiles, whether operational or rehabilitated. Another cause of sliding and formation of deep ravines, beside torrential precipitation, is the large water intake area of the stockpile slopes.

Sediment flow retention pools are constructed downstream of the stockpiles. However, they are inefficient. These pools become filled up with sediment and mud very quickly and require constant cleaning.

Released water have caused occasional fish poisoning.

Since the Facility is intended to act as a filter providing return water to the process plant, I believe that constructing a facility or a high stockpile in this place would be a hazard.

The TMF under Option 2 will be in the Koldjik valley. This project envisages tailings disposal following ore treatment without cyaniding – a non-cyaniding technology.

In that case it would be advantageous to dispose the flotation tailings in a TMF rather than in a Facility, because of the potential for further processing when new technologies become available. Such cases are known. The following items have been omitted from the site: step-down substation (the installed capacity in the process plant will be 7.5 MW); a medical facility, amenities and, perhaps, other facilities that may increase the level of investment.

II.5. SOCIAL EFFECT FROM THE IMPLEMENTATION

The period of operation, approximately 8 years, is short and insufficient to ensure the livelihood of the local population.

II.6. CONSIDERATIONS ABOUT CERTAIN FACTORS WITH ENVIRONMENTAL IMPACT

The project paper presents many tables with results and data about environmental impacts by dust, mine gases etc. I cannot comment these because I do not know how they were calculated and there are differences from my own expert assessment of mining equipment. For example:

- Page 14 states: “Ore mining and processing at 850,000 t/year requires approximately 1,700-2,000 t/y of diesel fuel, and approximately 2.0 l for the processing of one ton of ore.” Or 850,000 t/year x 2 l =1,700 th.l./year in the case of the process plant. In the case of 3,000-3,500 th.t./year in the mine, this leaves 300 t/year or 0.86 t day. This is an absurdity. One excavator with a 10-12 m^3 bucket and approximate power of 700 hp is filled up every day with a minimum of 3-3.5 t of fuel. Also, fuel will be needed for 5 haul trucks (55 tons) at 740 hp each (approximately 500 – 550 t/year per 1 truck), plus a bulldozer etc.

The paper pays more attention to the emissions of particulate matter and harmful gases during blasting. However, the main problems in the open pit are the gasses in the deep areas (sections) of the pits by automotive exhaust (acroleine, carbon oxide etc.). Such an area in the Ada Tepe section would be the deep portion of the southern part of the section, but such problems would not be likely there if only 1-2 workplaces are concentrated in this area. I believe that the issue of automotive exhaust and its constituent parts should be commented in more detail in the EIA Statement.

Irrespective of the above, what methodology was used – software?, Bulgarian?, foreign?

II.7. MINING AND GEOLOGICAL CONDITIONS FOR OVERBURDEN REMOVAL AND DEVELOPMENT OF THE MINE

This issue is not commented in the presented papers.

The geometry and type of mineralized areas indicate two types of mineralization of the Ada Tepe section:

- The “Embankment” area – a blanket vein (average depth of 9 m), gradually dipping (15º) to the north, developed above the interface of the foundation and sediments.

- “Upper” area – a series of vein bundles sinking steeply from east to west, oriented differently and occurring as additionally enriched structures.

The lodes in the “Embankment” area (stage 1) was defined as **probable reserves** – Code 122 (resources indexed in accordance with JORC): 1,493,000 t of ore with gold content of 7.3 g/t – 10,892.6 kg of gold and 6,440.6 kg of silver. **Measured resources** (Code 331) are added in stage 2 (extension of the Embankment contour).

The ore in the “Upper” area are defined as **measured resources** (Code 331).

In total, **the measured resources** (Code 331) are 7,292,000 t of gold ore with gold content of 2.4 g/t – 17,294 kg of gold and 7,503 kg of silver.

The gold content differs very highly between the two areas – 7.3 g/tAu versus 2.4 g/tAu.

Territorially, the two areas comprise two differently structured subsections – a blanket vein area and an area of steeply sinking vein bundles. Why have the quantity and quality of ore been determined at the same cut-off rate of gold at $K_б$=0,9 g/y? The ore in the “Embankment” area should be determined at a lower cut-off rate.

Why are the ores in the richer area, the “Embankment”, defined as “reserves”, and “resources” in the “Upper” area?

The technical mining conditions in the “Embankment” are better.

Overburden removal and development of a mine always begin on the “reserves” or “Embankment” area, but this allows for initial processing of rich ore with subsequent operation of “resources” where the content of gold in the ore is 2.4 g/tAu.

This concerns 1,493 th.t of rich ore (10.9 t of gold in the ore) that can be extracted during the first 3 years. The attached time schedule (page 46 of the Waste Management Plan) shows only quantities without any gold content. The provisions for the first 3 years are that 1,100 th.t./year of ore will be mined.

I have not information at present about the quantity and quality of ore from the satellite sections such as Sarnak etc., and of the mining and geological conditions.

Based on the gold content there, what is the price of gold at which the costs for ore mining, overburden removal, transporting and processing in these areas would be justified? Since these sections are small, they could not fulfil the capacity of the process plant alone. Also, the content of gold there is unknown. In such case the ore from these sections should be processed jointly with the ore from the Ada Tepe pit, but if the latter is operated at 2.4 g/ton of Au, what will be the economic viability? From the mining and technical perspectives, I believe that the ore reserves in the “Embankment” area of the Ada Tepe section should not be mined separately. When mined, they should be mixed with the ore from satellite sections and from the “Upper” area.

