Evaluation of Compliance with Environmental and Industrial Safety Standards at Kumtor Gold Mine

Report of the Interagency Governmental Commission of the Kyrgyz Republic

(Version dated December 28, 2011 with replies from Geoecology Agency of the Natural Resources Ministry of Kyrgyz Republic and other proposals and recommendations from the Commission members)

Bishkek - December 2011

Contents

To the current report contributed:
Presented the legislative and allowance materials and reports as to the approved forms:

The Ministry of the Natural Resources

State Agency for the Environmental Protection and Forestry of Kyrgyz Republic (A. Chyzhoev) – the data on the pollution payments and empty rock placement

The Ministry of the Economic Regulation

Water analysis were conducted: Kyrgyz State Laboratory, Agency for Environmental protection and forestry (that has accreditation ISO 17025-2000) and Central Laboratory, Ministry of the Natural Resources (having verification #KG 417/КЦА.ИЛ.026 till 16 August 2014 according to the international Standards ISO/IEC 17025:2005 - State Standard ISO/IEC 17025:2006)

The conclusions were given:
Gosgortechnadzor (A. Mahmutov)
Scientific-Engineering Center "Geopribor" (I. Torgoev)
Central-Asian Institute for Applied Geosciences (glaciologists R. Usubaliev and E. Azisov)
Lead specialist for architecture-construction for the Department of State Expertise (T. Omukeev)

The water samples were collected by T. Sadykbekov and E.Azisov.

Center for Human Development "Tree of Life" (Director Kalia Moldogazieva) – general coordination on the Report completion, program preparation, materials collection, tables for the water samples compilation, MPAs comparison, graphs, consultations with experts, general Commission Report finalization.

Photos: Mirjam Leuze

Sample points on the Google map: E.Azisov

General materials collection, legislation and logistics support: Nurbek Mambetsadykov

Organizational support for the Commission: Erkingul Imankozhoeva, partliamentarian

Introduction

Members of the Commission. Goals and tasks of the Commission. Programme of evaluation of compliance with environmental and industrial safety standards at Kumtor Mine.

Pursuant to the Decree No. 413-p of September 13, 2011 issued by the Government of the Kyrgyz Republic, an Interagency Commission was established comprising the following members:

Commission Chairman: E.B. Imankozhoeva, member of the Jogorku Kenesh of the Kyrgyz Republic (subject to approval).

Commission members:

- A.A. Saparaliev, Head, Department for State Environmental Control, Ministry of Natural Resources of the Kyrgyz Republic;
- C.O. Sadabaeva, Chief Expert, Department for Supervision of Mining, Metallurgical and Chemical Companies, State Mining Safety Inspectorate, Ministry of Natural Resources of the Kyrgyz Republic;
- A.A. Rustamov, Deputy Director, State Agency for Environment and Forestry, Government of the Kyrgyz Republic;
- T.A. Sadubekov, Deputy Head, Division for Environmental Monitoring and Forestry, State Agency for Environment and Forestry, Government of the Kyrgyz Republic;
- I.A. Torgoev, Director, GEOPRIBOR Scientific and Engineering Center, Geomechanics and Mineral Resources Development Institute, Academy of Sciences of the Kyrgyz Republic;
- T.O. Omukeyev, Chief Expert, Department of State Expertise, State Agency for Architecture and Construction, Government of the Kyrgyz Republic;
- M. J. Alypsatarov, acting Head, Road Division, Ministry of Transport and Communications of the Kyrgyz Republic;
- S.A. Mambetov, Vice President, Association of Miners and Geologists of the Kyrgyz Republic (subject to approval);
- R.A. Usubaliev, senior research officer, Central Asian Institute for Applied Geosciences (subject to approval);
- E.A. Azizov, engineer, Central Asian Institute for Applied Geosciences (subject to approval);
- K.S. Moldogaziyeva, CEO, Human Development Center “Life Tree” (subject to approval);
- Leuze Mirjam, camera operator (subject to approval);
- V. Martsynkevych, environmental expert, Bankwatch (subject to approval).

Formation of the Commission involved lengthy processes of getting approvals from various authorities and ministries and took almost 2 months.

The first Commission meeting took place on September 17 (?), 2011. The Commission Chair, member of the Jogorku Kenesh E.A. Imankozhoeva described the goals and tasks of the Commission to its members. She also suggested that K.S. Moldogazieva should be appointed as Deputy Commission Chair as she was experienced in the research of Kumtor's ecological problems and was a proficient environmental expert. As the Ministry of Natural Resources had declined to finance the Commission in view of the absence of the necessary funds, K.S.

Moldogaziyeva informed that Human Development Center "Tree of Life" headed by her had raised the necessary finance and would cover costs and expenses associated with the Commission's visit to Kumtor, analysis of samples in two laboratories and fees for several experts. K.S. Moldogaziyeva also prepared a programme to evaluate the compliance with environmental and industrial safety standards at Kumtor Mine.

In view of the foregoing, the Commission members approved K.S. Moldogazieva as Deputy Commission Chair. The Commission members reviewed the program of evaluation of compliance with environmental and industrial safety standards at Kumtor Mine and made specific suggestions with respect to the visit to Kumtor.

The Programme of evaluation of compliance with environmental and industrial safety standards at Kumtor Mine defines the aim of the mission as the identification of environmental compliance risks and weak points in the company's operation in the following areas:

Condition of the tailing pond and its dam

Condition of the Petrov Lake and measures taken by the company with respect to the lake's increasing size and possible break-out threat

Storage of solid industrial waste and condition of adjacent glaciers

Open-pit mine

Visit to the areas of the company's planned operational expansion, new concession area (Sary-Tyr, South-West, Muzdusuu, North-East, and Petrov Glacier)

Mine's reclamation plan and its implementation

Emergency action plan and its implementation

The Programme is divided into the following stages:

Preliminary stage: review of the available data of various authorities and ministries supervising the operations at Kumtor, reports by Kumtor Operating Company and other information sources.

- Visits to Kumtor, inspection of the condition of the tailing pond and dam, industrial waste storage, interviews and meetings with responsible departments at Kumtor, sampling etc;
- Preparation of opinion and recommendation by the responsible Commission members, preparation of the general opinion of the Commission.

1. Preliminary stage: review of the available data of various authorities and ministries supervising the operations at Kumtor, reports by Kumtor Operating Company and other information sources.

The following documents are required to form the database:

- company's environmental records;
- maximum allowable emission rates; water management records;
- environmental statistic reports for 3 years;
- certificates evidencing payment of fees for use of natural resources, environmental pollution and waste utilization for several years;
- environmental legal liability and environmental economic liability reports (statements of claim etc) for several years;
- records of stock-taking of environmental impact sources and wastes (pollution source record);

- licenses and agreements for special and comprehensive land-use;
- are environmental programmes and plans in which the company is directly involved;
- environmental protection action plans and implementation reports for several years;
- raw material, reagent and material consumption reports, and reports about the volume of produced ready-to-use products for several years;
- technical logs for operation of environmental facilities and machinery;
- projects of construction (reconstruction, technical retrofitting) of core operational units, waste water treatment systems, exhaust gas treatment systems, waste utilization and disposal schemes;
- existing environmental action plans, charts and other cartographic materials;
- mine reclamation plan;
- emergency action plan;
- feasibility study report (or preliminary feasibility study report and EIA for the new concession area)

2. Visits to Kumtor, inspection of the condition of the tailing pond and dam, industrial waste storage, interviews and meetings with responsible departments at Kumtor, sampling etc.

