Analyses of samples of surface water, waste water, sediment, landfill and sludge collected in the area of the Kumtor Gold Mine, Kyrgyz Republic, in October 2012

- Study Report -

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Executive Summary

The objective of the present study was to collect and to analyse samples of surface water, waste water, sedimertt, landfill and sludge that were collected at selected sampling locations inside and outside the area of the Kumtor Gold Mine in October 2012.

Sampling and analyses were performed by independent experts from Germany according to current guidelines and standard procedures established in the European Union and in Germany. The samples of water, waste water, sediment and landfill were analysed for the following parameters: antimony, arsenic, barium, cadmium, copper, chromium, cobalt, iron, lead, manganese, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, zinc, total and free cyanide, sulfate, nitrate, ammonia, boron, fluoride and chloride. Regarding the samples of sediment, landfill and sludge the aforementioned parameters were measured in the dried solid material as well as in the aqueous eluates.

The element concentrations and the cyanide and fluoride concentrations of the water samples collected largely correspond to the natural geochemical background levels. The analytical data do not provide evidence of the presence of undue high concentrations of cyanide and toxic elements in surface water at the sampling locations of this study. However, the concentrations of sulfate, nitrate, and ammonia were significantly increased when compared to natural background levels. The increased levels of sulfate presumably are related to the oxidation of sulfidic minerals such as pyrite, which are constituents of rocks and sediments in this area, and which are mobilized by mining and milling. The origin of the increased levels of nitrate and ammonia could not be clarified.

An ecotoxicological assessment of the quality of surface water was not part of this study. This would require a more comprehensive analysis of samples of surface water in areas, where aquatic organisms occur in surface water. The increased levels of sulfate, nitrate and ammonia in the water of the Kumtor river about 5 km downwards of the Kumtor Gold Mine appear to require a closer examination with regard to possible adverse effects on sensitive aquatic organisms. It should be noted, however, that other sources may cause or contribute to the increased levels of sulfate, nitrate and ammonia in this section of the river.

The sample of waste water from the waste water treatment plant was found to have a higher electric conductivity and increased concentrations of antimony, arsenic, copper, cobalt, molydenum, ammonia, sulfate, boron, and fluoride when compared with the surface water samples. According to the analytical results there is no evidence of the presence of undue high concentrations of cyanide and toxic elements in the analysed waste water sample. The concentration of elements and cyanide measured in this waste water sample are significantly below the limit values of the German Ordinance on Waste Water, Annex 51.

The samples of sediment and landfill that were collected predominantly exhibit element and cyanide concentrations in the range of the natural geochemical background

concentrations, which are typical for the Tien Shan Mountains. The analytical results do not provide evidence of the presence of sediments and landfill with undue high concentrations of toxic elements and cyanide at the sampling locations of this study. The aqueous eluates of the samples of sediment and landfill that were collected exhibit very low concentrations of elements and anions. Solely sulfate was increased in some samples.

A sample of sludge that was collected from the tailings pond does not exhibit undue high concentrations of cyanide and toxic elements. Likewise the aqueous eluate prepared from this sample does not exhibit undue high concentrations of cyanide and toxic elements. With regard to the great extension of the tailings pond a general conclusion cannot be drawn from the analysis of solely one spot sample.

Recommendations

This study, which is based on the analyses of a very limited number of spot samples, should be regarded as a study for orientation performed by independent experts. The results of this study should be compared with the results of the comprehensive environmental monitoring activities of the Kumtor Gold Mine, which are published in the annual environmental reports. A comprehensive evaluation of the risks to human health and to the environment that could be associated with the activities of the Kumtor Gold Mine should be based on all analytical and geophysical data available. This should be accomplished in a joint effort of experts of the Kumtor Gold Mine, independent experts, representatives of the government, of the parliament and of the "State Commission on Inspection and Studying of Observance of Joint-Stock Company "Kumtor Operating Company" of Norms and Requirements on Rational Use of Natural Resources, Environmental Protection, Safety of Productions and Social Protection of Population" of the Kyrgyz Republic, and – last but not least - representatives of environmentalists.

1. Background

The Kumtor Gold Mine is located in the Tien Shan Mountains in the Kyrgyz Republic at about 4000 m above sea level, about 350 km south-east of Bishkek and about 60 km north of the boundary with China. The mine started operation in 1997 and is owned by Centerra Gold Inc., a Canadian-based gold mining and exploration company engaged in the operation, exploration, development and acquisition of gold properties in Asia, the former Soviet Union and other emerging markets worldwide. It is the largest gold mine project operated by a Western company in the Central Asian region. In 2012 Kyrgyzaltyn JSC, the largest company of the Kyrgyz Republic specialized in gold mining became a direct shareholder of Centerra Gold Inc.

In the past years a public controversy has developed in the Kyrgyz Republic with regard to the environmental health and safety management of the Kumtor Gold Mine and with regard to environmental problems that could be related to the activities of the Kumtor Gold Mine. Environmentalists are concerned that toxic substances, which are used in the process of extracting gold from the rocks, may contaminate surface water and rivers flowing down to residential and agricultural areas. They suspect that this could represent a hazard to the residents of these areas. Concern was promoted by an accident in May 1998. A truck transporting 20 tons of highly toxic sodium cyanide used in the gold leaching process crashed into the Barksoon River and spilled 1.7 tons of its cargo into the waterway. Environmentalists also point to the accident at the Aurul Gold Mine near to Baia Mare, Romonia. On the night of January 30, 2000, a dam holding a pond contaminated sludge and water bursted and 100,000 cubic metres of cyanide-contaminated water containing an estimated amount of 100 tons of cyanides spilled over some farmland and then into the Someş river.

As a consequence environmentalists demanded that water and soil samples from the area of the Kumtor Gold Mine should be analysed according to international norms and standard procedures by an independent laboratory. The investigations should be directed primarily to toxic substances that are used in leaching gold from the rocks with cyanide as a prior agent.

Mrs. Erkingul Imankozhoeva, member of the Parliament of the Kyrgyz Republic, who had contact with some specialists in Germany, proposed to request Mr. Thomas Nordmann Cologne (Germany) to collect water samples and samples of glacier and river sediments from the Kumtor gold mine area. Mr. Nordmann declared to be prepared to collect the samples by himself, and proposed that the samples should be analysed in the Hygiene-Institut des Ruhrgebiets, located in the city of Gelsenkirchen (Germany). This institute war founded in 1902 and is one of the oldest institutes of hygiene in Germany with a great national reputation.

According to these proposals the government of the Kyrgyz Republic and the management of Kyrgyzaltyn OJSC agreed in October 2012 to make a contract with the Institute of Hygiene of the Ruhr Area, Gelsenkirchen (Germany), refering to the sampling and analysis of water and sediment samples collected in the area of the Kumtor Gold Mine. The contract was signed by

- Dr. O.M. Artykbaev, Director of the State Inspection on Environmental and Technical Safety of the Kyrgyz Republic and Head of the Working Group on Environmental and Mining Technical Expertise of the State Commission, formed by resolution of the Government of the Kyrgyz Republic No. 465 from 03. July 2012.

- Dr. Dilger S. Japarov, Chairman of the Board of Kyrgyzaltyn JSC

- Professor Dr. Ulrich Ewers, Head of the Department of Environmental Medicine and Toxicology. Hygiene-Institut des Ruhrgebiets, Gelsenkirchen (Germany)

- Mr. Thomas Nordmann, Consultant, Cologne (Germany)

2. Kumtor Gold Mine

The mining and milling operations and the extraction of gold from the ore concentrates at the Kumtor Gold Mine are described in detail in a Technical Report, prepared for Centerra Gold Inc. Toronto (Canada), which was published in March 2011 (see references).

According to this report the operations can be described briefly as follows:

Mining operations are carried out using conventional open-pit mining methods. The central deposit is mined in a large open pit where total material mined in 2010 was approximately 116 million tons, or 318,000 tons per day.

The plant flowsheet of the extraction of gold consists of crushing, grinding, pyrite flotation, and double re-grinding of the flotation concentrate. Two separate carbon-in-leach (CIL) circuits extract the gold from the re-ground concentrate and from the flotation tailings. Cyanide solution, slaked quicklime and activated carbon are required for this operation. Gold is adsobed at the surface of the carbon particles, which are stripped in a subsequent step. Finnally, the gold is recovered by electro-winning.

The tailings management facility consists of two tailings lines, an effluent treatment plant and two diversion ditches around the area to prevent runoff and natural watercourses from the tailings pond. The tailings pipelines are about six kilometres in length. The dam of the tailings pond was designed and constructed to address the permafrost conditions at the mine site. The dam is about 3 km long and up to 25 metres high. It is constructed from alluvial material alohg with a synthetic liner 100 metres on the upstream slopes. During construction the alluvial material was compacted to provide stability for the dam.

The tailings pond holds about 60 million cubic metres of tailings and 1.4 million cubic metres of untreated process water. During summer operations, some five million cubic metres of effluent are treated and subsequently discharged to the environment.

Kumtor Gold Company (KGC) has established a comprehensive Environmental Management System to address the effects of its operations on the environment and to monitor compliance with various regulations issued by the Kyrgyz authorities.

An Environmental Management Action Plan (EMAP) was established in 1995.

An Environmental Report presenting the results of all measurements and monitoring activities in the area of the Kumtor Gold Mine is published annually. The 2010 and 2011 reports are accessible for the public in the internet (see references).

3. Objective of the present study

The objective of the present study was to collect and to analyse samples of surface water, sediment, landfill and sludge from selected sampling locations in the area and outside of the area of the Kumtor Gold Mine.

Sampling and analyses should be performed by independent experts from Germany according to current guidelines and standard procedures established in the European Union and in Germany.

As per order the water and sediment samples should be analysed for the following parameters: antimony, arsenic, barium, cadmium, copper, chromium, cobalt, iron, lead, manganese, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, zinc, total and free cyanide, sulfate, nitrate, ammonia, boron, fluoride and chloride. Regarding the samples of sediment, landfill and sludge the aforementioned parameters were to be measured in the dried solid material as well as in the aqueous eluates prepared according to DIN 38414-S4.

4. Sampling of water, sediment and soil in the Kumtor Gold Mine area

Mr. Nordmann travelled to Kyrgystan on October, 11., 2012 carrying all the vessels that were required for sample collection in his baggage. The vessels were provided by the Hygiene-Institut des Ruhrgebiets.

The collection of samples was performed on October 12. and 13., 2012 in the presence of the following persons:

- Mrs. Erkingul Imankozhoeva, Member of the Parliament of the Kyrgyz Republic and member of the Working Group on Ecology and Mining Issues of the "State Commission on Inspection and Studying of Observance of Joint-Stock Company "Kumtor Operating Company" of Norms and Requirements on Rational Use of Natural Resources, Environmental Protection, Safety of Productions and Social Protection of Population"
- Mrs. Kalia Moldogazieva, member of the State Commission, deputy head of the Working Group on Ecology and Mining Issues of the State Commission mentioned above
- Mr. Rasul Artykbaev, head of the Department of Ecological Safety of the State Inspection of Ecological and Technical Safety under the Government of the Kyrgyz Republic
- Mr. Isakbek Torgoev, Director of the Scientific and Engineering Center "Geopribor" of the Institute of Geomechanics of the National Academy of Sciences of the Kyrgyz Republic
- Mrs. Gulnura Toktosunova, Secretariate of the Working Group on Environmental and Mining-technical Expertise of the State Commission mentioned above
- Mr. Sherulan Darmanov, Department on Industrial Safety of the State Inspection of Ecological and Technical Safety under the Government of the Kyrgyz Republic.
- Professor Dr. Peter Stegnar, Jozef Stefan Institute, Jamova 39, 1000 Ljubljana, Slovenia
- Mr. Aibek Abduvaliev, Kumtor Operating Company
- Mr. Iskender Omorov, Kumtor Operating Company
- Mr. Kamchybek Mambetov, Kumtor Operating Company
- Mr. Konush Abdygulov, Kumtor Operating Company
- Mrs. Nazira Kasenova, translator.

The samples of sediment and landfill that were collected consisted iof fine-grained material, which was transferred to 250 ml glas vessels, that were sealed with a screw cap. According to analyses performed in the laboratory of Professor Stegnar the mass concentration of particles < 1 mm were between 66 and 100 %. Only one sample (SK 1 s) exhibited a higher percentage of particles > 1 mm (63 %).

The water samples were transferred to 50 ml polyethylene vessels that were sealed with a screw cap. The water samples to be analysed for metals and metaloids were stabilized by the addition of nitric acid according to DIN EN ISO 17294-2. The water samples to be analysed for cyanide were collected in a second vessel and stabilized by the addition of NaOH according to DIN EN ISO 14403. The water samples to be analysed for the other anions were collected in a third vessels. No additive for stabilization was required.

The pH of the water samples and the electrical conductivity were measured in the field using a HQ40d Portable pH, Conductivity, Dissolved Oxygen, ORP, and ISE Multi-Parameter Meter (Manufacturere: Hach Company, Loveland, Colorado (USA))

In total, 13 water samples, 10 sediment samples, 2 samples of landfill, and 1 sample of sludge were collected.

Some photos taken during sample collection are presented in the photo documentation (see Annex I).

The sampling protocols are presented in Annex II.

Mr. Nordmann travelled back to Germany on October, 15., 2012. The vessels with the samples that had been collected were packed in two yellow boxes, which were transported in the same aircraft. Immediately upon arrival at Düsseldorf Airport Mr. Nordmann received the two boxes from the customs and brought the samples to us. The samples were unpacked by us and analysed within the follwing days. Alterations of the samples of solid material and water during the time elapsed from sampling until analysis in the laboratory can largely be excluded.

5. Sampling locations

The sampling locations were selected according to proposals of the representatives of the State Inspection on Environmental and Technical Safety of the Kyrgyz Republic, representatives of the Working Group on Environmental and Mining Technical Expertise of the State Commission, formed by resolution of the Government of the Kyrgyz Republic No. 465 from 03. July 2012, and representatives of the Kumor Gold Mine.

An overview on the sampling locations is presented in Table 1 and in Figures 1 and 2.

The Petrov Lake is located above the Kumtor Gold Mine and is not affected by mining activities. The sampling locations SK 12 and SK 16 also are apart from the Kumtor Gold Mine and appear not to be affected by mining and milling ooperations. The geochemical composition of the water and sediment samples collected at these locations can be considered to represent the typical natural geochemical composition of rocks, sediments and surface water of this part of the Tien Shan Mountains.

The sampling locations SK 4 – SK11 and SK 13 - SK 15 were selected because it was suspected that they could be affected by effluents from hazardous materials handling, from mine waste dumps, from the tailings pond, from the waste water treatment plant, or from spill incidents on site and off site.

6. Chemical Analyses

The analyses of the water samples and of the sediment and landfill samples were performed in the laboratories of the Hygiene-Institut des Ruhrgebiets, Gelsenkirchen (Germany) according to standard methods as indicated in the tables presenting the analyticals results (see Annex IV)

According to the accreditation attested by „Deutsche Akkreditierungsstelle GmbH" the institute is competent under the terms of DIN EN ISI /IEC 17025 : 2005 to carry out physical, physicochemical, chemical, biological and specific ecotoxicological analyses of water, sediment, soil and sludge (see Annex III).

The samples of Sediment, landfill and sludge were dried up to constant weight and digested with aqua regia prior to analysis. After digestion the residues were dissolved in a defined amount of water and analysed for various elements using Indictively-coupled Plass Emission Spectrometry (ICP-ES) and Atomic Absorbtion Spectrometry (AAS). The results are presented as mg/kg dry mass. The concentration of total and soluble cyanide was measured according to LAGA CN 2 / 79 / DIN ISO 17380.

The aqueous eluates of the sediment and landfill materials were prepared by shaking 100 g of the dried solid material with 1000 ml of water for 24 hours according to DIN 38414 – S4.

Table 1 . Overview on the sampling locations.

Number of Sample Location	Samples Collected	Sampling Location
SK 1	sediment, surface water	Outlet of the Petrov Lake, not affected by mining activities and discharges of waste material or waste water
SK 2	surface water	Petrov Lake, not affected by mining activities and discharges of waste material or waste water
SK 3	sediment, surface water	Outlet of the Lysyi Glacier under the waste dump
SK 4	sediment, surface water	Hydroposten water coming from the direction of the Lysyi Glacier
SK 5	sludge	Tailings pond, near to the dam
SK 6	waste water	Pipes transporting treated waste water from the wastewater treatment plant; mixed sample collected from the two pipes
SK 7	sediment, surface water	"Chon Sary Tor " river, outlet from the Davidov Glacier; water is coming from the open pit
SK 8	sediment, surface water	Outlet under the waste dump of the South-West open pit
SK 9	sediment, surface water,	Near to a bridge over the Kumtor river, about 4,9 km downwards of the last discharge from the mine
SK 10	sediment, surface water	Outlet of the central open pit
SK 11	surface water	Deepest location of the Kumtor Ultimate Pit
SK 12	sediment, surface water	Arabel river; apparently not affected by mining activities and discharges of waste material or waste water
SK 13	sediment, surface water	Spring of leak water under the dam of the tailings pond
SK 14	landfill	Valley of the Kumtor river, 360 m downwards of the dam of the tailings pond
SK 15	landfill	Valley of the Kumtor river, 480 m downwards of the dam of the tailings pond
SK 16	sediment, surface water	Barskoon river under the bridge, where a truck transporting highly toxic sodium cyanide crashed into the Barksoon river in May 1998

Figure 1. Satellite picture of the Kumtor Gold Mine area and the sampling locations.

