KUMTOR
КУМТОР

centerra GOLD

ENVIRONMENT AND SUSTAINABILITY REPORT **2015**

ABOUT KUMTOR MINE

Kumtor Mine is the largest western-operated gold mine in Central Asia and has been operating since 1997, having produced approximately 10.42 million ounces of gold by the end of 2015. Kumtor Gold Company CJSC (KGC) is the license holder for the Kumtor deposit.

The Kumtor open pit mine is located approximately 350 kilometers southeast of the capital Bishkek and 60 kilometers north of the border with the People's Republic of China. It is at an altitude of 4,000 meters above sea level in a partially glaciated permafrost zone in the Central Tien Shan Mountains. 2015 marked the nineteenth year of the Kumtor Mine operation in the Kyrgyz Republic, and the twelfth year under the parent company Centerra Gold Inc. (Centerra). The estimated end of the life of the Kumtor Mine is 2026.

About Centerra

Centerra Gold Inc. is the parent company, which owns 100% of KGC. Centerra is a publicly listed, Canadian-based gold mining company engaged in operating, developing, acquiring, and exploring gold properties in Asia, North America and other markets worldwide. The Company is the largest Western-based gold producer in Central Asia. Centerra has two producing gold mines, one in the Kyrgyz Republic and the other in Mongolia. Centerra also owns 100% of the Gatsuurt development project in Mongolia and Öksüt Gold Project in Turkey, a 50% interest in the Greenstone Gold Property (formerly the Trans-Canada Property) which includes the Hardrock Gold Project in north-western Ontario, Canada and has interests in exploration properties in Canada, Mexico, Mongolia, Nicaragua, Portugal and Turkey. Kyrgyzaltyn Open Joint Stock Company, a state owned entity, is Centerra's largest shareholder, owning 77,401,766 common shares, representing 32% of the outstanding shares. Additional information on Centerra is available at SEDAR (**www.sedar.com**) and on the company website (**www.centerragold.com**).

About this Report

This document is the Kumtor Annual Environment and Sustainability Report (AESR) for the 2015 financial year (ending December 31, 2015). This report is focused on the Kumtor Mine in the Kyrgyz Republic. Kumtor's performance data include only Kumtor's own operations, unless noted otherwise, although the policies of Centerra and Kumtor apply to both employees and contractors. Financial amounts are reported in US dollars (USD) unless otherwise stated.

This report follows the format of the Global Reporting Initiative (GRI), fourth generation (G4) Sustainability Reporting Guidelines and GRI Mining and Metals Sector Supplement (see **www.globalreporting.org**). and is written in accordance with the Core option. KGC has been reporting under GRI G3 standards from 2012. The previous report of the Company was based on the 2014 financial/calendar year, was published in August 2015 and is also available on our corporate website.

In addition, this report also addresses the key reporting requirements outlined in KGC's Environmental Management Action Plan. In determining the scope, content, and boundaries of this report, we considered a materiality assessment process described in the Governance Section of this report. Please see our Disclaimer Regarding Forward-Looking Statement also on the inside back cover. This report will also be available in the Russian and Kyrgyz languages. As we continue to further improve our systems and approaches, we welcome your comments and suggestions on how we can further improve our annual environmental and social reporting and practices. You can find contact details on the back cover of this report.

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MESSAGE FROM THE PRESIDENT

The Company's key activities, accomplishments and challenges we faced in 2015 are described in this report. We beat our production guidance, moved into a new camp at the mine site, and became more efficient and cost conscious. We are looking forward to continue our improvements in all aspects of our operations.

Contribution to the Kyrgyz Economy

KGC continues to contribute significantly to the economy of the Kyrgyz Republic. In 2015, our production accounted for 22.5% of Kyrgyzstan's overall industrial output and 6.8% of GDP. In 2015, payments made within the Kyrgyz Republic totaled $256 million making a total of $2.9 billion since 1994.

Largest Private Sector Employer

KGC is the largest taxpayer and the largest employer in Kyrgyzstan's private sector. By the end of 2015, we employed 3,741 Kyrgyz citizens - 97% of the full-time workforce. In 2015 we continued to decrease the number of expat employees, trying to promote local professionals. Payments made within the Kyrgyz Republic in 2015 include more than $105 million in employee and contractor wages and benefits.

> We continue to promote and support local business, and in 2015, our company spent almost $59 million on local procurement.

Increasing Local Procurement

We believe that the strategic approach to local procurement issues will not only benefit our company but also contribute to the development of local communities by creating more jobs and boosting the economy across the Issyk-Kul region. We continue to promote and support local business and in 2015, our company spent almost $59 million on local procurement.

Stakeholder Engagement

The company continues to deepen its cooperation with all stakeholders. Our cooperation with local communities is being carried out through four regional information centres, located in Balykchy, Bokonbaev, Barskoon, and Kyzyl Suu. Kyzyl Suu Centre is the second centre in Jety-Oguz district. It was opened in 2015 in the district centre for the convenience of local communities. The immediate purpose of these centres is to provide information relating to Kumtor operations, including details about social programs and community investments, employment procedures, human resources policies and vacancies. Regional liaison employees visit local social events, monitor KGC-sponsored development projects and serve as a link connecting the company with local communities.

In addition to the above structured activities, senior management takes part in the regular meetings with representatives of local communities to discuss cooperation, inform about company's plans, as well as to listen and address concerns raised by communities, represented by community and youth leaders, local authorities as well as representatives of small business and private farms.

Many of the projects described in this report have brought together communities, other partners, international aid communities and government officials. We continue to make additional efforts to mobilize and promote local entrepreneurs and business in the region.

In 2015 we launched the Kumtor Ambassadors program to promote volunteering among employees and contractors thereby engaging one of our largest internal stakeholder group – our workers – into social projects within the Republic. We have volunteered more than 2,000 hours to social work and took part in more than 40 charity, volunteering and mentorship activities. Some of other employees represented the Company in the Supervisory Boards of the community investment programs, supported by the company and became mentors for students of local universities.

Community Investments

Given that KGC is a key employer, taxpayer and consumer of local goods and services in Kyrgyzstan, the eventual closure of the mine is predicted to have negative effects on the Issyk-Kul region and national economy. To minimize such detrimental effects, our local community investment strategy is built on the promotion and development of a diversified economy that would not be heavily dependent on Kumtor alone. This approach is thought to help minimize negative effects of the Kumtor Mine's decommissioning. It is important for us that the various local companies which currently supply goods to KGC, become sustainable businesses after the closure of the mine.

We have launched a number of programs aimed at the integrated development of the Issyk-Kul province.

These are centered on the following four components: development of the agricultural sector; promotion of small and medium-sized business growth and diversity; collaboration with young people; and promotion of educational and environmental initiatives. In 2015, we contributed voluntarily a further $2 million in sponsorships and community development programs. This report describes some of the programs we have voluntarily initiated and results we have achieved. Moreover, the company has been contributing 1% of its gross revenue to the Issyk-Kul Region Development Fund since 2009. In 2015, our contribution was $7.1 million making a total of $47.4 million since these payments commenced.

Geotechnical Safety

The Kumtor Mine ore body and related infrastructure are situated under moving glaciers or subject to their impact. Since the approval of the Kumtor project in 1994, the removal of glacial ice (necessary for the safe operation of the mine), have been an integral part of the annual mining plans that are subject to approval by relevant Kyrgyz regulatory authorities. As described in this report, we have retained leading local and international experts and have employed advanced technologies to monitor and appraise the mine's geotechnical safety. We have also implemented programs designed to maintain proper safety standards at all facilities.

Health and Safety

We maintain our policy that no job is so important that it cannot be done safely. In 2015, we spent more than 71,628 hours on the promotion of health and safety training programs. Our statistics, such as reportable injury frequency rate, which was 0.21 in 2015, reflect the importance we attach to health and safety measures that also include awareness and training programs designed to improve our performance. Our safety performance overall is better than mines in some industrialized countries.

Environment and Biodiversity

We consider responsible environmental management an important part of our business, and in 2015 we spent approximately $6.8 million on environmental assessment and management. This includes maintaining a department of over 26 dedicated full-time environmental staff, and on-site and regional monitoring of water, air, biodiversity, soils and sediments, radiation, and waste.

In 2015 we improved our waste management practices and commissioned construction of a landfill. We incorporated waste segregation in all our locations. This not only relates to industrial waste, but also domestic.

The Company attaches great importance to conservation of the region's biodiversity and has worked with stakeholders concerned about nature conservation since the start of operations, including contributing to the creation of the Sarychat-Eertash Nature Reserve (SCER), established in 1995. Most recently, we partnered with Fauna & Flora International – the world's longest established international conservation body - to support biodiversity conservation projects within the SCER. KGC is proud of its support in this area, and since mining started, regional wildlife numbers of key species such as the snow leopard and Marco Polo sheep have increased.

Environmental Claims

By the end of 2015 there were four environmental claims received by the company from the State Inspectorate for Environmental and Technical Safety under the Government of the Kyrgyz Republic (SIETS). As previously disclosed, we dispute the allegations made in these claims and consider them to be exaggerated and without merit. We continue to work in close cooperation with the Government of the Kyrgyz Republic to amicably settle environmental and technological claims. Details on claims are described further in this report.

Life of Mine

As of December 31, 2015, KGC's proven and probable gold reserves total 5.641 million ounces. The most recent life-of-mine plan is for open-pit mining to end in 2023 and milling operations to conclude in 2026.

Looking Forward

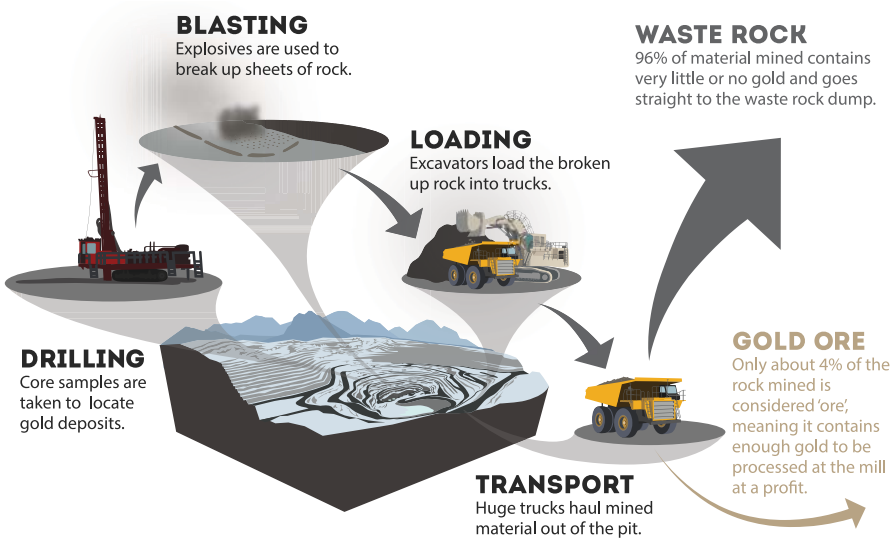
It is important for KGC that we continue to meet our production targets in a way that is safe, and environmentally and socially responsible. We beat our gold production guidance for 2015 due to relatively even quarterly gold production as compared to prior years when the majority of the ounces were produced in the fourth quarter. Gold production for the full year 2016 at the Kumtor Mine is forecast to be 480,000 to 530,000 ounces or 14.9-16.5 tonnes. In 2016, the company expects an increase in gold production in the latter half of the year.

Our long-term vision is to continue to adapt and evolve both our mining operation and our environmental and sustainability programs in an ethical and responsible way. We expect to continue to generate substantial and sustainable project benefits for all of our stakeholders. We welcome feedback on this report and encourage comments on how we can further improve our environmental and social performance in future.

Daniel Desjardins,
President,
Kumtor Gold Company

MINING PROCESS

Gold ore at the Kumtor deposit occurs mostly as fine gold particles embedded in pyrite. This ore is extracted using standard open-pit mining techniques, where rock is drilled and blasted in large strips. The blasted rocks can now be loaded unto large trucks using excavators and transported out of the pit.



Kumtor mine is outfitted with the latest mining machinery available. The fleet includes 103 Caterpillar trucks, each with the carrying capacity of 145-185 tonnes, 8 boring rigs, and 14 excavators. Besides these, there are 14 bulldozers and 11 blade graders which maintain the roads and other infrastructure of the mine. Workers are transported to and from the mine using KAMAZ trucks, popularly referred to as crew buses.

DRILLING

Drilling plays an essential role in extraction of precious metals. Before any major work can begin on a given section, geologists must have a precise idea of the average gold grade in the ore. Based on the drilling data they will then decide whether to process the ore at the mill, or haul it to a waste rock dump, if the gold content is too low to make a profit.

The mine's drilling rigs can drill to a depth of up to 12 meters, with an average drilling speed of 170 rotations per minute. An average of 350 holes are drilled during one shift. In addition to determining the gold content, these holes also serve as the first step in the blasting process.

BLASTING

Blasting is used to break up large sheets of primary rock. Rock in the permafrost zone is extremely hard which makes it impossible to load or transport without breaking it up first.

When the geologists decide on a blasting location, the entire zone is closed off. A grid of several dozen holes is drilled in that block of rock and filled with explosives.

Occupational health and safety compliance during the blasting of a section is of paramount importance for all employees involved in the mining operation. Before any explosives are detonated, the security service makes an announcement and all machine operators are required to vacate the mining pit before blasting can proceed.

LOADING

After the roads on the blast site have been cleared, excavators come to load the blasted rock unto trucks. There are two types of excavators working on the mine, the largest of which are five Hitachi EX3600-6 excavators.

TRANSPORTATION

In order to get at the gold ore, large sections of rock that contain little or no gold also need to be removed. This unprocessed 'waste rock' is hauled to designated waste rock dumps and unloaded there. Trucks transporting gold ore on the other hand go to the mill.

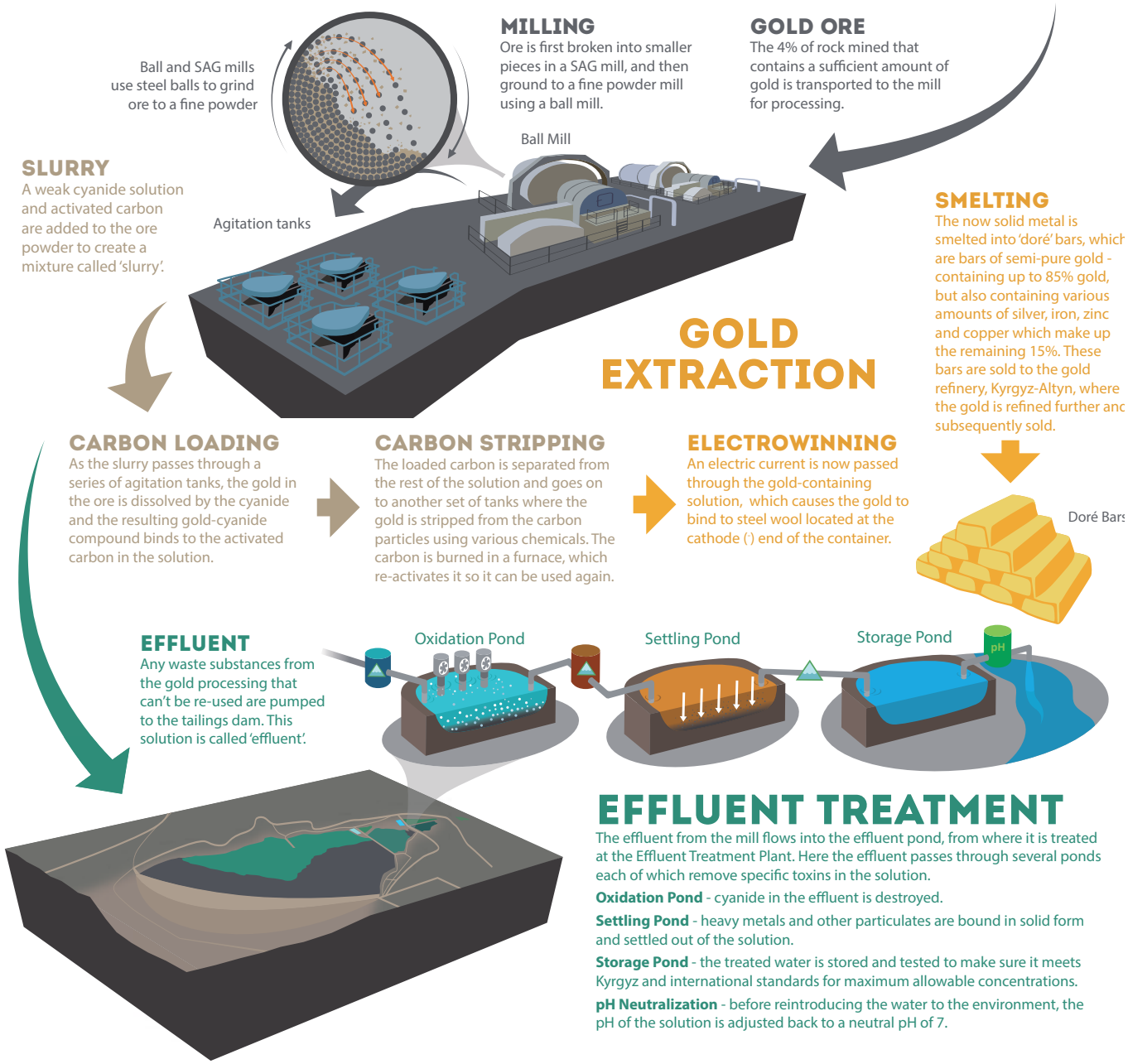
MILL

The ore is delivered to the crusher and then to the mill, where gold is extracted using carbon-in-leach technology. For more effective ore processing an ultra fine grinding mill (ISA Mill) was installed in the factory in 2005. It grinds ore down to 20 microns,which is about one fifth of the diameter of a human hair.

The mill's rated throughput is between 16,000 to 17,000 tonnes of ore per day. The entire production process is automated involving just 16 people per shift to operate the entire factory.

After the gold extractions is complete, the gold is smelted into Dore bars, which contain up to 80 percent of gold.

The Doré bars produced by the Kumtor mine are purchased by Kyrgyzaltyn JSC for processing at the Kara-Balta refinery pursuant to a Gold and Silver Sales Agreement signed by KOC, Kyrgyzaltyn and the Government of the Kyrgyz Republic. Kyrgyzaltyn JSC enjoys the exclusive right to sell refined gold and silver both in- and outside the Kyrgyz Republic.