- Kumtor visit by the Interagency Commission members was scheduled for September 5-7, 2011. The plans included collection of water, soil and snow samples in duplicates for state authorities and independent experts in their presence. Planned sampling points: before the tailings treatment; after treatment plant; in places of industrial waste storage; on glaciers; at the exit from the concession zone of the glacier. During the material review and visit to the glacier the Commission members may also suggest additional sampling points. The monitored facilities will be photographed.

  The following aspects should be taken into account at the material review and glacier survey stage:

  1.1. Spacial land use evaluation

  1.1.1. Total area occupied by the company (thousand square kilometers) including built-up area, waste storage area, planted area.

  1.1.2. Standard and actual width of buffer area, m.

  1.2. Operational waste storage area, square meters (open dumps, dump pits, refuse heaps, sludge pits, evaporators etc).

  1.2.2. Area of active pollution area of surface layer of atmospheric air (in accordance with harmful substance concentration fields).

  1.2.3. Description of functional use of the areas (in the total area of the areas polluted by the company, industrial built-up areas, residential built-up areas). These figures are used to make up relevant flow-charts and diagrams.

  1.3. Water resource impact assessment.

  1.3.1. Collection of water samples (thousand cubic meters per year, percent to cap value), including samples collected separately from natural water sources with water quality categorization.

1.3.2. Volume of consumed water (thousand cubic meters per year) including water used for drinking, domestic purposes, operational purposes etc.

1.3.5. Volume of waste water per each water facility (water inlet), total (thousand cubic meters per year) including:

1.3.5.1. Polluted water, including untreated and insufficiently treated polluted water;

1.3.5.2. Standard quality pure (undisturbed) water;

1.3.5.3. Standard quality purified water.

1.3.6. Volume of waste water transferred to other companies, absorption pits, storage units etc (with subdivision into group 1, 2, and 3 like for discharged waste water).

1.3.7. Amount of pollutants in waste water discharged into water sources (per unit of end product).

1.4. Evaluation of air pollution.

1.4.1. Number of production units in shops and production facilities that emit hazardous gases.

1.4.2. Volume of hazardous pollutants emitted by the said units (per every substance, including hazard class (g/second and ton/year)).

1.4.3. Specific emission of hazardous pollutants per unit of end product (per every substance).

1.4.4. Specific aggregate emission of hazardous pollutants per unit of end product.

1.4.5. Hazardous air pollutants per each emission source and each pollutant (ton per year) including for organized emission sources and non-organized emission sources.

1.4.6. Concentration of hazardous air pollutants (per every pollutant emitted by the company): on the site, on the border of buffer area, on the border of residential area (mg/m^3 and % to maximum allowable concentration).

1.5. Evaluation of solid waste formation process.

1.5.1. Amount of formed solid waste by type (tons per year), including:

1.5.1.1. disposed by the company;

1.5.1.2. transferred for disposal to a third party;

1.5.1.3. stored at the company's facilities;

1.5.1.4. stored outside of the company's premises;

1.5.1.5. removed from the territory, including:

centrally by the company to official field facilities, improved dumps and landfills, and to waste-processing companies.

Preliminary materials collection from ministries and authorities

Starting from July 2011, the Commission was reviewing the available data provided by the relevant authorities and ministries supervising Kumtor, reports of Kumtor Operating Company, and other materials.

Among other things, on request of E. Imankozhoeva the Ministry of Natural Resources provided a certificate dated July 27, 2011 signed by Deputy Minister L.A. Oseled'ko with reference to maximum allowable emission levels, actual volumes of emissions, discharges and waste (solid

domestic and industrial waste), amount of potentially hazardous chemical toxic substances used in operations, environmental pollution charges, emission and pollutant control measures, and environmental protection actions.

According to the information provided by the Kyrgyz Ministry of Natural Resources, Kumtor Operating Company has the following regulatory documents and approvals:

Emission standard levels for air pollutionRequirements to maximum allowable emissions (Maximum Permissible Amounts - MPAs)

Tables showing balance of water consumption, water disposal and pollutant discharge

Certificates for hazardous waste (hazard class 1 to 5)

Reports on formation and disposal of industrial and consumer waste for 2009-2010

Licenses issued to Kumtor Operating Company to import toxic chemicals in 2010-2011

Human Development Center "Life of Tree" has an environmental report of Kumtor Operating Company for 2009 that contains chapters on compliance with operational safety rules and environmental requirements, environmental monitoring programme, tailing ponds, glaciers and waste rock dumps.

The reviewed materials caused the following questions:

Maximum allowable discharges: how can the dramatic allowed increase of maximum allowable concentrations (MPC) of suspended matters up to 161,666.6 g/hour in 2011 for industrial water be explained?

This question was answered by G. Shabaeva, the Head of State Department of geoecology of the Natural Resources Ministry: "In 2009 the level of the MPCs for suspended particles for industrial waste waters was 81005 g/hour. The value of the limit values for suspended substances is not established. In the calculation of the MPCs for suspended solids the requirement of Annex 1 of "Rules of the surface waters KR" should be used, according to which "In sewage waters, the works, production on water bodies and in the coastal zone the content of suspended solids amount in the reference point the should not exceed the natural conditions by more than 0.75 mg / cubic dm. For streams that contain more than 30 mg / cubic dm of natural suspended matters, the increase in water content is allowed within 5%."

The average annual value of an existing background (natural) contaminants in the water of the river Kumtor according to a monitoring station W1.3 (above the effluent discharge) amounted 18 mg / l in 2009, in 2010 - 90.57 mg / liter. Therefore, maximum permissible concentration of suspended solids in the reference alignment for the year 2010 was adopted by 18.75 mg / l in 2011 - 95.098 mg / L. Accordingly, the MPC standard for 2010 was 31 875 g / h (18.75 multiplied by 1700), 2011 - 161,666.6 g / h (95.098 multiplied by 1700), where 1700 m3/hr - industrial wastewater discharge rate.

Furthermore, during the Commission's visit to Kumtor mine site Mike Fischer Vice President for Operations) received the Commission's Programme containing the list of all requested materials. He promised to provide the requested materials within 7-10 days, however, he only provided a document (in English) entitled *Property description and location* which, among other things, specifies that the concession are covers 26,000 hectares and that Kumtor Gold Company has an exclusive title to all minerals mined in the territory up to December 4, 2042. However, other sources refer to a different concession term. The annual environmental report of Kumtor Operating Company for 2010 was not provided until November 2011.

On November 4, 2011, Kumtor Operating Company finally provided its environmental report for 2010. The analysis of data contained in the environmental report of Kumtor Operating Company for 2010 is given below. In general, quality of the 2010 report is significantly higher than that of

the previous versions: among other things, it contains significantly more research details covering the potential impacts of operations at Kumtor. The review of this report gave rise to further questions and evidences that the company has not solved the problems that have mounted up over the recent years including reinforcement of the tailing pond dam, storage of dump waste etc.

