

Panning for Gold: the Kumtor Mine in the Kyrgyz Republic (A)

It is 20 May 1998, and disturbing news has just come from the Issyk-Kul region of the Kyrgyz Republic. A truck carrying nearly 2 tons of sodium cyanide has driven into the Barskoon River upstream of Lake Issyk-Kul. This lake is the Kyrgyz Republic's biggest tourist attraction, and the land bordering the lake is one of the few arable regions in the country. The truck was delivering the chemical to the Kumtor gold mining operation located in the mountains above Lake Issyk-Kul. Kumtor is a joint venture between Kyrgyzstan's state gold company, Kyrgyzaltyn, and Canada's Cameco Corporation. Reports vary as to the extent of the damage to the environment of the lake and its surrounding areas.



TheDailyReckoning.com

President Askar Akaev is concerned about this news. The environmental damage of such a spill can be quite serious. On the other hand, the Kumtor gold mining operation has been one of the few bright lights in an otherwise bleak economic performance over the last few years. He has asked you to assess the environmental damage, and to consider the appropriate governmental response in terms of regulating or shutting down the activities of the Kumtor mining operation.

He wants your response in two days: the bad news from Barskoon seems to be reaching avalanche proportions. What should our government do?

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The Kyrgyz Republic.

The Kyrgyz Republic is once again independent after a long period of foreign domination. It is a remote, mountainous country in Central Asia. Its land area is just less than South Dakota, but its population of 4.5 million people is six times as large. Its neighbors in the present day include Kazakhstan, Uzbekistan, Tajikistan and China.



Source: UNDP

The Kyrgyz people were nomadic throughout the earlier centuries, and were in loose federation with the Kazakh peoples through the 19th Century: maps from that period include the Kyrgyz land area along with present-day Uzbekistan, Turkmenistan and Tajikistan in the region known as Kazakhstan. The Russian Czars gradually extended their control over this region during the 19th Century, supplanting the authority of the khans who had traditionally ruled the peoples. The Russian domination over the Kyrgyz people became quite evident in 1916, when a revolt by Kazakh and Kyrgyz against Russian control was crushed by the Czar's troops. The resulting truce called for the forced relocation of Kyrgyz people from the arable regions in what is now known as the Issyk-Kul province to the mountainous and desert spaces of southern and eastern Naryn province. People of the Russian ethnic group were given the lands in the Issyk-Kul region.

During the Soviet period (1917-1991) the Kyrgyz Republic was one of the five Central Asian republics of the Soviet Union. The Kyrgyz Republic declared its independence in 1991. Ethnic Kyrgyz represent about 60 percent of the population at present, ethnic Russian are 17 percent, ethnic Uzbek are 14 percent and ethnic Ukrainian 2 percent. Islam is the prominent religion and is experiencing a revival since the independence of the country. The official language is Kyrgyz, although Russian is still widely used and accepted for official communication. The European Bank of Reconstruction and Development reports that, in 1996, the per capita income was in the range of \$2,000, indicating similar purchasing power to the peoples of Tunisia, Namibia or Peru.

The country has limited natural resources, with metallurgical deposits largely of gold and base metals. In recent years it has become a net exporter of electrical energy, but remains almost completely dependent on imported petroleum. Roughly seven percent of the land is arable. The

primary traditional economic activity of sheep and cattle husbandry uses about 40 percent of the mountainous terrain as pasture.

The capital of the Kyrgyz Republic is Bishkek with a population of over 600,000. Other main cities of the country are Osh, Karakul, Djalal-Abad, Tokmok and Kara Balta. Most of the industrial activity is concentrated in these cities.