ENVIRONMENTAL AND SUSTAINABILITY SNAPSHOT

Pillar	2015 Targets
Project Benefits	■ Maximize gold production during lower grade period of LOM ■ Reduce all-in costs to $900 per ounce sold
Health & Safety	■ No lost time injuries ■ Recordable injury frequency rate of 0.32 or lower
Environment	■ Improve compliance management and reporting ■ Improve communication of environment issues to key stakeholders
Community	■ Improve reputational management through more effective and meaningful engagement to better inform affected and influential stakeholders and address community perceptions ■ Implementation of all approved CSR projects within budget and on schedule including full Monitoring and Evaluation (M&E) programme, and improved management of donations ■ Strive for greater employee ownership and involvement in CSR (create Kumtor Ambassadors)
Governance and Risk Management	■ Ensure proactive mitigation for 2015 production top risks ■ Complete Environmental Risk Register for all departments

Target Outcome and Comment on Targets	2016 Targets
■ 520.7 k Oz Produced. Result 0.6% above budget of 517.5 k Oz. ■ $921/oz. Result 11.2% below budget all in cost of $1032/oz.	■ Reduce All-In Sustaining Cost Per Ounce to 840 (US$/oz)
■ 3 LTIs ■ RIF = 0.21. Includes 2 KGC and 1 long term contractor incident.	■ Recordable injury frequency rate of 0.33 or lower ■ Develop and Implement Visible Felt Leadership Program
■ Installed electronic compliance management & reporting system ■ Conducted analysis of historic environmental incidents and generated mitigation plan. Initiated implementation of the mitigation plan which focused on spills as a result of vehicle collisions ■ Through the Vehicle Accident Reduction Program (VARP) – KGC reduced vehicle collision from 32% to 7% of environmental incidents	■ No Reportable Spills > Level 2 ■ Update Conceptual Closure Plan including socio-economic conditions by Year-End 2016
■ Completed review of external stakeholder communications and develop new Communications Plan in Q2/2015 using various forms of engagement and media (incl. traditional and emerging best practice) ■ All planned projects achieved all scheduled objectives and within budget. Donations were <10% of total CSR annual budget. M&E implemented for all new projects, donations and retrofitted for ALL ongoing projects by the end of Q3/2015 ■ Developed the Kumtor Ambassador Program to incentivize and gain buy-in from employees (approved by Corporate). More than 40 focused pilot volunteer initiatives were implemented by year end in the communities between Balykchy and Karakol.	■ No Material Business Interruptions ■ Ensure continued implementation of Kumtor Ambassador Program
■ Fully and effectively implemented Corporate SEA procedure across ALL departments which identified environmental risks register/ Strategic Environmental Aspects and established a mitigation plan for all departments	■ Ensure the updated Conceptual Closure Plan includes adequate assessment of risk

1.1 | GOVERNANCE MODEL

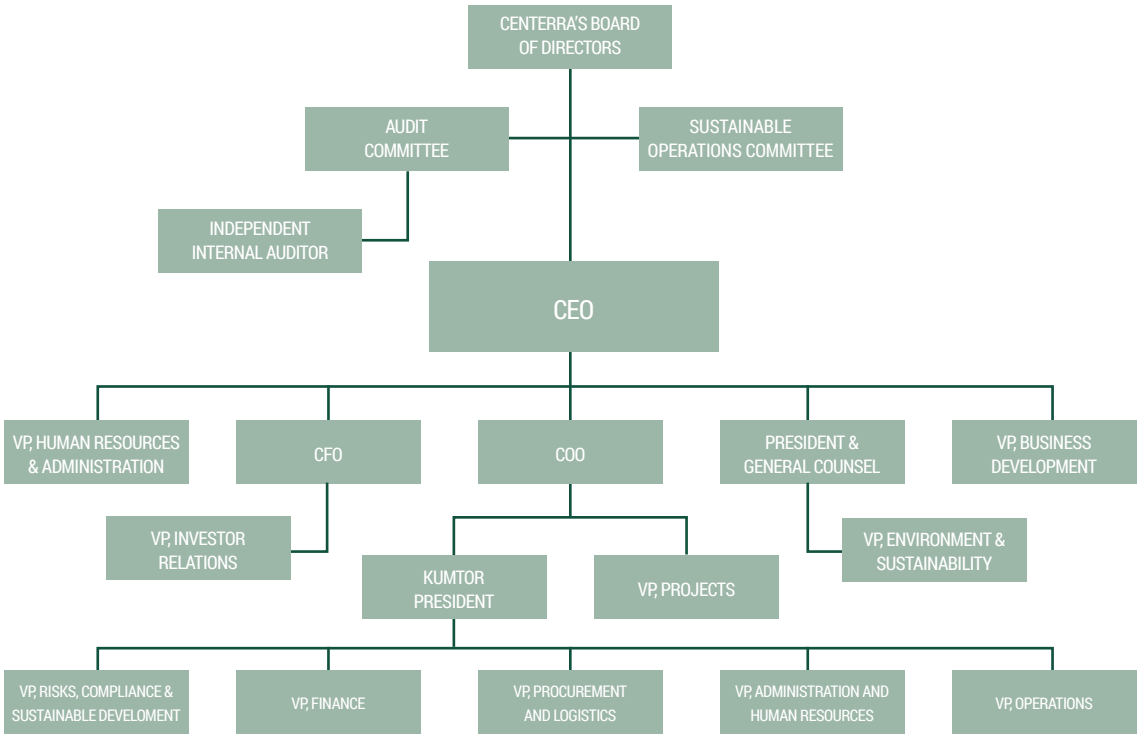


Fig. 1.1 Corporate Governance Structure (2015)

Aspects of corporate responsibility are considered by the Sustainable Operations and Audit Committees of Centerra's Board of Directors.

KGC operates under the governance and standards set by its parent company Centerra Gold Ltd. All our operations adhere to the governance and standards set by Centerra, whose board of directors and management believe that sound and effective corporate governance is essential to our performance. We have adopted practices and procedures to ensure that these governance principles are followed. We expect management, officers, and employees to conduct themselves in accordance with the highest ethical standards. These are detailed in three key policies:

a) Code of Ethics for officers and employees;

b) Code of Ethics for directors; and

c) International Business Conduct Policy for all directors, officers and employees.

KGC develops formal Policies and Procedures for setting performance with internal and external standards, meeting legislative responsibilities and promoting the long-term success of the company. The policies support KGC values and specifies the framework within which KGC takes day to day in the following areas:

- **Operational Health and Safety:** KGC ensures provisions for safe performance and operation during all states of our activities. Kumtor recognizes the protection of the health and safety of its employees, contractors, and the public along with responsible environmental management as being its highest corporate priorities. We are committed to the safety motto that **"no job is so important that we cannot take the time to do it safely."**
  Key commitments in our policy include:
  - Compliance with applicable laws and regulations of the jurisdictions in which we operate, and generally accepted international industry practices

- Providing employees and contractors with a working environment free of uncontrolled hazards Identifying and eliminating or controlling potential risks to health and safety of employees, contractors, and the public to levels as low as reasonably achievable, taking social and economic factors into account
- Achieving continual awareness of and improvement to our overall Health, Safety, and Environment (HSE) performance

- **Environmental Management:** KGC is committed to complying with applicable laws, regulations and standards and minimising potential environmental impacts due to company operations. KGC has an Environmental Management System (EMS) designed to monitor the effects of operations on the environment and compliance with permits and other requirements. The system provides for scheduled monitoring, engineering controls, performance requirements in line with good international mining practice and local regulations.
- **Compliance:** KGC has a comprehensive system to ensure compliance with laws, regulations and company policies, which is described further in the section.
- **Transparency and Reporting:** Actual results and company activity is reported regularly through the parent company Centerra Gold Ltd as well as on the company website (www.kumtor.kg).
- **Operational Excellence:** KGC has Standard Operating Procedures that describe the activities necessary to complete tasks in accordance with standards and regulations for running the operation. Policies stand as control measures for known or potential risks. However, in todays changing environment and variety of emerging risks, KGC uses an Enterprise Risk Management System to support its business activities and safeguard shareholder value. The risk management system is designed to ensure the risks are systematically identified, rigorously assessed, prioritized consistent with KGC's risk appetite and effectively managed to eliminate unwanted impacts.

The Code of Ethics for Directors requires Centerra's directors to promptly report all actual, potential, or perceived conflicts of interest to the corporate secretary, who is in turn required to bring such potential conflicts to the attention of the Nominating and Corporate Governance Committee. Directors may not participate in discussions, deliberations, or decision-making for matters in which they have a conflict of interest. All new directors are required to review and accept the Code of Ethics for Directors.

Our external memberships and commitments provide an opportunity to learn from, and align our activities with, good international industry practice. Centerra became a Supporting Company of the Extractive Industries Transparency Initiative (EITI) in 2011. The EITI is a coalition of governments, companies, civil society, investors, and international organizations. It promotes improved governance in resource-rich countries through the verification and publication of all company payments to governments, as well as government-reported revenues from oil, gas, and mining. Centerra has played an active role in promoting the EITI in the Kyrgyz Republic and Mongolia. Our operations were among the first to establish, report, and help improve EITI infrastructure in their respective countries. For more information on Centerra's submissions, **visit eiti.org/Kyrgyz Republic** and **eiti.org/Mongolia**. Centerra is also a member of the World Gold Council (WGC). The Council's members regard the management of the local environment and relationships with local communities as paramount considerations during the lifetime of any mine project.

In 2013, Centerra Gold adopted and implemented the WGC's Conflict-Free Gold Standard. In doing so, Centerra acknowledges that operating responsibly and maintaining the trust of our stakeholders requires us to demonstrate that the gold we produce has been extracted in a manner that does not fuel unlawful armed conflict or contribute to serious human rights abuses or breaches of international law.

Centerra is a signatory to the International Cyanide Management Code for the Manufacture, Transport, and Use of Cyanide in the Production of Gold. This Cyanide Code was developed by a multi-stakeholder steering committee under the guidance of the United Nations Environmental Program and the predecessor of the International Council on Mining and Metals. The objective of the Cyanide Code is to improve the management of cyanide used in gold mining and assist in the protection of human health and the reduction of environmental impacts.

Compliance

In order to comply with the requirements of regulatory and legal acts of the Kyrgyz Republic and international procedures in the area of operating activities and in order to ensure uninterrupted and safe operation of the mine, the Company established the Compliance and Projects Department (C&P) in 2012.

The C&P Department consists of 12 personnel, led by the Director of Compliance, who in turn reports to the KGC VP Risk Management & Compliance. It cooperates with all structural divisions of KGC and is governed by applicable legislation of the Kyrgyz Republic, international standards, restated investment and concession agreements, therefore abiding by the strictest requirements.

The C&P Department specialists monitor changes in KR legislation and determine potential risks affecting the activity of the Company. In accordance with the requirements of legislation, the C&P Department ensures timely obtaining of permits and licenses for the activities subject to licensing. In addition, the C&P Department:

- Assists other parts of the company to prepare contracts;
- Obtains all required permits for design and construction of mine site infrastructure facilities, and;
- Obtains approvals for the design estimate documentation and commissioning process;
- Assists design organizations to obtain approval/ expert opinions for Mine Plans/Designs, standards for emissions, discharges and wastes (including infrastructure projects) for the mine site and BMY;
- Provides technical assistance during update and/or introduction of new internal documentation for the Company in accordance with the requirements of KR legislation and international regulations.

To ensure uninterrupted operation of Kumtor Mine site, the C&P specialists maintain a constant liaison with authorities in the area of subsoil management, natural resources management, construction, sanitary and epidemiological control, technical supervision, as well as with KR Ministry of Economy, KR Ministry of Interior and KR Agency on Communications.

The C&P Department constantly updates the following permits that are issued by various Ministries and Agencies of the Kyrgyz Republic:

- Permit to execute mining (survey) operations at concession area;
- Permit to execute blasting operations in the Central Pit;
- Permit to use explosive materials;
- License for producing and selling explosive materials;
- License for importing explosive materials and Sodium Cyanide;
- Permit to transit Sodium Cyanide through the Republic of Kazakhstan;
- Permit to store weapons at the Kumtor Mine, which are necessary for safeguarding the mine site;
- Permit to transport and store hazardous cargo, Competency certificate for cargo vehicles to transport hazardous cargo;
- Permit to use and store precursors and medicines at Kumtor Mine site;
- License and Permit to dispose toxic materials in TMF and at specialized landfills within prescribed limit;
- Permit for emission into atmosphere and discharge of treated industrial and domestic effluents within prescribed limits;
- Permit to dispose wastes;
- Licenses for Electrical Communication, Radio Spectrum Use and Frequency Assignments to secure reliable connection between KGC facilities;
- Permit to use X-Ray devices and equipment containing ionizing radiation sources;
- Visas and Permits to Work in the Kyrgyz Republic for foreign employees of KGC.

About 450 permits to import goods, subject to mandatory certification or sanitary inspection, were obtained in 2015.

Audits, Inspections and Claims

Our operations are subject to regular audits by Kyrgyz and international companies and experts. We also receive inspections from relevant national agencies and audits commissioned by Centerra Gold and the European Bank for Reconstruction and Development (EBRD).

Environmental Claims

Kyrgyz Permitting and Regulatory Matters

In December 2015, KGC submitted its 2016 annual mine plan to the Kyrgyz Republic State Agency for Environment and Protection and Forestry (SAEPF) for environmental expertise and the Kyrgyz Republic State Agency for Geology and Mineral Resources (SAGMR) for industrial safety and subsoil expertise. The industrial safety expertise was issued on December 30, 2015. KGC has also received extension of its permits for maximum allowable emissions and toxic waste disposal until March 31, 2016.

However, as of December 31, 2015 there remained several other outstanding permits and approvals required from Kyrgyz regulatory authorities including the Ecological Passport and the Life-of-Mine technical plan (which outlines mining plans for the Kumtor Life-of-Mine). We understand that the regulatory authorities reviewing such permits and approvals have expressed concerns regarding potential conflicts with the Kyrgyz Republic Water Code. Centerra and KGC do not believe that the Water Code is applicable to the Kumtor Project. At the time of writing this report, KGC received all relevant operating permits till the end of 2016.

Centerra will continue to engage constructively and in good faith with the Kyrgyz Republic Government to resolve all outstanding matters affecting the Kumtor Project, including, among other things:

1. Claims made by the General Prosecutor relating to a $200 million inter-corporate dividend declared and paid by KGC to Centerra in December 2013;
2. Claims made by the General Prosecutor seeking to invalidate Kumtor's land use certificate and to seize certain lands within the Kumtor concession area;
3. Significant environmental claims made by various Kyrgyz state agencies alleging environmental offenses and other matters totalling approximately $473 million (at applicable exchange rates when the claims were commenced). Centerra believes that each of these claims is without foundation.

Kumtor will continue to work with the applicable Kyrgyz regulatory authorities to obtain the necessary permits and approvals, however there can be no assurances that such permits and approvals will be issued or issued in a timely manner.

If Kumtor is prohibited from moving ice (as a result of the purported application of the Water Code), the entire December 31, 2015 mineral reserves at Kumtor, and Kumtor's current life of mine plan would be at risk, leading to an early closure of the operation. Centerra believes that any disagreement in relation to the application of the Water Code to Kumtor would be subject to international arbitration under the 2009 agreements governing the Kumtor Project.

Green Party Claim

On December 25, 2015, KGC received a claim filed by the Green Party of Kyrgyzstan (the Green Party) with a Kyrgyz court which alleges environmental and glacier pollution and seeks damages of approximately $5.8 billion. The Company understands that the court has rejected the claim on procedural grounds, and it was returned to claimants. The Company believes that this claim is without merit and, in any event, is subject to the international arbitration provision of the Restated Investment Agreement.

Environmental Incidents

Kumtor maintains a system for reporting environmental and safety related incidents. This is based on a five category reporting system, which allows us to classify reportable and non-reportable environmental incidents and spills. The classification system considers level of environmental impact, national and other regulatory compliance, and concern of local communities. Senior environmental staff are immediately informed of all incidents and allocate the appropriate classification level. For Type I and Type II incidents, which are considered insignificant in terms of scale and severity of impact, there are no external reporting requirements. Such incidents are also not immediately reported to Kumtor's president and Centerra's board of directors. Incidents classified as III to V are reported to the board of directors and, in many cases, trigger external reporting requirements to relevant local regulatory agencies. No reportable environmental incidents occurred at Kumtor during 2015. However, 29 non-reportable incidents were reported, down from 38 in 2014. These were typically minor spills of fuels that were immediately contained and cleaned up, resulting in no significant or extended impact.

Fig. 1.2 Environmental Incidents and Spills

	2013	2014	2015
Non-reportable spills and environmental incidents (Type I)	20	31	28
Non-reportable spills and environmental incidents (Type II)	7	7	1
Reportable spills and incidents (Type III-V)	0	0	0

1.2 | SUSTAINABILITY MANAGEMENT

While Centerra's ultimate objective is to deliver value to our shareholders, we also believe in the principles of sustainable development. In endeavoring to achieve our strategic objectives we aim to:

- Be a leader among our peers with regard to business ethics, workplace safety, environmental protection, socio-economic development of communities, and shareholder value;
- Minimize the potential for adverse impacts from our operations, taking into account social and economic factors;
- Continually improve the management of our operations so we may respond to the economic, environmental, and social expectations of our stakeholders, including our employees, communities, shareholders, governments and the public; and
- As an international company, respect the different needs and values of people and their cultures, and operate with a high level of transparency to ensure stakeholder confidence. We believe our strong commitment to these principles will continue to make Centerra the employer and the business partner of choice in Asia and other markets.

1.3 | RISK MANAGEMENT

The Risk Management processes are currently being integrated with the general management of the organization so they are a part of decision-making process. Critical risks and monitoring of their mitigation plan is being successfully integrated in the day-to-day activities with the departments managing their own risks identification and monitoring process. Senior Management discusses new risks at a weekly Steering Committee Meeting and through a Quarterly Critical Risk Review Meeting. The goal is to use the outcome of risk assessment processes in planning, budgeting and cost control to ensure we focus on proactive rather than reactive management strategies.

The key risks events in 2015 related to Permitting and Geotechnical aspects of the operations as outlined further below.

- **Permitting and Licensing:** Mining operations at Kumtor are subject to various permits and licenses, some of which are obtained on an annual basis or for a fixed term. During 2015 KGC experienced delays in obtaining the necessary permits and approvals for the KGC annual mine plans and certain environmental permits, including the maximum allowable discharge permit, the permit for waste, and the Ecological Passport. KGC continues to work closely with Kyrgyz regulatory agencies to resolve all matters, and to ensure that the permits and licenses are received within the time frame provided under Kyrgyz Laws;
- **Geotechnical issues:** KGC has historically experienced ground movement in various parts of the Central Pit, which previously led to an employee casualty, considerable short falls in the annual gold production, changes in mining sequences, increased expenditure on depressurization and dewatering programs, the movement or reconstruction of existing infrastructure, reduced slope angles of the central pit and changes in waste rock dump design. Extensive efforts are taken by KGC personnel to prevent and anticipate further ground movement and a third party geotechnical review team was employed by KGC to review pit wall, glacier and waste dump behavior in 2015;
- **Gold Recovery:** It is not always possible to predict the precise metallurgical parameters of the ore. To minimize this natural effect, KGC conducts continuous metallurgical analysis and utilizes advanced methods to maximize the gold recovery. In 2015 changes were made to the cyclones on the regrind mill circuit to improve the effectiveness of the ultrafine grinding mill.