In particular, the report mentions that the maximum allowable concentration of aluminum in the Petrov Lake doubled above the 2009 levels. It also states that the concentration of iron in the point W 1.1 rose compared to 2009. On page 6.5 of the report it is stated that the concentration of nickel corresponds to "its historic level"; however, it does not contain any references to that level. As the water samples collected during the Commission's visit also demonstrated the rise of maximum allowable concentration of nickel in the area of three Sary-Tor streams (under the Davidov moraine, dump waste, and mine), **the company should provide these historic nickel data.** The maximum allowable concentration of arsenic indicated in the table on page 6.7 is 0.05 mg/l, however it is 0.01 mg/l in Kyrgyzstan according to the Hygienic Rules GN 2.1.5.1315-03 (*Maximum Allowable Concentrations of Chemicals in Water for Drinking, Household and Domestic Use*) currently effective in the country. Kumtor's water bodies fall into the category of water bodies for cultural and domestic use. **It is therefore inadmissible to use outdated maximum allowable concentration data for such toxic element as arsenic.** Also, it is stated that the total water consumption at the mine was 118.3 mln m^3 in 2010. However, no data for the previous years are given, and the 2009 report does not contain any relevant information. Page 6.16 contains a statement that **unsorted domestic waste is stored in the tailing pond. How legitimate is a disposal like that?** The report further refers (page 7.1) to lack of data evidencing that the produced tailings are not acid-forming and do not leach metals, and says that the company is continuing research on the issue. Hence, according to this report of Kumtor Operating Company, there is a risk that acids may form in the tailings upon the completion of operations at Kumtor Mine.

According to the report, in 2010 the company completed a number of works to reinforce the tailing pond dam.

The monitoring of glaciers showed that the Davidov Glacier is moving fastest, while the Lysy Glacier demonstrates less expressed movement, and the Sary-Tor Glacier is almost not moving at all (page 9.1 of the report). This difference is quite explainable as it is near the Davidov Glacier where the waste dumps are located.

Recharge of groundwater in waste dumps, the moraine and primary deposits takes place as a result of glacier melting due to the mine development. Currently, due to the vertical mine development open watered moraine deposits and dumps on the bench edges slide down in the direction of the mine deepening which threatens the edge stability and complicates the mining operations (page 9.4). Here we would add that this not only complicates the operations, but also create risks for pit walls fallout and emergency situations in future.

The report states that in 2010 the volume of water discharged from the mine through the pipelines was 7,984,228.56 m^3/hour. **This gives rise to a question where this water is disposed and is it treated preliminarily?**

There was a whole centralized system tanks and sumps built in the Central Pit area, where drainage from the pit is placed for sedimentation of suspended particles before releasing waters into the environment.

According to the analysis of wastewater samples, performed by State Agency for Environmental protection, high amounts of sulphate (up to 1110 mg / l) and suspended solids (up to 984 mg / l) in the effluent drainage were identified in the runoff from the mine pit, waste dumps and in the effluent from the glacial moraine.

This indicates the possible formation of acid runoff from dumps and the mine and the fact that the existing sumps and ponds drainage system of the Central pit does not fully cope with the task of cleaning from suspended particles of that water volumes.

The Ministry of Natural Resources of the Kyrgyz Republic therefore submited proposals to the Kumtor company to improve the situation with effluents from manufacturing operations from the mine and waste rock, consider the expansion of sedimentation ponds at the mine and cleaning of waters from rock dumps and glacial moraines.

Section 12.4 'Operational Plans of Kumtor Operating Company for 2012' states that the wall deformations of south-eastern edge of the south-western depression seriously complicated mining operations at Kumtor Mine and that the creeping part is moving to the area of ore bodies with high gold content. This is the evidence that in addition to complicated operations there is a threat to the stability of edges and the mine itself, which further increases chances for emergency situations.

This is why the company should disclose its Emergency Action Plan and take steps to prevent any such emergency situations and to improve safety levels. For the time being, neither the Ministry of Natural Resources nor the company provided the following materials to the Commission:

- Mine Reclamation Plan (which was supposed to be renewed in October 2011)
- Emergency Action Plan
- Feasibility study (or preliminary feasibility study) and EIA for the new concession area.

Visit to Kumtor Mine and Water Sampling Results

The Commission visited Kumtor mine on September 19-21, 2011.

The following Commission members visited the site:

- E.B. Imankozhoeva, member of the Jogorku Kenesh of the Kyrgyz Republic;
- K.S. Moldogazieva, Director, Human Development Center "Life of Tree", Deputy Commission Chair;
- A.A. Saparaliev, Head, Department for State Environmental Control, Ministry of Natural Resources of the Kyrgyz Republic;
- C.O. Sadabaeva, Chief Expert, Department for Supervision of Mining, Metallurgical and Chemical Companies, State Mining Safety Inspectorate, Ministry of Natural Resources of the Kyrgyz Republic;
- T.A. Sadykbekov, Deputy Head, Division for Environmental Monitoring and Forestry, State Agency for Environment and Forestry, Government of the Kyrgyz Republic;
- T.O. Omukeev, Chief Expert, Department of State Expertise, State Agency for Architecture and Construction, Government of the Kyrgyz Republic;
- E.A. Azizov, engineer, Central Asian Institute for Applied Geosciences;
- N. Mambetsadykov, Jogorku Kenesh expert;
- N. Asanaliyev, Citizens Against Corruption Centre.
- Leuze Mirjam, camera operator.

On the first day, September 19, 2011, the security guards at the checkpoint did not allow us to enter the site explaining that there was an investment meeting with deputies and that in response

to the order of the Kyrgyz Government the administration of Kumtor Operating Company sent a letter to change the date of the Commission's visit. However, no letter of such kind ever was delivered to Jogorku Kenesh. Also, the senior managers of Kumtor were insisting that the Commission members should undergo a medical examination Bishkek. However, in 2005 we underwent medical examination directly on the site, just like a group of deputies who arrived earlier. After long negotiations, the Commission members were transported to a guesthouse in village Tamga, and it was agreed that in the morning after a medical examination in Tamga we would get to the mine in order to complete our assignment.

On September 20, we arrived to Kumtor and started inspecting the mine. We had a meeting with Mike Fischer, Vice President for Operations, who offered us a traditional mine visit programme. In response, we suggested our programme that had been tailored according to our goals. The Commission visited the Petrov Lake, inspected the tailing pond dam, discharge pipe, waste dumps near the Davidov Glacier and Lysyi Glacier, inspected water bodies including the Kumtor River, Chon Sary-Tor Stream, Sary-Tor Glacier, and a part of the new concession area. The Commission took photographs of several places, and measured electrical conductivity, PH, and temperature at 6 places. Water samples were collected in 11 places, and from 2 glacier rivers. Sampling points are shown on Figure 1.

On September 21, the samples were delivered to 2 laboratories, the Laboratory of State Agency for Environmental Protection and Forestry (ISO/IEC 17025-2000 accredited) and the Central Laboratory of the Ministry of Natural Resources (accreditation certificate No. KG 417/KCA.IL.026 effective until August 16, 2014 according to ISO/IEC 17025:2005 (State Standard ISO/IEC 17025:2006). The samples were analyzed for anions, cyanides and uranium. The results were compared with Hygienic Rules GN 2.1.5.1315-03 (*Maximum Allowable Concentrations of Chemicals in Water for Drinking, Household and Domestic Use*) currently effective in Kyrgyzstan.