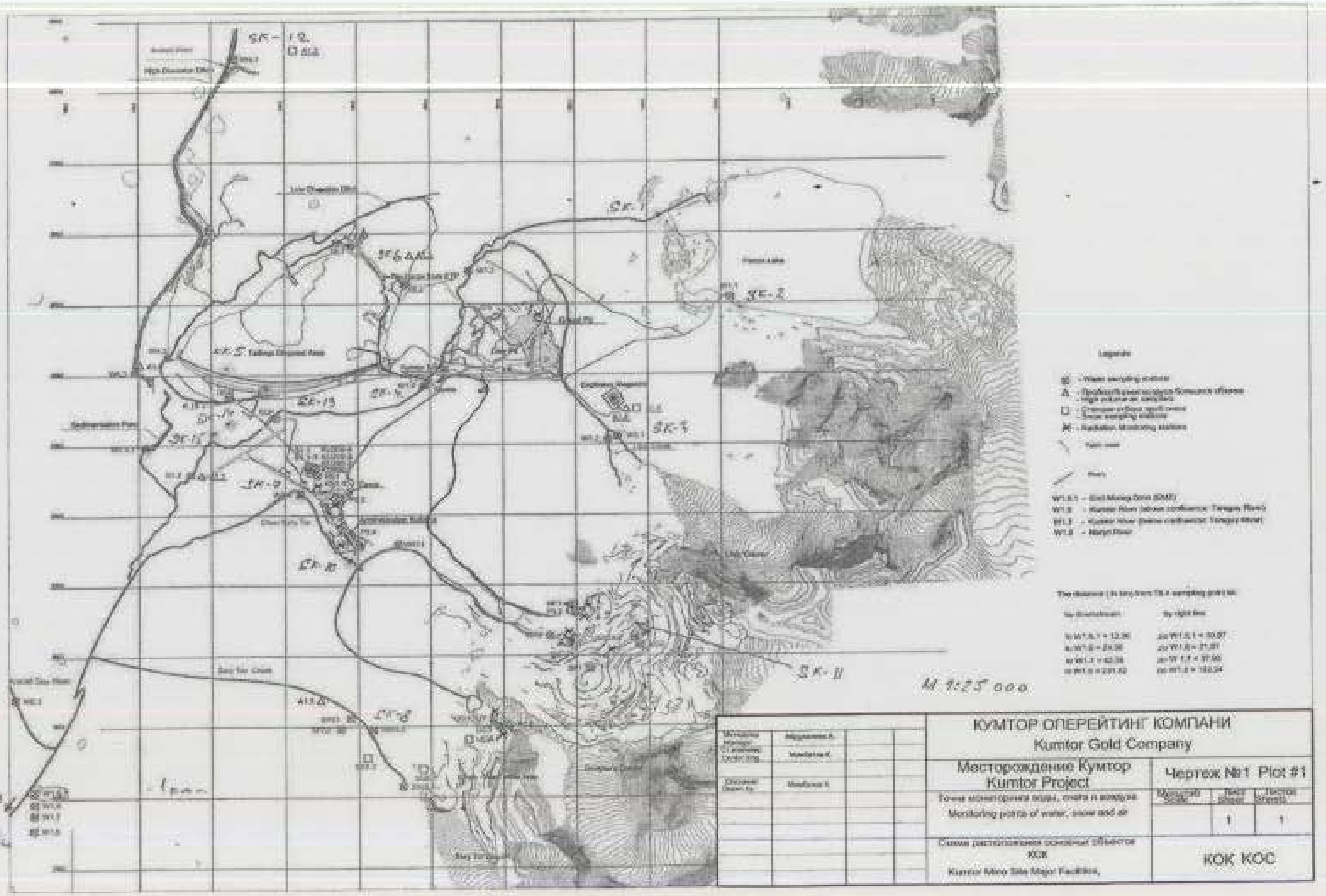

Figure 2. Map of the Kumtor Gold Mine area and sampling locations (on yellow colour).

7. Results

7.1 Water

The water samples comprised of 12 samples of surface water and one sample of waste water.

The results of the physicochemical and chemical analyses of the water samples are presented in Table 2.

Due to the sampling location the composition of the samples SK 1 w, SK 2 w, and SK 12 w appears not to be affected by activities of the Kumtor Gold Mine. Therefore, it can be assumed that the concentration of elements and various anions measured in these samples represent the typical natural background levels of surface water located in the higher parts of the Tien Shan Mountains in the Kyrgyz Republic. Therefore, these levels can be considered as reference levels.

Compared to these reference levels the water samples collected at locations in or below the area of the Kumtor Gold Mine, exhibit a much higher electric conductivity, which predominantly seems to be related to the significantly higher levels of sulfate, nitrate and ammonia in these samples. The presence of significantly increased sulfate concentrations appears to result from the oxidation of sulfidic metal compounds such as pyrite, which occur in the rocks and which are mobilized in the mining and milling operations.

Apart from the surface water sample SK 11 w the levels of cyanide in the surface water samples do not differ from the reference levels. The surface water sample SK 11 w , which was collected at the deepest site of the ultimate pit, exhibits slightly increased cyanide levels.

The concentrations of arsenic, antimony, and most metals in the surface water samples are similar to those of the reference levels. The levels of iron are significanly lower, the levels of molybdenum significantly higher when compred with the reference levels. The surface water samples SK 7 w, SK 8 w, and SK 10 w exhibit significantly increased nickel concentrations. The waste water sample (SK 6 w) was found to have increased levels of arsenic and molybdenum when compared with the reference levels.

The results do not provide evidence of the presence of undue high concentrations of cyanide and toxic elements in surface water at the sampling locations of this study.

Table 2. Results of physicochemical and chemical analyses of the water samples.

		SK 1 w *)	SK 2 w *)	SK 3 w	SK 4 w	SK 6 w	SK 7 w
Parameter	Unit	Effluent of Petrov Lake	Petrov Lake	Outlet of Lysyi Glacier	Hydro-posten	Waste water from the waste-water treat-ment plant	"Chon Sary Tor" River
pH		7,25	7,31	9,41	8,35	6,88	8,32
conductivity	µS/cm	103	92	1246	649	3210	2420
antimony	mg/l	< 0,001	< 0,001	< 0,001	0,004	0,041	0,006
arsenic	mg/l	0,002	0,002	< 0,001	0,002	0,008	0,003
barium	mg/l	0,109	0,082	0,031	0,054	0,03	0,051
cadmium	mg/l	< 0,0001	< 0,0001	<0,0001	<0,0001	0,0003	0,0002
copper	mg/l	0,005	0,004	0,002	0,012	0,088	0,004
chromium	mg/l	0,002	0,002	< 0,001	<0,001	<0,001	0,001
cobalt	mg/l	0,0019	0,0016	0,0005	0,0096	0,0789	0,015
iron	mg/l	2,79	2,58	0,21	1,21	0,18	1,85
lead	mg/l	0,005	0,004	<0,001	0,002	<0,001	0,003
manganese	mg/l	0,103	0,076	0,045	0,053	0,083	0,957
mercury	mg/l	< 0,0002	< 0,0002	<0,0002	<0,0002	< 0,0002	< 0,0002
molybdenum	mg/l	< 0,001	< 0,001	0,006	0,038	0,338	0,063
nickel	mg/l	0,002	0,002	0,012	0,002	0,006	0,123
selenium	mg/l	< 0,001	< 0,001	0,002	0,002	0,015	0,014
silver	mg/l	< 0,001	< 0,001	< 0,001	<0,001	<0,001	<0,001
thallium	mg/l	< 0,0001	< 0,0001	<0,0001	<0,0001	< 0,0001	< 0,0001
vanadium	mg/l	0,0038	0,0036	0,0001	0,0016	0,0003	0,0016
zinc	mg/l	0,014	0,014	<0,005	0,008	<0,005	0,006
cyanide total	mg/l	<0,01	<0,01	<0,01	<0,01	0,03	<0,01
cyanide free	mg/l	<0,01	<0,01	<0,01	<0,01	0,03	<0,01
sulfate	mg/l	14	13	602	221	1483	1088
nitrate	mg/l	< 2	2	12	< 2	57	250
ammonia	mg/l	0,08	< 0,05	0,06	2,2	17,6	13,3
boron	mg/l	< 0,005	< 0,005	0,007	0,007	0,027	0,011
fluoride	mg/l	0,23	0,2	0,17	0,27	0,34	0,18
chloride	mg/l	< 5	< 5	5	9	24	13

*) Not affected by acitivities of the Kumtor Gold Mine

Table 2, Part 2. Results of physicochemical and chemical analyses of the water samples.

		SK 8w	SK 9w	SK 10w	SK 11w	SK 12w *)	SK 13w	SK 16w *)
Parameter	Unit	Outlet of southwest open pit	Bridge over the Kumtor River	Outlet of the central open pit	Deepest point ultimate pit	Arabel River	Spring under the tailings dam	Barskoon River
pH		8,51	8,65	7,7	8,29	8,5	7,58	8,31
conductivity	µS/cm	2910	1060	2580	1126	117,8	1798	281
antimony	mg/l	<0,001	0,005	0,004	0,007	<0,001	<0,001	<0,001
arsenic	mg/l	<0,001	0,002	<0,001	0,003	0,001	0,001	0,002
barium	mg/l	0,02	0,052	0,03	0,06	0,022	0,056	0,019
cadmium	mg/l	<0,0001	<0,0001	0,0001	<0,0001	<0,0001	<0,0001	<0,0001
copper	mg/l	0,001	0,011	0,001	0,006	0,005	0,004	0,003
chromium	mg/l	<0,001	<0,001	<0,001	<0,001	0,002	<0,001	<0,001
cobalt	mg/l	0,0153	0,0114	0,0115	0,0054	0,0013	0,0035	<0,0001
iron	mg/l	0,87	1,05	0,23	1,29	1,77	1,66	0,05
lead	mg/l	<0,001	0,002	<0,001	0,001	0,002	0,002	<0,001
manganese	mg/l	1,05	0,171	0,725	0,31	0,112	0,233	0,002
mercury	mg/l	<0,0002	<0,0002	<0,0002	<0,0002	<0,0002	<0,0002	<0,0002
molybdenum	mg/l	0,009	0,043	0,063	0,038	0,001	<0,001	0,007
nickel	mg/l	0,102	0,019	0,116	0,026	0,002	0,002	<0,001
selenium	mg/l	0,001	0,004	0,015	0,002	<0,001	<0,001	<0,001
silver	mg/l	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001
thallium	mg/l	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001	<0,0001
vanadium	mg/l	0,0002	0,0013	0,0003	0,0008	0,002	0,0014	0,0002
zinc	mg/l	<0,005	0,006	<0,005	0,008	0,006	<0,005	<0,005
cyanide total	mg/l	<0,01	<0,01	<0,01	0,05	<0,01	<0,01	<0,01
cyanide free	mg/l	<0,01	<0,01	<0,01	0,04	<0,01	<0,01	<0,01
sulfate	mg/l	1980	416	1185	344	9	578	58
nitrate	mg/l	18	47	294	116	2	2,7	2,5
ammonia	mg/l	0,54	4,34	14,5	19	0,1	<0,05	0,09
boron	mg/l	<0,005	0,006	0,009	0,007	<0,005	0,01	0,01
fluoride	mg/l	0,22	0,26	0,16	0,2	0,3	0,22	0,82
chloride	mg/l	9	9	12	5	6	179	<5

*) Not affected by acitivities of the Kumtor Gold Mine

The waste water sample (SK 6 w) exhibits a higher electric conductivity and increased concentrations of antimony, arsenic, copper, cobalt, molydenum, ammonia, sulfate, boron, and fluoride when compared with the surface water samples. The most pronounced differences were found for antimony, copper and molybdenum. According to the analytical results there is no evidence of the presence of undue high concentrations of cyanide and toxic elements in the analysed waste water sample.

7.2 Sediments and landfill

The results of the chemical analyses of the sediment and landfill samples are presented in Table 3.

Due to the location of sampling the composition of the samples SK 1 s, SK 12 s appears not to be affected by activities at the Kumtor Gold Mine. Therefore, it can be assumed that the concentration of elements and cyanide measured in these samples represent the typical natural background levels of sediments and abundant rocks in the higher parts of the Tien Shan Mountains in the Kyrgyz Republic. These levels can be considered as reference levels.

These reference levels are in agreement with data on the average concentrations of elements in abundant rock species and in the continental earth's crust, as shown in Table 4.

Compared to these reference levels the samples of sediment and landfill collected at locations in or below the area of the Kumtor Gold Mine, predominantly exhibit element concentrations similar to the reference concentrations (e.g. cadmium, copper, chromium, iron, nickel, vanadium, zinc). Higher levels were found in some samples for arsenic, barium, manganese, and selenium.

The element concentrations in the sediment of Barskoon River under the bridge, where a trucktransporting sodium cyanide crashed into the rover in May 1998, were within the range of the reference concentrations.

In summary, it can be stated that the concentrations of elements and cyanide that were determined in the samples of sediment and landfill in this study, are within the range of element concentrations generally found in the continental earth's crust.

The data do not provide evidence of the presence of sediments and landfill with undue high concentrations of toxic elements and cyanide at the sampling locations of this study.

Table 3. Concentration of elements and cyanide in samples of sediment and landfill collected in the area of the Kumtor Gold Mine.

		SK 1 s	SK 3 s	SK 4 s	SK 7 s	SK 8 s	SK 9 s
Parameter	Unit	=utlet of Petrov Lake	Outlet Lysyi Glacier	Hydro-posten	River "Chon Sary Tor"	Outlet southwest open pit	Bridge over the Kumtor River
antimony	mg/kg	< 0,5	1,6	0,9	1,3	1,0	1,1
arsenic	mg/kg	3,7	32	11	22	24	16
barium	mg/kg	91	174	319	297	116	207
cadmium	mg/kg	< 0,20	< 0,20	< 0,20	0,21	< 0,20	< 0,20
copper	mg/kg	9,6	59	21	41	37	30
chromium	mg/kg	7,4	18	12	32	13	20
cobalt	mg/kg	4,1	19	7,7	20	19	13
iron	g/kg	13,1	36,0	29,4	39,2	38,4	28,5
lead	mg/kg	3,2	10	6,3	17	7,7	11
manganese	mg/kg	315	657	374	870	1130	674
mercury	mg/kg	< 0,10	< 0,10	< 0,10	< 0,10	< 0,10	< 0,10
molybdenum	mg/kg	0,67	5,4	2	3,3	5,7	2,2
nickel	mg/kg	9,5	42	17	52	51	33
selenium	mg/kg	1,6	6,5	4,1	2,5	3	2
silver	mg/kg	< 2,5	< 2,5	< 2,5	< 2,5	< 2,5	< 2,5
thallium	mg/kg	< 0,5	< 0,5	< 0,5	< 0,5	< 0,5	< 0,5
vanadium	mg/kg	12	18	30	38	25	28
zinc	mg/kg	27	46	35	73	34	50
cyanide total	mg/kg	<0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1
cyanide free	mg/kg	<0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1
boron	mg/kg	<12	< 12	< 12	< 12	< 12	< 12

*) Not affected by acitivities of the Kumtor Gold Mine

Table 3, Part 2. Concentration of elements and cyanide in samples of sediment and landfill collected in the area of the Kumtor Gold Mine.

		SK 10 s	SK 12s *)	SK 13 s	SK 14 l	SK 15 l	SK 16 s *)
Parameter	Unit	Outlet central open pit	Arabel river	Landfill under the tailings dam	Landfill in the Kumtor river valley	Landfill in the Kumtor river valley	Barskoon River
antimony	mg/kg	1,6	0,56	1,2	0,51	0,84	0,57
arsenic	mg/kg	27	13	19	8	12	16
barium	mg/kg	275	109	436	159	315	45
cadmium	mg/kg	< 0,20	< 0,20	< 0,20	<0,2	<0,2	< 0,20
copper	mg/kg	53	28	33	17	24	22
chromium	mg/kg	26	34	18	14	36	19
cobalt	mg/kg	21	12	12	6,9	10	7,4
iron	g/kg	42,5	30,9	36,1	19,7	25,9	26,0
lead	mg/kg	20	16	10	6,6	13	7,5
manganese	mg/kg	1100	572	806	453	518	435
mercury	mg/kg	< 0,10	< 0,10	< 0,10	< 0,1	< 0,1	< 0,10
molybdenum	mg/kg	4,1	0,53	3,8	0,96	0,99	< 0,5
nickel	mg/kg	55	28	30	16	27	16
selenium	mg/kg	3,3	1,5	1,7	<1	1,8	1,9
silver	mg/kg	< 2,5	< 2,5	< 2,5	< 2,5	< 2,5	< 2,5
thallium	mg/kg	< 0,5	< 0,5	< 0,5	< 0,5	< 0,5	< 0,5
vanadium	mg/kg	34	40	30	20	35	26
zinc	mg/kg	73	72	49	40	56	44
cyanide total	mg/kg	< 0,1	< 0,1	< 0,1	<0,1	<0,1	< 0,1
cyanide free	mg/kg	< 0,1	< 0,1	< 0,1	<0,1	<0,1	< 0,1
boron	mg/kg	< 12	< 12	< 12	<12	<12	<12

*) Not affected by acitivities of the Kumtor Gold Mine

Table 4. Comparison of the element concentrations in the sediment samples SK 1s, SK 12s, and SK 16s with average element concentrations in abundant rock species and in the continental earth's crust.

		SK 1 s	SK 12 s	SK 16 s	Average concentration according to Wedepohl (2004)			
Parameter	Unit	outlet of Petrov Lake	Arabel River	Barskoon River	Shales	Granitic rocks	Limestones	Continental crust
antimony	mg/kg	< 0,5	0,56	0,47	0,13	1,8	0,02	0,1
arsenic	mg/kg	3,7	13	16	10	1,5	2,5	3,1
cadmium	mg/kg	< 0,20	< 0,20	< 0,2	0,13	0,1	0,16	0,1
copper	mg/kg	9,6	28	22	45	13	4	25
chromium	mg/kg	7,4	34	19	90	12	11	126
cobalt	mg/kg	4,1	12	7,4	19	4	2	24
Iron	g/kg	13,1	30,9	26,0	48	20	15	43
lead	mg/kg	3,2	16	7,5	22	32	5	15
manganese	mg/kg	315	572	435	850	325	700	716
mercury	mg/kg	< 0,10	< 0,10	0,10	0,45	0,03	0,03	0,04
molybdenum	mg/kg	0,67	0,53	< 0,5	1,3	1,8	0,4	1,1
nickel	mg/kg	9,5	28	16	68	7	15	56
selenium	mg/kg	1,6	1,5	1,9	0,5	0,04	0,19	0,1
thallium	mg/kg	< 0,5	< 0,5	< 0,5	0,7	1,1	0,05	0,5
vanadium	mg/kg	12	40	26	130	94	20	98
zinc	mg/kg	27	72	44	95	50	23	65

7.3 Aqueous eluates of sediments and landfill

The samples of sediment and landfill were subjected to aqueous elution according to DIN 38414 – SV. The eluates were analysed for various elements, amomonia, and various anions. The results of these analyses are presented in Table 5.