The Kyrgyz Republic has achieved a substantial degree of political stability by following a comprehensive market-oriented reform program initiated after gaining independence in 1991. The introduction of the national currency, the som, in 1993 has helped trigger macroeconomic stabilization. The Kyrgyz Republic is a democratic, parliamentary Republic with a presidential form of governing. President Askar Akayev, the Kyrgyz Republic's first president, was re-elected to a second five-year term in 1996. A new constitution was adopted in 1993, which guarantees democratic rights to country citizens: the freedom of religion, ecclesiastical and cult freedom, open expression of ideas and opinions, the freedom of the press, the right of unrestricted travel, right of property, the privacy of correspondence, the freedom of meetings and demonstrations and universal equality. The legislative body consists of two houses of parliament (the Djogorku Kenesh). The Upper Chamber is a permanent body of 35 deputies and the Lower Chamber consists of 70 deputies working on a seasonal basis.

The years since independence have not been bountiful for the Kyrgyz Republic. In the period from 1990 to 1995 the real gross domestic product (GDP) of the economy shrank in each year, with a cumulative reduction of about 50 percent by 1995. There has been positive growth in 1996 and 1997, but at small enough rates that the GDP remains well below its peak. The agricultural and service sectors account for the largest shares of GDP, with 41 and 26 percent, respectively. Manufacturing is a relatively small sector in the Kyrgyz Republic, with 16 percent of the total, but is a rapidly growing sector as well. As an accounting for contributions to manufacturing output illustrates, the non-ferrous metal industry category jumped from only 4 percent of total manufacturing in 1990 to 33 percent in 1997. The chief reason for this dynamic performance in manufacturing is the Kumtor gold mining operation.

The Kumtor gold mining operation has value in addition to its contribution to output because its output is tradable on world markets. As the balance of payments statistics for the Kyrgyz Republic indicate, the Kumtor operations began production in 1997 and in that year alone contributed 30 percent of the total value of exports. Imports associated with Kumtor were much smaller, and direct foreign investment by the foreign partner Cameco Corporation financed those imports over the 1993-1995 period. Kumtor is a godsend to the Kyrgyz external balance.

In the northeastern part of the country lies Lake Issyk-Kul. The name means "warm sea", and the lake never freezes, not even in the coldest winter. At 700 meters deep, 170 kilometers long and 70 kilometers across, Lake Issyk-Kul is one of the largest fresh water lakes in the world. And at 1600 meters above sea level, Lake Issyk-Kul is also the world's second largest alpine lake, after Lake Titicaca in South America. Geologists say Lake Issyk-Kul lies at the juncture of two tectonic plates, slowly moving apart. Within a few centuries the lake is going to be twice as deep as it is

now. Deep underneath the lake's crystal clear water lies an ancient town. Divers have recovered artifacts from the town, mainly household goods and ceramic pots.

Lake Issyk-Kul and its surrounding area have tremendous potential as a destination for tourism. There are around one hundred health spas, or sanatoria, scattered around the lake.

Kumtor Gold Company.

The Kumtor Gold Company (KGC) is located at an elevation of 4000 meters on the western spur of the Tien-Shan Mountains in the Kyrgyz Republic. Kyrgyzaltyn owns two-thirds of KGC, with Cameco Gold owning one-third. The project is managed by the Kumtor Operating Company (KOC). Cameco Gold and the KOC are wholly-owned subsidiaries of Cameco Corporation of Saskatoon, Saskatchewan, Canada.

Cameco Gold entered into the KGC joint venture in 1992 to examine the feasibility of the project and, if the results were positive, to undertake financing and development of the project. The decision to develop the Kumtor deposit was made by KGC in May 1994. In the intervening months, a feasibility study was completed and extensive discussions with Kyrgyzaltyn, the Kyrgyz government and the Parliament ensued with the end result that the agreement was renegotiated twice. Discussions with lending institutions were also initiated at this time.

The capital costs of Kumtor were estimated at the feasibility stage at \$US360 million. Construction was initiated in July 1994 and completed ahead of schedule in 28 months at a capital cost of \$US 452 million, a 25% increase over the feasibility estimate. Commissioning of the facilities was completed within three months and commercial production began in May, 1997. The 1997 production totaled 502,156 ounces of gold at an average cost of \$185 an ounce.

The Kumtor deposit ranks among the 10 largest gold deposits in the world based on its size. The production capacity of the processing facility is nominally 14,500 tons/day. The forecast production for 1998 is 600,000 ounces at an average cost of less than \$175 an ounce. The mine life is in excess of eighteen years.