Some samples showed deviations from maximum allowable concentration levels as shown below in Table 1:

Consolidated Table 1. Results of Samples Collected at Kumtor Mine on September 20, 2011

Point	Location	Deviation from maximum allowable concentration levels according to the State Agency Laboratory	Deviation from maximum allowable concentration levels of anions according to Central Laboratory	Deviation from maximum allowable concentration levels of metals and uranium according to Central Laboratory
K_1	Petrov Lake			Arsenic in 2.1 times
K_2	Kumtor River upper the treated waste water discharge point			
K_3	Kumtor River 1000 m lower the industrial waste water discharge point			Arsenic in 3.4 times

K_4	Tailing pond, the lowest point (well) where water leaks			
K_5	Waste water arriving to treatment facilities	Ammonium nitrogen (3 times), nickel (67 times), cyanides (900 times)	Sulfates in 1.5 times, nitrates in 1.2 times	
K_6	Waste water after water treatment facilities	Ammonia nitrogen in 4.5 times, cyanides in 2.2 times	Sulfates in 1.8 times, insignificantly excessive nitrates	
K_7	Stream from the open-pit of mine	Ammonia nitrogen in 3.6 times, nickel in 8.5 times	Sulfates in 2.1 times, nitrates in 1.9 times	Manganese in 53.5 times
K_8	Davidov moraine stream	Ammonia nitrogen in 3.2 times, nickel in 4 times	Sulfates in 2.2 times, nitrates in 6.2 times	Manganese in 5 times, uranium slightly above the maximum allowable concentration level
K_9	Stream from Davidov wasterock	Ammonia nitrogen in 3.6 times, nickel in 5 times	Sulfates in 2.3 times, nitrates in 6.5 times	Manganese in 5 times, uranium slightly above the maximum allowable concentration level
K_{10}	Piezometer in the lower part of the tailing dam	Minor excess of chlorides, iron in 6 times		
K_{11}	Kumtor River 7 km downstream from the water discharge point	Minor excess of ammonia nitrogen		
L1	Sary-Tor Glacier stream			
L2	Lysy Glacier stream			Arsenic in 11 times

Therefore, the analysis of the water samples shows the deviations from maximum allowable concentration levels observed upon treatment procedures for a number of elements including cyanides, ammonia nitrogen, sulfates, and nitrates at K^6. The interpretation of the obtained data requires further details. Points K7, 8, 9, and 3 of the stream that connect in the Chon-Sary-Tor

Stream also showed deviations from maximum allowable concentration levels for a number of elements. There are no water treatment facilities in this place, and exceeding of maximum allowable concentration levels both in the water discharged from the mine and from the moraine and the waste dump means pollution by a number of parameters. Having preliminarily discussed the resulted data with the Commission members, we concluded that it is necessary to install water treatment facilities in the place, as the water further gets to the Kumtor River and Naryn River and may pollute the river bed – especially in cold time of the year when the volume of water drops and pollutants are not efficiently diluted. Sampling results showed that the maximum allowable concentration level of arsenic (a rather toxic element) is exceeded in the Petrov Lake, and significantly exceeded the required levels in the Lysyi Glacier Stream. This might be related to the nearby waste dumps. However, for more exact interpretation the data of spectral analysis of the ore should be made, or the data of the baseline pre-mining conditions.

The preliminary Comission report have been sent to the Ministry of Natural Resources and Agency of Geoecology. Below is the answer from these agencies regarding the exceeding concentrations of arsenic in the water samples identified:

"Regarding Arsenic - the question deserves attention and more precize monitoring of the situation.

December 14, 2011chemical engineer of the Central Laboratory of the Ministry of Natural Resources Satybaldiyeva A.B. re-collected the water samples from the Petrov Lake as well as tap water in Kumtor mine working camp and it was analyzed for the arsenic constituency. Arsenic content in both samples showed the concentration in the amount <0,005 mg / liter.

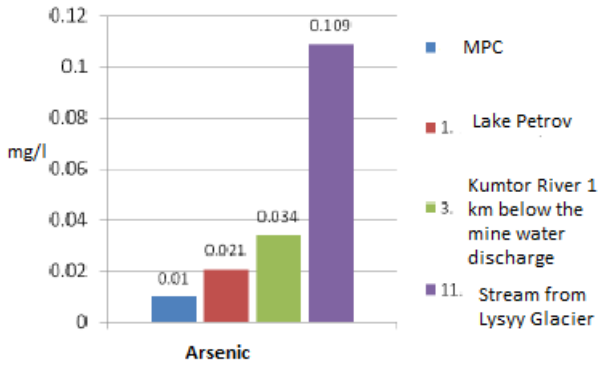
The issue requires additional sampling and analysis of water in order to clarify the situation and determine the causes of such testing results."

In connection with the above answer, we believe that in this case the repeated analysis of arsenic by the State Agency occurred without the participation of members of the interagency Commission participation, tus they cannot be a reason to ignore the test results for arsenic, received by the Commission during a visit to the Kumtor site. At the same time, we agree that the additional sampling and analysis of water samples is required in order to clarify the situation and determine the causes of such analysis results.

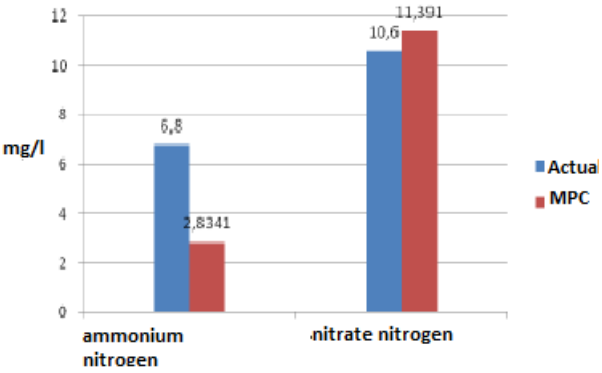
We have also provided a chemist - expert Dzhumaev water testing results for interpretation. In his conclusion the expert says that one should pay attention to the high values of electrical conductivity (EC), since all the additional chemical elements are reflected on this parameter. Especially obvious in this regard the water sample from Lake Petrov, where the value for EC equals 99 microS / cm (pure water), whereas only 7 km downstream Kumtor mine this parameter is almost 10-fold excess, compared to water from Lake Petrov. It is noteworthy that the water flowing to the treatment plant has EC = 2390 microS / cm, and after the treatment facilities EC = 2730 microS / cm. These data indicate that contaminants are readily soluble in water come mainly from the mine. Unfortunately, the data of electrical conductivity cannot answer exactly what chemicals are responsible for the high values of electrical conductivity. Dzhumaev fully agrees with an international expert hydrogeologist from the United States Robert E. Moran (Michael-Moran Assoc., LLC) on the need to expand the list of definitions of chemical elements such as antimony, thorium, radium, strontium, thallium, selenium, petroleum products, organic polluters.

Also his comments and a separate report on the environmental situation at the Kumtor mine, an international expert in geochemistry, hydrogeology and water quality R. Moran provided in addendum (see Appendix 4).

Below are the graphs showing the elements exceeding the Maximum Permissible Concentrations