The results show that – apart from sulfate, fluoride, ammonia, and iron - the concentration of the analytes in the aqueous eluates are very low. This can be explained by the fact, that most trace elements occurring in minerals, rocks and sediments are tightly fixed in the crystal structure of the rock-forming silicates and oxides.

The presence of sulfate appears to result from the oxidation of sulfidic metal compounds such as pyrite, which occur in the rocks and which are mobilized by the mining and milling operations.

The data do not provide evidence of undue high concentrations of cyanide and toxic elements in the eluates of sediments and landfill at the sampling locations of this study.

Table 5. Concentration of ammonia and various elements and anions in the aqueous eluates of sediment and landfill.

		SK 1 s *)	SK 3 s	SK 4 s	SK 7 s	SK 8 s	SK 9 s
Parameter	unit	Downriver of Petrov Lake	Outlet Lysyi Glacier	Hydroposten	"Chon Sary Tor" River	Outlet southwest open pit	Bridge over the Kumtor River
antimony	mg/l	< 0,001	< 0,001	0,001	0,002	< 0,001	0,001
arsenic	mg/l	0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001
barium	mg/l	0,011	0,012	0,027	0,025	0,008	0,023
cadmium	mg/l	< 0,0001	< 0,0001	< 0,0001	< 0,0001	< 0,0001	< 0,0001
copper	mg/l	< 0,001	< 0,001	0,002	< 0,001	< 0,001	< 0,001
chromium	mg/l	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001
cobalt	mg/l	< 0,0001	< 0,0001	0,0004	< 0,0001	< 0,0001	< 0,0001
iron	mg/l	0,14	< 0,05	0,38	< 0,05	< 0,05	< 0,05
lead	mg/l	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001
manganese	mg/l	0,003	< 0,001	0,013	0,008	< 0,001	0,003
mercury	mg/l	< 0,0002	< 0,0002	< 0,0002	< 0,0002	< 0,0002	< 0,0002
molybdenum	mg/l	< 0,001	0,012	0,010	0,022	0,011	0,010
nickel	mg/l	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001
selenium	mg/l	< 0,001	< 0,001	0,002	< 0,001	< 0,001	< 0,001
silver	mg/l	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001
thallium	mg/l	< 0,0001	< 0,0001	< 0,0001	< 0,0001	< 0,0001	< 0,0001
vanadium	mg/l	0,0009	0,0001	0,0009	0,0004	0,0002	0,0004
zinc	mg/l	< 0,005	< 0,005	< 0,005	< 0,005	< 0,005	< 0,005
cyanide total	mg/l	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01
cyanide free	mg/l	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01
sulfat	mg/l	<5	30,0	12,0	36,0	32,0	9,0
nitrate	mg/l	<2	<2	< 2	5,70	<2	<2
ammonia	mg/l	<0,05	<0,05	0,39	1,29	<0,05	0,08
boron	mg/l	0,022	0,013	0,01	0,019	0,009	0,013
fluoride	mg/l	0,15	0,16	0,19	0,29	0,16	0,23
chloride	mg/l	<5	<5	<5	<5	<5	<5

*) Not affected by acitivities of the Kumtor Gold Mine

Table 5, Part 2. Concentration of ammonia and various elements and anions in the aqueous eluates of sediment and landfill.

		SK 10 s	SK 12 s *)	SK 13 s	SK 14 l	SK 15 l	SK 16 s *)
Parameter	Unit	Outlet central open pit	Arabel River	Spring under the tailings dam	Valley of Kumtor river 360 m below the tailings dam	Valley of Kumtor river 480 m below the tailings dam	River Barskoon
antimony	mg/l	0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001
arsenic	mg/l	< 0,001	0,001	< 0,001	< 0,001	< 0,001	0,002
barium	mg/l	0,029	0,010	0,086	0,036	0,018	0,005
cadmium	mg/l	< 0,0001	< 0,0001	< 0,0001	< 0,0001	< 0,0001	< 0,0001
copper	mg/l	< 0,001	< 0,001	< 0,001	0,001	< 0,001	< 0,001
chromium	mg/l	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001
cobalt	mg/l	< 0,0001	< ,0001	0,0003	0,0004	< 0,0001	< 0,0001
iron	mg/l	< 0,05	< 0,05	< 0,05	< 0,05	< 0,05	0,20
lead	mg/l	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001
manganese	mg/l	< 0,001	0,015	0,216	< 0,001	0,041	0,003
mercury	mg/l	< 0,0002	< 0,0002	< 0,0002	< 0,0002	< 0,0002	< 0,0002
molybdenum	mg/l	0,014	0,005	0,005	0,003	0,003	0,001
nickel	mg/l	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001
selenium	mg/l	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001
silver	mg/l	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001	< 0,001
thallium	mg/l	< 0,0001	< 0,0001	< 0,0001	< 0,0001	< 0,0001	< 0,0001
vanadium	mg/l	0,0001	0,0009	0,0002	0,0003	0,0007	0,0007
zinc	mg/l	< 0,005	< 0,005	< 0,005	< 0,005	< 0,005	< 0,005
cyanide total	mg/l	< 0,01	< 0,01	<0,01	< 0,01	< 0,01	< 0,01
cyanide free	mg/l	< 0,01	< 0,01	0,018	< 0,01	< 0,01	< 0,01
sulfat	mg/l	28,0	8,0	24,0	111,0	17,0	<5
nitrate	mg/l	3,5	<2	<2	2,5	<2	<2
ammonia	mg/l	< 0,05	0,21	<0,05	< 0,05	0,12	< 0,05
boron	mg/l	0,013	0,017	0,018	0,018	0,013	0,007
fluoride	mg/l	0,3	0,68	0,24	0,38	0,3	0,26
chloride	mg/l	< 5	<5	7	35	17	< 5

*) Not affected by acitivities of the Kumtor Gold Mine

7.4 Sludge from the tailings pond

The concentrations of ammonia and various elements and anions in the sludge of the tailings pond (sample SK 5 s) and in the aqueous eluate of the sludge are presented in Table 6.

The concentrations of ammonia and various elements and anions in the sludge do not differ from the composition of the samples of sediment and landfill that were analysed in this study.

The eluate exhibits rather high concentrations of sulfate, manganese, barium and fluoride. The cyanid concentration in the sludge and in the eluate are very low.

The results do not provide evidence of undue high concentrations of cyanide and toxic elements in the sludge of the tailings pond and the aqueous eluate prepared from this sludge.

With regard to the great extension of the tailings pond It should be noted, however, that a general conclusion cannot be drawn from the analysis of solely one spot sample.

Table 6. Concentrations of ammonia and various elements and anions in the sludge of the tailings pond (sample SK 5 s) and in the aqueous eluate of the sludge.

Parameter	Dried sludge from the tailings pond		Aqueous eluate of the dried sludge from the tailings basin	
antimony	mg/kg	4,4	mg/l	0,008
arsenic	mg/kg	14	mg/l	< 0,001
barium	mg/kg	158	mg/l	0,058
cadmium	mg/kg	0,56	mg/l	< 0,0001
copper	mg/kg	69	mg/l	< 0,001
chromium	mg/kg	12	mg/l	< 0,001
cobalt	mg/kg	18	mg/l	0,004
iron	mg/kg	50500	mg/l	< 0,05
lead	mg/kg	56	mg/l	< 0,001
manganese	mg/kg	1800	mg/l	0,254
mercury	mg/kg	<0,1	mg/l	< 0,0002
molybdenum	mg/kg	5,9	mg/l	0,013
nickel	mg/kg	44	mg/l	< 0,001
selenium	mg/kg	3	mg/l	< 0,001
silver	mg/kg	<2,5	mg/l	< 0,001
thallium	mg/kg	<0,5	mg/l	< 0,0001
vanadium	mg/kg	17	mg/l	< 0,0001
zinc	mg/kg	173	mg/l	< 0,005
cyanide total'	mg/kg	0,9	mg/l	0,04
cyanide free	mg/kg	0,6	mg/l	< 0,01
sulfate	mg/kg	n.d.	mg/l	567
nitrate	mg/kg	n.d.	mg/l	< 2
ammonia	mg/kg	n.d.	mg/l	0,41
boron	mg/kg	<12	mg/l	0,019
fluoride	mg/kg	n.d.	mg/l	0,19
chloride	mg/kg	n.d.	mg/l	< 5

n.d. = not determined

8. Evaluation of the results

The results of this study are based on the analysis of spot samples of water, sediment and landfill collected in and downwards of the Area of the Kumtor Gold Mine and at some locations that apparently are not affected by activities of the Kumtor Gold Mine. The composition of the samples collected at places that are not affected by activities of the Kumtor Gold Mine may be considered to reflect the natural geochemical composition of surface water, rocks and sediments in this part of the Tien Shan Mountains.

8.1 Surface Water

The element concentrations and the cyanide and fluoride concentrations of the water samples collected in or downwards of the Kumtor Gold Mine largely correspond to the natural background levels. They exhibit, however, significantly increased concentrations of sulfate, nitrate, ammonia, and chloride when compared to natural background levels. The increased levels of sulfate presumably are related to the oxidation of sulfidic minerals such as pyrrite, which are constituents of rocks and sediments in this area, and which are mobilized by mining and milling. The origin of the increased levels of nitrate and ammonia is unclear. One explanation could be that effluents from sanitary facilities of the camp of the Kumtor Gold Mine discharge larger amounts of nitrate and ammonia into the environment. Another source could be the use of explosives in gold miming.

The analyses of the water samples do not provide evidence of the presence of undue high concentrations of cyanide and toxic elements in surface water at the sampling locations of this study. The same applies to the water of the Kumtor River about 4,.9 km downwards of the Kumtor Gold Mine.

As shown in Table 7 the water quality of the Kumtor River, the Arabel River and the Barskoon River is largely in accordance with the limit values of the European Council Directive 98/83/EC, of 3 November 1998 on the quality of water intended for human consumption and with the Environmental Quality Standards of the Directive 2008/105/EC of the European Parliament and of the Council of 16 December 2008 on environmental quality standards in the field of water policy. Solely the water of the Kumtor river exceeds the limit values for ammonia, iron and sulfate, and the water of Arabel River exceeds the limit value for iron. Apart from these parameters and possibly moíbrobiological parameters (which were not determined in this study) the water of these rivers may be used as water to produce water for human consumption and as water for feeding animals without concern. The elevated levels of ammonia, sulfate and iron do not represent a hazard for humans.

Table 7. Evaluation of the quality of river water with regard to the limit values of the European Directive for drinking water and the environmental Quality standards for surface waters accortduing to EU Directive 2008/105/EEC.

Parameter	Unit	Limit Value Drinking Water [1]	AA-EQS [2]	SK 9w Kumtor River [3]	SK 12w Arabel River	SK 16w Barskoon River
pH		6,5 – 9,5	-	8,65	8,5	8,31
conductivity	µS/cm	2500	-	1060	117,8	281
antimony	mg/l	0,005	-	0,005	<0,001	<0,001
Arsenic	mg/l	0,01	-	0,002	0,001	0,002
cadmium	mg/l	0,005	0,0002	<0,0001	<0,0001	<0,0001
Copper	mg/l	2	-	0,011	0,005	0,003
chromium	mg/l	0,5	-	<0,001	0,002	<0,001
Iron	mg/l	0,2 / 0,5	-	1,05	1,77	0,05
Lead	mg/l	0,01	0,007	0,002	0,002	<0,001
manganese	mg/l	0,05	-	0,171	0,112	0,002
mercury	mg/l	0,001	0,00005	<0,0002	<0,0002	<0,0002
Nickel	mg/l	0,02	0,02	0,019	0,002	<0,001
selenium	mg/l	0,01	-	0,004	<0,001	<0,001
cyanide total	mg/l	0,5	-	<0,01	<0,01	<0,01
cyanide free	mg/l	0,5	-	<0,01	<0,01	<0,01
Sulfate	mg/l	240	-	416	9	58
Nitrate	mg/l	50	-	47	2	2,5
ammonia	mg/l	0,5	-	4,34	0,1	0,09
Boron	mg/l	1	-	0,006	<0,005	0,01
Fluoride	mg/l	1,5	-	0,26	0,3	0,82
chloride	mg/l	250	-	9	6	<5

1) COUNCIL DIRECTIVE 98/83/EC of 3 November 1998 on the quality of water intended for human consumption.
2) Annual Average Environmental Quality standard according to DIRECTIVE 2008/105/EC of the European Parliament and of the Council of 16 December 2008 on environmental quality standards in the field of water policy.
3) About 5 km downward of the Kumtor Gold Mine

An ecotoxicological assessment of the quality of surface water was not part of this study. This would require a more comprehensive analysis of samples of surface water in areas, where aquatic organisms occur in surface water. The increased levels of sulfate, nitrate and ammonia in the water of the Kumtor river about 5 km downwards of the Kumtor Gold Mine appear to require a closer examination with regard to possible adverse effects on sensitive aquatic organisms. It should be noted, however, that other sources may cause or contribute to the increased levels of sulfate, nitrate and ammonia in this section of the river.

8.2 Waste water from the waste water treatment plant

The waste water sample (SK 6 w) exhibits a higher electric conductivity and increased concentrations of antimony, arsenic, copper, cobalt, molydenum, ammonia, sulfate, boron, and fluoride when compared with the surface water samples. The most pronounced differences were found for antimony, copper and molybdenum. According to the analytical results there is no evidence of the presence of undue high concentrations of cyanide and toxic elements in the analysed waste water sample.

The results of the chemical analyses from the waste water treatment were also evaluated according to the limit values of the German Ordinance on Waste Water, Annex 51, which refer to waste water and seeping water from waste disposal sites. Since there exist no specific limit values for waste water from gold mining these limit values were applied just for orientation (see Table 8).

As shown in Table 2 the concentration of elements and cyanide measured in the waste water from the waste water treatment plant are significantly below the limit values of the German Ordinance on Waste Water, Annex 51.

8.3 Sediments and landfill

The samples of sediment and landfill collected at locations in or below the area of the Kumtor Gold Mine, predominantly exhibit element and cyanide concentrations in the range of the reference concentrations. Higher levels were found in some samples for arsenic, barium, manganese, and selenium. That means, that the composition of these materials largely corresponds to the range of natural geochemical background levels, which are typical for this mountain area.

The analytical results do not provide evidence of the presence of sediments and landfill with undue high concentrations of toxic elements and cyanide at the sampling locations of this study.

Table 8. Results of physicochemical and chemical analyse of the waste water sample from the wastewater treatment plant; mixed sample collected from the two pipes

Parameter	Unit	Waste water from the waste water treatment	Limit value according to the German Ordinance on waste water Annex 51
pH		6,88	n.s.
coductivity	µS/cm	3210	n.s.
antimony	mg/l	0,041	n.s.
arsenic	mg/l	0,008	0,1
barium	mg/l	0,03	n.s.
cadmium	mg/l	0,0003	0,1
copper	mg/l	0,088	0,5
chromium	mg/l	<0,001	0,5
cobalt	mg/l	0,0789	n.s.
iron	mg/l	0,18	n.s.
lead	mg/l	<0,001	0,5
manganese	mg/l	0,083	n.s.
mercury	mg/l	<0,0002	0,05
molybdenum	mg/l	0,338	n.s.
nickel	mg/l	0,006	1
selenium	mg/l	0,015	n.s.
silver	mg/l	<0,001	n.s.
thallium	mg/l	<0,0001	n.s.
vanadium	mg/l	0,0003	n.s.
zinc	mg/l	<0,005	2
cyanide total	mg/l	0,03	n.s.
cyanide free	mg/l	0,03	0,2
sulfate	mg/l	1483	n.s.
nitrate	mg/l	57	n.s.
ammonia	mg/l	17,6	n.s.
boron	mg/l	0,027	n.s.
fluoride	mg/l	0,34	n.s.
chloride	mg/l	24	n.s.

n.s. = not specified

The analysis of the sediment of Kumtor River about 4,9 km downwards of the Kumtor Gold Mine also does not provide evidence of the presence of undue high concentrations of toxic elements and cyanide at this sampling location. The same applies to the sediment of Barskoon River at the place, where a truck transporting highly toxic sodium cyanide crashed into the Barksoon river in May 1998.

The aqueous eluates of the sediments exhibit very low element concentrations and also rather low concentrations of anions such as cyanide, sulfate, nitrate, fluoride and chloride. In general, the concentrations are much lower than those measured in the surface water samples.

8.4 Sludge from the tailings pond

The sludge of the tailings pond exhibits high concentrations of iron and manganese. The concentration of cyanide and toxic elements are rather low. The eluate shows high concentrations of manganese and barium. The concentrations of toxic elemlents and cyanide in the eluate are also very low.

The results do not provide evidence of undue high concentrations of cyanide and toxic elements in the sludge of the tailings pond and the aqueous eluate prepared from this sludge. With regard to the great extension of the tailings pond it should be noted, however, that a general conclusion cannot be drawn from the analysis of solely one spot sample.

9. Concluding remarks

It should be emphasized that this study, which is based on the analyses of a very limited number of spot samples, should be regarded solely as a study for orientation performed by independent experts. The results of this study should be compared with the results of the comprehensive environmental monitoring activities of the Kumtor Gold Mine, which are published in the annual environmental reports. A comprehensive evaluation of the risks to human health and to the environment that could be associated with the activities of the Kumtor Gold Mine should be based on all analytical and geophysical data available. This should be accomplished in a joint effort of experts of the Kumtor Gold Mine, independent experts, representatives of the government and of the parliament of the Kyrgyz Republic, and representatives of environmentalists.