The open pit, entirely located in permafrost, will be developed in three phases. The mining technique is a conventional drill-and-blast process, and the ore is selectively mined in six-meter benches to minimize dilution. Waste rock, isolated from the mineralized zones, is mined in 14-meter benches. The ultimate pit will be 2 km. long by 1.2 km. wide and will extend from elevations of 3720 meters to 4466 meters. Previous exploration indicates additional mineralization to the 3200-meter level, which may be mineable by underground methods, thereby extending the mine life.

The KGC is located in the Issyk-Kul district in the eastern part of the Kyrgyz Republic, along the northwestern slopes of the Akshirak Ridge in the interior of the Tien-Shan range. The site is approximately 60 km. south of Lake Issyk-Kul and 60 km. northwest of the border with China. The area in the vicinity of the site is potentially at risk to seismic activity. The Kumtor site is located near the headwaters of the Kumtor River, which joins the Ara-Bel-Su River and eventually discharges to the Taragey River at a location 25 km. southwest of the site. The weather at the site

is sharp continental with an average temperature of - 8 degrees centigrade. The temperature range is - 42 to + 24 degrees centigrade.

The main elements of the KGC Master Agreement were:

- Cameco had exclusive rights to assess the feasibility of developing the Kumtor gold deposit;
- Cameco had the right to a one-third interest if the Feasibility Study were positive;
- Cameco retains the voting majority for the first 10 years of operations, except for a limited number of issues requiring unanimous consent;
- the joint venture will appoint the KOC (a wholly owned Cameco subsidiary) as operator;
- the KOC responsible for arranging the financing and gold sales;
- 2 percent of the profits are given to the local government during loan repayment and 4 percent thereafter.

The arranging of the financing proved to be a daunting task that began in early 1993 and was completed in July of 1995. Ultimately, \$452 million were required to develop the Kumtor site. Following a selection process, Chase Manhattan Bank was chosen to underwrite the commercial bank tranche of \$155 million. Canada's Export Development Corporation (EDC) agreed to provide \$50 million in the form of export credit. Both the European Bank of Reconstruction and Development (EBRD) and the International Finance Corporation (IFC) agreed to senior loans totaling \$30 million each. Two subordinate loans for \$10 million from each of the EBRD and the IFC were also part of the package. Cameco provided \$45 million in equity capital used in the initial development work. Cameco Gold also agreed to provide a further \$122 million in project loans.

The KOC initiated pre-construction development at Kumtor in 1995. First, the haul roads were constructed. Ice and waste removal was also initiated. The mining of ore began in late 1996.

Transport and logistics.

The Kumtor site is at high altitude and in a relatively inaccessible area. All employees are brought to the mine face for short periods, and all equipment and supplies must be trucked in along mountain roads. The rarefied atmosphere results in equipment underperformance by 30 percent and renders the workforce less productive. Continuous monitoring of workforce health is required. National employees rotate to the site on a 14-day schedule, whereas expatriate employees rotate on a 28-day schedule.

Bulk supplies and production materials are brought initially to a rail depot in Balykchy, 245 kilometers from the Kumtor site. The KOC convoys all these materials by truck from the rail yard to the mine site. All convoys are linked by radio transmission to ensure that vehicles are not left behind due to mechanical failures. For cyanide shipments, local police both lead and follow the convoys from the rail yard to the mine site.

The roads leading from Balykchy to Kumtor have been graded carefully by the KOC. There is some controversy, however, about the quality of the roads. One Member of the Kyrgyz Parliament

has alleged that the roads are safe for 10-ton loads, but that the KOC convoys are made up of 20-ton trucks.

Gold mining operations.

Gold mining in operations like the Kumtor facility involve three steps.