К 6. Water after treatment plant



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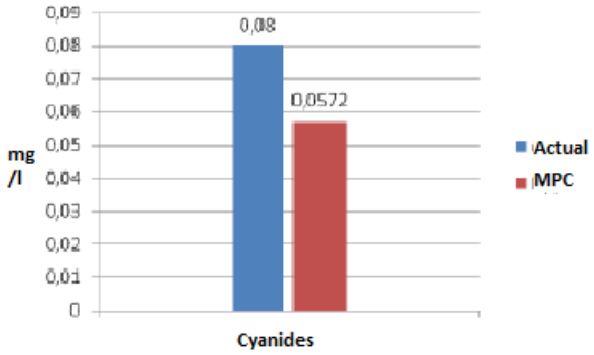
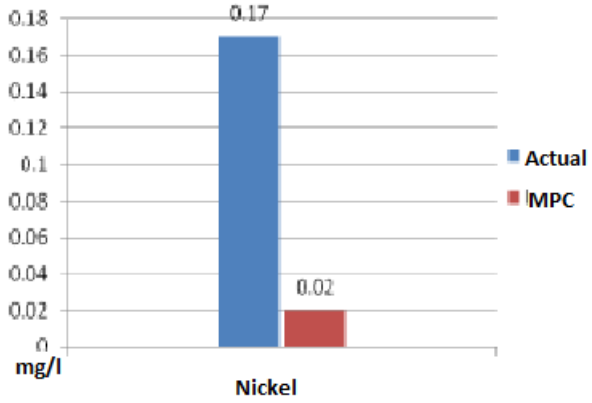
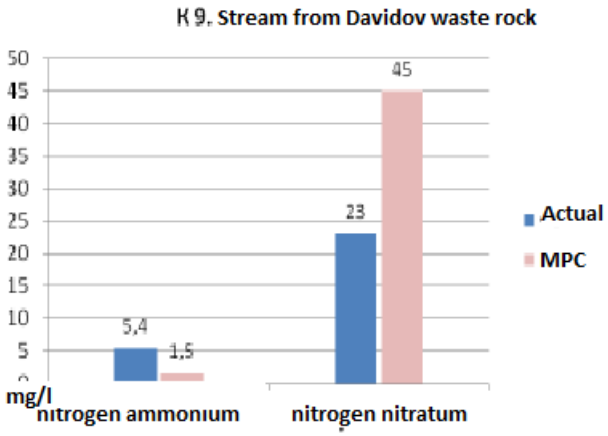
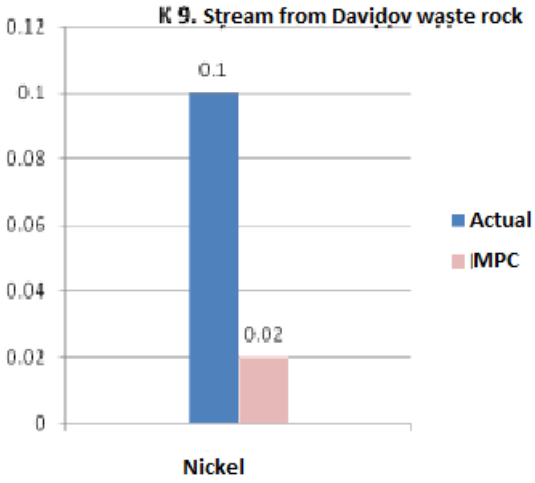
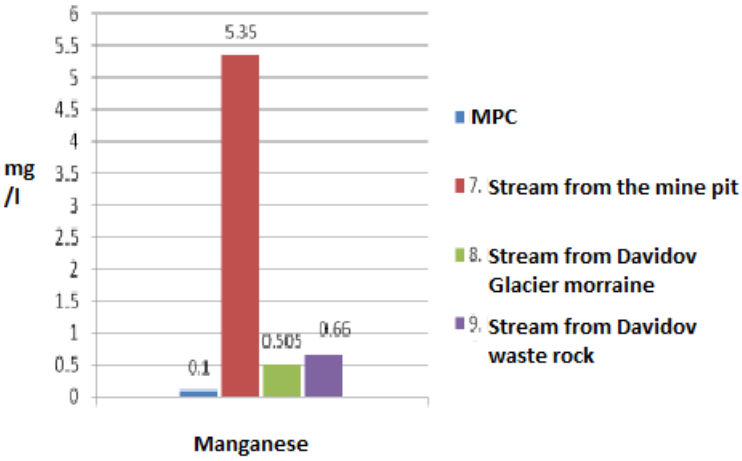


К 7. Stream from the mine pit

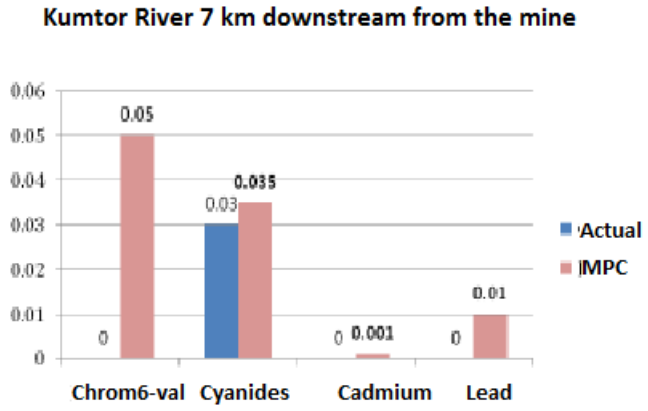








However, at the final point at the mine exit the analysis data show almost no deviations at all which may be evidence of safety of water discharged from the treatment facilities and the safety of water sources for the downstream settlements (see Figure below).



Opinions of the Commission Members from Various Authorities and Ministries

State of Kumtor glaciers

The opinion submitted by glaciologists R. Usubaliyev and E. Azisov provides an analysis of content of chemical elements in the glaciers compared to previous periods. In particular, they found that the general mineralization in summer precipitation is 3 to 6 times higher than that in winter precipitation, however, the contents of heavy metals in winter precipitation is 1.5 to 2 times higher. Some experts believe that the volume of natural admixtures is higher in cold periods due to the intensification of circulation processes. Still, this claim requires a confirmation or refutation based on special research conducted in various regions of Tien Shan, because the peak level of precipitation in the highland areas of Tien Shan is observed in spring and winter.

As open-pit gold mining operations take place in the immediate vicinity of glaciers in the south-western slope of Ak-Shyirak Mountain Range, it is, naturally, very likely that local anthropogenic factors have impact on the glacial systems in the area. The analysis of mineralization in snow, snowflakes, glaciers and river water in the Kum-Tor and Sary-Tor River basins in the Ak-Shyirak Mountain Range showed that their general mineralization is low. Snow on the surface of the glacier and moraine has hydrocarbonate-magnesium-calcium composition with aggregate amount of ions not more than 20 mg/l, and belongs to chloride type.

Relative sulfate enrichment of streams on these glaciers compared to chlorides is explained by the sulfide mineralization. This ratio is typical for the whole area which is further confirmed by the analysis of water samples collected in the Petrov Glacier stream in 1927, and analysis of samples systematically collected by Kumtor Operating Company from the Lysyi stream and the results of the recent chemical analyses. However, in the three streams running from the Davidov Glacier, the sulfate contents are over 2 times above the maximum allowable concentration levels (2 to 6.5 times for nitrate, see Table 1). This is, of course, explained by the immediate vicinity of mining operations in the Davidov Glacier basin and the impact that waste rock dumps stored on the surface of the glacier ice tongue have on the general chemical composition of the glacial meltwater. The content of chloride and nitrite in all samples compared to the maximum allowable concentration level was much lower. Here, we need to mention that for the Kumtor area [8] the levels of general mineralization of glacial meltwater in small rivers are taken as background figures.

We measured pH in the samples collected in the glacial streams and pH in two samples of melted snow water collected from glaciers in the area in focus. Snow water from glaciers is poorly mineralized and soft, and shows acid and neutral reaction. For purposes of comparison: snow cover and meltwater of glaciers of the Ak-Shyirak Mountain Range showed neutral and alkalescent reaction (pH = 6.8 to 7.2 to 7.6). Samples collected in the Kumtor River (No. 165)

down the point of merge with the Lysy stream and in the Davidov Glacier stream showed reaction close to alkaline.

Therefore, processes of demineralization and secondary enrichment due to the impact of moraine (or waste rock dumps in case of the Davidov Glacier) play the key role in the formation of chemical composition of melted glacial water in this glacier's stream. Furthermore, due to operational needs rocks in the largest part of the Davidov Glacier basin were exposed to some extent of mechanical man-made destruction which dramatically accelerated natural weathering processes. Some changes might also be caused by the removed ice from the middle part of the glacier where it is piled near the overburden rock dumps. Such ice always contains various types of rock due to natural or anthropogenic impacts. Ultimately, these rocks are gradually washed away by surface flows thus enriching melted glacial water with chemical elements.