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http://www.gesetze-im-internet.de/abwv/index.html

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Projekt: Kumtor Goldmine, Kirgistan
hier: Wasseruntersuchungen
(Probeneingang: 15.10.2012)

Parameter / Probe			SK1W	Untersuchungsmethode
Antimon	Sb	mg/l	< 0,001	DIN EN ISO 17294-2
Arsen	As	mg/l	0,002	DIN EN ISO 17294-2
Barium	Ba	mg/l	0,109	DIN EN ISO 17294-2
Cadmium	Cd	mg/l	< 0,0001	DIN EN ISO 17294-2
Kupfer	Cu	mg/l	0,005	DIN EN ISO 17294-2
Chrom	Cr	mg/l	0,002	DIN EN ISO 17294-2
Kobalt	Co	mg/l	0,0019	DIN EN ISO 17294-2
Eisen	Fe	mg/l	2,79	DIN EN ISO 17294-2
Blei	Pb	mg/l	0,005	DIN EN ISO 17294-2
Mangan	Mn	mg/l	0,103	DIN EN ISO 17294-2
Quecksilber	Hg	mg/l	< 0,0002	DIN EN 1483
Molybdän	Mo	mg/l	< 0,001	DIN EN ISO 17294-2
Nickel	Ni	mg/l	0,002	DIN EN ISO 17294-2
Selen	Se	mg/l	< 0,001	DIN EN ISO 17294-2
Silber	Ag	mg/l	< 0,001	DIN EN ISO 17294-2
Thallium	Tl	mg/l	< 0,0001	DIN EN ISO 17294-2
Vanadium	V	mg/l	0,0038	DIN EN ISO 17294-2
Zink	Zn	mg/l	0,014	DIN EN ISO 17294-2
Gold	Au	mg/l	< 0,1	DIN EN ISO 17294-2
Bor	B	mg/l	< 0,005	DIN EN ISO 17294-2
Cyanid, ges.	CN-	mg/l	< 0,01	DIN EN ISO 14403
Cyanid, l.fr.	CN^-	mg/l	< 0,01	DIN EN ISO 14403
Sulfat	SO_4^{2-}	mg/l	14	DIN EN ISO 10304-1
Nitrat	NO_3^-	mg/l	< 2	DIN EN ISO 10304-1
Fluorid	F^-	mg/l	0,23	DIN EN ISO 10304-1
Chlorid	Cl^-	mg/l	< 5	DIN EN ISO 10304-1
Ammonium	NH_4^+	mg/l	0,08	DIN EN ISO 11732

Projekt: Kumtor Goldmine, Kirgistan
hier: Wasseruntersuchungen
(Probeneingang: 15.10.2012)

Parameter \ Probe			SK2W	Untersuchungsmethode
Antimon	Sb	mg/l	< 0,001	DIN EN ISO 17294-2
Arsen	As	mg/l	0,002	DIN EN ISO 17294-2
Barium	Ba	mg/l	0,082	DIN EN ISO 17294-2
Cadmium	Cd	mg/l	< 0,0001	DIN EN ISO 17294-2
Kupfer	Cu	mg/l	0,004	DIN EN ISO 17294-2
Chrom	Cr	mg/l	0,002	DIN EN ISO 17294-2
Kobalt	Co	mg/l	0,0016	DIN EN ISO 17294-2
Eisen	Fe	mg/l	2,58	DIN EN ISO 17294-2
Blei	Pb	mg/l	0,004	DIN EN ISO 17294-2
Mangan	Mn	mg/l	0,076	DIN EN ISO 17294-2
Quecksilber	Hg	mg/l	< 0,0002	DIN EN 1483
Molybdän	Mo	mg/l	< 0,001	DIN EN ISO 17294-2
Nickel	Ni	mg/l	0,002	DIN EN ISO 17294-2
Selen	Se	mg/l	< 0,001	DIN EN ISO 17294-2
Silber	Ag	mg/l	< 0,001	DIN EN ISO 17294-2
Thallium	Tl	mg/l	< 0,0001	DIN EN ISO 17294-2
Vanadium	V	mg/l	0,0036	DIN EN ISO 17294-2
Zink	Zn	mg/l	0,014	DIN EN ISO 17294-2
Gold	Au	mg/l	< 0,1	DIN EN ISO 17294-2
Bor	B	mg/l	< 0,005	DIN EN ISO 17294-2
Cyanid, ges.	CN-	mg/l	< 0,01	DIN EN ISO 14403
Cyanid, l.fr.	CN^-	mg/l	< 0,01	DIN EN ISO 14403
Sulfat	SO_4^{2-}	mg/l	13	DIN EN ISO 10304-1
Nitrat	NO_3^-	mg/l	2,0	DIN EN ISO 10304-1
Fluorid	F^-	mg/l	0,20	DIN EN ISO 10304-1
Chlorid	Cl^-	mg/l	< 5	DIN EN ISO 10304-1
Ammonium	NH_4^+	mg/l	< 0,05	DIN EN ISO 11732

Projekt: Kumtor Goldmine, Kirgistan
hier: Wasseruntersuchungen
(Probeneingang: 15.10.2012)

Parameter / Probe			SK3W	Untersuchungsmethode
Antimon	Sb	mg/l	< 0,001	DIN EN ISO 17294-2
Arsen	As	mg/l	< 0,001	DIN EN ISO 17294-2
Barium	Ba	mg/l	0,031	DIN EN ISO 17294-2
Cadmium	Cd	mg/l	< 0,0001	DIN EN ISO 17294-2
Kupfer	Cu	mg/l	0,002	DIN EN ISO 17294-2
Chrom	Cr	mg/l	< 0,001	DIN EN ISO 17294-2
Kobalt	Co	mg/l	0,0005	DIN EN ISO 17294-2
Eisen	Fe	mg/l	0,210	DIN EN ISO 17294-2
Blei	Pb	mg/l	< 0,001	DIN EN ISO 17294-2
Mangan	Mn	mg/l	0,045	DIN EN ISO 17294-2
Quecksilber	Hg	mg/l	< 0,0002	DIN EN 1483
Molybdän	Mo	mg/l	0,006	DIN EN ISO 17294-2
Nickel	Ni	mg/l	0,012	DIN EN ISO 17294-2
Selen	Se	mg/l	0,002	DIN EN ISO 17294-2
Silber	Ag	mg/l	< 0,001	DIN EN ISO 17294-2
Thallium	Tl	mg/l	< 0,0001	DIN EN ISO 17294-2
Vanadium	V	mg/l	0,0001	DIN EN ISO 17294-2
Zink	Zn	mg/l	< 0,005	DIN EN ISO 17294-2
Gold	Au	mg/l	< 0,1	DIN EN ISO 17294-2
Bor	B	mg/l	0,007	DIN EN ISO 17294-2
Cyanid, ges.	CN-	mg/l	< 0,01	DIN EN ISO 14403
Cyanid, l.fr.	CN^-	mg/l	< 0,01	DIN EN ISO 14403
Sulfat	SO_4^{2-}	mg/l	602	DIN EN ISO 10304-1
Nitrat	NO_3^-	mg/l	12	DIN EN ISO 10304-1
Fluorid	F^-	mg/l	0,17	DIN EN ISO 10304-1
Chlorid	Cl^-	mg/l	5	DIN EN ISO 10304-1
Ammonium	NH_4^+	mg/l	0,06	DIN EN ISO 11732

Projekt: Kumtor Goldmine, Kirgistan
hier: Wasseruntersuchungen
(Probeneingang: 15.10.2012)

Parameter		Probe	SK4W	Untersuchungsmethode
Antimon	Sb	mg/l	0,004	DIN EN ISO 17294-2
Arsen	As	mg/l	0,002	DIN EN ISO 17294-2
Barium	Ba	mg/l	0,054	DIN EN ISO 17294-2
Cadmium	Cd	mg/l	< 0,0001	DIN EN ISO 17294-2
Kupfer	Cu	mg/l	0,012	DIN EN ISO 17294-2
Chrom	Cr	mg/l	< 0,001	DIN EN ISO 17294-2
Kobalt	Co	mg/l	0,0096	DIN EN ISO 17294-2
Eisen	Fe	mg/l	1,21	DIN EN ISO 17294-2
Blei	Pb	mg/l	0,002	DIN EN ISO 17294-2
Mangan	Mn	mg/l	0,053	DIN EN ISO 17294-2
Quecksilber	Hg	mg/l	< 0,0002	DIN EN 1483
Molybdän	Mo	mg/l	0,038	DIN EN ISO 17294-2
Nickel	Ni	mg/l	0,002	DIN EN ISO 17294-2
Selen	Se	mg/l	0,002	DIN EN ISO 17294-2
Silber	Ag	mg/l	< 0,001	DIN EN ISO 17294-2
Thallium	Tl	mg/l	< 0,0001	DIN EN ISO 17294-2
Vanadium	V	mg/l	0,0016	DIN EN ISO 17294-2
Zink	Zn	mg/l	0,008	DIN EN ISO 17294-2
Gold	Au	mg/l	< 0,1	DIN EN ISO 17294-2
Bor	B	mg/l	0,007	DIN EN ISO 17294-2
Cyanid, ges.	CN-	mg/l	< 0,01	DIN EN ISO 14403
Cyanid, l.fr.	CN^-	mg/l	< 0,01	DIN EN ISO 14403
Sulfat	SO_4^{2-}	mg/l	221	DIN EN ISO 10304-1
Nitrat	NO_3^-	mg/l	< 2	DIN EN ISO 10304-1
Fluorid	F^-	mg/l	0,27	DIN EN ISO 10304-1
Chlorid	Cl^-	mg/l	9	DIN EN ISO 10304-1
Ammonium	NH_4^+	mg/l	2,20	DIN EN ISO 11732

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(Probeneingang: 15.10.2012)

Parameter \ Probe			SK6W	Untersuchungsmethode
Antimon	Sb	mg/l	0,041	DIN EN ISO 17294-2
Arsen	As	mg/l	0,008	DIN EN ISO 17294-2
Barium	Ba	mg/l	0,030	DIN EN ISO 17294-2
Cadmium	Cd	mg/l	0,0003	DIN EN ISO 17294-2
Kupfer	Cu	mg/l	0,088	DIN EN ISO 17294-2
Chrom	Cr	mg/l	< 0,001	DIN EN ISO 17294-2
Kobalt	Co	mg/l	0,0789	DIN EN ISO 17294-2
Eisen	Fe	mg/l	0,180	DIN EN ISO 17294-2
Blei	Pb	mg/l	< 0,001	DIN EN ISO 17294-2
Mangan	Mn	mg/l	0,083	DIN EN ISO 17294-2
Quecksilber	Hg	mg/l	< 0,0002	DIN EN 1483
Molybdän	Mo	mg/l	0,338	DIN EN ISO 17294-2
Nickel	Ni	mg/l	0,006	DIN EN ISO 17294-2
Selen	Se	mg/l	0,015	DIN EN ISO 17294-2
Silber	Ag	mg/l	< 0,001	DIN EN ISO 17294-2
Thallium	Tl	mg/l	< 0,0001	DIN EN ISO 17294-2
Vanadium	V	mg/l	0,0003	DIN EN ISO 17294-2
Zink	Zn	mg/l	< 0,005	DIN EN ISO 17294-2
Gold	Au	mg/l	< 0,1	DIN EN ISO 17294-2
Bor	B	mg/l	0,027	DIN EN ISO 17294-2
Cyanid, ges.	CN-	mg/l	0,03	DIN EN ISO 14403
Cyanid, l.fr.	CN^-	mg/l	0,03	DIN EN ISO 14403
Sulfat	SO_4^{2-}	mg/l	1483	DIN EN ISO 10304-1
Nitrat	NO_3^-	mg/l	57	DIN EN ISO 10304-1
Fluorid	F^-	mg/l	0,34	DIN EN ISO 10304-1
Chlorid	Cl^-	mg/l	24	DIN EN ISO 10304-1
Ammonium	NH_4^+	mg/l	17,6	DIN EN ISO 11732

Projekt: Kumtor Goldmine, Kirgistan
hier: Wasseruntersuchungen
(Probeneingang: 15.10.2012)

Parameter		Probe	SK7W	Untersuchungsmethode
Antimon	Sb	mg/l	0,006	DIN EN ISO 17294-2
Arsen	As	mg/l	0,003	DIN EN ISO 17294-2
Barium	Ba	mg/l	0,051	DIN EN ISO 17294-2
Cadmium	Cd	mg/l	0,0002	DIN EN ISO 17294-2
Kupfer	Cu	mg/l	0,004	DIN EN ISO 17294-2
Chrom	Cr	mg/l	0,001	DIN EN ISO 17294-2
Kobalt	Co	mg/l	0,0150	DIN EN ISO 17294-2
Eisen	Fe	mg/l	1,85	DIN EN ISO 17294-2
Blei	Pb	mg/l	0,003	DIN EN ISO 17294-2
Mangan	Mn	mg/l	0,957	DIN EN ISO 17294-2
Quecksilber	Hg	mg/l	< 0,0002	DIN EN 1483
Molybdän	Mo	mg/l	0,063	DIN EN ISO 17294-2
Nickel	Ni	mg/l	0,123	DIN EN ISO 17294-2
Selen	Se	mg/l	0,014	DIN EN ISO 17294-2
Silber	Ag	mg/l	< 0,001	DIN EN ISO 17294-2
Thallium	Tl	mg/l	< 0,0001	DIN EN ISO 17294-2
Vanadium	V	mg/l	0,0016	DIN EN ISO 17294-2
Zink	Zn	mg/l	0,006	DIN EN ISO 17294-2
Gold	Au	mg/l	< 0,1	DIN EN ISO 17294-2
Bor	B	mg/l	0,011	DIN EN ISO 17294-2
Cyanid, ges.	CN-	mg/l	< 0,01	DIN EN ISO 14403
Cyanid, l.fr.	CN^-	mg/l	< 0,01	DIN EN ISO 14403
Sulfat	SO_4^{2-}	mg/l	1088	DIN EN ISO 10304-1
Nitrat	NO_3^-	mg/l	250	DIN EN ISO 10304-1
Fluorid	F^-	mg/l	0,18	DIN EN ISO 10304-1
Chlorid	Cl^-	mg/l	13	DIN EN ISO 10304-1
Ammonium	NH_4^+	mg/l	13,3	DIN EN ISO 11732

Projekt: Kumtor Goldmine, Kirgistan
hier: Wasseruntersuchungen
(Probeneingang: 15.10.2012)

Parameter		Probe	SK10W	Untersuchungsmethode
Antimon	Sb	mg/l	0,004	DIN EN ISO 17294-2
Arsen	As	mg/l	< 0,001	DIN EN ISO 17294-2
Barium	Ba	mg/l	0,030	DIN EN ISO 17294-2
Cadmium	Cd	mg/l	0,0001	DIN EN ISO 17294-2
Kupfer	Cu	mg/l	0,001	DIN EN ISO 17294-2
Chrom	Cr	mg/l	< 0,001	DIN EN ISO 17294-2
Kobalt	Co	mg/l	0,0115	DIN EN ISO 17294-2
Eisen	Fe	mg/l	0,230	DIN EN ISO 17294-2
Blei	Pb	mg/l	< 0,001	DIN EN ISO 17294-2
Mangan	Mn	mg/l	0,725	DIN EN ISO 17294-2
Quecksilber	Hg	mg/l	< 0,0002	DIN EN 1483
Molybdän	Mo	mg/l	0,063	DIN EN ISO 17294-2
Nickel	Ni	mg/l	0,116	DIN EN ISO 17294-2
Selen	Se	mg/l	0,015	DIN EN ISO 17294-2
Silber	Ag	mg/l	< 0,001	DIN EN ISO 17294-2
Thallium	Tl	mg/l	< 0,0001	DIN EN ISO 17294-2
Vanadium	V	mg/l	0,0003	DIN EN ISO 17294-2
Zink	Zn	mg/l	< 0,005	DIN EN ISO 17294-2
Gold	Au	mg/l	< 0,1	DIN EN ISO 17294-2
Bor	B	mg/l	0,009	DIN EN ISO 17294-2
Cyanid, ges.	CN-	mg/l	< 0,01	DIN EN ISO 14403
Cyanid, l.fr.	CN^-	mg/l	< 0,01	DIN EN ISO 14403
Sulfat	SO_4^{2-}	mg/l	1185	DIN EN ISO 10304-1
Nitrat	NO_3^-	mg/l	294	DIN EN ISO 10304-1
Fluorid	F^-	mg/l	0,16	DIN EN ISO 10304-1
Chlorid	Cl^-	mg/l	12	DIN EN ISO 10304-1
Ammonium	NH_4^+	mg/l	14,5	DIN EN ISO 11732

Projekt: Kumtor Goldmine, Kirgistan
hier: Wasseruntersuchungen
(Probeneingang: 15.10.2012)

Parameter / Probe			SK11W	Untersuchungsmethode
Antimon	Sb	mg/l	0,007	DIN EN ISO 17294-2
Arsen	As	mg/l	0,003	DIN EN ISO 17294-2
Barium	Ba	mg/l	0,060	DIN EN ISO 17294-2
Cadmium	Cd	mg/l	< 0,0001	DIN EN ISO 17294-2
Kupfer	Cu	mg/l	0,006	DIN EN ISO 17294-2
Chrom	Cr	mg/l	< 0,001	DIN EN ISO 17294-2
Kobalt	Co	mg/l	0,0054	DIN EN ISO 17294-2
Eisen	Fe	mg/l	1,29	DIN EN ISO 17294-2
Blei	Pb	mg/l	0,001	DIN EN ISO 17294-2
Mangan	Mn	mg/l	0,310	DIN EN ISO 17294-2
Quecksilber	Hg	mg/l	< 0,0002	DIN EN 1483
Molybdän	Mo	mg/l	0,038	DIN EN ISO 17294-2
Nickel	Ni	mg/l	0,026	DIN EN ISO 17294-2
Selen	Se	mg/l	0,002	DIN EN ISO 17294-2
Silber	Ag	mg/l	< 0,001	DIN EN ISO 17294-2
Thallium	Tl	mg/l	< 0,0001	DIN EN ISO 17294-2
Vanadium	V	mg/l	0,0008	DIN EN ISO 17294-2
Zink	Zn	mg/l	0,008	DIN EN ISO 17294-2
Gold	Au	mg/l	< 0,1	DIN EN ISO 17294-2
Bor	B	mg/l	0,007	DIN EN ISO 17294-2
Cyanid, ges.	CN-	mg/l	0,05	DIN EN ISO 14403
Cyanid, l.fr.	CN^-	mg/l	0,04	DIN EN ISO 14403
Sulfat	SO_4^{2-}	mg/l	344	DIN EN ISO 10304-1
Nitrat	NO_3^-	mg/l	116	DIN EN ISO 10304-1
Fluorid	F^-	mg/l	0,20	DIN EN ISO 10304-1
Chlorid	Cl^-	mg/l	5	DIN EN ISO 10304-1
Ammonium	NH_4^+	mg/l	19,0	DIN EN ISO 11732