1.4 | MATERIALITY ASSESSMENT

In accordance with the GRI G4 reporting standard, KGC is required to identify and report only on material issues – defined as issues that have a significant impact on KGC's business AND are important to multiple stakeholder groups.

In order to assess which issues are material, we considered the following data sources:

- Opinions of Senior Management and Departments Heads – via several internal meetings and workshops;
- Views of local communities in Issyk-Kul – via our community relations officers in the districts;
- Risks that were rated as High or Extreme on the KGC Risk Register;
- Relevant legal obligations of the Company;
- Data from the KGC community relations on-line database, where we document our engagements with the key stakeholders in the region to record all concerns and issues raised, as well as record and track grievances and requests from local communities;
- Internal policies, values, goals and targets;
- Incoming correspondence - to identify key issues raised by Stakeholders via official requests;
- Media coverage of the Company.

As shown on Figure 1.3, the issues shaded red were considered material:

Fig. 1.3 Materiality Matrix

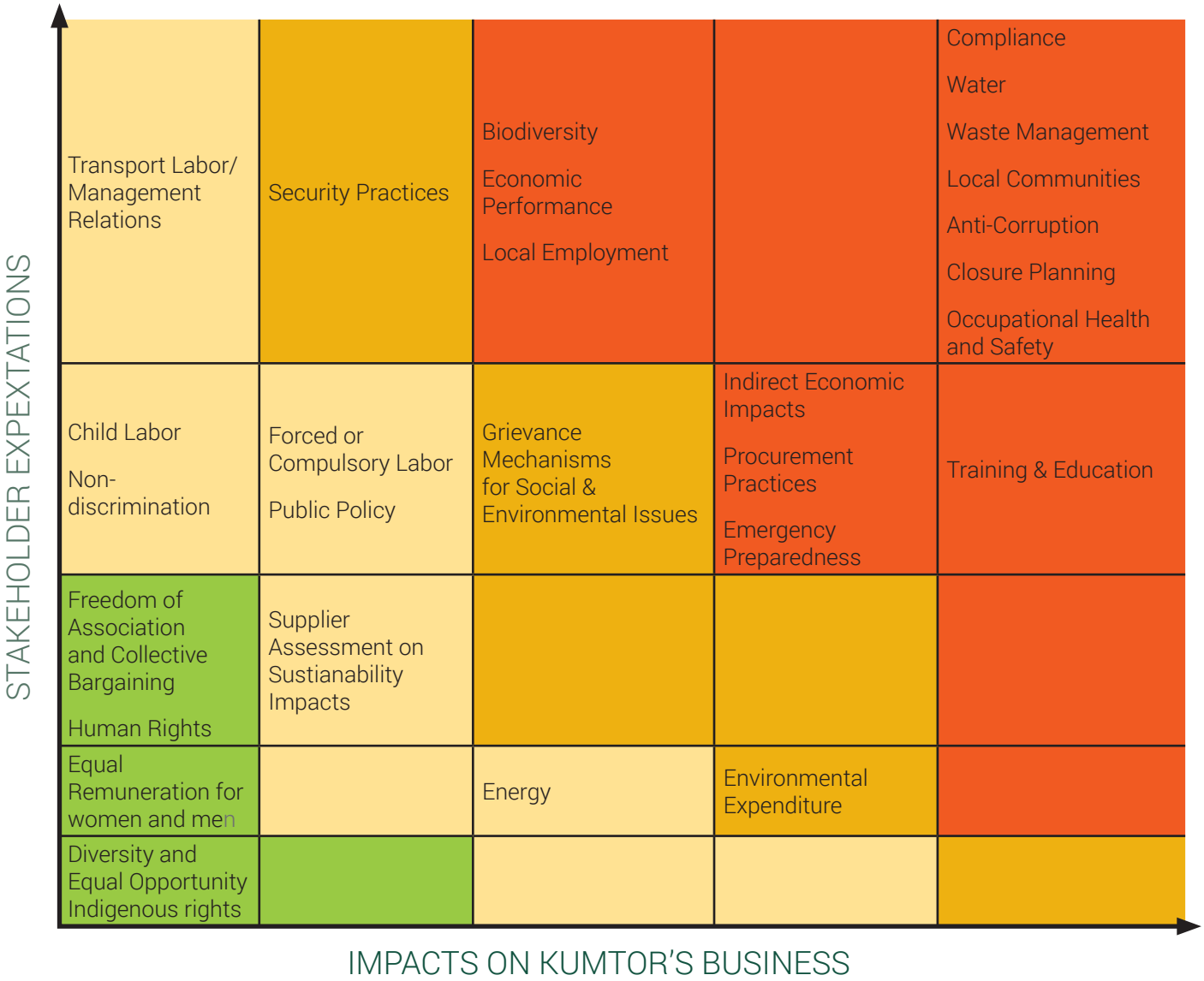


Fig. 1.4 List of Identified Material Aspects and Boundaries

G4 Materials Aspect	Impact Inside organization	Impact Outside organization	Relevance outside the organization
Economic Performance	×	×	Economic Performance plays significant role in the Kyrgyz economy, providing 7% of GDP, jobs for more than 3,000 people, supporting local producers and investing into local communities.
Procurement Practices	×	×	Local procurement amounts to $59 million annually, creating positive value contribution to local suppliers
Indirect Economic Impacts		×	KGC's social investments allow local communities to solve social and infrastructural issues, develop their skills and build capacity.
Closure Planning	×	×	Conceptual closure plan and emergency preparedness plan – are requirements of KR laws and financial institutions which lend money to Kumtor These documents are being updated on a regular basis.
Emergency Preparedness	×	×	
Biodiversity	×	×	Minimizing impact of our operations on the environment at the mine site is one of KGC's main objectives. We comply with KR and international standards and follow the Good International Industry Practice (GIIP) in our operations.
Air Emissions	×	×	
Compliance	×	×	
Water	×	×	
Waste Management	×	×	
Local Employment	×	×	KGC is the largest employer and a taxpayer in KR, with more than 80% of employees from the Issyk-Kul region
Local Communities	×	×	Constructive dialogue with the local communities is a key to our successful cooperation and uninterrupted operations.
Anti-Corruption		×	According to Transparency International Corruption Perception Index, Kyrgyzstan is ranked high among the countries most prone to corruption. KGC has a zero tolerance policy for unethical behavior and has always been committed to fair and transparent operation.
Occupational health and Safety	×		Our employees receive regular health checks and support, are provided with high quality safety clothing, and receive health and safety training to protect themselves and co-workers. Our motto is "No job is so important we cannot take time to do it safely."
Training and Education	×		The Company facilitates professional development and career advancement through implementation of training and internship programs for employees and graduates from local communities.

> KGC has a zero tolerance policy for unethical behavior and has always been committed to fair and transparent operation.

1.5 | BUSINESS ETHICS

Recent high-profile corruption and bribery cases, increasing diligence on the part of regulatory agencies means that corruption in many developing countries has increased the risks of non-compliance and the related damage to organizational reputation. According to Transparency International Corruption Perception Index, Kyrgyzstan is ranked high among the countries most prone to corruption.

KGC has a zero-tolerance policy for unethical behavior and has always been committed to fair and transparent operation. Supported by our Code of Conduct, Code of Ethics and IBC Policy. The Code of Conduct provides an ethical framework for employee decisions, actions and behavior. It outlines the principles for appropriate conduct and explains the standard of behavior expected. These Policies regulate KGC's business conduct with Government Officials, interactions with others and include important concepts such as preventing conflicts of interest between parties of the company including engaging in improper activities with suppliers and others that do business with the Company. The IBC Policy contributes to creating a workplace culture that encourages and supports staff to identify and declare conflicts of interests so that they can be managed in an open and transparent way. Our employees provide formal acknowledgment of awareness on these Policies, as this subject is an important component of our commitment to conduct business in an ethical and lawful manner.

The Company has established financial and other controls to (a) prevent corrupt payments from being made, (b) detect any such payments that are made, and (c) defend KGC actions if challenged by enforcement authorities. KGC require accurate documentation from all of our partners. KGC maintains records that accurately reflect all transactions — payments, expense reimbursements, gifts, business entertainment, disbursements, commission payments, fees and other dealings with prospective customers, agents, subsidiaries and other affiliates. Any valid case can be reported to the Confidential Complaint Hotline – available in English/Russian at **www.clearviewconnects.com**. The Hotline is confidential and available 24 hours a day and is operated by a third party provider.

2 ECONOMIC VALUE

2.1 | ECONOMIC PERFORMANCE

KGC is the largest private sector employer and taxpayer in the territory of the Kyrgyz Republic. In 2015 KGC operations accounted for 6.8% of GDP and 22.5% of national industrial output.

Total payments within the Kyrgyz Republic since 1994 have now reached $2.96 billion. Our strategic community investment programs in 2015, described in the Social Responsibility section, were $2 million.

We continue to contribute 1% of gross revenue to the Issyk-Kul Development Fund for support of social and community projects. In 2015 we paid $7.1 million to the Fund. The Fund is government-controlled with local oversight, which aim is to develop social infrastructure such as schools, clinics and kindergartens in Issyk-Kul Oblast.

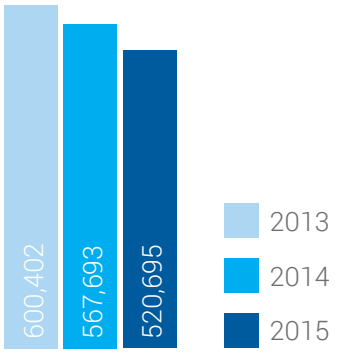
In addition, the Kyrgyz government, through the state owned mining company Kyrgyzaltyn OJSC, remains the largest single shareholder of Centerra Gold, owner of KGC. By the end of 2015, KGC employed 3,741 people, including contractors, with Kyrgyz nationals making up more than 97% of full-time staff, which is detailed further in the People section.

Fig. 2.1 Kumtor's Share of GDP (%)

Fig. 2.2 Kumtor's Share of Total Industrial Output (%)

Kumtor's macroeconomic impact in the Kyrgyz Republic SOURCE | Kyrgyz Republic National Statistics Committee

Fig. 2.3 Gold Production Statistics



Gold (oz)

> "In 2015 we paid $7.1 million to the Issyk-Kul Development Fund."

Fig. 2.4 Direct Economic Value Generated and Distributed*

Indicator	2013	2014	2015
Revenues from gold sales	810,943,801	694,590,808	604,521,845
Other income [a]	1,060,620	2,134,531	5,029,607
Operating costs (goods and services) [b]	293,540,903	288,327,187	235,845,312
Corporate administration costs	-	-	-
Exploration costs	6,111,584	-	-
Capital expenditure [c]	88,826,803	88,847,144	64,642,771
Other operating costs	2,868,852	1,845,042	1,572,558
Employee and contractor wages and benefits	115,142,726	118,579,207	105,111,954
Payments to providers of funds	200,000,000	-	-
Taxes and royalties	113,532,132	97,242,713	84,633,058
Community donations and investments	6,240,535	5,114,257	2,203,078
Economic value retained	14,259,114	96,769,787	115,542,721

Notes:

****** *Data has been prepared on an accrual basis and non-cash costs have been ignored.*

a) *Other income includes income from financial investments, sale of assets, and other services.*

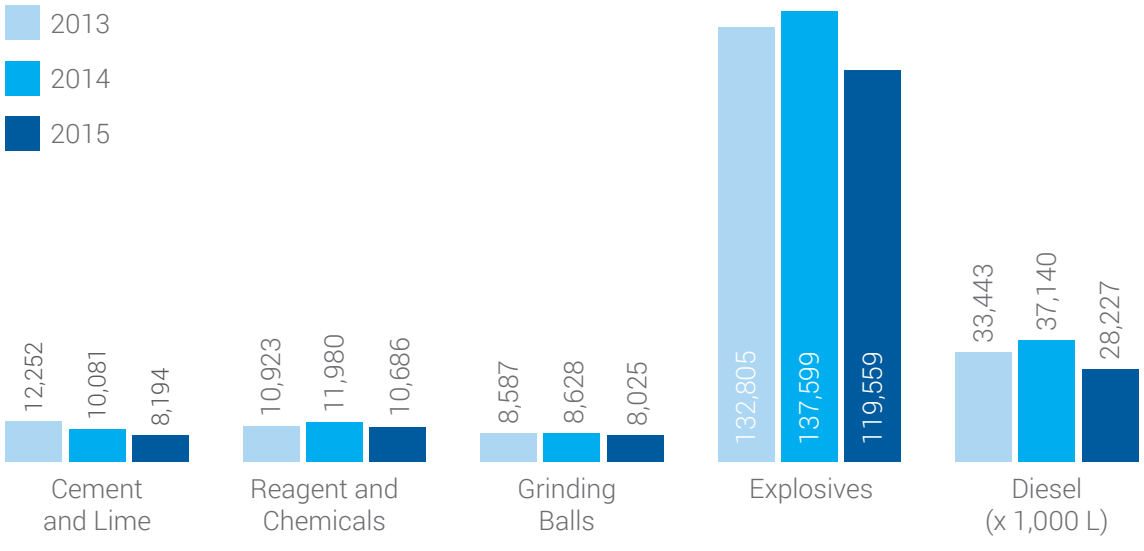
b) *Includes capitalized overburden stripping costs.*

c) *Excludes capitalized overburden stripping costs.*

Consumption of Materials

Mines are large consumers of supplies and materials for both the operations and the working community. Efficient use of materials is essential for both economic and environmental reasons. The major raw materials consumed include diesel fuel, cement and lime, reagents and chemicals (including cyanide) used in the milling and leaching processes, and grinding balls to crush the ore. We also consume substantial quantities of other non-renewable materials such as fuel, lubricants, grease and explosives.

Fig. 2.5 Major Consumables (tonnes)



2.2 | LOCAL PROCUREMENT

One of KGC's priorities is to procure goods locally. We have strict criteria all local suppliers must meet. We consider sustainability, quality, and price when we procure goods and services.

To improve on local procurement, we worked with international experts to develop our local procurement development strategy. We also engaged various institutes to explore opportunities for development of the local market. In addition, we implemented a number of measures, including advertising our requirements in local newspapers and on our website; procurement presentations; and identifying items currently procured internationally for possible local procurement.

KGC's Local Procurement Strategy will create substantial economic benefits for Kyrgyzstan on local, regional, and national levels. Local procurement leads to creation of new employment opportunities and income sources, acquisition of new skills and technologies, and helps to establish vital local business networks. Therefore, local procurement provides immediate opportunities for creation of common benefits – benefits for both KGC and the communities in which we operate. More information about our local procurement strategy is available on our corporate website in the Procurement and Logistics section.

Some of our stakeholders may be surprised to learn that nearly 600 Kyrgyz enterprises supply our operations with almost 11,000 items needed for our day-to-day operations. For more than 8 years 100% of food products are purchased within the Kyrgyz Republic. We will provide more details about our partners, local suppliers of goods and services in this report.

Throughout the calendar year, KGC continuously provides work for about 1,100 contracted personnel of various trades and qualifications. The survey showed that the contracted labour predominantly (about 88%) originates from the Issyk-Kul province. This includes the major contributions of 44% from the Jeti-Oguz district, 12% from Ton district, with remaining 32% from other districts of Issyk-Kul province. In view of the relatively constant seasonal work scopes for currently contracted organizations, and the well-established labour and equipment sourcing processes from nearby towns and villages, then potential new providers of the same services must be well equipped, very experienced, and competitive. Building on this base, we continue our efforts to further expand the number of local suppliers. We proactively inform and communicate our requirements, and advise potential suppliers what they need to achieve to have the best chance of becoming a KGC supplier.

Fig. 2.6 **Local Procurement in Context**

	Units	2013	2014	2015
Total Payments for Goods and Services#	USD	413,494,920	377,760,751	279,731,777
Local Payments for Goods and Services#	USD	71,541,577	79,750,616	59,336,002
Local Payments for Goods and Services as % or Total	%	17%	21%	21%
Local Payments for Goods and Services as % of Adjusted Gross*	%	59%	58%	57%

 # These figures include the fees paid to the Kyrgyzaltyn Refinery

** Excluding original equipment manufacturer (OEM) capital equipment and parts, major consumables, and reagents that are not available for purchase in the Kyrgyz Republic and fuel import from Russia. This is slightly different to the figures included in the Direct Economic Value Generated and Distributed Table because it is based on actual invoices paid (including advance payments) and does not differentiate between operating costs and capital expenditure.*

> "Since 2008 100% of food products are purchased within the Kyrgyz Republic."

LOCAL PROCUREMENT

CHALLENGES OF PROCURING GOODS LOCALLY:

Businesses are informal
- not registered
- not paying taxes
- not keeping good records
- not using bank facilities

Poor health and safety practices
- danger of food-borne illnesses in locally procured food items
- products do not comply with international standards
- no certification

Small production capacity
- unable to supply large business demand
- no export potential

High production cost
- unable to compete with bigger, more efficient enterprises abroad

Low cash-flow
- unable to survive if they get paid 30 days after invoicing (standard for big businesses)

HOW KUMTOR IS HELPING:

Requires good business practices
- licensing and registration
- paying taxes
- record keeping
- use of bank facilities
- compliance with international health and safety standards & provide training

Helping businesses development
- fostering relationships with other development partners such as EBRD, who can help finance businesses
- helping businesses to harness national resources

Pays more for local goods in the short run
- allows small businesses to compete for lucrative contracts
- provides stable revenue for businesses to grow and improve

Flexible Supplier Payment System
- paying faster, sometimes even in advance

EFFECT ON THE LOCAL ECONOMY:

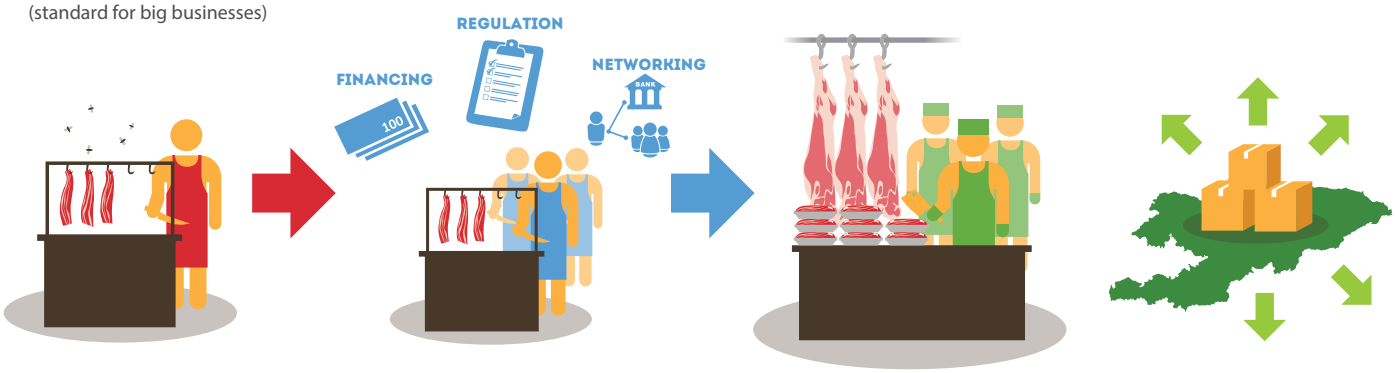
Formalization of business practices
- reduces corruption
- provides government revenue to pay for roads, schools, etc...
- job creation

Implementation of Health and Safety Standards
- lower risk of food borne illnesses
- access to new markets which have similar standards

Bigger production capacity.
- ability to supply larger companies
- potential to export surplus products
- ability to support themselves after mine closure

Business Growth
- stronger, more self-sustaining economy

Competitiveness
- ability to compete with larger, more affluent enterprises for Kumtor contracts



Who is eligible to be a supplier?

