

Kumtor & Water Management



ABOUT THIS BROCHURE

We provide clear facts on our water use in a regional context, addressing issues raised in recent critical Kyrgyz government sponsored inspections. This is one of a series of brochures.

ABOUT KUMTOR

Kumtor open-pit gold mine is one of the world's highest, its operations lying between 3600 and 4400 metres above sea level, in a partially glaciated permafrost zone. Gold production began in 1997, with planned completion in 2026. Approximately one-third of mine-operator Centerra Gold Inc. is owned by Kyrgyz Republic state-owned enterprise, Kyrgyzaltan.

OUR COMMITMENTS

Our highest corporate priorities include the health and safety of our employees, contractors and the public, combined with effective environmental management systems, as detailed in our policy statement and Annual Environmental Reports posted at www.kumtor.kg.

KUMTOR'S WATER MANAGEMENT

Water management is an integral and significant part of our operations. As detailed in the 1993 Environmental Impact Assessment, the mine's operational footprint results in some impact on the natural water environment. However, we are committed to limiting impacts to acceptable levels through careful monitoring and management of water use, the key components of which are:

- Removal of water and ice from in and around pit to ensure safe access to the ore
- Water use for mineral processing
- Recycling of water within the mill to reduce total volumes required
- Water use for domestic and sanitary uses at the mine camp
- Wastewater management and treatment using modern technologies prior to return to the environment



centerraGOLD



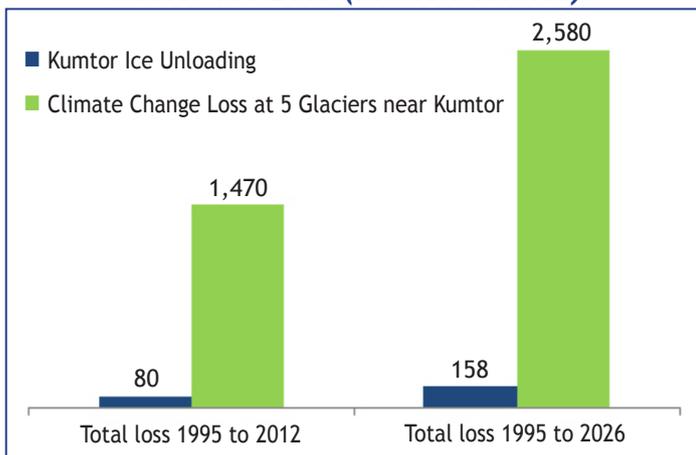
KUMTOR & WATER MANAGEMENT

ABOUT THE GLACIERS

An official Kyrgyz submission to the UN Framework Convention on Climate Change (UNFCCC 2009) estimated there were, in year 2000, about 6,400 glaciers in the country with a combined area of about 6,800 km². Climate change had reduced this from approximately 8,200 glaciers and 8,000 km² in 1960, a trend predicted to continue, with an estimated 64-94% loss of Kyrgyzstan glaciers by the end of this century.

The Kumtor mine is close to five major glaciers, covering about 100 km². The bar chart below shows that the volumes of ice removed by Kumtor operations are small compared to the climate change impacts, representing about 6% for full mine life.

Glacier Ice Loss (million tonnes)



ABOUT NATURAL WATER FLOWS

The rivers are fed by natural flows from rainfall, snowmelt and glacier retreat, with precipitation (rain and snow) generally providing over 80% of flows. Due to permafrost (ground generally frozen) groundwater flow is very limited.

Melting glacier ice forms streams in the valleys, which combine to form Kumtor River, one of several tributaries of Naryn River.

Meltwater from Petrov Glacier first enters the natural Petrov Lake, contained by a natural moraine dam (moraine being the rocky deposits left by glacial melting). Petrov Lake is the main water source for mining operations. A separate brochure will address the risks of a 'Glacial Lake Outburst Flood' from the moraine dam, and what we are doing to research and manage this issue with the help of Kyrgyz and international experts.

Naryn River has many tributaries so that on reaching the nearest town, Naryn, over 230 km from Kumtor, the flow contribution from Kumtor River is only about 2%.

ABOUT OUR WATER USE

Most water use (97%) is for ore processing in the mill. However, a large water volume (about 5 million m³/year) is recycled within the mill, reducing our demand from Petrov Lake. The remainder of water use (3%) is for domestic and sanitary uses at the mine camp.