Projekt: Kumtor Goldmine, Kirgistan
<u>hier:</u> Wasseruntersuchungen
(Probeneingang: 15.10.2012)

Parameter / Probe			SK12W	Untersuchungsmethode
Antimon	Sb	mg/l	< 0,001	DIN EN ISO 17294-2
Arsen	As	mg/l	0,001	DIN EN ISO 17294-2
Barium	Ba	mg/l	0,022	DIN EN ISO 17294-2
Cadmium	Cd	mg/l	< 0,0001	DIN EN ISO 17294-2
Kupfer	Cu	mg/l	0,005	DIN EN ISO 17294-2
Chrom	Cr	mg/l	0,002	DIN EN ISO 17294-2
Kobalt	Co	mg/l	0,0013	DIN EN ISO 17294-2
Eisen	Fe	mg/l	1,77	DIN EN ISO 17294-2
Blei	Pb	mg/l	0,002	DIN EN ISO 17294-2
Mangan	Mn	mg/l	0,112	DIN EN ISO 17294-2
Quecksilber	Hg	mg/l	< 0,0002	DIN EN 1483
Molybdän	Mo	mg/l	0,001	DIN EN ISO 17294-2
Nickel	Ni	mg/l	0,002	DIN EN ISO 17294-2
Selen	Se	mg/l	< 0,001	DIN EN ISO 17294-2
Silber	Ag	mg/l	< 0,001	DIN EN ISO 17294-2
Thallium	Tl	mg/l	< 0,0001	DIN EN ISO 17294-2
Vanadium	V	mg/l	0,002	DIN EN ISO 17294-2
Zink	Zn	mg/l	0,006	DIN EN ISO 17294-2
Gold	Au	mg/l	< 0,1	DIN EN ISO 17294-2
Bor	B	mg/l	< 0,005	DIN EN ISO 17294-2
Cyanid, ges.	CN-	mg/l	< 0,01	DIN EN ISO 14403
Cyanid, l.fr.	CN^-	mg/l	< 0,01	DIN EN ISO 14403
Sulfat	SO_4^{2-}	mg/l	9	DIN EN ISO 10304-1
Nitrat	NO_3^-	mg/l	2,0	DIN EN ISO 10304-1
Fluorid	F^-	mg/l	0,30	DIN EN ISO 10304-1
Chlorid	Cl^-	mg/l	6	DIN EN ISO 10304-1
Ammonium	NH_4^+	mg/l	0,10	DIN EN ISO 11732

Projekt: Kumtor Goldmine, Kirgistan
hier: Wasseruntersuchungen
(Probeneingang: 15.10.2012)

Parameter		Probe	SK13W	Untersuchungsmethode
Antimon	Sb	mg/l	< 0,001	DIN EN ISO 17294-2
Arsen	As	mg/l	0,001	DIN EN ISO 17294-2
Barium	Ba	mg/l	0,056	DIN EN ISO 17294-2
Cadmium	Cd	mg/l	< 0,0001	DIN EN ISO 17294-2
Kupfer	Cu	mg/l	0,004	DIN EN ISO 17294-2
Chrom	Cr	mg/l	< 0,001	DIN EN ISO 17294-2
Kobalt	Co	mg/l	0,0035	DIN EN ISO 17294-2
Eisen	Fe	mg/l	1,66	DIN EN ISO 17294-2
Blei	Pb	mg/l	0,002	DIN EN ISO 17294-2
Mangan	Mn	mg/l	0,233	DIN EN ISO 17294-2
Quecksilber	Hg	mg/l	< 0,0002	DIN EN 1483
Molybdän	Mo	mg/l	< 0,001	DIN EN ISO 17294-2
Nickel	Ni	mg/l	0,002	DIN EN ISO 17294-2
Selen	Se	mg/l	< 0,001	DIN EN ISO 17294-2
Silber	Ag	mg/l	< 0,001	DIN EN ISO 17294-2
Thallium	Tl	mg/l	< 0,0001	DIN EN ISO 17294-2
Vanadium	V	mg/l	0,0014	DIN EN ISO 17294-2
Zink	Zn	mg/l	< 0,005	DIN EN ISO 17294-2
Gold	Au	mg/l	< 0,1	DIN EN ISO 17294-2
Bor	B	mg/l	0,010	DIN EN ISO 17294-2
Cyanid, ges.	CN-	mg/l	< 0,01	DIN EN ISO 14403
Cyanid, l.fr.	CN^-	mg/l	< 0,01	DIN EN ISO 14403
Sulfat	SO_4^{2-}	mg/l	578	DIN EN ISO 10304-1
Nitrat	NO_3^-	mg/l	2,7	DIN EN ISO 10304-1
Fluorid	F^-	mg/l	0,22	DIN EN ISO 10304-1
Chlorid	Cl^-	mg/l	179	DIN EN ISO 10304-1
Ammonium	NH_4^+	mg/l	< 0,05	DIN EN ISO 11732

Projekt: Kumtor Goldmine, Kirgistan
hier: Wasseruntersuchungen
(Probeneingang: 15.10.2012)

Parameter	Probe		SK16W	Untersuchungsmethode
Antimon	Sb	mg/l	< 0,001	DIN EN ISO 17294-2
Arsen	As	mg/l	0,002	DIN EN ISO 17294-2
Barium	Ba	mg/l	0,019	DIN EN ISO 17294-2
Cadmium	Cd	mg/l	< 0,0001	DIN EN ISO 17294-2
Kupfer	Cu	mg/l	0,003	DIN EN ISO 17294-2
Chrom	Cr	mg/l	< 0,001	DIN EN ISO 17294-2
Kobalt	Co	mg/l	< 0,0001	DIN EN ISO 17294-2
Eisen	Fe	mg/l	0,050	DIN EN ISO 17294-2
Blei	Pb	mg/l	< 0,001	DIN EN ISO 17294-2
Mangan	Mn	mg/l	0,002	DIN EN ISO 17294-2
Quecksilber	Hg	mg/l	< 0,0002	DIN EN 1483
Molybdän	Mo	mg/l	0,007	DIN EN ISO 17294-2
Nickel	Ni	mg/l	< 0,001	DIN EN ISO 17294-2
Selen	Se	mg/l	< 0,001	DIN EN ISO 17294-2
Silber	Ag	mg/l	< 0,001	DIN EN ISO 17294-2
Thallium	Tl	mg/l	< 0,0001	DIN EN ISO 17294-2
Vanadium	V	mg/l	0,0002	DIN EN ISO 17294-2
Zink	Zn	mg/l	< 0,005	DIN EN ISO 17294-2
Gold	Au	mg/l	< 0,1	DIN EN ISO 17294-2
Bor	B	mg/l	0,010	DIN EN ISO 17294-2
Cyanid, ges.	CN-	mg/l	< 0,01	DIN EN ISO 14403
Cyanid, l.fr.	CN^-	mg/l	< 0,01	DIN EN ISO 14403
Sulfat	SO_4^{2-}	mg/l	58	DIN EN ISO 10304-1
Nitrat	NO_3^-	mg/l	2,5	DIN EN ISO 10304-1
Fluorid	F^-	mg/l	0,82	DIN EN ISO 10304-1
Chlorid	Cl^-	mg/l	< 5	DIN EN ISO 10304-1
Ammonium	NH_4^+	mg/l	0,09	DIN EN ISO 11732

Projekt: Kumtor Goldmine, Kirgistan
hier: Sediment- / Bodenuntersuchungen
(Probeneingang: 15.10.2012)

Parameter		Probe	SK1S	Untersuchungsmethode
Eluatanalyse				DIN 38414-S4
pH-Wert			8,87	DIN 38404-C5
Antimon	Sb	mg/l	< 0,001	DIN EN ISO 17294-2
Arsen	As	mg/l	0,001	DIN EN ISO 17294-2
Barium	Ba	mg/l	0,011	DIN EN ISO 17294-2
Cadmium	Cd	mg/l	< 0,0001	DIN EN ISO 17294-2
Kupfer	Cu	mg/l	< 0,001	DIN EN ISO 17294-2
Chrom	Cr	mg/l	< 0,001	DIN EN ISO 17294-2
Kobalt	Co	mg/l	< 0,0001	DIN EN ISO 17294-2
Eisen	Fe	mg/l	0,14	DIN EN ISO 17294-2
Blei	Pb	mg/l	< 0,001	DIN EN ISO 17294-2
Mangan	Mn	mg/l	0,003	DIN EN ISO 17294-2
Quecksilber	Hg	mg/l	< 0,0002	DIN EN 1483
Molybdän	Mo	mg/l	< 0,001	DIN EN ISO 17294-2
Nickel	Ni	mg/l	< 0,001	DIN EN ISO 17294-2
Selen	Se	mg/l	< 0,001	DIN EN ISO 17294-2
Silber	Ag	mg/l	< 0,001	DIN EN ISO 17294-2
Thallium	Tl	mg/l	< 0,0001	DIN EN ISO 17294-2
Vanadium	V	mg/l	0,0009	DIN EN ISO 17294-2
Zink	Zn	mg/l	< 0,005	DIN EN ISO 17294-2
Gold	Au	mg/l	< 0,1	DIN EN ISO 17294-2
Bor	B	mg/l	0,022	DIN EN ISO 17294-2
Cyanid, ges.	CN-	mg/l	< 0,01	DIN EN ISO 14403
Cyanid, l.fr.	CN^-	mg/l	< 0,01	DIN EN ISO 14403
Sulfat	SO_4^{2-}	mg/l	< 5	DIN EN ISO 10304-20
Nitrat	NO_3^-	mg/l	< 2	DIN EN ISO 10304-20
Fluorid	F^-	mg/l	0,15	DIN EN ISO 10304-20
Chlorid	Cl^-	mg/l	< 5	DIN EN ISO 10304-20
Ammonium	NH_4^+	mg/l	< 0,05	DIN EN ISO 11732

Projekt: Kumtor Goldmine, Kirgistan
hier: Sediment- / Bodenuntersuchungen
(Probeneingang: 15.10.2012)

Parameter / Probe			SK3S	Untersuchungsmethode
Eluatanalyse				DIN 38414-S4
pH-Wert			8,29	DIN 38404-C5
Antimon	Sb	mg/l	< 0,001	DIN EN ISO 17294-2
Arsen	As	mg/l	< 0,001	DIN EN ISO 17294-2
Barium	Ba	mg/l	0,012	DIN EN ISO 17294-2
Cadmium	Cd	mg/l	< 0,0001	DIN EN ISO 17294-2
Kupfer	Cu	mg/l	< 0,001	DIN EN ISO 17294-2
Chrom	Cr	mg/l	< 0,001	DIN EN ISO 17294-2
Kobalt	Co	mg/l	< 0,0001	DIN EN ISO 17294-2
Eisen	Fe	mg/l	< 0,05	DIN EN ISO 17294-2
Blei	Pb	mg/l	< 0,001	DIN EN ISO 17294-2
Mangan	Mn	mg/l	< 0,001	DIN EN ISO 17294-2
Quecksilber	Hg	mg/l	< 0,0002	DIN EN 1483
Molybdän	Mo	mg/l	0,012	DIN EN ISO 17294-2
Nickel	Ni	mg/l	< 0,001	DIN EN ISO 17294-2
Selen	Se	mg/l	< 0,001	DIN EN ISO 17294-2
Silber	Ag	mg/l	< 0,001	DIN EN ISO 17294-2
Thallium	Tl	mg/l	< 0,0001	DIN EN ISO 17294-2
Vanadium	V	mg/l	0,0001	DIN EN ISO 17294-2
Zink	Zn	mg/l	< 0,005	DIN EN ISO 17294-2
Gold	Au	mg/l	< 0,1	DIN EN ISO 17294-2
Bor	B	mg/l	0,013	DIN EN ISO 17294-2
Cyanid, ges.	CN-	mg/l	< 0,01	DIN EN ISO 14403
Cyanid, l.fr.	CN^-	mg/l	< 0,01	DIN EN ISO 14403
Sulfat	SO_4^{2-}	mg/l	30	DIN EN ISO 10304-20
Nitrat	NO_3^-	mg/l	< 2	DIN EN ISO 10304-20
Fluorid	F^-	mg/l	0,16	DIN EN ISO 10304-20
Chlorid	Cl^-	mg/l	< 5	DIN EN ISO 10304-20
Ammonium	NH_4^+	mg/l	< 0,05	DIN EN ISO 11732

Projekt: Kumtor Goldmine, Kirgistan
hier: Sediment- / Bodenuntersuchungen
(Probeneingang: 15.10.2012)

Parameter		Probe	SK4S	Untersuchungsmethode
Eluatanalyse				DIN 38414-S4
pH-Wert			8,15	DIN 38404-C5
Antimon	Sb	mg/l	0,001	DIN EN ISO 17294-2
Arsen	As	mg/l	< 0,001	DIN EN ISO 17294-2
Barium	Ba	mg/l	0,027	DIN EN ISO 17294-2
Cadmium	Cd	mg/l	< 0,0001	DIN EN ISO 17294-2
Kupfer	Cu	mg/l	0,002	DIN EN ISO 17294-2
Chrom	Cr	mg/l	< 0,001	DIN EN ISO 17294-2
Kobalt	Co	mg/l	0,0004	DIN EN ISO 17294-2
Eisen	Fe	mg/l	0,38	DIN EN ISO 17294-2
Blei	Pb	mg/l	< 0,001	DIN EN ISO 17294-2
Mangan	Mn	mg/l	0,013	DIN EN ISO 17294-2
Quecksilber	Hg	mg/l	< 0,0002	DIN EN 1483
Molybdän	Mo	mg/l	0,010	DIN EN ISO 17294-2
Nickel	Ni	mg/l	< 0,001	DIN EN ISO 17294-2
Selen	Se	mg/l	0,002	DIN EN ISO 17294-2
Silber	Ag	mg/l	< 0,001	DIN EN ISO 17294-2
Thallium	Tl	mg/l	< 0,0001	DIN EN ISO 17294-2
Vanadium	V	mg/l	0,0009	DIN EN ISO 17294-2
Zink	Zn	mg/l	< 0,005	DIN EN ISO 17294-2
Gold	Au	mg/l	< 0,1	DIN EN ISO 17294-2
Bor	B	mg/l	0,010	DIN EN ISO 17294-2
Cyanid, ges.	CN-	mg/l	< 0,01	DIN EN ISO 14403
Cyanid, l.fr.	CN^-	mg/l	< 0,01	DIN EN ISO 14403
Sulfat	SO_4^{2-}	mg/l	12	DIN EN ISO 10304-20
Nitrat	NO_3^-	mg/l	< 2	DIN EN ISO 10304-20
Fluorid	F^-	mg/l	0,19	DIN EN ISO 10304-20
Chlorid	Cl^-	mg/l	< 5	DIN EN ISO 10304-20
Ammonium	NH_4^+	mg/l	0,39	DIN EN ISO 11732

Projekt: Kumtor Goldmine, Kirgistan
hier: Sediment- / Bodenuntersuchungen
(Probeneingang: 15.10.2012)

Parameter / Probe			SK5S	Untersuchungsmethode
Eluatanalyse				DIN 38414-S4
pH-Wert			7,45	DIN 38404-C5
Antimon	Sb	mg/l	0,008	DIN EN ISO 17294-2
Arsen	As	mg/l	< 0,001	DIN EN ISO 17294-2
Barium	Ba	mg/l	0,058	DIN EN ISO 17294-2
Cadmium	Cd	mg/l	< 0,0001	DIN EN ISO 17294-2
Kupfer	Cu	mg/l	< 0,001	DIN EN ISO 17294-2
Chrom	Cr	mg/l	< 0,001	DIN EN ISO 17294-2
Kobalt	Co	mg/l	0,0038	DIN EN ISO 17294-2
Eisen	Fe	mg/l	< 0,05	DIN EN ISO 17294-2
Blei	Pb	mg/l	< 0,001	DIN EN ISO 17294-2
Mangan	Mn	mg/l	0,254	DIN EN ISO 17294-2
Quecksilber	Hg	mg/l	< 0,0002	DIN EN 1483
Molybdän	Mo	mg/l	0,013	DIN EN ISO 17294-2
Nickel	Ni	mg/l	< 0,001	DIN EN ISO 17294-2
Selen	Se	mg/l	< 0,001	DIN EN ISO 17294-2
Silber	Ag	mg/l	< 0,001	DIN EN ISO 17294-2
Thallium	Tl	mg/l	< 0,0001	DIN EN ISO 17294-2
Vanadium	V	mg/l	< 0,0001	DIN EN ISO 17294-2
Zink	Zn	mg/l	< 0,005	DIN EN ISO 17294-2
Gold	Au	mg/l	< 0,1	DIN EN ISO 17294-2
Bor	B	mg/l	0,019	DIN EN ISO 17294-2
Cyanid, ges.	CN-	mg/l	0,04	DIN EN ISO 14403
Cyanid, l.fr.	CN^-	mg/l	< 0,01	DIN EN ISO 14403
Sulfat	SO_4^{2-}	mg/l	567	DIN EN ISO 10304-20
Nitrat	NO_3^-	mg/l	< 2	DIN EN ISO 10304-20
Fluorid	F^-	mg/l	0,19	DIN EN ISO 10304-20
Chlorid	Cl^-	mg/l	< 5	DIN EN ISO 10304-20
Ammonium	NH_4^+	mg/l	0,41	DIN EN ISO 11732

Projekt: Kumtor Goldmine, Kirgistan
hier: Sediment- / Bodenuntersuchungen
(Probeneingang: 15.10.2012)