- First, the ore is stripped from the pit and is ground into fine powder. This powder is combined with water, forming a slurry.
- Second, the gold is leached from the rest of the rock. In the leaching procedure, sodium cyanide and carbon are added to the slurry. The gold is induced by this to combine with the carbon, and the two are separated from the remaining rock (the tailings).
- In the third stage there are two separate streams. The tailings (99 percent of the bulk) are taken off by pipeline to a series of four purification ponds to remove the poisonous chemicals. The effluent from this process, once cleaned, goes into the river. The gold/carbon mixture is sent through a stripping process to separate gold from carbon and a refining process to ensure market-quality purity in the gold.

A cyanide destruction plant is under construction and will be commissioned in late 1998.

The KOC has committed itself to operate the project in an environmentally responsible and sensitive manner. The operation adopts the most stringent of Canadian, World Bank and Kyrgyz environmental and worker health and safety regulations. The challenges at Kumtor are formidable, because the location is remote and considerable logistical planning is required for the timely delivery of supplies. A portion of the open pit is covered by glacial ice. Glaciers generate considerable run-off during the warmer months and a water management program is required in the open pit.

Currently, the KOC employs about 1300 direct employees with the Kyrgyz national component of the workforce in excess of 87%.

Business profitability.

The mining operations exceeded expectations of profitability for 1997. Production was in excess of 502,156 ounces, exceeding the forecast of 410,000 ounces. Mill throughput averaged 13,400 tons of powdered ore per day and the grade of the captured gold was 5.49 grams/troy compared with the forecast of 4.53 grams/troy. Operating costs averaged \$185/ounce compared with a budget of \$220/ounce. In 1998 the operation is expected to produce 600,000 ounces at an operating cost of less than \$175/ounce.

The only problem with the operation has been in the final good price. Gold has historically been a valuable commodity, but in the past 18 months the market price per ounce of gold has fallen by 25 percent to under \$300 per ounce. Cameco Corporation has remained profitable during the period, although net earnings have fallen off. The large production costs of KGC coupled with the lower revenues due to the price drop have undoubtedly contributed to the fall in net earnings.

Payments of the KGC to Kyrgyz Residents.

The following table provides an estimate of the spillover of the KGC operations to the Kyrgyz Republic during the forecast complete year of operations in 1999 (as measured in 1999 US Dollars).

Item	Value (in millions of 1999 US dollars)
Taxes paid	9.1
Concessions tax	5.1
Road tax	1.4
Royalty tax	0.9
Income tax (by workers)	1.0
Welfare and pension tax (by workers)	0.7
Payments to finance Tamga Power Line	4.9
Scholarships	0.6
Worker Training	0.7
Payroll (to workers)	4.9
Electricity purchase	3.8
Purchase of local materials	4.1
Total	28.1

The Issyk-Kul Cyanide Spill in 1998 (media reports).

On 22 May 1998 a convoy of five trucks carrying sodium cyanide left the rail yard in Balykchy. The fourth truck in the convoy overturned at the bridge over the Barskoon River and spilled 1.7 tons of highly toxic sodium cyanide into the river. The river is a source of water for drinking and irrigation, and flows downstream into Lake Issyk-Kul. The following articles from Radio Liberty reported on the ensuing events:

May 22: OFFICIALS CLAIM NO DAMAGE TO ISSYK-KUL... Following an accident in which nearly two tons of sodium cyanide leaked into a river close to the Kyrgyz Republic's biggest lake, Issyk-Kul, Deputy Environmental Minister Tilekбай Kyshtobayev said at the scene of the accident that "there are no grounds for panic. No ecological disaster is expected," ITAR-TASS reported. That viewpoint was echoed by Gerhard Glates, the head of the nearby Kumtor gold mine. Glates said there will be no serious environmental consequences and that his company will cover all expenses for the cleanup. Both ITAR-TASS and RFE/RL correspondents report that dead fish and cattle have been found near the scene of the accident. They also say that residents of the area have been warned against drinking unboiled water or swimming in the river or lake. Minister of Ecology Kulubek Bokonbayev told RFE/RL correspondents that since the 20 May accident, some 250 residents of the Issyk-Kul region have sought medical help. Issyk-Kul is a major tourist attraction in Central Asia.