ABOUT SOURCES OF WATER

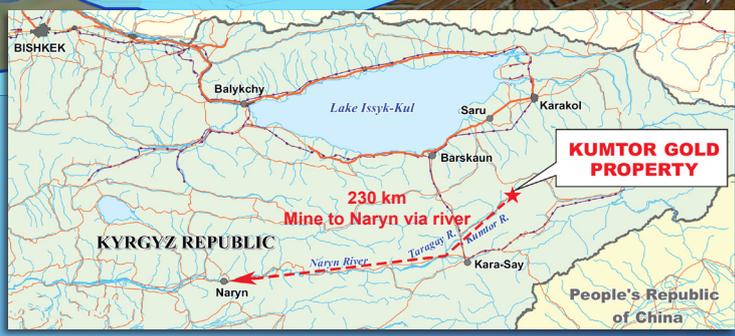
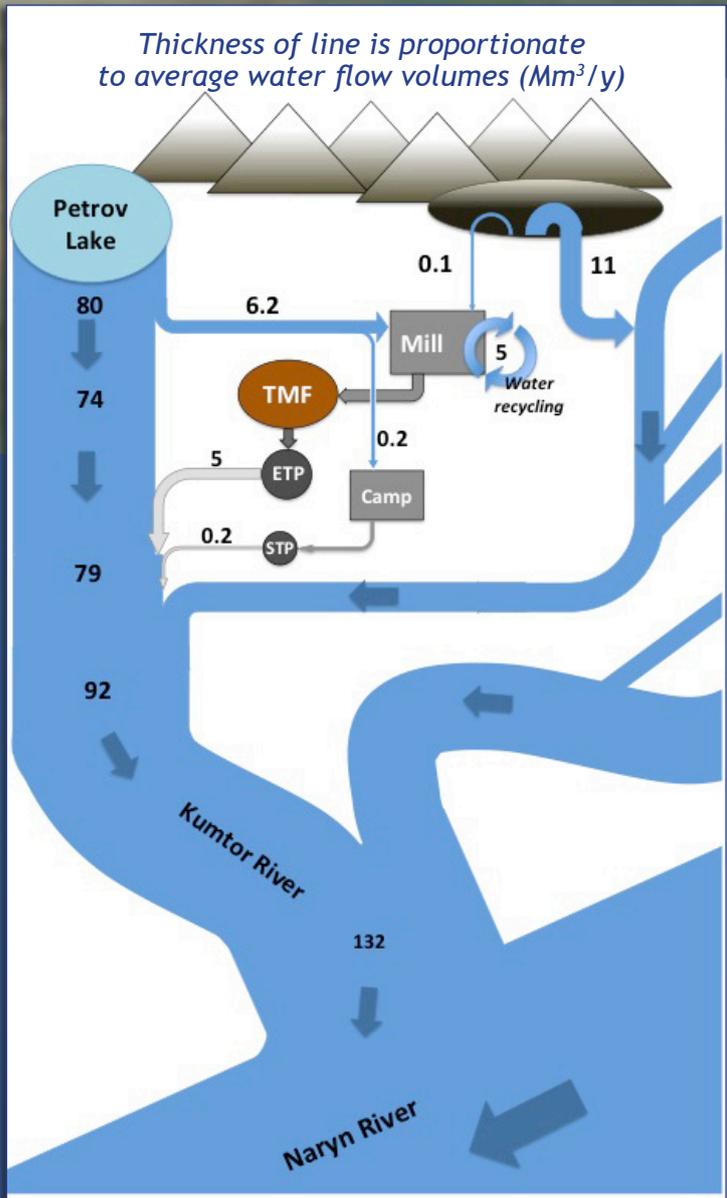
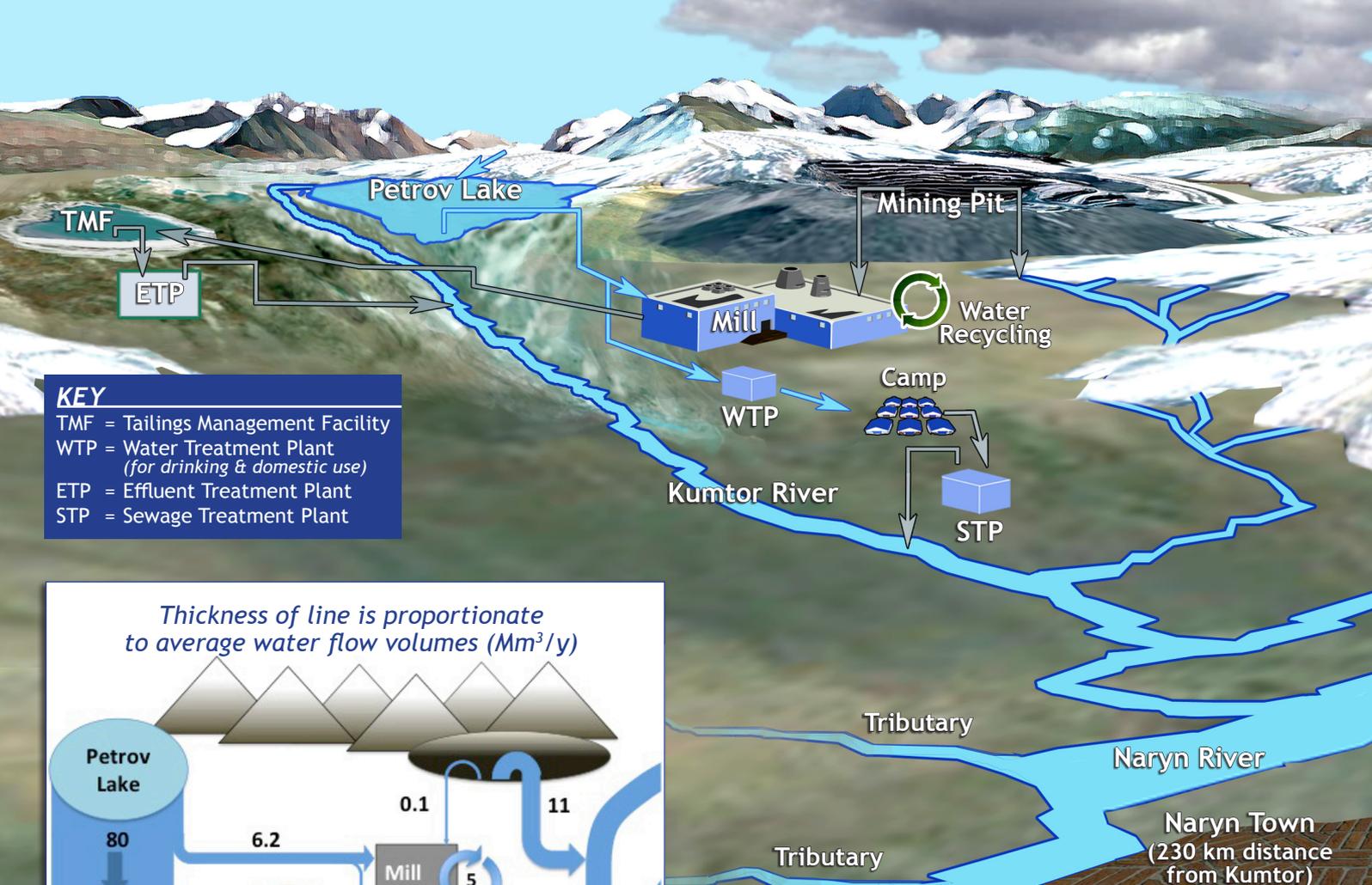
Almost all water we use is sourced from Petrov Lake. The approximately 6 million m³/year pumped is about 8% of the lake's natural annual through-flow. Following the return of treated wastewater downstream of the lake, our net water use is less than 2% of natural through-flow.