- Businesses who meet Kumtor's health and safety standards;
- Businesses who are licensed by the government and approved by Kumtor;
- Businesses who are not likely to have a conflict of interest, of any kind, with Kumtor;
- Businesses who can provide competitively priced goods and services on a sustainable basis.

Kumtor prefers dealing with local goods manufacturers vs. importing from abroad when possible.

C1. Local Enterprises
- Located in the in Jeti-Oguz, Ton or Ak-Suu Raion.
- Most preferred

C2. Regional Enterprises
- Located in the wider Issyk-Kul Oblast.
- Second preference

C3. National Enterprises
- Located in the Kyrgyz Republic.
- Third preference

C4. International Enterprises
- Last resort - used only if products can't be supplied from within the country
- Foreign enterprises twinning with local Kyrgyz enterprises to develop a local business, preferrably in the Kumtor Impact Region.

KUMTOR
КУМТОР

In 2015, we switched more than 15 goods and services from international to local suppliers, including a range of tools, personal protection equipment, consumables, and transportation services. In 2015, we continued to implement the local procurement improvement opportunities identified by the KGC Procurement Department and Engineers Without Borders, an international NGO. Details and examples of joint efforts of KGC and an NGO are outlined on the website: **www.miningsharedvalue.com/our-work/**.
Like most international mining companies operating in regions with a limited history of large scale or modern mining practices, KGC faces a number of barriers to sourcing more goods and services locally. These include Kyrgyz suppliers not being familiar with standard procurement processes, not initially meeting the high quality standards the industry demands, and a lack of financial resources or support to develop and sustain the quality and volumes of goods and services required for a major and long-term industrial operation. The level of interest from local suppliers seeking to deal with KGC is increasing. However, many suppliers copy successful ideas of other suppliers, and in doing so, try to displace them. We support existing and potential local suppliers to help them overcome these barriers. We encourage local businesses and entrepreneurs to think 'outside the box' and come up with new ideas, products, and services. In doing so, their business will be more sustainable and will create jobs and opportunities for the local community. Understanding their need for working capital, we pay suppliers quickly, often within days, and provide advance payment in appropriate cases involving long-lead items.

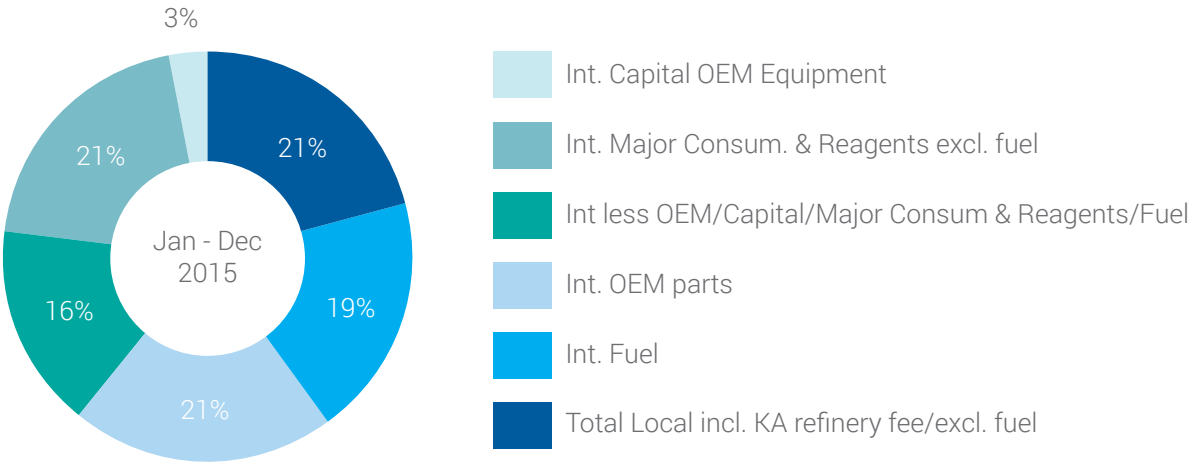
Local procurement brings significant benefits to KGC. It is one of the most effective ways for KGC to maintain its social license to operate, strengthen its relationship within the Kyrgyz Republic, and improve the supply chain efficiency. One of the priories of our procurement team is to increase the quantity and range of goods and services procured locally by KGC in order to create shared value for the company and the Kyrgyz Republic. We also aim to increase positive economic impact of the Kumtor Mine in the Kyrgyz Republic and in so doing, leave a positive legacy, which will further drive the development of the Mining sector and related industries.

Despite our continuous efforts for improvement, there remains a significant part of our procurement needs, which are not produced or readily available in the Kyrgyz Republic. Examples include specialized mining goods and services, such as heavy mining trucks, original equipment manufacturer (OEM) parts, tires, and major consumables and reagents. Also, as a large consumer of diesel fuel, we have to import a large portion of our fuel.

Our total expenditures on goods and services in 2015 was nearly $279 million. This included approximately $59 million procurement within the Kyrgyz Republic. When adjusted to exclude goods with no potential for local procurement, and imported fuel, over 56% of procurement expenditures remained within the Kyrgyz Republic in 2015.

- 2015 total spend represented by 1,037 suppliers (481 International and 556 Local)
- 80% of the total spend represented by 52 suppliers (39 International and 13 Local)
- 20% of the total spend represented by 985 suppliers (442 International and 543 Local)

Fig. 2.7 12-month Total Spend, International vs Local



Excluding OEM Capital Equipment, OEM parts, Major Consumables and Reagents not available for purchase in Kyrgyz Republic, and fuel, total spend for the period January 2015 – December 2015 was $103.16 mil, consisting of:

International Consumables, misc.
$44.75 mil/43.4%

Local Consumables, Services, misc.
$58.41 mil/56.6%

Leaving a Positive Legacy

We carried out an economic impact assessment of our business in 2014. This provided more detail on the impact Kumtor Gold has on the Kyrgyz economy, and helped us further determine where we could improve in this area. We plan to additionally update local procurement aspect in the scheduled revision of the Mine Closure Plan in 2016.

The current projected lifetime of the Kumtor Gold Mine is until 2026. We want our positive impact on the Kyrgyz economy to continue long after this time. Therefore, we encourage our suppliers not to be over-dependent on our business, but to use it as a catalyst to diversify their product and customer base. Many of our suppliers highlight that a contract to supply KGC is a mark of quality making their products more attractive to other potential customers. Looking ahead to 2026 and mine closure, we need to ensure that we do not cause greater socio-economic difficulties by having large numbers of suppliers suddenly closing once KGC stops operating. Therefore, we place an emphasis on helping businesses grow without relying on KGC as a sole customer.

Balykchy Marshalling Yard

Balykchy Marshalling Yard (BMY) is the central transportation hub for all materials arriving by rail. Materials are dispatched to the Kumtor Mine using mostly MACK (KGC) trucks and contracted transport (when necessary).

- An average of 220 rail cars and 60 truck loads are received per month;
- BMY dispatches an average 22 truckloads of goods and products to the mine site per day. These typically consist of 12 trucks of fuel, 5 trucks of ammonium nitrate, 1 truck of lime, and others containing ceramic grinding balls and consolidated containers containing equipment and reagents;
- Our self-owned fleet of trucks consists of 48 trucks, and we use an average of 1 contracted truck per day;
- The distance from BMY to the mine site is 250 km, which means distances of 347,000 km are travelled monthly, volume of transported diesel fuel per month amounts up to 11 million liters, and 2,800 tonnes of ammonium nitrate.

BMY consists of a fuel farm with a filling station. The fuel farm accommodates 6 tanks with capacity of 12,000 tonnes, two 100 tonne tanks for fueling trucks with diesel fuel, and one 200 tonne tank for gasoline. Other infrastructure includes warehouses, mechanical workshops, administration facilities and 3 guest houses, including 2 for senior management. 226 people are employed at BMY and the strategy is to employ people from local communities in and around Balykchy. We also make use of suppliers in Balykchy for material and product purchases, and maintenance work required for the day-to-day operational needs for BMY and its guesthouses.

Case Studies

In our case studies, we describe examples of local entrepreneurial companies - Vulkan Plus and fishery, which have become successful and valued suppliers to KGC. In addition, the major infrastructure relocation and camp construction project commenced at the Mine site in 2014 and was completed in 2015. The Project focused on local procurement of goods and services. One of the successful examples was procurement of furniture for the new camp from a national supplier. Two local companies were contracted for maintenance and repair of light vehicles, which was formerly done by the company.

LOCAL SUPPLIER OF RAINBOW TROUT

KGC has been cooperating with local fisheries since the launch of the Project. One of the successful examples of suppliers of fish is Ton district-based private entrepreneur Turganbaev Bekjan. Annually KGC purchases about 8 tonnes of local trout fish for the average amount of 50,000 US dollars per year.

Supplier follows strict rules and comply with the Kyrgyz Republic sanitary standards and KGC's requirements in terms of quality, delivery and storage conditions. All trout is supplied in frozen condition. Stable and frequent purchase orders from KGC allows the supplier to widen its business and to develop further. Now the fishery supplies trout to 15 cafés and 15 resorts within Issyk-Kul region and the city of Bishkek. They are also working on diversifying their business and planning to supply trout fish to Kazakhstan and Russia.

The enterprise employs 5 workers servicing 20 pools with trout fish located in the mountains near Turasuu village in Ton region. Two representatives are spreading live and frozen trout fish between customers on a daily basis. Mr. Turganbaev helps other suppliers of fish to develop further by selling juvenile fish to them, and providing them with consultations.

VULKAN PLUS – LOCAL SUPPLIER OF GRINDING BALLS

Each year KGC needs to mill and crush more than 5 million tonnes of ore to fine sand to be able to liberate and process the fine gold it contains. This requires the use of 8,000 tonnes of steel balls used in the ball mills. These steel balls are an essential consumable and must meet defined specifications of hardness, chemical composition, shape, and size. Until 2012, all of KGC's grinding balls were procured internationally.

Local company Vulkan Plus was established in 2012 with the primary purpose of supplying KGC with a portion of its grinding balls. KGC purchased approximately $3 million of goods from Vulkan Plus in 2015, allowing them among other achievements to become one of the largest taxpayers in the region. Moreover, KGC allocates scrap metal from the mine site to Vulkan Plus for processing, which in turn, help us to improve our waste management and eliminates the need to seek for additional sources of supplying metal for grinding balls production. We also helped to teach personnel on the main health and safety procedures, cost efficiency and reviewed optimization processes. Now the plant is trying to acquire ISO 9000 with the help of foreign specialists and volunteers from Engineers without Borders.

This is a clear demonstration of our commitment to supporting and encouraging local procurement. Vulkan Plus now is able to employ around 120 workers.

3 PEOPLE

3.1 | WORKPLACE PRACTICES

KGC maintains a high level of care and responsibility for our workforce, including contractors. We train and equip our workforce to operate safely, and to protect themselves and fellow employees. Employees' health and diet is monitored, and they are trained to work with respect for the natural environment around them.

Labour and Local Hiring

We continue to maintain a high percentage of Kyrgyz nationals among our full-time employees, rising from 95% in 2011 to 97% by the end of 2015.

Worker Compensation

We believe the biggest contribution we make to the well-being of local communities is through creation of long-term, well-paid employment opportunities. This helps not only the employee and their family, but also provides wider economic benefits to their communities. Our pay rates are far above the Kyrgyz average, with the entry-level wage in 2015 thirteen times higher than the national minimum wage. The satisfaction of Kyrgyz employees is reflected in the fact that many remain working for us long term.

Employee Benefits

The benefits we provide to our full-time employees include:

- Cash awards for significant work anniversaries, births, and child adoptions;
- Home improvement loans;
- Vacation and rest allowances;
- Sick pay for temporary incapacity from work related injury or illness;
- Funeral allowances and many other benefits.

Collective Bargaining

Freedom of association is a human right defined by international declarations and conventions, and support of the principles of collective bargaining is part of a framework of responsible management at KGC. The Collective Contract signed between three trade unions (that currently exist in the Company) and KGC administration (effective from January 1, 2015, to December 31, 2016), covers 84% of employees. This Contract covers a wide range of issues, including labour compensation, inflation increase, probation, work schedule, health and safety, benefits for employees and their families, as well as labour dispute resolution. It also includes a notice period of one month for significant operational changes. Staff commit in turn to perform their job duties safely and with good quality, adhere to labour discipline, not to hold illegal strikes, etc. The Collective Contract stabilizes and guarantees labour relations at the largest gold mining company in Kyrgyzstan for the next two years.

Fig. 3.1 **Standard National Entry Level Wages and Those Paid by Kumtor**

	units	2013	2014	2015
Kyrgyz minimum wage per hour	KGS	5.18	5.40	5.80
Kumtor entry-level wage per hour	KGS	65.86	73.34	78.20
Kumtor entry-level to Kyrgyz minimum wage ratio		13:1	14:1	13:1

> “Our pay rates are far above the Kyrgyz average, with the entry-level wage 13 times higher than the national minimum wage.”

Fig. 3.2 Proportion of Kyrgyz Citizens as Full-time Staff

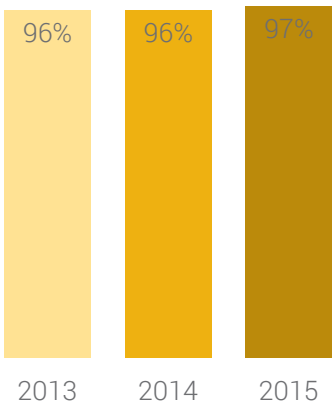
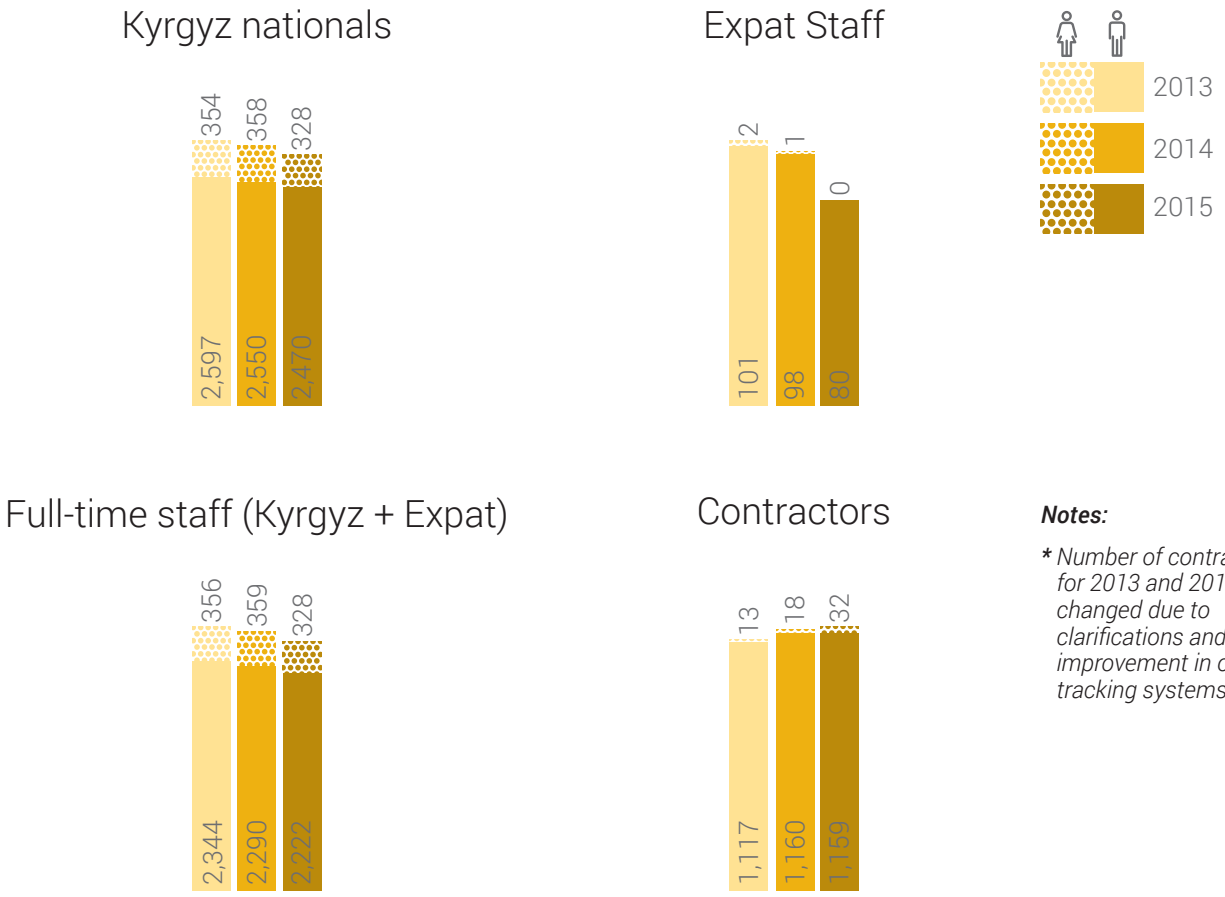


Fig. 3.3 Employee Demographics at KGC*



Notes:

** Number of contractors for 2013 and 2014 changed due to clarifications and improvement in our tracking systems.*

Fig. 3.4 Total Workforce by Region and Gender

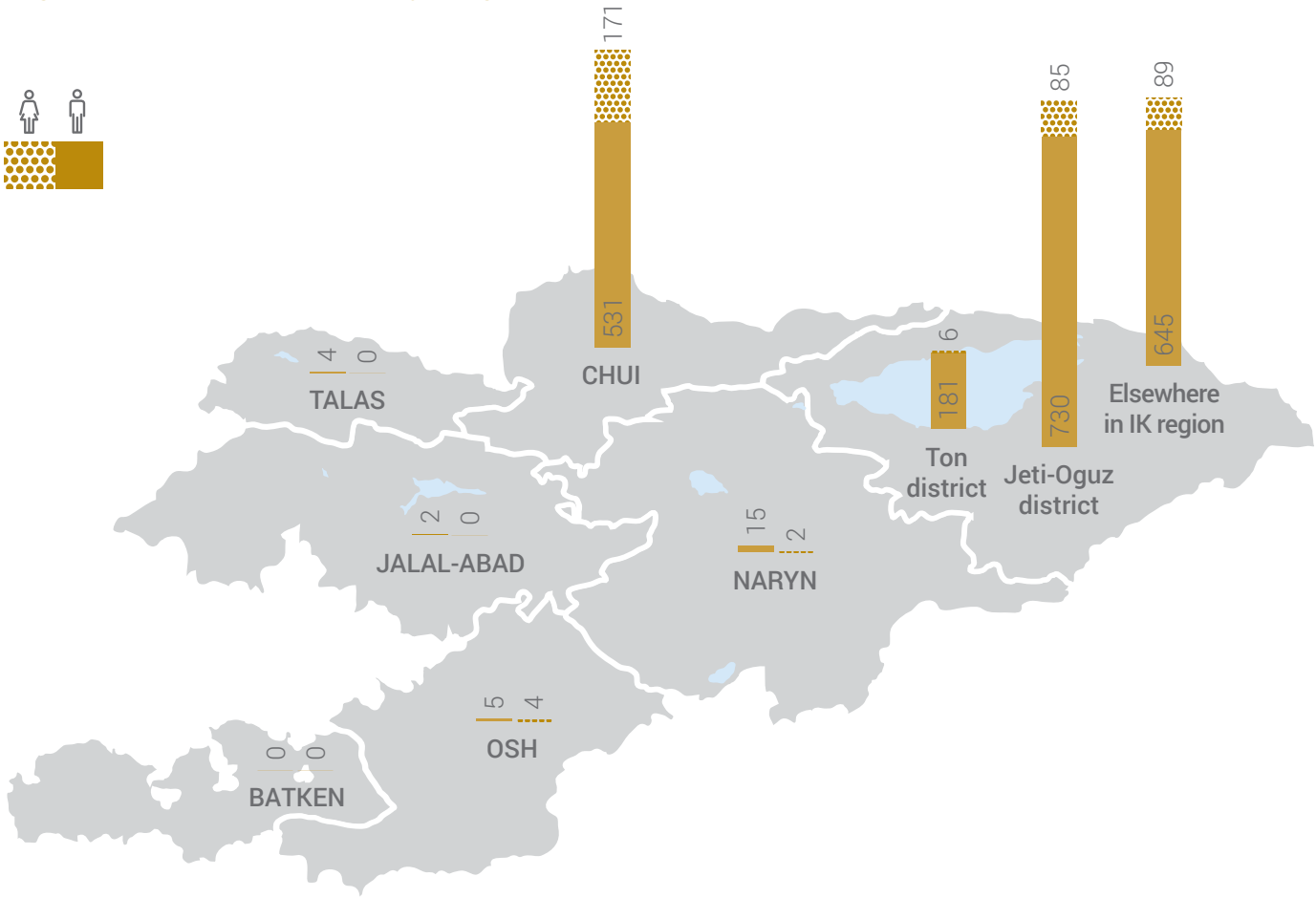


Fig. 3.5 Number of Contractors by Region and Gender

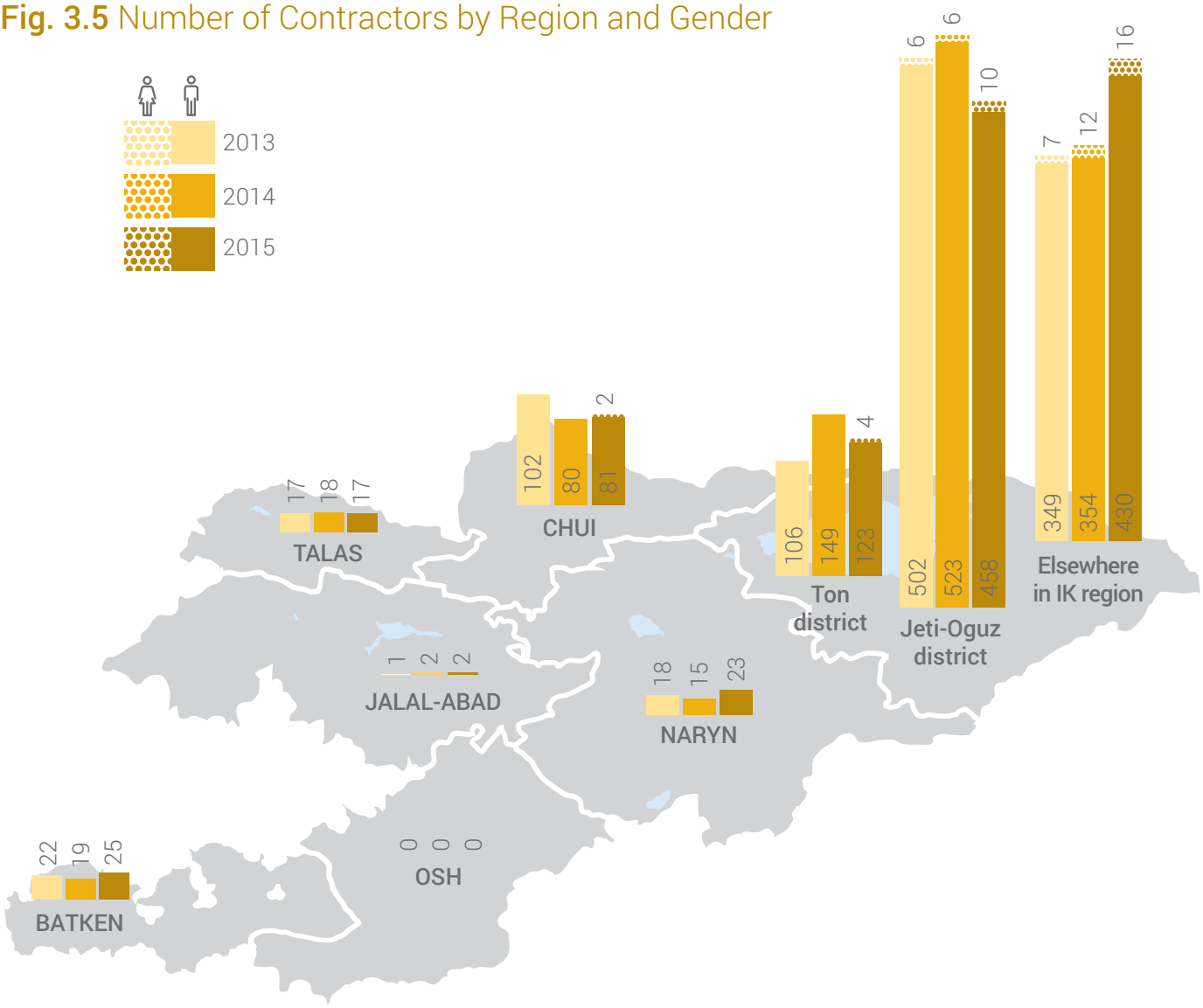


Fig. 3.6 Total Number and Rates of New Employee Hires and Employee Turnover by Gender and Region

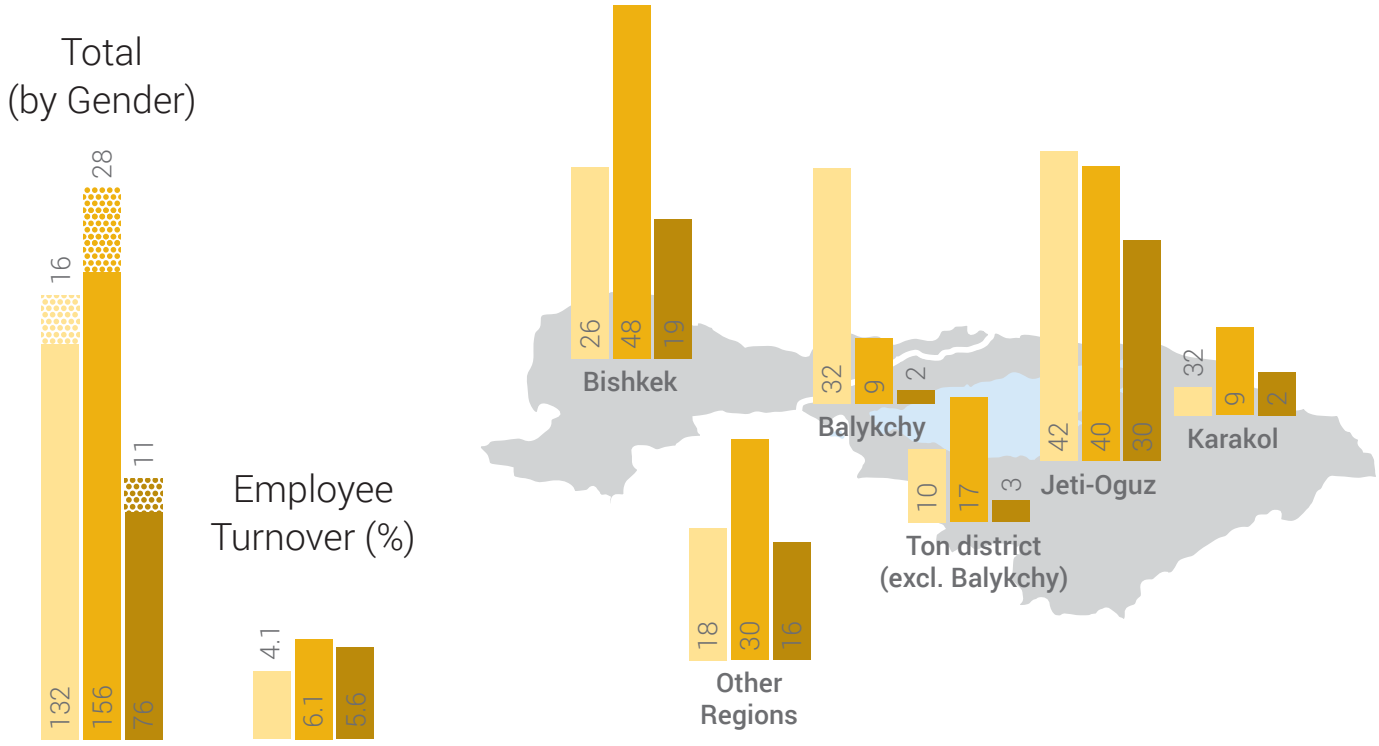
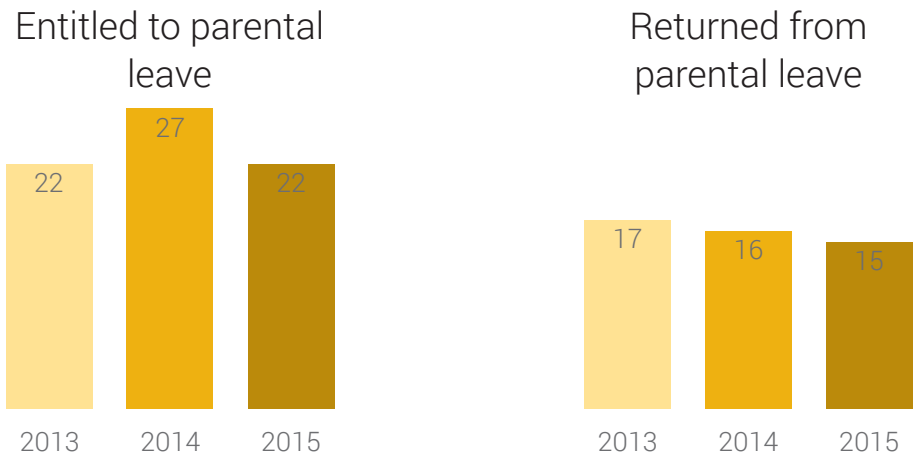


Fig. 3.7 Return to Work and Retention Rates After Parental Leave (Female Employees)



Recruitment Process

KGC has a policy to ensure its recruitment process is open, transparent and fair, as defined in the Policy and Procedure documents on National Employment and Recruitment and Selection. We have clear criteria on defining who is eligible for consideration, and we operate a clear and open recruitment process.

As it is standard for employment in an advanced industrial operation, we have minimum eligibility requirements. Depending on the position, candidates must meet minimum education and qualification requirements and pass appropriate medical examinations to demonstrate fitness and good health given the high altitude conditions at the mine site. Some positions require specialized state-issued certificates, for example, for drilling and blasting work. Our recruitment process covered in the infographic on the next page.

> “Family or personal connections provide no bias or benefit in the selection process.”

KUMTOR HIRING PROCEDURE

Kumtor is regularly on the lookout for people with specific skills, initiative, and good character to help take the company forward.

To find these people we have strict procedures in place:

FIND INTERNAL CANDIDATES

We give current employees, who are interested, the chance to apply for an open position first.

WHEN QUALIFIED INTERNAL CANDIDATES CANNOT BE IDENTIFIED, A FORMAL REQRUITMENT CAMPAIGN IN HELD.

EMPOYMENT OPPORTUNITY ANNOUNCEMENT

Advertising for an open position is done through all media (newspaper, TV, web). The community relations department uses all possible channels to notify the local community.

APPLICATION

Application forms are provided by the local administration and are also available at all company offices - located in Bishkek, Karakol, Balykchy, Bokonbaevo, and Kyzyl Suu.

Applicants must have all the required qualifications, skills, and experience to be considered.

INTERVIEW

The top candidates whose skills, education, and experience best fits the position will get interviewed and take a written evalutation.

SELECTION

The candidate whose experience and evaluation results best meet the requirements will be selected. Where possible, we try to select candidates from a wide range of communities.

THE FINAL HIRING DECISION IS MADE BY THE COMPANY ADMINISTRATION.

ATTENTION!

Employment at Kumtor is not for sale.

You should not have to pay anyone.

Please contact 0800 223-23-23 or 0312 90-07-07 if you are approached with a job for money offer. Such offers are **illegal** and go against Kumtor policy.

KUMTOR
КУМТОР

Employee Training

All new KGC employees, students and contract partner employees receive Safety Induction and Initial Health, Safety and Environment Instruction, First Aid Training along with regular annual refresher training. Training covers safety orientation, first aid, firefighting, emergency response, workplace hazards, materials safety, transportation of dangerous goods, defensive driving, forklift truck operation, work permits, radiation hazards, vessels under pressure, working in confined spaces, handling cyanide and other chemicals, hearing protection, ultraviolet radiation, frost bite and hypothermia.

- Mandatory and Compliance Safety training totaled 50,697 hours for the year 2015 for more than 1,700 employees, students and contractors;
- Sessions for new employees, students and contract partner employees - 15,343 hours;
- Annual Refresher sessions - 21,602 hours;
- Red Crescent First Aid Certification Training - 13,752 hours.

During 2015 KGC invested approximately $2.8 million for the training of employees, students and contract partner employees compared to 2014, when we invested $1.2 million. KGC employs more than 35 full-time dedicated training staff and KGC also utilizes the services of external training providers, such as Red Crescent Society of Kyrgyzstan, Training Centre under the State Agency of Geology and Natural Resources, Bishkek Business School, Borusan Makina and several other local and international training providers.

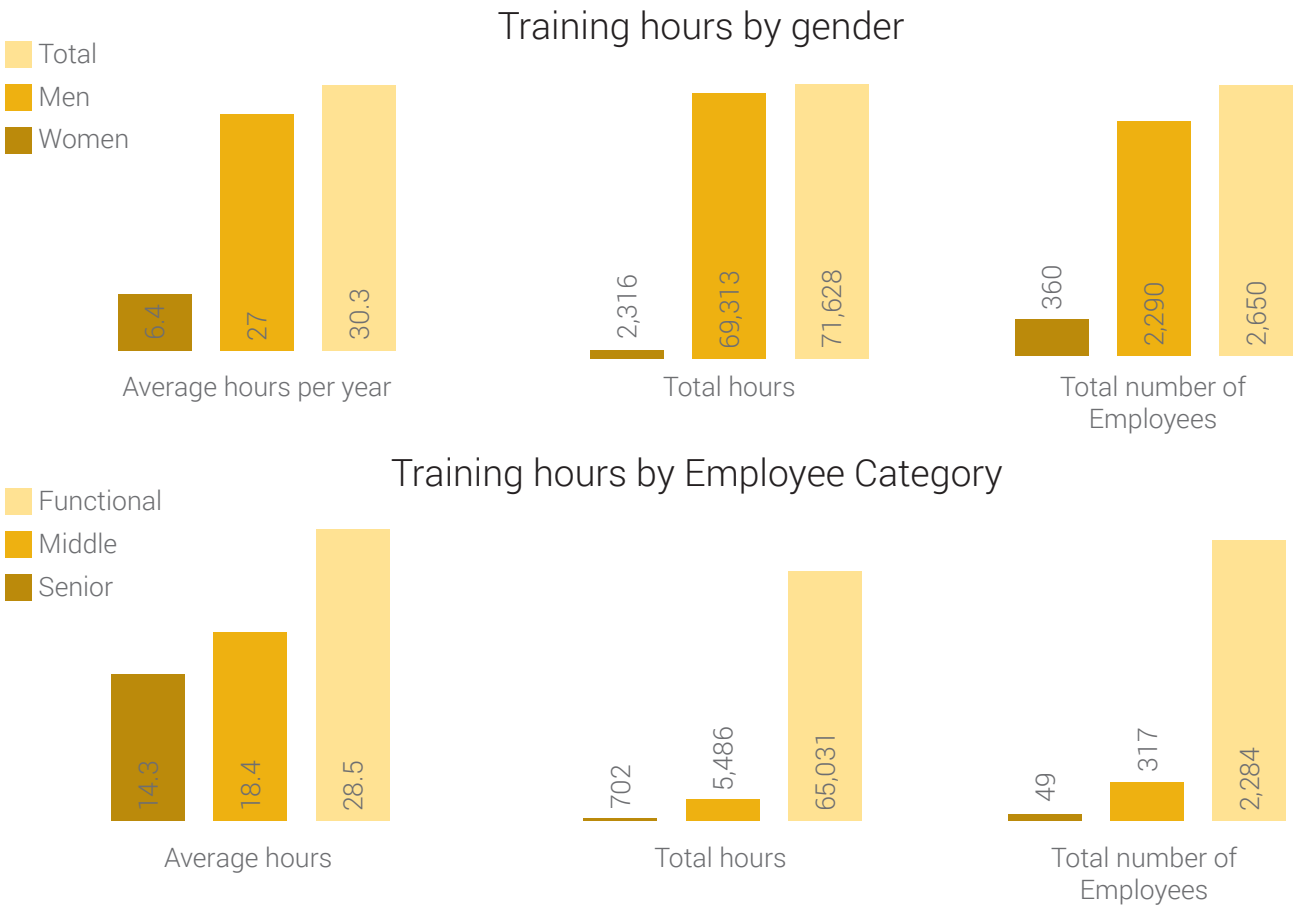
The total value of $2.8 million includes all cost associated with training from all KGC departments and includes all costs incurred with employing training staff, maintaining facilities, contracts with local and international providers, etc.

Three training facilities established in 2014 in Karakol, Balykchy and Bishkek continued their operation in 2015 proving to be a cost and time efficient decision in terms of process of optimization. It allowed KGC employees, students and contract partner employees the opportunity to attend any required training during their off-duty time in a location close to their place of residence.

All regular workers - especially those in charge, engineers and technicians - are trained in specialized centres and receive certification from government agencies in hazardous operations, in accordance with the law of the Kyrgyz Republic.