May 27: MORE PEOPLE TAKEN ILL AFTER KYRGYZ CHEMICAL SPILL. One week after a truck from the Kumtor gold mining company spilled sodium cyanide into the Barskoon River in eastern Kyrgyz Republic, 475 people have become sick and sought medical treatment, Interfax reported. Of those, 68 have been kept in the hospital. Officials from the Kyrgyz government and the Kumtor company continue to say that the effects from the spill will be negligible.

June 1: KUMTOR HEADS VISIT TO DISASTER SITE. The heads of the Kumtor gold mining project on 29 May visited residents of the area in which one of the company's trucks overturned and spilled nearly two tons of cyanide into the water supply, RFE/RL correspondents reported. Dastan Sarygulov and Gerhardt Glattis said the company will pay for all medical costs of the more than 1,000 people affected by the spill and will install a water system to villages on the south shore of Lake Issyk-Kul. The residents have demanded that there be no further shipments of sodium cyanide along the lake's southern road. ITAR-TASS reported on 29 May that on the lake's northern shore, where tourist facilities are located, more than half the reservations for the summer season have been canceled following reports of cyanide in Issyk-Kul.

June 2: KYRGYZ PREMIER COMMENTS ON ISSYK-KUL DISASTER. Kubanychbek Jumaliev held a press conference in Bishkek on 28 May to report on the consequences to date of the sodium cyanide spill into the Barskoon River, RFE/RL correspondents reported. Jumaliev said more than 1,000 residents of the southern Issyk-Kul area have sought medical treatment and at least 93 have been kept in the hospital. Two people have died, while eight are in a serious condition and have been moved by helicopter to better facilities in Bishkek, he noted. The previous day, Deputy Premier Boris Silayev said the Kumtor Mining Company was irresponsible in its handling of the situation, pointing to the company's failure to inform the Kyrgyz government or local residents for several hours after the spill. A team of experts from the World Health Organization was due to inspect the scene of the incident on 28 May. BP

June 3: WOMAN DIES FROM CYANIDE POISONING IN KYRGYZ REPUBLIC... A woman on 3 June died in a hospital in the eastern town of Karakol from cyanide poisoning, RFE/RL correspondents reported. She is the first person to die as a result of the spill last month of 1.7 tons of sodium cyanide into the Barskoon River, which flows into the southern part of Lake Issyk-Kul. More than 1,000 people have received medical treatment following the accident. The full extent of the damage is still unknown. RFE/RL correspondents report that at the end of May, tourists on the north shore of Issyk-Kul received little, if any information, about the toxic spill and were still swimming in Issyk-Kul. BP

June 5: EVACUATION OF BARSKOON BEGINS. Kyrgyz Deputy Prime Minister Boris Silayev on 4 June announced that 3,500 residents of the Barskoon area on the southern shore of Lake Issyk-Kul will be evacuated to the northern shore, RFE/RL correspondents reported. The village of Barskoon is located near the scene of the 20 May spill of sodium cyanide into the Barskoon River. More than 1,000 people received medical attention in the week following the spill, and one woman died from cyanide poisoning. Residents of the southern shore are demanding the Kumtor gold mining operation, which is responsible for the spill, be shut down. Concerns have also been raised about the storage of 2,000 tons of sodium cyanide in the town of Balykchy, on the western shore

of Issyk-Kul. Despite mounting evidence of a major environmental disaster, government officials continue to say it is safe to swim in the lake.

In subsequent days, hospital officials in the Kyrgyz Republic attributed four deaths to cyanide poisoning. According to reports, the spill led to approximately 2,600 people being treated and more than 1,000 of them hospitalized.

Your charge.

There have been serious health consequences of the Barskoon spill. The Kumtor Gold Company (KGC) is the agency responsible for the spill. On the other side of the ledger, the Kumtor operations are one of the few bright spots for the Kyrgyz economy during this transition period.

What do you recommend to President Akayev that the Kyrgyz government do?

Before reading this case, use Google Earth to view the location of the Kumtor mine in the Kyrgyz Republic. Zoom out until you can see the location of Lake Issyk-kul as well.

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