Parameter		Probe	SK7S	Untersuchungsmethode
Eluatanalyse				DIN 38414-S4
pH-Wert			8,18	DIN 38404-C5
Antimon	Sb	mg/l	0,002	DIN EN ISO 17294-2
Arsen	As	mg/l	< 0,001	DIN EN ISO 17294-2
Barium	Ba	mg/l	0,025	DIN EN ISO 17294-2
Cadmium	Cd	mg/l	< 0,0001	DIN EN ISO 17294-2
Kupfer	Cu	mg/l	< 0,001	DIN EN ISO 17294-2
Chrom	Cr	mg/l	< 0,001	DIN EN ISO 17294-2
Kobalt	Co	mg/l	< 0,0001	DIN EN ISO 17294-2
Eisen	Fe	mg/l	< 0,05	DIN EN ISO 17294-2
Blei	Pb	mg/l	< 0,001	DIN EN ISO 17294-2
Mangan	Mn	mg/l	0,008	DIN EN ISO 17294-2
Quecksilber	Hg	mg/l	< 0,0002	DIN EN 1483
Molybdän	Mo	mg/l	0,022	DIN EN ISO 17294-2
Nickel	Ni	mg/l	< 0,001	DIN EN ISO 17294-2
Selen	Se	mg/l	< 0,001	DIN EN ISO 17294-2
Silber	Ag	mg/l	< 0,001	DIN EN ISO 17294-2
Thallium	Tl	mg/l	< 0,0001	DIN EN ISO 17294-2
Vanadium	V	mg/l	0,0004	DIN EN ISO 17294-2
Zink	Zn	mg/l	< 0,005	DIN EN ISO 17294-2
Gold	Au	mg/l	< 0,1	DIN EN ISO 17294-2
Bor	B	mg/l	0,019	DIN EN ISO 17294-2
Cyanid, ges.	CN-	mg/l	< 0,01	DIN EN ISO 14403
Cyanid, l.fr.	CN^-	mg/l	< 0,01	DIN EN ISO 14403
Sulfat	SO_4^{2-}	mg/l	36	DIN EN ISO 10304-20
Nitrat	NO_3^-	mg/l	5,7	DIN EN ISO 10304-20
Fluorid	F^-	mg/l	0,29	DIN EN ISO 10304-20
Chlorid	Cl^-	mg/l	< 5	DIN EN ISO 10304-20
Ammonium	NH_4^+	mg/l	1,29	DIN EN ISO 11732

Projekt: Kumtor Goldmine, Kirgistan
hier: Sediment- / Bodenuntersuchungen
(Probeneingang: 15.10.2012)

Parameter		Probe	SK8S	Untersuchungsmethode
Eluatanalyse				DIN 38414-S4
pH-Wert			8,07	DIN 38404-C5
Antimon	Sb	mg/l	< 0,001	DIN EN ISO 17294-2
Arsen	As	mg/l	< 0,001	DIN EN ISO 17294-2
Barium	Ba	mg/l	0,008	DIN EN ISO 17294-2
Cadmium	Cd	mg/l	< 0,0001	DIN EN ISO 17294-2
Kupfer	Cu	mg/l	< 0,001	DIN EN ISO 17294-2
Chrom	Cr	mg/l	< 0,001	DIN EN ISO 17294-2
Kobalt	Co	mg/l	< 0,0001	DIN EN ISO 17294-2
Eisen	Fe	mg/l	< 0,05	DIN EN ISO 17294-2
Blei	Pb	mg/l	< 0,001	DIN EN ISO 17294-2
Mangan	Mn	mg/l	< 0,001	DIN EN ISO 17294-2
Quecksilber	Hg	mg/l	< 0,0002	DIN EN 1483
Molybdän	Mo	mg/l	0,011	DIN EN ISO 17294-2
Nickel	Ni	mg/l	< 0,001	DIN EN ISO 17294-2
Selen	Se	mg/l	< 0,001	DIN EN ISO 17294-2
Silber	Ag	mg/l	< 0,001	DIN EN ISO 17294-2
Thallium	Tl	mg/l	< 0,0001	DIN EN ISO 17294-2
Vanadium	V	mg/l	0,0002	DIN EN ISO 17294-2
Zink	Zn	mg/l	< 0,005	DIN EN ISO 17294-2
Gold	Au	mg/l	< 0,1	DIN EN ISO 17294-2
Bor	B	mg/l	0,009	DIN EN ISO 17294-2
Cyanid, ges.	CN-	mg/l	< 0,01	DIN EN ISO 14403
Cyanid, l.fr.	CN^-	mg/l	< 0,01	DIN EN ISO 14403
Sulfat	SO_4^{2-}	mg/l	32	DIN EN ISO 10304-20
Nitrat	NO_3^-	mg/l	< 2	DIN EN ISO 10304-20
Fluorid	F^-	mg/l	0,16	DIN EN ISO 10304-20
Chlorid	Cl^-	mg/l	< 5	DIN EN ISO 10304-20
Ammonium	NH_4^+	mg/l	< 0,05	DIN EN ISO 11732

Projekt: Kumtor Goldmine, Kirgistan
hier: Sediment- / Bodenuntersuchungen
(Probeneingang: 15.10.2012)

Parameter		Probe	SK9S	Untersuchungsmethode
Eluatanalyse				DIN 38414-S4
pH-Wert			8,26	DIN 38404-C5
Antimon	Sb	mg/l	0,001	DIN EN ISO 17294-2
Arsen	As	mg/l	< 0,001	DIN EN ISO 17294-2
Barium	Ba	mg/l	0,023	DIN EN ISO 17294-2
Cadmium	Cd	mg/l	< 0,0001	DIN EN ISO 17294-2
Kupfer	Cu	mg/l	< 0,001	DIN EN ISO 17294-2
Chrom	Cr	mg/l	< 0,001	DIN EN ISO 17294-2
Kobalt	Co	mg/l	< 0,0001	DIN EN ISO 17294-2
Eisen	Fe	mg/l	< 0,05	DIN EN ISO 17294-2
Blei	Pb	mg/l	< 0,001	DIN EN ISO 17294-2
Mangan	Mn	mg/l	0,003	DIN EN ISO 17294-2
Quecksilber	Hg	mg/l	< 0,0002	DIN EN 1483
Molybdän	Mo	mg/l	0,010	DIN EN ISO 17294-2
Nickel	Ni	mg/l	< 0,001	DIN EN ISO 17294-2
Selen	Se	mg/l	< 0,001	DIN EN ISO 17294-2
Silber	Ag	mg/l	< 0,001	DIN EN ISO 17294-2
Thallium	Tl	mg/l	< 0,0001	DIN EN ISO 17294-2
Vanadium	V	mg/l	0,0004	DIN EN ISO 17294-2
Zink	Zn	mg/l	< 0,005	DIN EN ISO 17294-2
Gold	Au	mg/l	< 0,1	DIN EN ISO 17294-2
Bor	B	mg/l	0,013	DIN EN ISO 17294-2
Cyanid, ges.	CN-	mg/l	< 0,01	DIN EN ISO 14403
Cyanid, l.fr.	CN^-	mg/l	< 0,01	DIN EN ISO 14403
Sulfat	SO_4^{2-}	mg/l	9	DIN EN ISO 10304-20
Nitrat	NO_3^-	mg/l	< 2	DIN EN ISO 10304-20
Fluorid	F^-	mg/l	0,23	DIN EN ISO 10304-20
Chlorid	Cl^-	mg/l	< 5	DIN EN ISO 10304-20
Ammonium	NH_4^+	mg/l	0,08	DIN EN ISO 11732

Projekt: Kumtor Goldmine, Kirgistan
<u>hier:</u> Sediment- / Bodenuntersuchungen
(Probeneingang: 15.10.2012)

Parameter / Probe			SK10S	Untersuchungsmethode
Eluatanalyse				DIN 38414-S4
pH-Wert			8,01	DIN 38404-C5
Antimon	Sb	mg/l	0,001	DIN EN ISO 17294-2
Arsen	As	mg/l	< 0,001	DIN EN ISO 17294-2
Barium	Ba	mg/l	0,029	DIN EN ISO 17294-2
Cadmium	Cd	mg/l	< 0,0001	DIN EN ISO 17294-2
Kupfer	Cu	mg/l	< 0,001	DIN EN ISO 17294-2
Chrom	Cr	mg/l	< 0,001	DIN EN ISO 17294-2
Kobalt	Co	mg/l	< 0,0001	DIN EN ISO 17294-2
Eisen	Fe	mg/l	< 0,05	DIN EN ISO 17294-2
Blei	Pb	mg/l	< 0,001	DIN EN ISO 17294-2
Mangan	Mn	mg/l	< 0,001	DIN EN ISO 17294-2
Quecksilber	Hg	mg/l	< 0,0002	DIN EN 1483
Molybdän	Mo	mg/l	0,014	DIN EN ISO 17294-2
Nickel	Ni	mg/l	< 0,001	DIN EN ISO 17294-2
Selen	Se	mg/l	< 0,001	DIN EN ISO 17294-2
Silber	Ag	mg/l	< 0,001	DIN EN ISO 17294-2
Thallium	Tl	mg/l	< 0,0001	DIN EN ISO 17294-2
Vanadium	V	mg/l	0,0001	DIN EN ISO 17294-2
Zink	Zn	mg/l	< 0,005	DIN EN ISO 17294-2
Gold	Au	mg/l	< 0,1	DIN EN ISO 17294-2
Bor	B	mg/l	0,013	DIN EN ISO 17294-2
Cyanid, ges.	CN-	mg/l	< 0,01	DIN EN ISO 14403
Cyanid, l.fr.	CN^-	mg/l	< 0,01	DIN EN ISO 14403
Sulfat	SO_4^{2-}	mg/l	28	DIN EN ISO 10304-20
Nitrat	NO_3^-	mg/l	3,5	DIN EN ISO 10304-20
Fluorid	F^-	mg/l	0,30	DIN EN ISO 10304-20
Chlorid	Cl^-	mg/l	< 5	DIN EN ISO 10304-20
Ammonium	NH_4^+	mg/l	< 0,05	DIN EN ISO 11732

Projekt: Kumtor Goldmine, Kirgistan
<u>hier:</u> Sediment- / Bodenuntersuchungen
(Probeneingang: 15.10.2012)

Parameter \ Probe			SK12S	Untersuchungsmethode
Eluatanalyse				DIN 38414-S4
pH-Wert			8,06	DIN 38404-C5
Antimon	Sb	mg/l	< 0,001	DIN EN ISO 17294-2
Arsen	As	mg/l	0,001	DIN EN ISO 17294-2
Barium	Ba	mg/l	0,010	DIN EN ISO 17294-2
Cadmium	Cd	mg/l	< 0,0001	DIN EN ISO 17294-2
Kupfer	Cu	mg/l	< 0,001	DIN EN ISO 17294-2
Chrom	Cr	mg/l	< 0,001	DIN EN ISO 17294-2
Kobalt	Co	mg/l	< 0,0001	DIN EN ISO 17294-2
Eisen	Fe	mg/l	< 0,05	DIN EN ISO 17294-2
Blei	Pb	mg/l	< 0,001	DIN EN ISO 17294-2
Mangan	Mn	mg/l	0,015	DIN EN ISO 17294-2
Quecksilber	Hg	mg/l	< 0,0002	DIN EN 1483
Molybdän	Mo	mg/l	0,005	DIN EN ISO 17294-2
Nickel	Ni	mg/l	< 0,001	DIN EN ISO 17294-2
Selen	Se	mg/l	< 0,001	DIN EN ISO 17294-2
Silber	Ag	mg/l	< 0,001	DIN EN ISO 17294-2
Thallium	Tl	mg/l	< 0,0001	DIN EN ISO 17294-2
Vanadium	V	mg/l	0,0009	DIN EN ISO 17294-2
Zink	Zn	mg/l	< 0,005	DIN EN ISO 17294-2
Gold	Au	mg/l	< 0,1	DIN EN ISO 17294-2
Bor	B	mg/l	0,017	DIN EN ISO 17294-2
Cyanid, ges.	CN-	mg/l	< 0,01	DIN EN ISO 14403
Cyanid, l.fr.	CN^-	mg/l	< 0,01	DIN EN ISO 14403
Sulfat	SO_4^{2-}	mg/l	8	DIN EN ISO 10304-20
Nitrat	NO_3^-	mg/l	< 2	DIN EN ISO 10304-20
Fluorid	F^-	mg/l	0,68	DIN EN ISO 10304-20
Chlorid	Cl^-	mg/l	< 5	DIN EN ISO 10304-20
Ammonium	NH_4^+	mg/l	0,21	DIN EN ISO 11732

Projekt: Kumtor Goldmine, Kirgistan
hier: Sediment- / Bodenuntersuchungen
(Probeneingang: 15.10.2012)

Parameter / Probe			SK13S	Untersuchungsmethode
Eluatanalyse				DIN 38414-S4
pH-Wert			7,93	DIN 38404-C5
Antimon	Sb	mg/l	< 0,001	DIN EN ISO 17294-2
Arsen	As	mg/l	< 0,001	DIN EN ISO 17294-2
Barium	Ba	mg/l	0,086	DIN EN ISO 17294-2
Cadmium	Cd	mg/l	< 0,0001	DIN EN ISO 17294-2
Kupfer	Cu	mg/l	< 0,001	DIN EN ISO 17294-2
Chrom	Cr	mg/l	< 0,001	DIN EN ISO 17294-2
Kobalt	Co	mg/l	0,0003	DIN EN ISO 17294-2
Eisen	Fe	mg/l	< 0,05	DIN EN ISO 17294-2
Blei	Pb	mg/l	< 0,001	DIN EN ISO 17294-2
Mangan	Mn	mg/l	0,216	DIN EN ISO 17294-2
Quecksilber	Hg	mg/l	< 0,0002	DIN EN 1483
Molybdän	Mo	mg/l	0,005	DIN EN ISO 17294-2
Nickel	Ni	mg/l	< 0,001	DIN EN ISO 17294-2
Selen	Se	mg/l	< 0,001	DIN EN ISO 17294-2
Silber	Ag	mg/l	< 0,001	DIN EN ISO 17294-2
Thallium	Tl	mg/l	< 0,0001	DIN EN ISO 17294-2
Vanadium	V	mg/l	0,0002	DIN EN ISO 17294-2
Zink	Zn	mg/l	< 0,005	DIN EN ISO 17294-2
Gold	Au	mg/l	< 0,1	DIN EN ISO 17294-2
Bor	B	mg/l	0,018	DIN EN ISO 17294-2
Cyanid, ges.	CN-	mg/l	< 0,01	DIN EN ISO 14403
Cyanid, l.fr.	CN^-	mg/l	< 0,01	DIN EN ISO 14403
Sulfat	SO_4^{2-}	mg/l	24	DIN EN ISO 10304-20
Nitrat	NO_3^-	mg/l	< 2	DIN EN ISO 10304-20
Fluorid	F^-	mg/l	0,24	DIN EN ISO 10304-20
Chlorid	Cl^-	mg/l	7	DIN EN ISO 10304-20
Ammonium	NH_4^+	mg/l	< 0,05	DIN EN ISO 11732

Projekt: Kumtor Goldmine, Kirgistan
hier: Sediment- / Bodenuntersuchungen
(Probeneingang: 15.10.2012)

Parameter / Probe			SK14B	Untersuchungsmethode
Eluatanalyse				DIN 38414-S4
pH-Wert			7,87	DIN 38404-C5
Antimon	Sb	mg/l	< 0,001	DIN EN ISO 17294-2
Arsen	As	mg/l	< 0,001	DIN EN ISO 17294-2
Barium	Ba	mg/l	0,036	DIN EN ISO 17294-2
Cadmium	Cd	mg/l	< 0,0001	DIN EN ISO 17294-2
Kupfer	Cu	mg/l	0,001	DIN EN ISO 17294-2
Chrom	Cr	mg/l	< 0,001	DIN EN ISO 17294-2
Kobalt	Co	mg/l	0,0004	DIN EN ISO 17294-2
Eisen	Fe	mg/l	< 0,05	DIN EN ISO 17294-2
Blei	Pb	mg/l	< 0,001	DIN EN ISO 17294-2
Mangan	Mn	mg/l	< 0,001	DIN EN ISO 17294-2
Quecksilber	Hg	mg/l	< 0,0002	DIN EN 1483
Molybdän	Mo	mg/l	0,003	DIN EN ISO 17294-2
Nickel	Ni	mg/l	< 0,001	DIN EN ISO 17294-2
Selen	Se	mg/l	< 0,001	DIN EN ISO 17294-2
Silber	Ag	mg/l	< 0,001	DIN EN ISO 17294-2
Thallium	Tl	mg/l	< 0,0001	DIN EN ISO 17294-2
Vanadium	V	mg/l	0,0003	DIN EN ISO 17294-2
Zink	Zn	mg/l	< 0,005	DIN EN ISO 17294-2
Gold	Au	mg/l	< 0,1	DIN EN ISO 17294-2
Bor	B	mg/l	0,018	DIN EN ISO 17294-2
Cyanid, ges.	CN-	mg/l	< 0,01	DIN EN ISO 14403
Cyanid, l.fr.	CN^-	mg/l	< 0,01	DIN EN ISO 14403
Sulfat	SO_4^{2-}	mg/l	111	DIN EN ISO 10304-20
Nitrat	NO_3^-	mg/l	2,5	DIN EN ISO 10304-20
Fluorid	F^-	mg/l	0,38	DIN EN ISO 10304-20
Chlorid	Cl^-	mg/l	35	DIN EN ISO 10304-20
Ammonium	NH_4^+	mg/l	< 0,05	DIN EN ISO 11732

Projekt: Kumtor Goldmine, Kirgistan
hier: Sediment- / Bodenuntersuchungen
(Probeneingang: 15.10.2012)