KGC continues to develop an electronic Training Management System with a software supplier. This will enable more efficient scheduled training, centralize the collection of quality training data, and enhance reporting.

Fig. 3.8 Average Hours of Training per Year per Employee by Gender, and by Employee Category (2015)



GRADUATE DEVELOPMENT PROGRAM

KGC introduced the two-year Graduate Development program in 2006, intended to attract high caliber post-secondary graduate students whose areas of study are closely related to the mineral extraction industry.

Recent graduates are eligible to apply for the program that allows them the opportunity to gain practical experience by applying their theoretical knowledge and expertise in the workplace. They are also given opportunity to become familiar with the interaction of departments within the company and the structure of KGC and Centerra Gold Inc.

During May 2015 KGC representatives conducted presentations at numerous universities in Bishkek promoting the program and as a result received more than 80 applications for the 10 available positions

This Graduate Development Program has been instrumental in KGC's ability to recruit, develop and retain many talented graduates that have chosen employment with KGC following completion of the program.

Since inception of the program, 53 graduates have been recruited, with 38 gaining full-time positions or continuing to participate in the program, including 4 that are now in supervisory positions.

2015 professional development opportunities for employees included:

- Education assistance support to obtain higher education degrees at institutes of higher learning, examples of this are roles requiring technical diplomas or MBAs, financial support and education leaves are granted as per Policy 1-25;
- Overseas short program learning opportunities, in business, management, employee development and other role-specific programs are arranged for employees allowing them to increase skills and to perform more effectively in their roles. This training would normally be part of the employees' individual development plan and a part of the overall KGC succession plan;
- Overseas technical learning opportunities in skills development specific to operational departments designed to equip employees with the technical skills to keep up with a changing technological environment;
- In 2015 we introduced Professional Development training for KGC Supervisors and Managers utilizing local businesses offering training in supervisor skills development, effective management techniques and the coaching and mentoring process;
- Team building and coaching/mentoring sessions for mid-level and senior-level managers providing a venue to build comradery and a sense of working together to achieve the company's business plan. These workshops and sessions are facilitated by a local Professional Development coach under contract with KGC.

Apart from investing in the education and training of current employees, KGC has programs designed for the younger generation – our potential future workers. Also, in agreement with Technical School #27 and Technical School 91, KGC sponsored Red Crescent First Aid Training for 10 Instructors from each institution. After completing the eight-hour training session instructors were awarded First Aid Certificates that are valid for 2 years.

The Regional Scholarship Program for students completing high school, and keen to pursue a vocational career, has been running since 2000. More information about the Scholarship program is available in the Social Responsibility Section of the Report.

3.2 | OCCUPATIONAL HEALTH AND SAFETY

When mining at the high altitude of 4,000 meters, the major challenges are living and working in a cold climate and reduced oxygen levels. Average annual temperature is minus 8°C with a minimum as low as minus 38°C.

Our employees receive regular health checks and support, are provided with high quality safety clothing, and receive health and safety training to protect themselves and co-workers. We record and analyze incidents and near misses, and maintain an emergency response team that performs regular training exercises. Our motto is **"No job is so important that we cannot take time to do it safely."**

Medical Screening and Wellness

Our employees undergo annual medical examinations, in particular with respect to ensuring they are fit to travel and work at the mine site with reduced oxygen conditions. To assist with these examinations, KGC has several contracts with local state polyclinic in Bishkek and Issyk-Kul regions. In 2015, 2,181 employees passed annual medical examinations, 362 passed pre-employment screening, 173 employees were referred for special medical examinations and 22 employees were classified as medically unfit to work at the high altitude mine site.

KGC maintains medical clinics and staff in Bishkek, at the BMY and at the mine site, with trained medical staff including doctors and nurses. Some expatriate employees and visitors receive medical checks at the Bishkek clinic to verify their fitness to work at the mine. On arrival at site, they receive a further check, and if necessary, treatment is given if any symptoms of acute mountain sickness (AMS) arise. A barometric chamber and oxygen are always available on site to help treat persons with symptoms of AMS.

We have pro-active health programs to motivate our employees and improve their general health and wellbeing. Every year we conduct a flu prevention vaccination program, which included 1,000 employees during the 2014/15 winter season. Our monitoring shows that upper respiratory tract infections remain the principal cause of illness and work absence. We have been running a smoking cessation program since 2002 consisting of a number of parallel initiatives including individual counselling, medication and allocating areas outside of the work place where smoking is permitted. This latter provision is particularly important for reducing the risks of passive smoking.

A nutrition-monitoring program has been conducted since 2010, which includes individual counselling of employees on their nutrition and reviewing the nutritional balance of food, provided at the mine camp. For every meal, a wide choice of high quality, freshly prepared food is available, providing for personal and cultural preferences, and entirely sourced from companies within the Kyrgyz Republic.

Fig. 3.9 Medical Screening and Visits

> No job is so important that we cannot take the time to do it safely.

automatic 6,000 lost work days is counted for the fatality and 21 lost work days for the LTI.

Accident Reporting

We run a program to identify, record, assess and control accidents, hazards and Near Misses. When any employee observes or identifies a hazard or a Near Miss in an operational area, they are required to complete an industrial hazards or Near Miss form and submit it to the Safety Coordinator. The Coordinator then evaluates the risk and according to risk classification, implements appropriate measures to remove the hazard or Near Miss and reduce any future risks from taking place. In 2015 we significantly improved our key health and safety indicators. No fatalities were recorded in the reporting period.

Our key health and safety statistics are shown in the table overleaf.

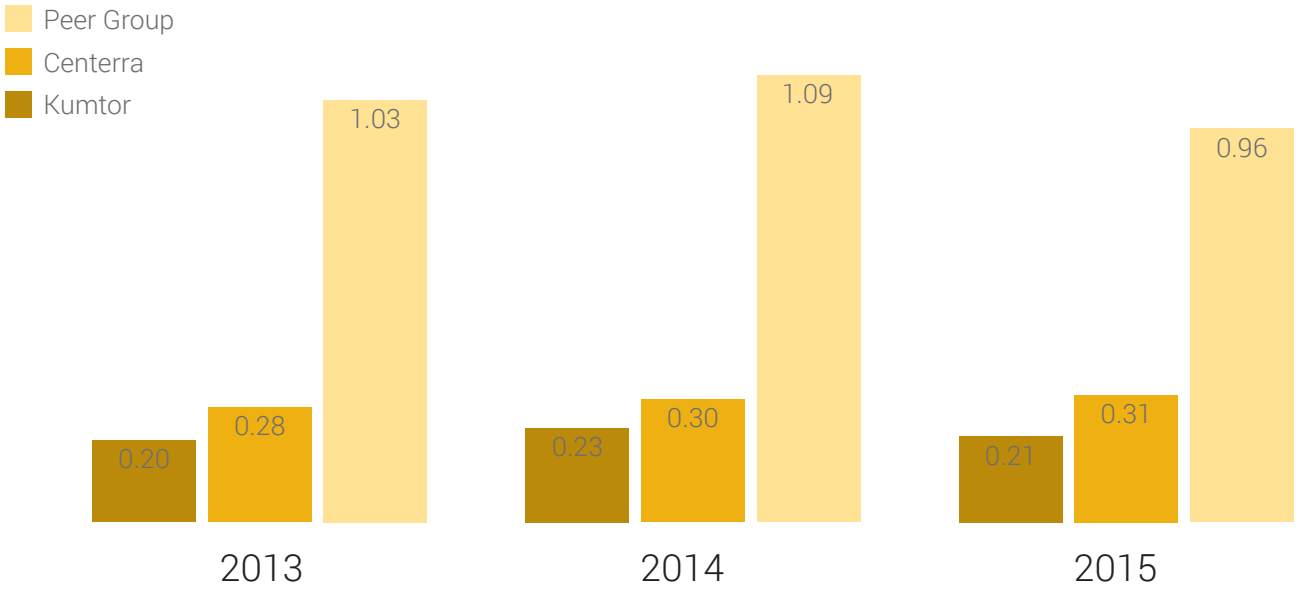
Fig. 3.10 **Key Health and Safety Statistics**

	Units	2013	2014	2015
Hours worked	Hours	5,925,671	5,981,799	5,734,240
Lost Time Injuries (LTI's)	Number	5	4	3
Medical aid	Number	1	3	3
First aid	Number	24	16	16
Days lost to injury	Days	82	6,093	52
LTI frequency rate	No. of LTIs per 200,000 hours worked	0.77	0.13	0.10
LTI severity rate	Lost time days per 200,000 hours worked	2.77	203	1.81
Reportable Injury Frequency Rate (RIF)	No. of Reportable Injuries per 200,000 hours worked	0.20	0.23	0.21
Incidents with Property damage	Number	77	38	31

Note: *See Glossary for definitions of key terms*

**The large variance in this table for days lost to injury and the 2014 LTI severity rate is due to the fatality and lost time injury that occurred when our subcontractor was climbing to service a Kumtor high altitude communications repeater. Based on international standards, an*

Fig. 3.11 Reportable Injury Frequency Rate: KGC/Centerra vs Peer Group



Centerra is a member of the global Mining Safety Round Table group (Peer Group) consisting of other global mining companies that are all mostly based in North America but do business across the globe. Peer group members meet 3 to 4 times a year to exchange and share mine safety best practices as well as research and test innovative technologies for the mining industry. As well, if/when one of the members is having difficulty with a particular issue, possible solutions are discussed and shared. TRIF Rates are shared on a bi-yearly benchmarking exercise.

Reducing Vehicle Incidents

A special focus for employee awareness remained, as for previous years, on vehicle incidents with collisions and over-turning vehicles in the mine pit considered the most significant risks. Our program has been successful in reducing vehicle accidents by half compared to 2011. The table below shows the key vehicle accident statistics for the past few years, which we post on information boards around the mine site alongside photographs of recent incidents as a regular reminder of the constant need for

care when driving. We also continue to improve driver skill and awareness through job assessments and training. Currently we are in the process of reducing Light Vehicle permits/licenses in the pit in an effort to reduce the risk of Heavy Equipment and Light Vehicle interaction.

Cyanide Transport and Handling

Cyanide is an essential chemical for gold extraction, which must therefore be transported to site. In 1998, there was a cyanide spillage incident during transportation from the Balykchy Marshalling Yard to the mine site. An independent International Scientific Commission review was carried out shortly afterwards. The report concluded there were no serious or lasting environmental impacts, including no short or long-term damage to Lake Issyk-Kul, and there were no reported deaths that could be attributed to cyanide exposure. The full report can be downloaded from the Kumtor website **www.kumtor.kg**. Since April 2012, Kumtor is certified by the International Cyanide Management Institute (ICMI) for transportation of cyanide from the Balykchy Marshalling Yard to the mine site in accordance with the International Cyanide Management Code.

Emergency Prevention and Response

We have Joint Environment and Occupational Health and Safety Committee, consisted of 326 representatives from management, employees, and contractors from various locations of the Company.

We maintain a 24-hour voluntary emergency response team with a medical doctor, ambulance and extensive emergency response equipment at the mine site. We review and update our emergency response plans annually, provide training and conduct periodic drills. Mock training exercises and an annual competition involving the Company's team and others (such as Ministry of Emergency Situations, local communities and Kyrgyzaltyn) contribute to our preparedness and emergency response capabilities. Our training is in accordance with the Kyrgyz State Inspectorate for Environmental and Technical Safety. Our emergency response training is aligned with international practices. If significant events occur we analyze and learn from them, review our emergency procedures and improve them as appropriate.

Fig. 3.12 **Vehicle Incident Reduction Program (total number of incidents)**

	2013	2014	2015
Overall vehicle accidents	17	17	12
High-potential injury risk - light vehicle accidents	1	4	2
In-pit heavy versus light vehicle collisions	1	4	2
Injuries due to vehicle accidents	1	2	1

Emergency Team Trainings and Exercises

Every Saturday, between ten and fourteen emergency response team members from all mine site locations go through Emergency prevention training sessions and exercises.In 2015, we conducted 52 training sessions, totaling to 260 hours. Additionally, every year, team members are trained in a specialized Training Centre under the Ministry of Emergency Situations of the Kyrgyz Republic. Command-post exercises for threats and emergencies are held at the district level with participation of the Kumtor emergency response team every third year.

> "We remain vigilant and constantly communicate the need for awareness to our employees."

4.1 | ENVIRONMENTAL RESPONSIBILITY

We consider responsible environmental management an important part of our business.

Environmental Expenditures

We operate a full-time Environment Department of over 26 people at the mine site. Our total annual expenditure on environmental management exceeds $6.8 million for a range of activities including monitoring, laboratory analyses, external consultants, waste disposal, emissions treatment, water treatment and environmental impact prevention/minimization.

Focused Environmental Studies and Projects

We completed a range of focused environmental projects during 2015 – all aimed at improving our environmental management practices or our understanding of the natural environment and our impact upon it. These studies involved staff of the KGC Environment Department working with international consultants, many scientists and researchers from the Kyrgyz National Academy of Sciences, Kyrgyz National Agrarian University, and, as well as other national scientists, postgraduates and researchers. These projects included:

- Continued monitoring of traffic and dust concentrations in the Barskoon Valley in accordance with international standards;
- A variety of fauna and hydro-biological surveys within the KGC concession area including observations of Marco Polo sheep, mountain goats, wolves, and foxes;
- Continued studies into the potential risk of CN impacts on biodiversity around the tailings dam – as part of demonstrating compliance with the International Cyanide Management Code;
- Further support and cooperation with Flora Fauna International (FFI) to improve biodiversity conservation and management in the SCER;
- Continued research into appropriate rehabilitation techniques for disturbed land, including the establishment of rehabilitation trial plots and top soil stockpiles long-term storage;
- Completion of a Risk Assessment to consider potential 'gradual' release events during the Life-of-Mine and post closure;
- Demonstration scale research into the use of wetlands to reduce concentrations of ammonia and heavy metals from the waste rock dump runoff and ETP discharge;
- Integrated Waste Management Program aimed at reducing the amount of waste landfilled in the mine site and optimizing the waste management related costs;
- Monitoring of glaciers and meteorological conditions on the KGC concession area and the basins of the Arabel and Uchkol Rivers;
- Controlled lowering of the water level in Petrov Lake to reduce the risk of a Glacial Lake Outburst Flood (GLOF).

Fig. 4.1 **KGC Environmental Protection Expenditures and Investments (USD)**

	2013	2014	2015
Waste disposal, emissions treatment	3,969,131	4,036,409	3,456,740
Prevention and environmental management costs	2,878,554	3,547,008	3,344,100
Total annual environmental protection expenditures	6,847,685	7,583,418	6,800,840

> “Our total annual expenditure on environmental management exceeds $6.8 million.”

4.2 | ENVIRONMENTAL MONITORING

Our monitoring programs follow Kyrgyz and international standards, and include:

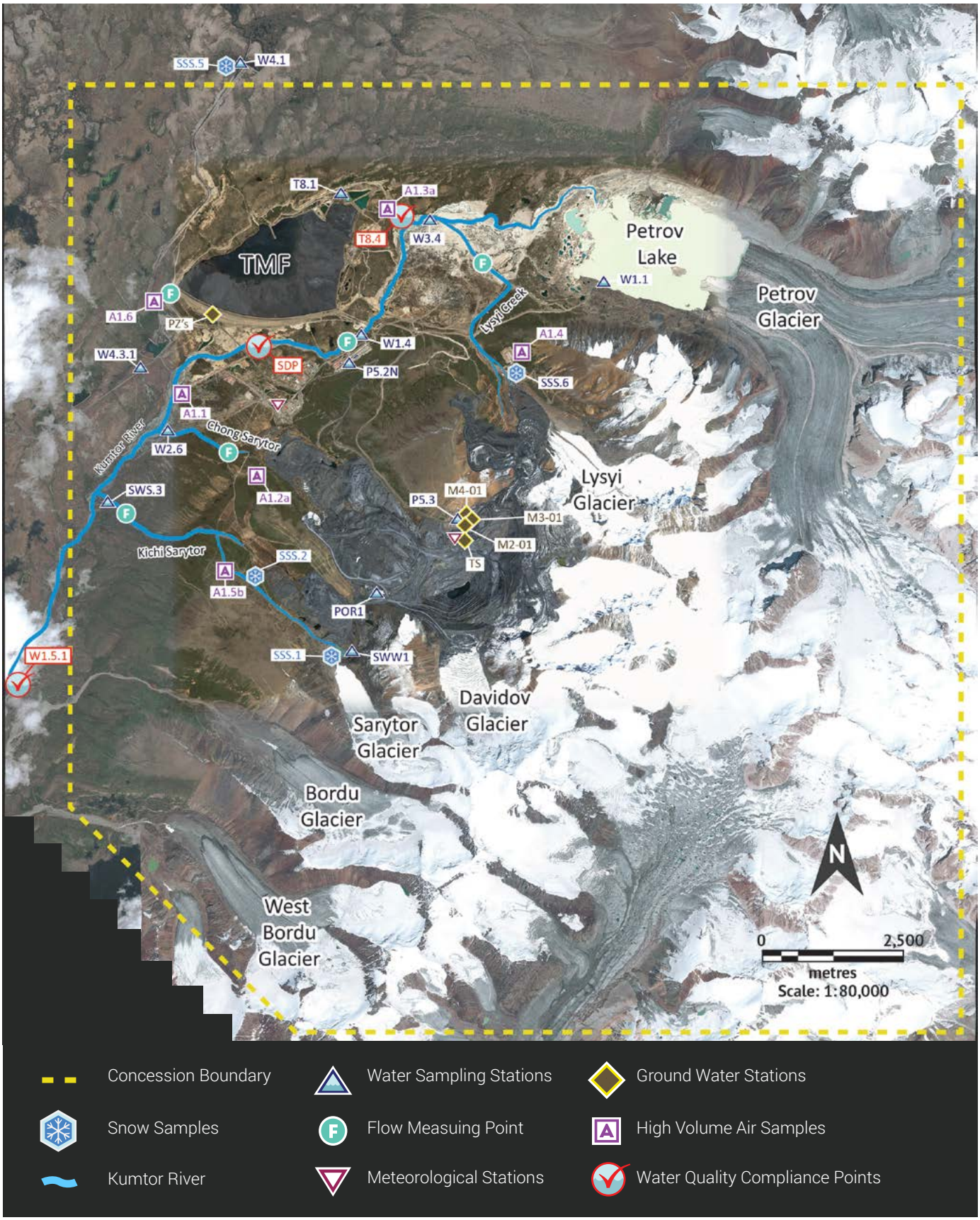
- Water quality and flow;
- Effluent quality and flow;
- Biodiversity;
- Air quality;
- Waste streams;
- Acid rock drainage;
- Meteorology.

The locations of key monitoring points are detailed in Figure 4.3 on the next page.