We have compared the data obtained for other melted glacial water in the area in different years. Here, the focus is drawn by the difference in contents of elements in samples of snow, ice, and melted ice. In general, in terms of most heavy metals, the contents of these elements in the recent past was much lower than in the samples recently collected in rivers and streams in the Kumtor mine area; some elements (arsenic, for instance) were absent at all. It is important to mention that upon the merge of heavily polluted melted glacial water with a main river (Kumtor River in this case) the level of most of heavy metals in the water drops radically, becoming almost normal.

Talking to K.S. Moldogaziyeva, R.Usubaliyev mentioned that not only the glacier melting process is crucial here, but also the mechanical ice unloading which determines the dynamics of the glacier movement and sliding.

Opinion of I.A. Torgoyev, Director, GEOPRIBOR Scientific and Engineering Center, Geomechanics and Mineral Resources Development Institute, Academy of Sciences of the Kyrgyz Republic:

Prior research of moraine and ice of the Petrov Lake and Glacier has identified the following problems and risks. Comprehensive (bathymetric, hydrological, and geophysical) studies and geodetic survey of moraine and ice system of the Petrov Lake in 2006-2009 defined the total (65 mln m^3) and break risk (over 30 mln m^3) volume of the lake as of September 2009, defined the speed of retreat of various parts of the Petrov Glacier, and thoroughly examined the structure of the moraine and ice dam of the lake in the potentially risky area of the Blue Bay. Geophysical methods helped to find out that the dam core is formed by blocks of buried ice which rise to the surface in some places. The buried ice in this part is still actively melting and gets exposed sometimes, and the melting process is further accelerated by the heat of water in the Blue Bay which reaches 12-13°C in summer time. A reason for special concern is subsidence on top of the dam in the far western part of the Blue Bay. Activation of subsidence processes in this part may result in the formation of a closing channel with a bottom lower than the water level in the Petrov Lake itself which is hydraulically connected with the Blue Bay.

Reconnaissance examination of the Blue Bay in September 2007 revealed a dam slide by all height and with depth of approximately 1.5 m on the inner side of the dam facing the Bay covering approximately 30 m. Buried ice was exposed in several local sites. This is a proof of intensification of thermokarst and degradation processes occurring within the dam. The final report outlined that if underground drainage channels are formed along the thermokarst cavities (grottos) inside the dam (including during severe earthquakes), it may bring the most dangerous scenario - rapid underground discharge of the lake water with a speed of up to 1000 m^3/second which may transform into a heavily destructive mud stream.

The following recommendations were prepared based on the results of comprehensive studies that took place in 2007-2009 in order to prevent and/or mitigate risks of the Petrov Lake dam break:

- continued geodesic and geophysical monitoring of the moraine and ice system – first of all, for the potentially dangerous part of the Blue Bay;
- geophysical examination of bridge between the lake and the Blue Bay, engineering, geological and hydrological survey in the Kumtor River closing channel to prepare a feasibility study of regulated reduction of level of water in the Petrov Lake until the volume of water is safe.
- mathematical modeling of various possibilities of the lake dam break taking into account results of comprehensive studies conducted in 1998 and 2006-2009 and monitoring data to evaluate the potential impacts of hydrodynamic wave of the underground break on tailing facilities of the Kumtor Mine and the nearby areas of the Naryn River Basin.

The 2009 annual environmental protection report of Kumtor Operating Company (Section 7.1) specifies that the above measures were to be completed by 2010. However, as of September 2011 we had no information about the status of these measures.

It is obvious that global warming that caused the accelerated melting of the Petrov Lake and significant increase in the area and volume of water in the lake, continues to aggravate the risks of the lake dam break as the dam is gradually losing its stability due to intense melting of the ice buried within it and active development of thermokarst processes that may lead to the formation of underground break channel. In 2011, Geopribor Scientific and Engineering Centre initiated evaluative modeling of the tailing pond flooding in case of underground break of the Petrov Lake dam. **The results of this study have shown that transformation of hydrodynamic breaking wave from the Petrov Lake into a mud stream may result into a significant erosion of ancient moraine line in the place of narrowing of the Kumtor River Valley bottom near the Eastern End of the tailing pond dam, which may further cause flooding of the tailing pond. In view of the aforesaid, it is crucial to take the proposed preventive measures to decrease the risks of the dam break (including monitoring and research) as soon as possible.**

According to the Opinion of Deputy Director of the State Mining Safety Inspectorate A. Makhmutov, since 1995 Kumtor Operating Company (KOC) conducts the mine deposit development as an open pit mine. The mining operations are being conducted in the central part of the Kumtor deposit. All objects of the Kumtor gold mining complex are supervised by the State Mining Safety Inspectorate of Kyrgyz Republic since June 1995, according to the Regulation on Gosgortekhnadzor. Gosgortechnadzor oversees hazardous industrial objects in the deposit.

At present, all mining, blasting, including the exploration at the Kumtor mine, are held in accordance with the Projects and Plans for mining operations. KOC uses modern industrial explosives. The daily output of mining in the quarry reaches 500 thousand tons. For exploration in the central part of the Kumtor deposit are carried out by underground methods. Currently two declines are being passed and will be used for the ore exploration in the lower horizons. For the mining – the open pit and underground mining equipment with high-performance on diesel is used.

In February 2009 while conducting the inspection for industrial safety in mining operations there have been identified the displacement of Davidov glacier and moraine and the crumple zone on south-eastern wall of the Central pit was formed (hovering, cracks, bulging ice and rock). The State Mine Inspection suspended mining and blasting works in places where the monitoring points movement exceeded 50 mm / h at the dangerous southeast pit wall. As requested by the State inspection a "special project for reload and restoration of the south-eastern edge of Kumtor pit" was developed, it provided engineering solutions for the safe working out the material in the that slipping pit wall part and the creation and keeping in a safe condition of the reload zone of the pit wall. At the present time the precautionary measures take place to ensure the safety of mining operations at lower levels of the mine and to exclude the possibility of the rock and ice

collapse into the pit. There are no threats for the collapse of the south-eastern edge nowadays. The monitoring reports from this zone are brought to the Inspection weeklyfor analysis and control.

From the gold recovery plant the pulp reaches the tailing facilities and then is treated at the treatment plant, so, the natural process if the cyanide decomposition is foreseen and as well the metals neutralization and sedimantation by the INCO-S02 method.

According to the Kumtor Project feasibility study, the design capacity of industrial wastes in the tailing facilities may reach 93 million cubic meters with tailings dam high as 3670.5 m and mine life time till 2014. In this regard, during the period since 2006 till present KOC performs gradual build-up of the dam to the level of 3664.0 m as approved.

In 1999, after two years of operation of the tailings, the horizontal displacement at the base of the western wing of the dam was found. The State Mine Inspection prescribed to KOC to conduct exploration work in order to obtain conclusions about the stability of the tailings dam from Kyrgyz research institutes and to take urgent measures to eliminate the horizontal displacement of the dam.

KOC has decided to build structures that will retain horizontal displacement of the Kumtor mine tailings dam, according to the design solutions developed on the basis of the Technical Regulations, sponsored by the Institute of Physics and 'rock mechanics (Institute of Rock Mechanics and Exploitation of Mineral Resources), National Academy of Sciences of the Kyrgyz Republic and agreed with the relevant regulatory authorities Kyrgyz Republic.