Parameter / Probe			SK15B	Untersuchungsmethode
Eluatanalyse				DIN 38414-S4
pH-Wert			8,23	DIN 38404-C5
Antimon	Sb	mg/l	< 0,001	DIN EN ISO 17294-2
Arsen	As	mg/l	< 0,001	DIN EN ISO 17294-2
Barium	Ba	mg/l	0,018	DIN EN ISO 17294-2
Cadmium	Cd	mg/l	< 0,0001	DIN EN ISO 17294-2
Kupfer	Cu	mg/l	< 0,001	DIN EN ISO 17294-2
Chrom	Cr	mg/l	< 0,001	DIN EN ISO 17294-2
Kobalt	Co	mg/l	< 0,0001	DIN EN ISO 17294-2
Eisen	Fe	mg/l	< 0,05	DIN EN ISO 17294-2
Blei	Pb	mg/l	< 0,001	DIN EN ISO 17294-2
Mangan	Mn	mg/l	0,041	DIN EN ISO 17294-2
Quecksilber	Hg	mg/l	< 0,0002	DIN EN 1483
Molybdän	Mo	mg/l	0,003	DIN EN ISO 17294-2
Nickel	Ni	mg/l	< 0,001	DIN EN ISO 17294-2
Selen	Se	mg/l	< 0,001	DIN EN ISO 17294-2
Silber	Ag	mg/l	< 0,001	DIN EN ISO 17294-2
Thallium	Tl	mg/l	< 0,0001	DIN EN ISO 17294-2
Vanadium	V	mg/l	0,0007	DIN EN ISO 17294-2
Zink	Zn	mg/l	< 0,005	DIN EN ISO 17294-2
Gold	Au	mg/l	< 0,1	DIN EN ISO 17294-2
Bor	B	mg/l	0,013	DIN EN ISO 17294-2
Cyanid, ges.	CN-	mg/l	< 0,01	DIN EN ISO 14403
Cyanid, l.fr.	CN^-	mg/l	< 0,01	DIN EN ISO 14403
Sulfat	SO_4^{2-}	mg/l	17	DIN EN ISO 10304-20
Nitrat	NO_3^-	mg/l	< 2	DIN EN ISO 10304-20
Fluorid	F^-	mg/l	0,30	DIN EN ISO 10304-20
Chlorid	Cl^-	mg/l	17	DIN EN ISO 10304-20
Ammonium	NH_4^+	mg/l	0,12	DIN EN ISO 11732

Projekt: Kumtor Goldmine, Kirgistan
hier: Sediment- / Bodenuntersuchungen
(Probeneingang: 15.10.2012)

Parameter / Probe			SK16S	Untersuchungsmethode
Eluatanalyse				DIN 38414-S4
pH-Wert			8,09	DIN 38404-C5
Antimon	Sb	mg/l	< 0,001	DIN EN ISO 17294-2
Arsen	As	mg/l	0,002	DIN EN ISO 17294-2
Barium	Ba	mg/l	0,005	DIN EN ISO 17294-2
Cadmium	Cd	mg/l	< 0,0001	DIN EN ISO 17294-2
Kupfer	Cu	mg/l	< 0,001	DIN EN ISO 17294-2
Chrom	Cr	mg/l	< 0,001	DIN EN ISO 17294-2
Kobalt	Co	mg/l	< 0,0001	DIN EN ISO 17294-2
Eisen	Fe	mg/l	0,20	DIN EN ISO 17294-2
Blei	Pb	mg/l	< 0,001	DIN EN ISO 17294-2
Mangan	Mn	mg/l	0,003	DIN EN ISO 17294-2
Quecksilber	Hg	mg/l	< 0,0002	DIN EN 1483
Molybdän	Mo	mg/l	0,001	DIN EN ISO 17294-2
Nickel	Ni	mg/l	< 0,001	DIN EN ISO 17294-2
Selen	Se	mg/l	< 0,001	DIN EN ISO 17294-2
Silber	Ag	mg/l	< 0,001	DIN EN ISO 17294-2
Thallium	Tl	mg/l	< 0,0001	DIN EN ISO 17294-2
Vanadium	V	mg/l	0,0007	DIN EN ISO 17294-2
Zink	Zn	mg/l	< 0,005	DIN EN ISO 17294-2
Gold	Au	mg/l	< 0,1	DIN EN ISO 17294-2
Bor	B	mg/l	0,007	DIN EN ISO 17294-2
Cyanid, ges.	CN-	mg/l	< 0,01	DIN EN ISO 14403
Cyanid, l.fr.	CN^-	mg/l	< 0,01	DIN EN ISO 14403
Sulfat	SO_4^{2-}	mg/l	< 5	DIN EN ISO 10304-20
Nitrat	NO_3^-	mg/l	< 2	DIN EN ISO 10304-20
Fluorid	F	mg/l	0,26	DIN EN ISO 10304-20
Chlorid	Cl^-	mg/l	< 5	DIN EN ISO 10304-20
Ammonium	NH_4^+	mg/l	< 0,05	DIN EN ISO 11732

Projekt: Kumtor Goldmine, Kirgistan
hier: Sediment- / Bodenuntersuchungen
(Probeneingang: 15.10.2012)

Parameter		Probe	SK1S	Untersuchungsmethode
Feststoffanalyse				
Wassergehalt	W_W	%	13,32	DIN ISO 11465
Trockenrückstand	W_T	%	86,68	DIN ISO 11465
pH-Wert			6,61	DIN ISO 10390
Königswasseraufschluß				DIN ISO 11466
Antimon	Sb	mg/kg m_T	< 0,5	DIN EN ISO 17294-2
Arsen	As	mg/kg m_T	3,7	DIN EN ISO 17294-2
Barium	Ba	mg/kg m_T	91	DIN EN ISO 17294-2
Cadmium	Cd	mg/kg m_T	< 0,20	DIN EN ISO 17294-2
Kupfer	Cu	mg/kg m_T	9,6	DIN EN ISO 17294-2
Chrom	Cr	mg/kg m_T	7,4	DIN EN ISO 17294-2
Kobalt	Co	mg/kg m_T	4,1	DIN EN ISO 17294-2
Eisen	Fe	mg/kg m_T	13100	DIN EN ISO 17294-2
Blei	Pb	mg/kg m_T	3,2	DIN EN ISO 17294-2
Mangan	Mn	mg/kg m_T	315	DIN EN ISO 17294-2
Quecksilber	Hg	mg/kg m_T	< 0,10	DIN EN 1483
Molybdän	Mo	mg/kg m_T	0,67	DIN EN ISO 17294-2
Nickel	Ni	mg/kg m_T	9,5	DIN EN ISO 17294-2
Selen	Se	mg/kg m_T	1,6	DIN EN ISO 17294-2
Silber	Ag	mg/kg m_T	< 2,5	DIN EN ISO 17294-2
Thallium	Tl	mg/kg m_T	< 0,5	DIN EN ISO 17294-2
Vanadium	V	mg/kg m_T	12	DIN EN ISO 17294-2
Zink	Zn	mg/kg m_T	27	DIN EN ISO 17294-2
Gold	Au	mg/kg m_T	< 25	DIN EN ISO 17294-2
Bor	B	mg/kg m_T	< 12	DIN EN ISO 17294-2
Cyanid, ges.	CN-	mg/kg m_T	< 0,1	LAGA CN 2 / 79 / DIN ISO 17380
Cyanid, l.fr.	CN^-	mg/kg m_T	< 0,1	LAGA CN 2 / 79 / DIN ISO 17380

Projekt: Kumtor Goldmine, Kirgistan
hier: Sediment- / Bodenuntersuchungen
(Probeneingang: 15.10.2012)

Parameter		Probe	SK3S	Untersuchungsmethode
Feststoffanalyse				
Wassergehalt	W_W	%	18,43	DIN ISO 11465
Trockenrückstand	W_T	%	81,57	DIN ISO 11465
pH-Wert			7,41	DIN ISO 10390
Königswasseraufschluß				DIN ISO 11466
Antimon	Sb	mg/kg m_T	1,6	DIN EN ISO 17294-2
Arsen	As	mg/kg m_T	32	DIN EN ISO 17294-2
Barium	Ba	mg/kg m_T	174	DIN EN ISO 17294-2
Cadmium	Cd	mg/kg m_T	< 0,20	DIN EN ISO 17294-2
Kupfer	Cu	mg/kg m_T	59	DIN EN ISO 17294-2
Chrom	Cr	mg/kg m_T	18	DIN EN ISO 17294-2
Kobalt	Co	mg/kg m_T	19	DIN EN ISO 17294-2
Eisen	Fe	mg/kg m_T	36000	DIN EN ISO 17294-2
Blei	Pb	mg/kg m_T	10	DIN EN ISO 17294-2
Mangan	Mn	mg/kg m_T	657	DIN EN ISO 17294-2
Quecksilber	Hg	mg/kg m_T	< 0,10	DIN EN 1483
Molybdän	Mo	mg/kg m_T	5,4	DIN EN ISO 17294-2
Nickel	Ni	mg/kg m_T	42	DIN EN ISO 17294-2
Selen	Se	mg/kg m_T	6,5	DIN EN ISO 17294-2
Silber	Ag	mg/kg m_T	< 2,5	DIN EN ISO 17294-2
Thallium	Tl	mg/kg m_T	< 0,5	DIN EN ISO 17294-2
Vanadium	V	mg/kg m_T	18	DIN EN ISO 17294-2
Zink	Zn	mg/kg m_T	46	DIN EN ISO 17294-2
Gold	Au	mg/kg m_T	< 25	DIN EN ISO 17294-2
Bor	B	mg/kg m_T	< 12	DIN EN ISO 17294-2
Cyanid, ges.	CN-	mg/kg m_T	< 0,1	LAGA CN 2 / 79 / DIN ISO 17380
Cyanid, l.fr.	CN^-	mg/kg m_T	< 0,1	LAGA CN 2 / 79 / DIN ISO 17380

Projekt: Kumtor Goldmine, Kirgistan
<u>hier:</u> Sediment- / Bodenuntersuchungen
(Probeneingang: 15.10.2012)

Parameter		Probe	SK4S	Untersuchungsmethode
Feststoffanalyse				
Wassergehalt	W_W	%	21,26	DIN ISO 11465
Trockenrückstand	W_T	%	78,74	DIN ISO 11465
pH-Wert			7,34	DIN ISO 10390
Königswasseraufschluß				DIN ISO 11466
Antimon	Sb	mg/kg m_T	0,9	DIN EN ISO 17294-2
Arsen	As	mg/kg m_T	11	DIN EN ISO 17294-2
Barium	Ba	mg/kg m_T	319	DIN EN ISO 17294-2
Cadmium	Cd	mg/kg m_T	< 0,20	DIN EN ISO 17294-2
Kupfer	Cu	mg/kg m_T	21	DIN EN ISO 17294-2
Chrom	Cr	mg/kg m_T	12	DIN EN ISO 17294-2
Kobalt	Co	mg/kg m_T	7,7	DIN EN ISO 17294-2
Eisen	Fe	mg/kg m_T	29400	DIN EN ISO 17294-2
Blei	Pb	mg/kg m_T	6,3	DIN EN ISO 17294-2
Mangan	Mn	mg/kg m_T	374	DIN EN ISO 17294-2
Quecksilber	Hg	mg/kg m_T	< 0,10	DIN EN 1483
Molybdän	Mo	mg/kg m_T	2	DIN EN ISO 17294-2
Nickel	Ni	mg/kg m_T	17	DIN EN ISO 17294-2
Selen	Se	mg/kg m_T	4,1	DIN EN ISO 17294-2
Silber	Ag	mg/kg m_T	< 2,5	DIN EN ISO 17294-2
Thallium	Tl	mg/kg m_T	< 0,5	DIN EN ISO 17294-2
Vanadium	V	mg/kg m_T	30	DIN EN ISO 17294-2
Zink	Zn	mg/kg m_T	35	DIN EN ISO 17294-2
Gold	Au	mg/kg m_T	< 25	DIN EN ISO 17294-2
Bor	B	mg/kg m_T	< 12	DIN EN ISO 17294-2
Cyanid, ges.	CN-	mg/kg m_T	< 0,1	LAGA CN 2 / 79 / DIN ISO 17380
Cyanid, l.fr.	CN^-	mg/kg m_T	< 0,1	LAGA CN 2 / 79 / DIN ISO 17380

Projekt: Kumtor Goldmine, Kirgistan
hier: Sediment- / Bodenuntersuchungen
(Probeneingang: 15.10.2012)

Parameter		Probe	SK5S	Untersuchungsmethode
Feststoffanalyse				
Wassergehalt	W_W	%	21,04	DIN ISO 11465
Trockenrückstand	W_T	%	78,96	DIN ISO 11465
pH-Wert			7,68	DIN ISO 10390
Königswasseraufschluß				DIN ISO 11466
Antimon	Sb	mg/kg m_T	4,4	DIN EN ISO 17294-2
Arsen	As	mg/kg m_T	14	DIN EN ISO 17294-2
Barium	Ba	mg/kg m_T	158	DIN EN ISO 17294-2
Cadmium	Cd	mg/kg m_T	0,56	DIN EN ISO 17294-2
Kupfer	Cu	mg/kg m_T	69	DIN EN ISO 17294-2
Chrom	Cr	mg/kg m_T	12	DIN EN ISO 17294-2
Kobalt	Co	mg/kg m_T	18	DIN EN ISO 17294-2
Eisen	Fe	mg/kg m_T	50500	DIN EN ISO 17294-2
Blei	Pb	mg/kg m_T	56	DIN EN ISO 17294-2
Mangan	Mn	mg/kg m_T	1800	DIN EN ISO 17294-2
Quecksilber	Hg	mg/kg m_T	< 0,10	DIN EN 1483
Molybdän	Mo	mg/kg m_T	5,9	DIN EN ISO 17294-2
Nickel	Ni	mg/kg m_T	44	DIN EN ISO 17294-2
Selen	Se	mg/kg m_T	3	DIN EN ISO 17294-2
Silber	Ag	mg/kg m_T	< 2,5	DIN EN ISO 17294-2
Thallium	Tl	mg/kg m_T	< 0,5	DIN EN ISO 17294-2
Vanadium	V	mg/kg m_T	17	DIN EN ISO 17294-2
Zink	Zn	mg/kg m_T	173	DIN EN ISO 17294-2
Gold	Au	mg/kg m_T	< 25	DIN EN ISO 17294-2
Bor	B	mg/kg m_T	< 12	DIN EN ISO 17294-2
Cyanid, ges.	CN-	mg/kg m_T	0,9	LAGA CN 2 / 79 / DIN ISO 17380
Cyanid, l.fr.	CN^-	mg/kg m_T	0,6	LAGA CN 2 / 79 / DIN ISO 17380

Projekt: Kumtor Goldmine, Kirgistan
<u>hier:</u> Sediment- / Bodenuntersuchungen
(Probeneingang: 15.10.2012)

Parameter		Probe	SK7S	Untersuchungsmethode
Feststoffanalyse				
Wassergehalt	W_W	%	19,53	DIN ISO 11465
Trockenrückstand	W_T	%	80,47	DIN ISO 11465
pH-Wert			7,60	DIN ISO 10390
Königswasseraufschluß				DIN ISO 11466
Antimon	Sb	mg/kg m_T	1,3	DIN EN ISO 17294-2
Arsen	As	mg/kg m_T	22	DIN EN ISO 17294-2
Barium	Ba	mg/kg m_T	297	DIN EN ISO 17294-2
Cadmium	Cd	mg/kg m_T	0,21	DIN EN ISO 17294-2
Kupfer	Cu	mg/kg m_T	41	DIN EN ISO 17294-2
Chrom	Cr	mg/kg m_T	32	DIN EN ISO 17294-2
Kobalt	Co	mg/kg m_T	20	DIN EN ISO 17294-2
Eisen	Fe	mg/kg m_T	39200	DIN EN ISO 17294-2
Blei	Pb	mg/kg m_T	17	DIN EN ISO 17294-2
Mangan	Mn	mg/kg m_T	870	DIN EN ISO 17294-2
Quecksilber	Hg	mg/kg m_T	< 0,10	DIN EN 1483
Molybdän	Mo	mg/kg m_T	3,3	DIN EN ISO 17294-2
Nickel	Ni	mg/kg m_T	52	DIN EN ISO 17294-2
Selen	Se	mg/kg m_T	2,5	DIN EN ISO 17294-2
Silber	Ag	mg/kg m_T	< 2,5	DIN EN ISO 17294-2
Thallium	Tl	mg/kg m_T	< 0,5	DIN EN ISO 17294-2
Vanadium	V	mg/kg m_T	38	DIN EN ISO 17294-2
Zink	Zn	mg/kg m_T	73	DIN EN ISO 17294-2
Gold	Au	mg/kg m_T	< 25	DIN EN ISO 17294-2
Bor	B	mg/kg m_T	< 12	DIN EN ISO 17294-2
Cyanid, ges.	CN-	mg/kg m_T	< 0,1	LAGA CN 2 / 79 / DIN ISO 17380
Cyanid, l.fr.	CN^-	mg/kg m_T	< 0,1	LAGA CN 2 / 79 / DIN ISO 17380

Projekt: Kumtor Goldmine, Kirgistan
hier: Sediment- / Bodenuntersuchungen
(Probeneingang: 15.10.2012)

Parameter		Probe	SK8S	Untersuchungsmethode
Feststoffanalyse				
Wassergehalt	W_W	%	12,45	DIN ISO 11465
Trockenrückstand	W_T	%	87,55	DIN ISO 11465
pH-Wert			7,50	DIN ISO 10390
Königswasseraufschluß				DIN ISO 11466
Antimon	Sb	mg/kg m_T	1,0	DIN EN ISO 17294-2
Arsen	As	mg/kg m_T	24	DIN EN ISO 17294-2
Barium	Ba	mg/kg m_T	116	DIN EN ISO 17294-2
Cadmium	Cd	mg/kg m_T	< 0,20	DIN EN ISO 17294-2
Kupfer	Cu	mg/kg m_T	37	DIN EN ISO 17294-2
Chrom	Cr	mg/kg m_T	13	DIN EN ISO 17294-2
Kobalt	Co	mg/kg m_T	19	DIN EN ISO 17294-2
Eisen	Fe	mg/kg m_T	38400	DIN EN ISO 17294-2
Blei	Pb	mg/kg m_T	7,7	DIN EN ISO 17294-2
Mangan	Mn	mg/kg m_T	1130	DIN EN ISO 17294-2
Quecksilber	Hg	mg/kg m_T	< 0,10	DIN EN 1483
Molybdän	Mo	mg/kg m_T	5,7	DIN EN ISO 17294-2
Nickel	Ni	mg/kg m_T	51	DIN EN ISO 17294-2
Selen	Se	mg/kg m_T	3	DIN EN ISO 17294-2
Silber	Ag	mg/kg m_T	< 2,5	DIN EN ISO 17294-2
Thallium	Tl	mg/kg m_T	< 0,5	DIN EN ISO 17294-2
Vanadium	V	mg/kg m_T	25	DIN EN ISO 17294-2
Zink	Zn	mg/kg m_T	34	DIN EN ISO 17294-2
Gold	Au	mg/kg m_T	< 25	DIN EN ISO 17294-2
Bor	B	mg/kg m_T	< 12	DIN EN ISO 17294-2
Cyanid, ges.	CN-	mg/kg m_T	< 0,1	LAGA CN 2 / 79 / DIN ISO 17380
Cyanid, l.fr.	CN^-	mg/kg m_T	< 0,1	LAGA CN 2 / 79 / DIN ISO 17380