Fig. 4.2 **Description of Key Water Quality Sampling Points**

Station Name	Location Description
W1.1	Petrov Lake outflow – Kumtor River Head Waters (alpine glacier fed lake – elevated Al, Fe)
W3.4	Lysyi Creek before joining Kumtor River
W1.3	Kumtor River after confluence of Lysyi Creek and just before ETP discharge
TPX	End of tailings spigot - discharge into Tailings Management Facility (TMF) pond. Discharge point moves along dam wall.
T8.1	Tailings Pond (feed to ETP)
T8.4	ETP discharge point into Kumtor river (MAD limits apply)
W1.4	Between Kumtor bridge and flume 1km downstream from ETP discharge
SDP	Treated sewage discharge point into Kumtor River (MAD limits apply)
W4.1	Head water of Arabel Suu diversion ditch (background level)
W4.2	Lower Diversion Ditch (LDD)
W4.3.1	Discharge of Upper Diversion Ditch (UDD) sediment pond to Kumtor River
W2.6	New Chon Sarytor Creek in Central Valley Wasted Dumps before joining Kumtor River
POR1	Pit water collection sump before discharge to Kichi Sarytor Creek
SWS.3	Kichi Sarytor Creek before joining Kumtor River
SWW1	Meltwater from Sarytor glacier
W1.5.1	Kumtor River, just downstream from Kumtor Concession Area (voluntary compliance point)
W6.1	Arabel-Suu River, 6km from Kumtor Concession Area (background level)
W1.6	Kumtor River, 17 km from Kumtor Concession Area (before confluence with Taragay River)
W1.7	Taragay River, 40 km from Kumtor Concession Area (Kumtor + Kashka Suu + Maitor Rivers)
W1.8	Naryn River in Naryn City, approximately 230km downstream from Kumtor Concession Area
W1.8F	Naryn River just after Naryn City
P5.2N, P5.3	Potable (treated drinking) water - Camp and mill

Fig. 4.3 Key Environmental Monitoring Locations



Meteorological Monitoring

We have a mutually beneficial arrangement with the Kyrgyz hydro meteorological agency. One of the monitoring stations is a formal part of the national weather network, which provides local weather forecasts, important for safe and efficient operation in the extreme climatic conditions on site. In addition, KGC has installed automated meteorological stations, first in 1996, and an additional one in 2012. These stations collect and report data in accordance with Canadian Atmospheric Environment Services protocols. The Saskatchewan Research Council in Canada is contracted to calibrate sensors and ensure they function correctly.

ENVIRONMENTAL DATA MANAGEMENT SYSTEM ADOPTED AT THE MINE

To minimize the risk of human error and ensure quality control of data we adopted a comprehensive and integrated Environmental Data Management system, MP-5. This helped to automate the data collection process as much as possible.

Field data is now entered directly using iPads and synchronised later in the office, external laboratory reports are directly imported, and some environmental monitoring instrumentation (stream flow, weather etc) imports data directly into MP5. The system helps to analyze and interrogate data quickly and accurately, and report on compliance against environmental standards.

Warning and compliance levels have been established in the system to ensure any data which is outside of specified ranges leads to an alert emailed to responsible employees and management. The majority of environmental data is now entered directly into the system, minimizing the risk of human error and leading to the removal of most paper templates and spreadsheets from use.

Hydrological Flow Monitoring

We track hydrological flows of the main water bodies within the concession area. These include Kumtor River and its principal tributaries (including Chon-Sarytor, Kichi-Sarytor and Lysyi Creek), Petrov Lake, and the Upper and Lower Diversion Ditches that divert the Arabel River around the tailings management facility.

The Kumtor River flow generally peaks between June and September each year. In 2015, a peak of 36.72 m^3/s was recorded on July 22, 17.88 m^3/s more than the peak in 2014. In 2015, the total annual flow of Kumtor River at the flume within the concession area was 104.7 million m^3, 13.15 million m^3 more than in 2014. The flow at the End of Mixing Zone (also called W1.5.1), KGC's main water quality compliance point, was estimated to be 118.4 million m^3, 3.8 million m^3 more than 2014. These variations are not considered significant in the context of normal year-to-year fluctuations (see Fig. 4.4).

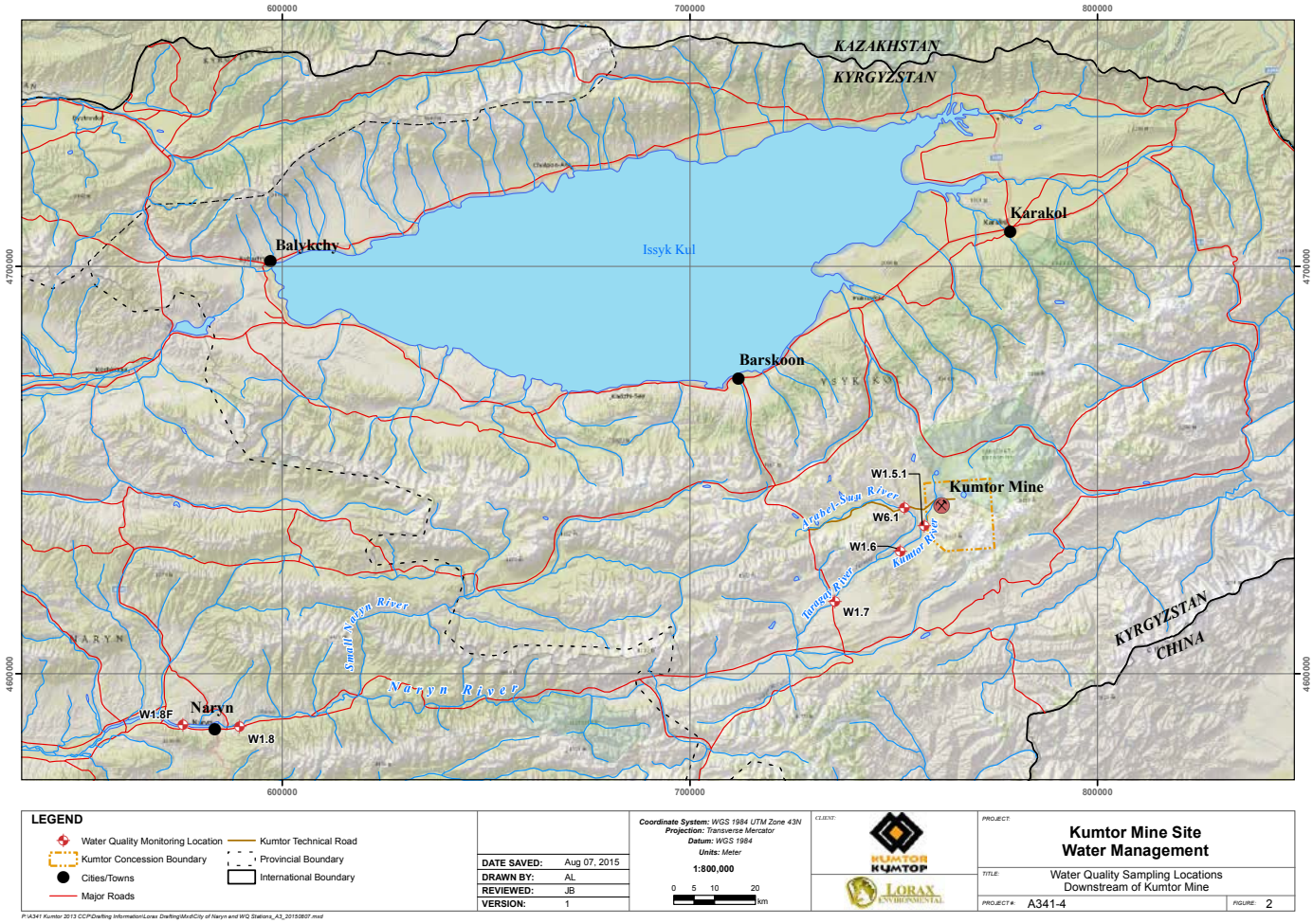
We also monitor water levels in Petrov Lake, which serves as the fresh water source for Kumtor Mine site. The highest recorded level was 3,734.49 m above sea level in July 2015 (compared to 3,734.06 m in 2014) and the lowest was 3,731.55 m at the end of December 2015 (compared to 3,732.24 in 2014), representing an approximate 0.7m difference – a reflection of our efforts to lower the Lake level in a controlled fashion.

As the Kumtor River flows downstream after leaving the concession area, it receives additional flow from many tributary streams and rivers. At the nearest town, Naryn, approximately 230km downriver from Kumtor, the flow increases to an estimated 2,340 million m^3 per year. Our water use at the mine site has no measurable impact on river flows at Naryn since the volume extracted each year from Petrov Lake represents just approximately 0.2% of average flow at Naryn. The treated effluent discharged back to the Kumtor River also reduces the net extracted volume (Fig. 4.5).

Fig. 4.4 **Kumtor River Flow**

Monitoring station	units	2013	2014	2015
Annual Flow in Kumtor River at flume (W1.4)	m^3/year	87,277,246	91,169,982	159,247,771
Annual Flow in Kumtor River at compliance point (W1.5.1)	m^3/year	113,103,607	103,765,221	197,085,788
Annual Peak instantaneous flow in Kumtor River at Flume	m^3/s	11.25	18.84	36.72
Peak daily flow in Kumtor River at Flume (W1.4)	m^3/day	977,000	1,627,776	3,172,608

Fig. 4.5 Water Quality Sampling Stations Downstream of Kumtor Mine



Water Quality Monitoring

We follow a comprehensive program of sampling and analyses for water quality based on a network of more than 30 stations. The key stations are listed and described in Figure 4.2 in this section, with locations shown on an aerial photograph of the concession area (Fig. 4.3 and in Figure 4.5). Water quality results and associated discussion are in a separate section of this report: Water Quality and Compliance.

Quality Assurance and Control

Most of our analyses are contracted to a professional external laboratory, Stewart Assay and Environmental Laboratories LLC (SAEL), part of the international ALS group. SAEL is located in Kara-Balta in the Kyrgyz Republic. We also maintain an on-site laboratory to support operational control. We routinely review our sampling program and processes, updating them as appropriate. Our monitoring program includes a formal Quality Assurance and Quality Control (QA/QC) program for collection and handling of samples. This includes duplicate samples, blind samples, and blank samples, as well as calibration and documentation of instruments and procedures. As part of quality control, samples are sent to expert local and international laboratories including SAEL (in Kyrgyz Republic), Saskatchewan Research Council (Canada), and Lakefield Research Laboratories (Canada). Lakefield Research specializes in cyanide chemistry and analysis.

> “We routinely review our sampling program and processes, updating them as appropriate.”

4.3 | BIODIVERSITY

Our Commitment

As a large open cut mine, it is inevitable KGC impacts the local natural environment. We are committed to understanding our impacts, understanding the native biodiversity, reducing negative impacts during the mine's operational life, and to working with our partners to pursue net biodiversity gains. A critical success factor includes consulting with, and working with local, national, and international stakeholders. Further information is available on our website via the link below, from where our full Biodiversity Management Strategy and Plan (2012) can be downloaded: **www.kumtor.kg/en/environment-protection/biodiversity**.

PURSUING CN CODE CERTIFICATION AT KUMTOR

In addition to securing the CN Code certification of its transport operation within the Kyrgyz Republic, Kumtor continues to work towards the certification of its gold mining operations which were considered to be "substantially compliant" with the Cyanide Code by international auditors in 2012, and again in 2015. To achieve full certification, Kumtor was requested to collect and present a variety of scientific data and wildlife observations over multiple seasons at Kumtor's large-scale (400 hectare) tailings management facility (TMF).

Between 1 January 2015 and 31 December 2015, daily wildlife observations reported a total of 13,399 wildlife visitations - primarily from birds. In comparison, another gold mine in New Zealand recorded over 25,000 wildlife visitation per year to its tailings facility, and Lake Issyk-Kul supports a wintering population of some 60,000 – 80,000 water birds. This difference is mainly due to the fact that the climatic and chemical composition of Kumtor's tailings pond does not make it an attractive habitat and provides very limited food resources for water fowl when the pond is not frozen. No cyanide-related deaths have been recorded during the study.

Regional Context

The Tien Shan mountain range is one of the longest in Central Asia, stretching approximately 2,800 km through mostly the Kyrgyz Republic and China. The region features globally important biodiversity and is home to a number of endangered species including the snow leopard, and the Marco Polo sheep (Argali).

The snow leopard is an important cultural symbol in Central and South Asia and features widely in local folklore. Other species of concern include an aquatic plant in the Ranunculus family (Hedysarum kirgizorum), which is also included in the Kyrgyz Red Data book, possibly endemic species of dandelion (Taraxacum syrtorum), and a tulip (Tulpe tetraphylia).

Ecosystem Services

Ecosystem services are the benefits that people and businesses derive from ecosystems. Kumtor Mine is remote, with no villages close to its boundaries that could be impacted by day-to-day operations at the mine site.

The nearest village, Ak-Shyirak, with a population of approximately 120, is located approximately 80 km from the mine in a different valley. Agricultural activities for the Ak-Shyirak community, such as crop growing, are very limited due to the harsh high altitude climate. Their livelihoods rely on grazing sheep, goats, and other livestock, in addition to government-funded support. There is also seasonal sheep grazing in the valleys leading to the Kumtor Mine site.

While there is little scope for KGC's operations to negatively impact ecosystem services of Ak-Shyirak, our support – alongside contributions by other key nature conservation players – for biodiversity conservation (see right) is expected to generate positive benefits for the wider region.

Glacier-fed rivers, including the Kumtor River, which originates from the Petrov Lake, form part of an important ecosystem service for a broader range of communities in the Kyrgyz Republic and for the Kumtor Mine itself. The Tien Shan region also contains significant grasslands, which provide carbon storage and sequestration services.

SARYCHAT-EERTASH NATURE RESERVE'S 20TH ANNIVERSARY

2015 marked the 20th anniversary of Sarychat-Eertash State Nature Reserve (SCER), established by a Governmental Decree in 1995. The establishment of the SCER became possible because of KGC's involvement with the European Bank for Reconstruction and Development (EBRD) and the International Finance Corporation (IFC), both multilateral lenders to the Kumtor Project.

A draft management plan for the SCER reserve was published in 2008. Its development was facilitated by Flora and Fauna International (FFI) and co-financed through the EBRD and the IFC. In 2014, the management plan was finalized by FFI and submitted to the State Agency on Environment Protection and Forestry for formal approval. This is still being reviewed by Kyrgyz authorities. We also continued working under the Memorandum of Understanding with FFI, which will expire in 2016.This MOU is based on the principle of mutual cooperation with the primary objective to deliver biodiversity conservation and management in SCER and the wider surrounding Tien Shan landscape.

Funded by KGC, in 2015 FFI continued to work with the SCER administration and local stakeholders to develop and deliver effective conservation actions in line with the updated SCER Management Plan. Activities in 2015 build on the achievements of previous years and take forward priority actions from the Management Plan.

The activities to support the SCER in 2015 included:

- Research and monitoring of wildlife - scientists from the KR National Academy of Science, developed monitoring schedules for animals and plants, which will be used in the park for wildlife data collection and analysis. These schedules were developed in the form of manuals covering all the steps from planning, data collection, data entry, and analysis;
- Wolf training for KGC staff - FFI wildlife specialist visited the mine site to provide input to KGC's wildlife monitoring strategy and deliver training on human-wolf conflict prevention. The training included the history of the conflict and the perception of the animal. It also covered the ecological aspects of wolf presence in the ecosystem with examples of effects of wolf's extinction and reintroduction;
- Providing field gear to improve the performance of rangers. Rangers have to be present in the field very often and for long periods. SCER rangers work in extreme conditions, and need to be prepared for a variety of weathers. KGC contributed equipment to enable them to continue their important work with confidence;
- Producing a film about SCER - aimed at raising public awareness and eco-education among Issyk-Kul schools which are now better informed about the reserve, its fauna and flora, threats and the need to conserve it.

Fig. 4.6 Regional Fauna Species with Conservation Status Identified Within the Study Area

Common Name	Latin Name	Kyrgyz Red Book (2006)	IUCN Red Book	Kumtor Concession	SCER
		Mammals			
Snow Leopard	Uncia Uncial	Critically Endangered	Endangered	Yes	Yes
Brown Bear	Ursus Arctors	Locally Rare	Least Concern	No	Yes
Argali	Ovis Ammon	Vulnerable	Near Threatened	Yes	Yes
Manul	Otocolobus Manul	Near Threatened	Near Threatened	No	Yes
		Birds			
Golden Eagle	Aquila Chrysaetos	Near Threatened	Least Concern	Yes	Yes
Lammergeyer	Gypaetus Barbatus	Near Threatened	Least Concern	Yes	Yes
Saker Falcon	Falco Cherrug	Endangered	Endangered	Yes	Yes

Note: *SCER is Sarychat – Eertash Nature Reserve; IUCN is the International Union for Conservation of Nature.*

4.4 | ENERGY USE AND CARBON EMISSIONS

Energy Consumption

Our large scale mining operation is a significant consumer of fuel and electricity. Fuel represents over 20% of the commodity and service-related purchases. Diesel and gasoline are the preferred choices for many applications such as vehicles and essential generators. However, wherever feasible, we use electricity. The most energy-intensive operation is the mill, representing approximately 75% of our electricity consumption.

We continue to calculate and monitor our greenhouse gas (GHG) emissions, and explore ways to reduce them as part of energy conservation measures. Our calculations include our three main sites: the mine, Balykchy Marshalling Yard, and Bishkek head office. However, the mine represents around 98% of energy use, and the only site using explosives.

We include explosives in our GHG emission calculations as it was determined to be a significant component of the total emissions. The Kyrgyz Republic generates more than 70% of its electricity through hydropower. In fact, the Kyrgyz Republic is a leading producer and exporter of hydroelectric energy in the Central Asia region, due to its mountainous terrain and abundant water resources.

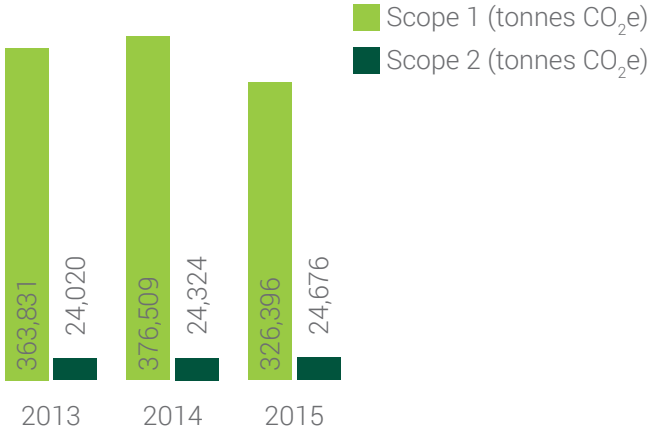
The major source of the power supplied to KGC is from the Toktogul Reservoir located on the Naryn River. This means that our specific GHG footprint generated from electricity is relatively low. It also means that efforts that reduce or replace our fuel consumption with grid power offers the greatest value in terms of reducing our GHG emissions.