III. CONCLUSIONS

1. The project is inconsistent with the reprot on the results from the geological survey for prospecting and assessment of the auriferous ores and reserves in the Khan Krum deposit was submitted to the Ministry of Economy at the end of 2004 describing the following sections – Ada Tepe; Sarnak; Skalak; Kaklitsa and Kapel, in the Krumovgrad exploration area as existing in 01.09.2004. , The protocol of the meeting of Special Council of Experts НБ - 17/21.04.2005 adopting and approving a Commercial Discovery with the provisional name of Kahn Krum and with Certificate of Commercial Discover 0417/28.08.2009 issued to BMM EAD in accordance with the Ores and Minerals Act.
2. This project concerns only the processing of ore in the Ada Tepe section. The quantities and quality of ore in the Ada Tepe as of this moment or at a recent date are unknown.

   The current geological information means that the ore mining will start at the “Embankment” area, the **“reserves”** (Code 122) – 7.3 g/tAu, and that the other ore is **“resources” (Code 331) – 2.4 g/tAu.**
3. No comment is made about ores from other sections such as expected reserves, resources, quantities and quality.
4. The project in its current form means that development of ore from the Sarnak, Skalak, Kaklitsa and Kapel sections (Stage II) would be impossible due to lack of volume in the Facility (Option 1) or TMF in Kaldjik Valley (Option 2) available for the tailings from the additional ore.
5. The envisaged mining equipment is insufficient.
6. The annual output of mined material set at 3,000 – 3,500 th.t./year and including 850 th.t./year of ore for the process plant is high and hard to achieve under the particular mining and geological and technical conditions. The output rate after the 8^{th} year will, most likely, decrease substantially since the remaining sections are small and would not provide for up to 850 th.t/year of ore under the existing technical conditions at the mine. The yield at the Kaklitsa and Kapel sections will be small also because these sections are located at the right-hand side of the river. The national road network will be used. A bridge over the river will have to be used. This would require the use of dump trucks of small carrying capacity.

7. The mining and geological conditions such as geometry, mineralization, and concentration of gold mean that the rich ore in the Ada Tepe section will have to be mined with priority, but this should not be allowed.
8. The Facility and the process of its construction are unpopular and dangerous. It will be used also as a source of additional recycled water for the plant.
9. It is unclear how the underdrain will be ensured against emergencies both with a view to the stability of the facility itself and against compromising the return water supply to the plant.
10. No stability (K_c) and seismicity ($K_{seismicity}$) studies of the Facility have been made as is required by the Bulgarian legislation.
11. No evidence that the Facility is not laying over a potential source of ore is provided. The same applies to the TMF (Option 2).
12. It is unclear how the Facility will be secured against local slides and pollution of the Krumovitsa River.
13. The sub-projects, the Facility and the TMF, are not designed in consideration of all sections where operations will be carried out. No sufficient volumes are ensured.
14. It is unclear what method was used to determine the environment protection parameters – software?, Bulgarian? foreign?
15. The period of operation is short – 8 years. It will not create a livelihood of the local population.
16. The presented paper does not clarify the possibilities for complete processing of the ore in the Khan Krum deposit in accordance with the Commercial Discovery. There is no concept about the processing of the remaining sections.

IV. RECOMMENDATIONS

1. The raw material quantities should be updated and clarified as of the present time or the most recent date for the Ada Tepe section and for the remaining sections of the Khan Krum deposit (according to Article 22 of the Ores and Minerals Act, amended in the SG. issue 70/2008). The permit holders must submit to the MOEW information about the condition and changes of the resources once every five years.

As regards the Ada Tepe section, the quantity and quality of low-grade ore must be clarified.

2. To synchronize mining during the development of individual sections, to reduce the dynamics of mining operations and increase the period of operation in order to create a livelihood for the population I suggest that the annual output capacity of the process plant be reduced to around 500 th.t./year, or to a level close to it.

Optimizing the plant (500 th.t./year of ore) or 1,500 th.t/year of mined material requires the use of a simulation (drawings) while looking into the possibility to create technical mining conditions for working with a 2.5 m high step or for another solution (joint mining of another section; changing the step height), i.e. determining the parameters of the system of operation. The expected dilution and losses should be determined on the basis of step height.

3. The so-called Facility should not be constructed since it is dangerous.

4. Considering the current gold prices at more than 1,000 USD troy ounce and consistent with the letter from the MOEW and item 9 of the Project regarding the scope and content of the EIA, consideration and evaluation of "alternative solutions and options for implementation of the project proposal in terms of process alternatives, siting options for project infrastructure and facilities - TMF, stockpiles, roads etc." is required and I suggest the development of an alternative option or options with the concept for overall development of the Khan Krum deposit with the placement of a tailings management facility (TMF) in a new location and with a capacity sufficient for the waste from the entire ore (all sections of the Khan Krum deposit) plus a spare capacity of around 15%.

5. No stockpiles, TMF or other sources of pollution should be placed in the Krumovitsa River valley.

6. The stability calculations (K_c and $K_{seismicity}$) for the stockpiles and TMFs should involve expert studies by a specialized Bulgarian institution. This should be done prior to the preparation of the engineering detailed project.

   The stability estimates for the general angles of the final contour of the mine will be made as the detailed engineering project is developed.

7. Two new sections should be added to item 9 of the project, concerning the structure and content of the EIA, as follows:

   - Condition of the raw materials in the Khan Krum deposit;
   - Social effectiveness of the operations.

8. The text "the options" under item 9 of the Project should be as in the letter by the MOEW – "options".

9. The EIA statement should concern also the processing of ore from all sections of the Khan Krum Deposit.

It should be elaborated for the final technological set-up and arrangement of the facilities on site, because approval of the EIA statement is followed by elaboration of the overall engineering project.