In 2003, 600 meters of the dam were strengthened by a shear key and supported by the rock of 90 mln cubic meters. The Institute of Rock Mechanics and Exploitation of Mineral Resources of Kyrgyz Republic, National Academy of Sciences concluded that the shear key will provide stability to the dam during the earthquake of 9 points. Institute of Rock Mechanics and Exploitation of Mineral Resources is currently the developer of projects to strengthen the tailings dam and ensure its stainability.

In addition, since 2006 the Mine Inspection requested strengthening of the dam with specialized Kyrgyz design organizations, coming through the state examination for environmental, industrial safety and for compliance with design decisions with building regulations.

Taking into account the KOC plans and further intensive development of mining facilities Kumtor mine, to take timely preventive action for emergency situation at the mine, the Mine Inspection prescribed the management of KOC to decide on the design and construction of a new tailings facility. If the reserves of "South West" deposit are to be mined, this will inevitably raise the question of the possibility of storing industrial tailings as the current facility is not designed for this volume.

In 2007, the Research Centre "Geopribor" at the Mineral Resources Development Institute, Academy of Sciences of the Kyrgyz Republic and Research production company "Eco-service" conducted research for the alternatives on the areas to place the new tailing facility and the preliminary choice was made.

At the same time, representatives of Gosgortekhnadzor according to the "Regulations on order inspections of business entities", approved by Government Decision #533 of 06.11.2007 stated there can be inspection for industrial security at Kumtor mine only a once a year. With a planned inspection once a year, it is virtually impossible to conduct preventive work to prevent accidents and injuries, impact on improving safety of workers.

The Mining Safety Inspectorate considers the state of the production safety as satisfactory. However**there is a need to inspect the industrial safety levels more often than 1 time in a year, because it is otherwise impossible to take measures to prevent failures and injuries.**

According to T.O. Omukeyev, Chief Expert, Department of State Expertise, State Agency for Architecture and Construction, visual checks revealed no violations of rules and requirements applicable to the tailing pond's operation. The height of the dam above the water is within required standards of industrial safety. Sizes of the banks meet current standards and design decisions. Filling the tailings is on schedule and in the according sections as it has been designed. The upper and lower slopes of the dam no visible leaks have been found. Crest of the dam is in satisfactory condition. Raising the dam's height is conducted in accordance with design decisions. Tails transportation system, pulp collection system for the leachate collection, emergency pools-storages, diversion of surface water channels, sewage treatment facilities are in satisfactory condition.

However, he pointed that Canadian companies Kilborn Inc. and Golder Associates used an incorrect project solution for the tailing pond construction. An ice loamy layer was left in the dam bottom, and, in specific conditions, it will become a plane on which the dam will slide.

Also the solution to store waste rock dumps on glaciers was a wrong decision. It is well known that the mountain glaciers are pulsing. **Sooner or later, such dumps will reach the final glacier moraine, and its components will pollute the water sources** *(what, as proven by the sample analysis, has already happened. – K.M.)***.**

The Division also believes that new territories should not be provided to the company for mining purposes. For the time being, the deposits under the existing license have not been fully mined, which does not create incentives for the company to complete underground works that are more expensive compared to open-pit method.

Borders between the concession zone of Kumtor Mine and protected areas of the Sarychat-Eertash Nature Reserve

Kumtor Mine borders on the Sarychat-Eertash Nature Reserve. During the expert meeting on September 4, 2011, organized by Life Tree Human Development Centre, one of the experts said that a part of the Sarychat-Eertash Nature Reserve was going to be a part of the new concession zone. **We requested the relevant explanations from the Department of State Ecological Expertise, Biodiversity Conservation, Protected Nature Areas and Environmental Education of the State Agency for Environmental Protection and Forestry.** They provided a document which, among other things, contained the following statement: "Pursuant to the Decree No. 356 issued by the Government of the Kyrgyz Republic on June 5, 2009 *On amendment of the decree No. 76 issued by the Government of the Kyrgyz Republic on March 10, 1997 'On Sarychat-Eertash Nature Reserve',* **4,380 hectares of the Nature Reserve's land was assigned to Kumtor Operating Company** to accommodate the needs of the company and ensure further development of prospecting and mining operations at Kumtor Mine. **This land assignment is in breach of the core provisions of 'Procedure of transfer (transformation) of land plots from one category to another category, or from one type of land to another type of land' approved by the Decree No. 19 issued by the Kyrgyz Government on January 22, 2008, which states (clause 8) that 'transfer of lands covered by protected nature reserves into other categories is subject to positive opinions of state environmental experts or other relevant documents as required by the Kyrgyz environmental laws in case the continued use of such lands according to the intended purpose is no longer possible in the result of loss of their special nature protection, scientific, historic, cultural, aesthetic, recreational, health or other valuable significance… Furthermore, Kumtor Operating Company has a license for prospecting in Karasay and Kandinsky Licensing Areas which are a buffer area of this Nature Reserve. It is necessary to revoke it or start an additional study of the impact that the prospecting has on the Nature Reserve's ecosystem".**

The reserve is an important component of the Central Tien Shan ecosystems of Central Asia, where the focus unique biodiversity of global significance, as the range of biodiversity includes many species that

are endangered not only the region but also globally. From the Red Book of Kyrgyz Republic 5 rare mammals live in Sarychat-Eertash Reserve: snow leopard, the Tien-Shan brown bear, argali, manul and stone marten. In addition, the reserve is a habitat, marmots, ibex and many other species. Also, there are 87 species of birds, of which 7 Red Book: Golden Eagle, lammergeyer, Himalayan Vulture (Kumai), Griffon vulture, black vulture, falcon Saker Falcon, Eagle Owl.

Hence, this is a clear violation, and the Jogorku Kenesh and the Kyrgyz Government should solve this issue.

Discussion of the Outcomes and Conclusions

Having analyzed the obtained data that characterize the ecological and industrial safety at Kumtor Mine, we can conclude as follows:

2010 saw a rapid increase of the maximum allowable concentrations of suspended matters (from 819.53 g/hour in 2009 to 31,875 g/hour in 2010 and up to 161,666.6 g/hour in 2011 for industrial water). The State Agency for geoecology letter explained that this was due to the increase the average annual value of an existing background (natural) contaminants in the waters of the Kumtor according to a monitoring station W1.3 (above the effluent discharge) in 2011. However, increasing the MPC will increase accordingly human-induced pressures on the environment. Also at the mine the number of employees increased up to 2988 people, compared with 2009 (2590 people). The company report provide the data on the consumption of water at the mine in 2010 - 118, 3 million cubic meters, but there is no comparison between years.

Maximum allowable concentrations are exceeded for a number of components, especially heavy metals such as arsenic, nickel and manganese - especially at places that are not involved in the operational process (e.g. Petrov Lake or Lysy Stream) or located near water treatment facilities.

It is inadmissible to set the maximum allowable concentration level for arsenic at 0.05 mg/l as this is in breach with the hygienic standards effective in Kyrgyzstan and creates risks that the danger of increased contents of this element in the Petrov Lake will not be taken seriously. Although the company has a modern drinking water purification system, an additional analysis of drinking water at the mine is necessary to ensure sufficient safety. To separate the impact of the operational process and increased natural content of some chemical elements in water at the mine, **it is necessary to have the geochemical and hydrogeological data for the periods before gold mining operations started in the area.**

The glaciers are demonstrating movement and sliding down, especially in case of the Davidov Glacier. Waste dump at the Davidov Glacier is moving, too. Although glaciologists believe that glacier melting is mainly caused by natural fluctuations and pulsations, man-made impacts should be taken into account as well. Not only the glacier melting process is crucial here, but also the mechanical ice unloading which determines the dynamics of the glacier movement and sliding. In general, as R. Usubaliyev pointed out, in terms of most heavy metals, the contents of these elements in the recent past was much lower than in the samples recently collected in rivers and streams in the Kumtor mine area; some elements (arsenic, for instance) were absent at all. It is important to mention that upon the merge of heavily polluted melted glacial water with a main river (Kumtor River in this case) the level of most of heavy metals in the water drops radically, becoming almost normal. **It is therefore necessary to offer alternative options to a number of operational processes that take place near the glaciers (e.g. ice unloading) to reduce the pace of the glacier moving and melting.**

According to the 2010 report of Kumtor Operating Company and opinions of the Commission, the ore mine's condition is unstable which is further aggravated by the mine deepening works. **From this point of view, the perfect solution would be to stop the mining operations and intensify the mine edge reinforcement efforts. However, the ongoing operations require stronger monitoring by the State Mining Safety Inspectorate, and the Inspectorate's**

suggestion to inspect the mine on a more regular basis to ensure the operational safety at the mine is absolutely substantiated.