Projekt: Kumtor Goldmine, Kirgistan
<u>hier:</u> Sediment- / Bodenuntersuchungen
(Probeneingang: 15.10.2012)

Parameter		Probe	SK9S	Untersuchungsmethode
Feststoffanalyse				
Wassergehalt	W_W	%	21,64	DIN ISO 11465
Trockenrückstand	W_T	%	78,36	DIN ISO 11465
pH-Wert			7,53	DIN ISO 10390
Königswasseraufschluß				DIN ISO 11466
Antimon	Sb	mg/kg m_T	1,1	DIN EN ISO 17294-2
Arsen	As	mg/kg m_T	16	DIN EN ISO 17294-2
Barium	Ba	mg/kg m_T	207	DIN EN ISO 17294-2
Cadmium	Cd	mg/kg m_T	< 0,20	DIN EN ISO 17294-2
Kupfer	Cu	mg/kg m_T	30	DIN EN ISO 17294-2
Chrom	Cr	mg/kg m_T	20	DIN EN ISO 17294-2
Kobalt	Co	mg/kg m_T	13	DIN EN ISO 17294-2
Eisen	Fe	mg/kg m_T	28500	DIN EN ISO 17294-2
Blei	Pb	mg/kg m_T	11	DIN EN ISO 17294-2
Mangan	Mn	mg/kg m_T	674	DIN EN ISO 17294-2
Quecksilber	Hg	mg/kg m_T	< 0,10	DIN EN 1483
Molybdän	Mo	mg/kg m_T	2,2	DIN EN ISO 17294-2
Nickel	Ni	mg/kg m_T	33	DIN EN ISO 17294-2
Selen	Se	mg/kg m_T	2	DIN EN ISO 17294-2
Silber	Ag	mg/kg m_T	< 2,5	DIN EN ISO 17294-2
Thallium	Tl	mg/kg m_T	< 0,5	DIN EN ISO 17294-2
Vanadium	V	mg/kg m_T	28	DIN EN ISO 17294-2
Zink	Zn	mg/kg m_T	50	DIN EN ISO 17294-2
Gold	Au	mg/kg m_T	< 25	DIN EN ISO 17294-2
Bor	B	mg/kg m_T	< 12	DIN EN ISO 17294-2
Cyanid, ges.	CN-	mg/kg m_T	< 0,1	LAGA CN 2 / 79 / DIN ISO 17380
Cyanid, l.fr.	CN^-	mg/kg m_T	< 0,1	LAGA CN 2 / 79 / DIN ISO 17380

Projekt: Kumtor Goldmine, Kirgistan
hier: Sediment- / Bodenuntersuchungen
(Probeneingang: 15.10.2012)

Parameter		Probe	SK10S	Untersuchungsmethode
Feststoffanalyse				
Wassergehalt	W_W	%	33,63	DIN ISO 11465
Trockenrückstand	W_T	%	66,37	DIN ISO 11465
pH-Wert			7,31	DIN ISO 10390
Königswasseraufschluß				DIN ISO 11466
Antimon	Sb	mg/kg m_T	1,6	DIN EN ISO 17294-2
Arsen	As	mg/kg m_T	27	DIN EN ISO 17294-2
Barium	Ba	mg/kg m_T	275	DIN EN ISO 17294-2
Cadmium	Cd	mg/kg m_T	< 0,20	DIN EN ISO 17294-2
Kupfer	Cu	mg/kg m_T	53	DIN EN ISO 17294-2
Chrom	Cr	mg/kg m_T	26	DIN EN ISO 17294-2
Kobalt	Co	mg/kg m_T	21	DIN EN ISO 17294-2
Eisen	Fe	mg/kg m_T	42500	DIN EN ISO 17294-2
Blei	Pb	mg/kg m_T	20	DIN EN ISO 17294-2
Mangan	Mn	mg/kg m_T	1100	DIN EN ISO 17294-2
Quecksilber	Hg	mg/kg m_T	< 0,10	DIN EN 1483
Molybdän	Mo	mg/kg m_T	4,1	DIN EN ISO 17294-2
Nickel	Ni	mg/kg m_T	55	DIN EN ISO 17294-2
Selen	Se	mg/kg m_T	3,3	DIN EN ISO 17294-2
Silber	Ag	mg/kg m_T	< 2,5	DIN EN ISO 17294-2
Thallium	Tl	mg/kg m_T	< 0,5	DIN EN ISO 17294-2
Vanadium	V	mg/kg m_T	34	DIN EN ISO 17294-2
Zink	Zn	mg/kg m_T	73	DIN EN ISO 17294-2
Gold	Au	mg/kg m_T	< 25	DIN EN ISO 17294-2
Bor	B	mg/kg m_T	< 12	DIN EN ISO 17294-2
Cyanid, ges.	CN-	mg/kg m_T	< 0,1	LAGA CN 2 / 79 / DIN ISO 17380
Cyanid, l.fr.	CN^-	mg/kg m_T	< 0,1	LAGA CN 2 / 79 / DIN ISO 17380

Projekt: Kumtor Goldmine, Kirgistan
hier: Sediment- / Bodenuntersuchungen
(Probeneingang: 15.10.2012)

Parameter		Probe	SK12S	Untersuchungsmethode
Feststoffanalyse				
Wassergehalt	W_W	%	20,33	DIN ISO 11465
Trockenrückstand	W_T	%	79,67	DIN ISO 11465
pH-Wert			7,09	DIN ISO 10390
Königswasseraufschluß				DIN ISO 11466
Antimon	Sb	mg/kg m_T	0,56	DIN EN ISO 17294-2
Arsen	As	mg/kg m_T	13	DIN EN ISO 17294-2
Barium	Ba	mg/kg m_T	109	DIN EN ISO 17294-2
Cadmium	Cd	mg/kg m_T	< 0,20	DIN EN ISO 17294-2
Kupfer	Cu	mg/kg m_T	28	DIN EN ISO 17294-2
Chrom	Cr	mg/kg m_T	34	DIN EN ISO 17294-2
Kobalt	Co	mg/kg m_T	12	DIN EN ISO 17294-2
Eisen	Fe	mg/kg m_T	30900	DIN EN ISO 17294-2
Blei	Pb	mg/kg m_T	16	DIN EN ISO 17294-2
Mangan	Mn	mg/kg m_T	572	DIN EN ISO 17294-2
Quecksilber	Hg	mg/kg m_T	< 0,10	DIN EN 1483
Molybdän	Mo	mg/kg m_T	0,53	DIN EN ISO 17294-2
Nickel	Ni	mg/kg m_T	28	DIN EN ISO 17294-2
Selen	Se	mg/kg m_T	1,5	DIN EN ISO 17294-2
Silber	Ag	mg/kg m_T	< 2,5	DIN EN ISO 17294-2
Thallium	Tl	mg/kg m_T	< 0,5	DIN EN ISO 17294-2
Vanadium	V	mg/kg m_T	40	DIN EN ISO 17294-2
Zink	Zn	mg/kg m_T	72	DIN EN ISO 17294-2
Gold	Au	mg/kg m_T	< 25	DIN EN ISO 17294-2
Bor	B	mg/kg m_T	< 12	DIN EN ISO 17294-2
Cyanid, ges.	CN-	mg/kg m_T	< 0,1	LAGA CN 2 / 79 / DIN ISO 17380
Cyanid, l.fr.	CN-	mg/kg m_T	< 0,1	LAGA CN 2 / 79 / DIN ISO 17380

Projekt: Kumtor Goldmine, Kirgistan
hier: Sediment- / Bodenuntersuchungen
(Probeneingang: 15.10.2012)

Parameter		Probe	SK13S	Untersuchungsmethode
Feststoffanalyse				
Wassergehalt	W_W	%	25,14	DIN ISO 11465
Trockenrückstand	W_T	%	74,86	DIN ISO 11465
pH-Wert			7,23	DIN ISO 10390
Königswasseraufschluß				DIN ISO 11466
Antimon	Sb	mg/kg m_T	1,2	DIN EN ISO 17294-2
Arsen	As	mg/kg m_T	19	DIN EN ISO 17294-2
Barium	Ba	mg/kg m_T	436	DIN EN ISO 17294-2
Cadmium	Cd	mg/kg m_T	< 0,20	DIN EN ISO 17294-2
Kupfer	Cu	mg/kg m_T	33	DIN EN ISO 17294-2
Chrom	Cr	mg/kg m_T	18	DIN EN ISO 17294-2
Kobalt	Co	mg/kg m_T	12	DIN EN ISO 17294-2
Eisen	Fe	mg/kg m_T	36100	DIN EN ISO 17294-2
Blei	Pb	mg/kg m_T	10	DIN EN ISO 17294-2
Mangan	Mn	mg/kg m_T	806	DIN EN ISO 17294-2
Quecksilber	Hg	mg/kg m_T	< 0,10	DIN EN 1483
Molybdän	Mo	mg/kg m_T	3,8	DIN EN ISO 17294-2
Nickel	Ni	mg/kg m_T	30	DIN EN ISO 17294-2
Selen	Se	mg/kg m_T	1,7	DIN EN ISO 17294-2
Silber	Ag	mg/kg m_T	< 2,5	DIN EN ISO 17294-2
Thallium	Tl	mg/kg m_T	< 0,5	DIN EN ISO 17294-2
Vanadium	V	mg/kg m_T	30	DIN EN ISO 17294-2
Zink	Zn	mg/kg m_T	49	DIN EN ISO 17294-2
Gold	Au	mg/kg m_T	< 25	DIN EN ISO 17294-2
Bor	B	mg/kg m_T	< 12	DIN EN ISO 17294-2
Cyanid, ges.	CN-	mg/kg m_T	< 0,1	LAGA CN 2 / 79 / DIN ISO 17380
Cyanid, l.fr.	CN^-	mg/kg m_T	< 0,1	LAGA CN 2 / 79 / DIN ISO 17380

Projekt: Kumtor Goldmine, Kirgistan
hier: Sediment- / Bodenuntersuchungen
(Probeneingang: 15.10.2012)

Parameter		Probe	SK14L	Untersuchungsmethode
Feststoffanalyse				
Wassergehalt	W_W	%	11,61	DIN ISO 11465
Trockenrückstand	W_T	%	88,39	DIN ISO 11465
pH-Wert			7,65	DIN ISO 10390
Königswasseraufschluß				DIN ISO 11466
Antimon	Sb	mg/kg m_T	0,51	DIN EN ISO 17294-2
Arsen	As	mg/kg m_T	8,0	DIN EN ISO 17294-2
Barium	Ba	mg/kg m_T	159	DIN EN ISO 17294-2
Cadmium	Cd	mg/kg m_T	< 0,20	DIN EN ISO 17294-2
Kupfer	Cu	mg/kg m_T	17	DIN EN ISO 17294-2
Chrom	Cr	mg/kg m_T	14	DIN EN ISO 17294-2
Kobalt	Co	mg/kg m_T	6,9	DIN EN ISO 17294-2
Eisen	Fe	mg/kg m_T	19700	DIN EN ISO 17294-2
Blei	Pb	mg/kg m_T	6,6	DIN EN ISO 17294-2
Mangan	Mn	mg/kg m_T	453	DIN EN ISO 17294-2
Quecksilber	Hg	mg/kg m_T	< 0,10	DIN EN 1483
Molybdän	Mo	mg/kg m_T	0,96	DIN EN ISO 17294-2
Nickel	Ni	mg/kg m_T	16	DIN EN ISO 17294-2
Selen	Se	mg/kg m_T	< 1	DIN EN ISO 17294-2
Silber	Ag	mg/kg m_T	< 2,5	DIN EN ISO 17294-2
Thallium	Tl	mg/kg m_T	< 0,5	DIN EN ISO 17294-2
Vanadium	V	mg/kg m_T	20	DIN EN ISO 17294-2
Zink	Zn	mg/kg m_T	40	DIN EN ISO 17294-2
Gold	Au	mg/kg m_T	< 25	DIN EN ISO 17294-2
Bor	B	mg/kg m_T	< 12	DIN EN ISO 17294-2
Cyanid, ges.	CN-	mg/kg m_T	< 0,1	LAGA CN 2 / 79 / DIN ISO 17380
Cyanid, l.fr.	CN^-	mg/kg m_T	< 0,1	LAGA CN 2 / 79 / DIN ISO 17380

Projekt: Kumtor Goldmine, Kirgistan
<u>hier:</u> Sediment- / Bodenuntersuchungen
(Probeneingang: 15.10.2012)

Parameter		Probe	SK15L	Untersuchungsmethode
Feststoffanalyse				
Wassergehalt	W_W	%	15,54	DIN ISO 11465
Trockenrückstand	W_T	%	84,46	DIN ISO 11465
pH-Wert			7,56	DIN ISO 10390
Königswasseraufschluß				DIN ISO 11466
Antimon	Sb	mg/kg m_T	0,84	DIN EN ISO 17294-2
Arsen	As	mg/kg m_T	12	DIN EN ISO 17294-2
Barium	Ba	mg/kg m_T	315	DIN EN ISO 17294-2
Cadmium	Cd	mg/kg m_T	< 0,20	DIN EN ISO 17294-2
Kupfer	Cu	mg/kg m_T	24	DIN EN ISO 17294-2
Chrom	Cr	mg/kg m_T	36	DIN EN ISO 17294-2
Kobalt	Co	mg/kg m_T	10	DIN EN ISO 17294-2
Eisen	Fe	mg/kg m_T	25900	DIN EN ISO 17294-2
Blei	Pb	mg/kg m_T	13	DIN EN ISO 17294-2
Mangan	Mn	mg/kg m_T	518	DIN EN ISO 17294-2
Quecksilber	Hg	mg/kg m_T	< 0,10	DIN EN 1483
Molybdän	Mo	mg/kg m_T	0,99	DIN EN ISO 17294-2
Nickel	Ni	mg/kg m_T	27	DIN EN ISO 17294-2
Selen	Se	mg/kg m_T	1,8	DIN EN ISO 17294-2
Silber	Ag	mg/kg m_T	< 2,5	DIN EN ISO 17294-2
Thallium	Tl	mg/kg m_T	< 0,5	DIN EN ISO 17294-2
Vanadium	V	mg/kg m_T	35	DIN EN ISO 17294-2
Zink	Zn	mg/kg m_T	56	DIN EN ISO 17294-2
Gold	Au	mg/kg m_T	< 25	DIN EN ISO 17294-2
Bor	B	mg/kg m_T	< 12	DIN EN ISO 17294-2
Cyanid, ges.	CN^-	mg/kg m_T	< 0,1	LAGA CN 2 / 79 / DIN ISO 17380
Cyanid, l.fr.	CN^-	mg/kg m_T	< 0,1	LAGA CN 2 / 79 / DIN ISO 17380

Projekt: Kumtor Goldmine, Kirgistan
hier: Sediment- / Bodenuntersuchungen
(Probeneingang: 15.10.2012)

Parameter		Probe	SK16S	Untersuchungsmethode
Feststoffanalyse				
Wassergehalt	W_W	%	13,41	DIN ISO 11465
Trockenrückstand	W_T	%	86,59	DIN ISO 11465
pH-Wert			7,59	DIN ISO 10390
Königswasseraufschluß				DIN ISO 11466
Antimon	Sb	mg/kg m_T	0,57	DIN EN ISO 17294-2
Arsen	As	mg/kg m_T	16	DIN EN ISO 17294-2
Barium	Ba	mg/kg m_T	45	DIN EN ISO 17294-2
Cadmium	Cd	mg/kg m_T	< 0,20	DIN EN ISO 17294-2
Kupfer	Cu	mg/kg m_T	22	DIN EN ISO 17294-2
Chrom	Cr	mg/kg m_T	19	DIN EN ISO 17294-2
Kobalt	Co	mg/kg m_T	7,4	DIN EN ISO 17294-2
Eisen	Fe	mg/kg m_T	26000	DIN EN ISO 17294-2
Blei	Pb	mg/kg m_T	7,5	DIN EN ISO 17294-2
Mangan	Mn	mg/kg m_T	435	DIN EN ISO 17294-2
Quecksilber	Hg	mg/kg m_T	< 0,10	DIN EN 1483
Molybdän	Mo	mg/kg m_T	< 0,5	DIN EN ISO 17294-2
Nickel	Ni	mg/kg m_T	16	DIN EN ISO 17294-2
Selen	Se	mg/kg m_T	1,9	DIN EN ISO 17294-2
Silber	Ag	mg/kg m_T	< 2,5	DIN EN ISO 17294-2
Thallium	Tl	mg/kg m_T	< 0,5	DIN EN ISO 17294-2
Vanadium	V	mg/kg m_T	26	DIN EN ISO 17294-2
Zink	Zn	mg/kg m_T	44	DIN EN ISO 17294-2
Gold	Au	mg/kg m_T	< 25	DIN EN ISO 17294-2
Bor	B	mg/kg m_T	< 12	DIN EN ISO 17294-2
Cyanid, ges.	CN-	mg/kg m_T	< 0,1	LAGA CN 2 / 79 / DIN ISO 17380
Cyanid, l.fr.	CN^-	mg/kg m_T	< 0,1	LAGA CN 2 / 79 / DIN ISO 17380