About 11 million m³/year of water is pumped from the pit, from sumps and hydrogeological wells, to ensure safe, dry working conditions. About 99% is returned unused into the river system. Pit water is mainly from glacier melt that would enter the river system naturally. A small proportion of water is pumped to, and used by the mill.



WASTEWATER MANAGEMENT

Wastewater from the mill is piped to and stored at the Tailings Management Facility (TMF). During summer, when Kumtor River is not frozen, effluents from the TMF are pumped via an Effluent Treatment Plant (ETP) to ensure the water meets Kumtor River quality criteria (maximum allowable discharge criteria). Wastewater from the camp is treated at a separate Sewage Treatment Plant (STP) for the same reason prior to river discharge.



VISUALIZING WATER IMPACTS

Consumptive water used at the mine (water not returned as treated wastewater) is equivalent to 4 parts in 10,000 of average river flow at Naryn town. But how to visualize this? If the river flow at Naryn is represented by the width of a standard soccer field (70 m), then consumptive water use by the mine would be less than the width of the white boundary line. Alternatively, if the river flow at Naryn is represented by the water in a household bath, then consumptive use at the mine would be less than a small glass of water.



WATER IMPACTS ON THE ENVIRONMENT

Ice removed by mining works eventually enters the river system when it melts. As explained above, the actively removed volume is equivalent to only about 6% of climate change related glacier melt. On completion of mining, climate change recession is expected to continue, so mining activities will have minimal impact on long term total ice cover.

Our net water use, after return of treated wastewater to the river basin, is about 1 million m³/y, about 16% of overall volume of water pumped from Petrov Lake. This means we 'consume' less than 2% of Kumtor River flow estimated to be approximately 92 million m³/y below the mine.

As Kumtor River flows downstream, tributary streams and rivers provide additional flow. At Naryn town, 230 km downriver from the mine, flow increases to an average 2,340 million m³ per year. The volume of water obtained from Petrov Lake for mining operations is equivalent to 2 parts in 1000 of average river flow at Naryn town. Consumptive water use (water not returned as treated wastewater) is equivalent to only 4 parts in 10,000 of flow at Naryn. To visualize this, see the soccer field and bathtub analogies in this brochure. These volumes are much less than the natural flow variations, and therefore of insignificant impact.

PHOTO CREDITS

1. Petrov Lake and glacier
2. Maintaining treatment plant
3. ETP pond #1
4. Naryn River 230 km downstream of mine
5. ETP pond #1
6. Water treatment pond - Aeration system on the pond #1 of ETP
7. River water sampling near Naryn

All photos by Kumtor/Prizma



IN CONCLUSION

The impact of mining operations on the natural water quantity in the vicinity of the mine is less than 2% of Kumtor River average flow. This is substantially less than the additional flow from glacier recession by climate change. Active removal of ice is only about 6% of total ice loss by climate change during the life of the mine, and much less of continued recession after mine closure.

CONTACT

Kumtor welcomes your comments and questions about this BMSPP and all related activities. Please direct your communication by email to:

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