Another problem is risk of break of the Petrov Lake dam, as this may bring catastrophic consequences for the mine and the surrounding areas. A. Torgoyev suggests the following steps to prevent this:

continued geodesic and geophysical monitoring of the moraine and ice system – first of all, for the potentially dangerous part of the Blue Bay;

geophysical examination of bridge between the lake and the Blue Bay, engineering, geological and hydrological survey in the Kumtor River closing channel to prepare a feasibility study of regulated reduction of level of water in the Petrov Lake until the volume of water is safe;mathematical modeling of various possibilities of the lake dam break taking into account results of comprehensive studies conducted in 1998 and 2006-2009 and monitoring data to evaluate the potential impacts of hydrodynamic wave of the underground break on tailing facilities of the Kumtor Mine and the nearby areas of the Naryn River Basin.

The conclusions of the Department of Architecture and Construction of the State Expertise Division with respect to the tailing pond dam and development of the new concession zone are absolutely substantiated:

Canadian companies Kilborn Inc. and Golder Associates used an incorrect project solution for the tailing pond construction. An ice loamy layer was left in the dam bottom, and, in specific conditions, it will become a plane on which the dam will slide. The expert also noted that the solution to store overburden waste rock dumps on glaciers is a failure. Sooner or later, such dumps will reach the final glacier moraine, and its components will pollute the water sources (what, as proven by the sample analysis, has already happened). **The Division also believes that new territories should not be provided to the company for mining purposes. For the time being, the deposits under the existing license have not been fully mined, which does not create incentives for the company to complete underground works that are more expensive compared to open-pit method.**

Kumtor Operating Company has obviously violated the applicable laws in getting licenses for prospecting and mining and assignment of lands occupied by the protected Sarychat-Eertash Nature Reserve. **It is therefore necessary to fulfill the recommendations of the Department of State Ecological Expertise, Biodiversity Conservation, Protected Nature Areas and Environmental Education of the State Agency for Environmental Protection and Forestry, and to conduct the state environmental expertise and transformation of the assigned lands.** In general, assignment of protected nature areas for mining is illegal under the Kyrgyz laws, **so it is necessary to raise the question about revocation of Kumtor Operating Company's license for the protected areas.**

Preliminary Recommendations of the Commission:

To Kumtor Operating Company:

1. Disclose all relevant materials, reports and reclamation plan, provide answers to the questions asked by the Commission (see report).
2. Provide the Annual Environmental Report on the national language
3. Exceeding of the maximum allowable concentrations of some elements in the moraine stream and glacial water may be a sign of pollution of the Chon-Sary-Tor Stream. Absence of toxic elements at the final sampling point (K11) is evidence of water concentration dilution to the maximum allowable concentration level or to a level that is slightly above the required level (for ammonia compounds).

4. In terms of exceeding of maximum allowable concentration of arsenic in the Petrov Lake: it is necessary to take samples of drinking water at the mine and conduct spectral analysis of ore and blast dust (or use the data of the previous relevant geochemical studies).
5. Many Commission members believe that water treatment facilities should be installed at places where the streams from the mine, waste dumps and moraine merge, as the reduction of the total volume of water discharged into the Kumtor and Naryn Rivers the level of pollution will inevitable rise.
6. Consider the issue of constructing a new tailing pond at a distance from the glaciers.

To Kyrgyz Government and responsible authorities

7. Monitoring and safety measures to prevent the break of the Petrov Lake dam.
8. In our opinion, it is now too early to provide a new concession zone to the company for development as it has not yet completed mining of the available deposits using underground method, and given the accumulating negative impact of operations in the new concession zone located in the vicinity of the Sary Tor, Muzdu Suu (?) glaciers and the buffer area of the Sarychat-Eertash Nature Reserve.
9. With respect to the Sarychat-Eertash Nature Reserve: the State Agency for Environmental Protection and Forestry should initiate state ecological expertise to examine the legitimacy of assignment a part of the protected area of the Sarychat-Eertash Nature Reserve.
10. The State Mining Safety Inspectorate should be authorized to run industrial safety inspections more frequently in view of the risks associated with Kumtor and to ensure a proper level of industrial safety on the site.
11. The process of approval of the Commission's membership and dates of the mine visit showed the shortcomings of the *Decree on Rules and Procedures of the Kyrgyz Government* and revealed lack of efficient liaison between the Government and the Jogorku Kenesh. A more efficient decision-making mechanism should be established by the Government.
12. Because the whole complex of the problems and risks at the Kumtor mine have been identified during the Commission visit (with allowed concentrations for a number of chemical elements to be exceeded, instability of the pit walls, Petrov Lakes break-out potential, illegal land Natural park land transfer for the new concession Kumtor area) – we recommend to temporarily suspend the Kumtor mine for further analysis and elimination of all violations and problematic issues.

To the Jogorku Kenesh:

13. The Committee of the Jogorku Kenesh for Land, Agrarian Issues, Water Resources, Environment and Regional Development should consider the issue of violation by transfer of lands occupied by the Sarychat-Eertash Nature Reserve to Kumtor Operating Company of the Kyrgyz laws, 'Procedure of transfer (transformation) of land plots from one category to another category, or from one type of land to another type of land' approved by the Decree No. 19 issued by the Kyrgyz Government on January 22, 2008, and Agreement on New Terms and Conditions for the Kumtor Project signed by and between the Government of the Kyrgyz Republic, Kyrgyzaltyn OJSC, Centerra Gold Inc., Kumtor Operating Company and Cameco Corporation on April 24, 2009, and consider an option to revoke the license given to Kumtor Operating Company for the Karasay and Koendinsky License Areas.

List of Sources

1. Reports of Kumtor Operating Company for 2009-2010.

2. Regulatory documents, permits and authorizations issued to Kumtor Operating Company by the Ministry of Natural Resources:

   Air emission permits;

   Maximum allowable discharges;

   Tables showing water consumption, water discharge and pollutant disposal

   Certificates for hazardous waste (Class 1 to Class 5)

   Reports of formation and disposal of operational and consumption waste for 2009-2010

   Licenses for import of toxic chemicals for 2010-2011.

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Appendix 1 - Results of Analysis of Samples at 2 Laboratories

Appendix 2 – Photographs Taken during the Visit to the Mine on September 19-20, 2011

Appendix 3 – the chemist Dzhumaev report

Appendix 4 – Comments and report on the ecological state at the Kumtor mine by international expert in geochemistry, hydrogeology and water quality Robert Moran

All Comission members signed this report.

Additional documents received after December 26, 2011:

Appendix 5 – Data from Alex Stewart laboratory

Appendix 6 – Special opinion C. Sadabaeva, A. Saparaliev