Fig. 4.7 Electricity, Fuel and Explosive Consumption (Kumtor Mine)

GHG Emissions and Intensity

Scope 1 (direct) total GHG emissions in 2015 are lower compared to 2014 mainly because of reduced diesel and explosives usage. We used less explosives because we blasted less overall material, expanded our blast pattern size and used less emulsion product because of drier conditions in the pit. Scope 2 (indirect) total emissions are comparable to previous years. Kumtor's GHG intensity, a measure that normalizes GHG emission to gold production, is less than 2014 for the reasons mentioned above, but generally consistent with previous years.

Fig. 4.8 GHG Emissions



Energy Conservation Measures

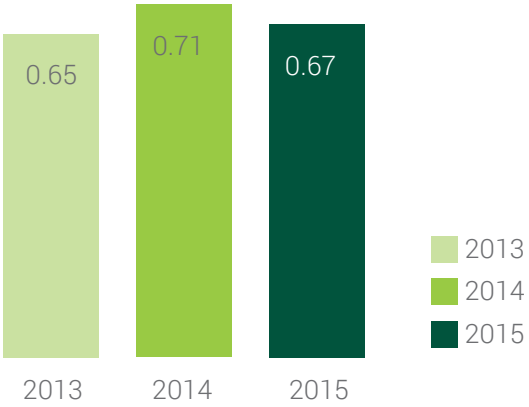
We aim to reduce our GHG intensity by reducing our specific energy consumption and by increasing energy efficiency. We switch from diesel generators to grid electricity, wherever and whenever feasible, for such uses as mine-site lighting, dewatering pumps, and other equipment. This reduces both costs and our GHG footprint.

After the mill, our truck fleet is the largest energy consumer. Our program of reducing vehicular-related fuel consumption has the benefit of reducing use of energy and carbon-intense consumables.

For example, we are transitioning to more fuel-efficient engines and have a proactive program to reduce the need for, and occurrence of, running engines on parked vehicles.

We have also implemented energy conservation measures ranging from the installation of low wattage, high efficiency lighting systems, better insulation in camp buildings, and encouraging behavior changes. However, such activities do not make a material difference to our GHG footprint due to the fact that these energy uses are very small, compared to major operational energy use, and because electricity already has a low GHG intensity.

Fig. 4.9 GHG Intensity Ratio



We continue to explore ways of reducing our energy and GHG intensity but because electricity is already mostly from renewable sources, the scope is limited.

External Reporting

As in previous years, KGC's carbon footprint is reported through Centerra's participation in the Carbon Disclosure Project. This is an independent international not-for-profit organization that tracks and reports corporate information pertaining to climate change. The data for individual companies is publicly available.

> “Our program of reducing vehicular-related fuel consumption has the benefit of reducing use of energy and carbon-intense consumables.”

4.5 | AIR EMISSIONS

Road dust, dispersed by the movement of light and heavy vehicles, is the principle source of observable and measurable air emissions along our access road through the Barskoon Valley. Concerns have also been raised about mine dust deposition on nearby glaciers.

Air Quality at the Mine

We routinely monitor and report the air quality at the mine site. This effort is supported by six high-volume samplers located strategically around the mine site to measure total suspended particulate (TSP) levels. In 2015, the TSP concentration at all monitoring stations was below the Kyrgyz 24-hour TSP limit of 500 µg/m³ for industrial zones.

Our analysis of historical data suggests that during spring, occasional point exceedances are generally related to commencement of tailing dam works.

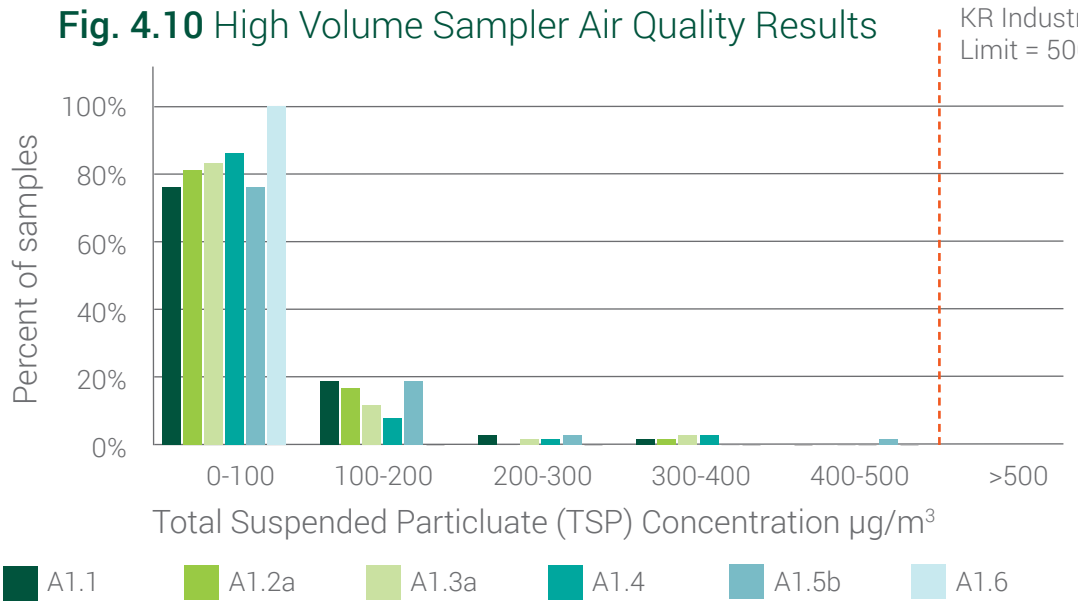
Selected TSP samples are also analyzed for cyanide, sulphur, arsenic, nickel, selenium, zinc, uranium, radium-226, and strontium-90. Consistent with previous results, the 2015 monitoring data, which are presented in the appendix, demonstrate that the results are orders of magnitude below their relevant threshold limit values.

KGC has Maximum Allowable Emission (MAE) limits for pollutants emitted into the atmosphere. Actual emissions are compared against these limits (Figure 4.11) and calculated based on a variety of operational data, including:

- Volume of ore mined and deposited at waste rock dumps;
- Annual average consumption of all types of explosives (ANFO, emulsion);
- Total days blasted - 335;
- Specific consumption of ANFO and emulsion per 1m³ of mine rock blasted;
- Size fraction of rock in the waste rock dumps and ore in the ore stockpiles;
- Average humidity of rock in the pit;
- Number and types of pit machinery and equipment;
- Total volume of consumed diesel fuel and gasoline (lead-free), including stationary sources;
- Average operating efficiency of dust-gas collecting units at the Mill, Crusher, Assay Laboratory, Mobile Batch Plant (data on instrumental measurements);
- Average concentration of pollutants in emissions from the Mill, Crusher, Emulsion Plant, Assay Laboratory (data on instrumental measurements);
- Work hours of emission sources of onsite main and auxiliary facilities;
- List of areas and volumes of dumped mine rock in waste rock dumps and ore stockpiles etc.

Emissions of pollutants from stationary sources at the Mill, Crusher, Emulsion Plant, and Assay Laboratory were calculated based on instrumental measurements of pollutants in exhaust gases, conducted by Environmental Monitoring Department of the State Agency on Environmental Protection and Forestry (SAEPF) under the KR Government. According to results of the calculation and based on mass and composition of emitted pollutants, the enterprise belongs to hazard category 1.

Fig. 4.10 High Volume Sampler Air Quality Results



Note: *TSP is total suspended particulates, Kyrgyz 24-hour TSP compliance limit for industrial zones is 500 µg/m³.*
Monitoring station locations change occasionally along with changing footprint of the mine.
Only annual average results are shown for locations with more than 6 months of data.

Fig. 4.11 **Kumtor Mine Emissions vs MAE Standard (tonnes/year)**

Pollutant	MAE Standard	Actual 2014	Actual 2015
Dust that contains SiO_2 20-70%	1,189	1,089	1,113
Hydrogen cyanide	0.0007	0.0008	0.0008
Sodium hydroxide	0.3534	0.3600	0.3516
Calcium oxide dust (lime)	0.2416	0.2668	0.5892
Carbon (soot)	0.1434	0.1496	0.0837
Welding aerosol	0.2749	0.3258	0.3066
Manganous oxide	0.0373	0.0440	0.0416
Tetrafluorosilane (fluorides)	0.0126	0.0146	0.0136
Hydrocarbon	3.9384	3.7125	3.4827
Carbon oxide	53.4674	45.3154	48.8834
Nitrogen dioxide	98.0438	68.69346	79.2165
Hydrogen fluoride (fluorides)	0.0014	0.03857	0.0360
Lead aerosol	0.0014	0.0014	0.00114
Sulfur dioxide	2.3134	2.4310	0.1233
Ammonia	0.8022	0.8175	0.7787
Hydrochloride	0.000026	0.000026	0.0000257
Silica compositions	0.0126	0.0146	0.0136
Total:	1,348	1,212	1,248

Emissions from non-stationary sources are calculated according to methodological instructive regulations based on actual data (operating factors) for the previous period. In 2015, a total of 1,248 tonnes of pollutants were emitted into the atmosphere from onsite sources (see Fig. 4.11), the majority of which were from pit operations. Blasting operations, and emissions of inorganic dust from excavation-and-loading operations were the major contributors.

Among gaseous pollutants, nitrogen oxide is a major contributor to atmospheric emissions. Within the Concession area, maximum ground level concentration is calculated at 0.2 times the MAC standard. The maximum concentrations of the remainder pollutants do not exceed 0.3 times the MAC standard.

According to calculations, the impact of Kumtor mine operations on the atmosphere is predicted as moderately significant. Based on analysis of ground level concentrations of pollutants, it can be predicted that outside the Concession area none of pollutants in atmospheric air will exceed MAC limits.

To minimise these impacts, work areas are wetted down during mining and other operations on site, including excavation-and-loading operations. The mining face is also wetted down prior to and after blasting operations.

Taking into account that Sarychat-Eertash Nature Reserve is located in close proximity to mine operations, regular monitoring of atmospheric air is conducted in the northeastern part of the Concession area and in the southwestern part of the Nature Reserve.

Dust in Barskoon Valley

Access to the site, for personnel and delivery of consumables and other materials, is via an unsealed road (called the technical road) which is managed by KGC, which passes through the Barskoon Valley. This road also serves as an access road to tourist sites, several small communities, including Ak-Shyirak village, summer pastures and 'hunting farms' in the high altitude valleys, and the Sarychat-Eertash Nature Reserve. Consequently, this road brings not only the supplies and people needed for mining operations, but also residents, researchers, hunters, and tourists.

Following stakeholder concerns about dust levels in the Barskoon Valley, we expanded our road watering activities and continued monitoring of dust levels. As in previous years, three high-volume air samplers were installed during the summer of 2015 to measure the total suspended particulate (TSP) concentrations in the air - there were no exceedance of the applicable standard of 100 micrograms per m^3 (μg/m^3) in the Barskoon gorge. To verify that the company vehicles are not the sole source of dust, in autumn of 2014 we installed a radar device which records any vehicle passing by at a speed faster than 10 km/hr. Also, along the whole technical road going to the mine we installed dust fallout gauges to measure the amount of dust in the air, which have been monitored monthly starting in 2015 .

Concerns have been raised that dust adversely impacts some flora immediately adjacent to the road, that it is a driver of landslides originating from steep slopes (which often follow significant rain events), that is endangering a rare tulip species (Tulipa tetraphylla).

Some stakeholders from villages near the Issyk-Kul Lake, claim they are being adversely affected by dust and other air emissions emanating from the mine. However, the separation of these villages from the mine by a mountain range, and a radial distance of tens of kilometres, rules out the mine as a source of air pollution. Burning of rubbish and other uncontrolled air emissions are known to be commonplace in these village areas, and therefore, a much more likely source of emissions.

AIR QUALITY MONITORING ON THE TECHNICAL ROAD

KGC has been assessing summer time air quality on the technical road using high volume air samplers for many years (see Figure 4.12). In 2014, the company installed two additional monitoring devices along the road with the assistance of independent experts, representatives of the public environmental organizations, as well as members of the Jashyl Oi youth eco-camp. The first device is an automated radar/counter that collects data on the number of passing cars, their size, and the direction of their movement. The second type (dust fallout gauges) were installed in forty locations along the road. Monitoring of dust at these locations includes analysis of the total amount of dust which is deposited over a month period, and the concentration of heavy metals in the dust.

All samples were analyzed by the independent laboratory Stewart Assay and Environmental Laboratories LLC in the Kyrgyz Republic. Monitoring results show that all samples were below international standard criteria for dust deposition and most of the metal concentrations and other parameters were very low (below the laboratory detection limits). Of the metals that were detected, none were found with high loadings that would likely be of concern from a human health perspective.

Sampling is ongoing and will continue to monitor both dust volumes and the metal content of the dust in order to analyze trends over time. We will continue to conduct regular grading and watering of the Technical Road and will take measures to lower speed limits, since the study of independent experts suggested that reduction in traffic speed would reduce dust creation.

> Following stakeholder concerns about dust levels in the Barksoon Valley, we expanded our road watering activities and continued monitoring of dust levels.

Fig. 4.12 **Dust Monitoring in the Barskoon Valley (µg/m³)**

Sampling Points (Stations)	Aug 2013	Sep 2013	Jul 2014	Aug 2014	Jul 2015	Aug 2015
#1	20	120	87	175	88	71
#2	33	93	126	304	78	58
#3	12	163		248	47	71
Recommended MAC*	100	100	100	100	100	100

Note: *#1 sampler was located 50 m south of the road from the upper Kamaz truck monument; #2 sampler was located 100 m to the north from the road, towards the Barskoon River; #3 sampler was located 50 m to the north of road, opposite to Kamaz truck monument, towards Barskoon River.*

** Recommended KR maximum admissible concentration (MAC) standard for populated areas*

4.6 | WASTE MANAGEMENT

KGC understands the importance of waste minimization and operates in compliance with Good International Industry Practice (GIIP). We are committed to the ongoing improvement of our waste management strategy.

Waste Management Practices

In 2013, international consultants completed a review of our waste management practices and developed an 'integrated solid waste management strategy' in accordance with good international industry practice. KGC is still implementing this strategy and has been improving its waste management practices for the past few years including decreasing waste generation volumes, and increasing waste re-use and recycling. This includes the introduction of separate extraction of industrial waste resulting in increased volumes of scrap metal, wood, plastic and waste oil removed from the mine site.

In 2015, separate collection of cardboard continued which reduced the volume of waste disposed at the domestic waste landfill and saved valuable land, financial and human resources. We also started shipping cardboard off the mine site for recycling. The current priority is to continue to reduce the amount of domestic waste being landfilled at the mine site and optimize the amount of labour and equipment used for waste handling.

Major Waste Streams

Three major types of waste (not including waste rock and tailings) result from the mine site operation. These include domestic, industrial, and hazardous waste. Domestic waste typically includes food waste and various types of packaging from camp and offices. Industrial waste typically includes plastic, wood, scrap metal, cardboard and paper, waste oil and fluids, as well as tires. Hazardous waste includes cyanide packaging, batteries, medical waste, and expired reagents.

Waste Handling

Waste collection and disposal areas are currently located within the landfills. These areas will eventually be covered by tailings and rehabilitated in accordance with our mine closure strategy

Our waste management facilities include a sanitary landfill for domestic waste; primarily generated by the offices and residential camp with a typical population of up to 1,600 people. The per capita domestic waste generation at KGC is approximately 1.4 kg/person/day, which compares to approximately 2.0 kg/person/day in the United States in 2013 as reported by the US Environmental Protection Agency. We also maintain separate lined landfill cells for oily rags and cyanide packaging.

Waste Recycling

In 2015, for the second year in row, KGC recycled 100% of its industrial waste. Scrap metal, wood, plastic and waste oil were the main contributors. These types of waste are shipped to third party recycling companies. Waste items with a potential to be recycled or reused, are temporarily stored on site until feasible recycling options become available.

We also re-use scrap metal in the production of grinding balls. The local company Vulkan Plus produces different size steel balls used for ore grinding at the Mill. In 2015, KGC spent more than $3.7 million on the purchase of grinding balls. We continued purchasing steel balls in 30, 40, 50, and 60 mm in diameter. It is noteworthy that the cooperation with Vulkan Plus began with only the purchase of small grinding balls, and they now employ 120 people.

NEW LANDFILLS FOR SOLID DOMESTIC AND HAZARDOUS WASTE

In compliance with KR environmental legislation, KGC, as the owner of waste, is committed to ensure safe utilization of its waste. In order to increase the level of environmental responsibility and care, KGC has upgraded its waste management practices based on conclusions of KR state agencies and recommendations of international experts.

In 2015, KGC commissioned new landfills for solid domestic and hazardous waste. These landfills were designed, constructed and commissioned in compliance with all KR engineering and environmental requirements. The landfill sites were designed to prevent negative impact on groundwater and surface water, and minimize emissions of pollutants into the atmosphere. Other factors such as preservation of pasturelands, effect of runoff and melt water on generation of leachate and its safe utilization, and prevention of negative impact on local fauna were also taken into account. The landfills are operated in full accordance with the approved design and in compliance with environmental, sanitary, technical and safety requirements.

Future plans include segregation and separate collection of solid domestic waste to reduce waste volumes disposed at the landfill. According to the current LOM Plan, the planned life of mine is until 2026; therefore, it is necessary to ensure continuous operation of the existing landfills until then. When waste is segregated and collected separately, 75% of the material can be recycled and reused. This will help reduce waste volumes disposed at the domestic waste landfill by a factor of 2 -3 times and thereby ensure ongoing operation of the existing landfill until mine closure.

Operation of the landfill involves placing the waste in layers and compacting, followed by covering the waste with a soil layer 20-30 cm thick in order not to attract animals and to prevent generation of dust.

Fig. 4.13 **KGC Waste Generation - 2015**

	Generated	Units	Disposal Method
Industrial Waste			
Metal	3,479	tonnes	100% Recycled
Paper	25	tonnes	Partially recycled - recycling started in 2015
Wood	1,043	tonnes	100% recycled and donated to local communities
Plastic	141	tonnes	100% Recycled
Oil	1,651	tonnes	100% Recycled
Total	5,638	tonnes	
Hazardous Waste			
Packaging	71	tonnes	Landfilled
Oily rags	16	tonnes	Landfilled
Batteries	26	tonnes	100% recycled
Mercury lamps	0.14	tonnes	Temporarily stored
Total	110	tonnes	
Tires			
Used tires	1,154	tonnes	100% recycled

> In 2015, for the second year in row, KGC recycled 100% of its industrial waste.
>
> Waste items with a potential to be recycled or reused, are temporarily stored on site until feasible recycling options become available.

Fig. 4.14 Waste Produced at Kumtor Mine Site

4.7 | UNPROCESSED WASTE ROCK

As typical for most open pit mining projects, KGC must remove a large volume of unprocessed (waste) rock and other materials in order to safely access the ore. The waste rock is deposited in agreed designated locations and is routinely monitored for its impact on the environment.

Waste Rock Dumps

In accordance with the KR Law on Subsoil Protection, as well as standards of industrial safety, waste rock dumps must have sufficient storage capacity, and be located at a minimum distance from a mining cutback. Mined waste should be placed in areas proven to contain no mineralisation. Waste dumps should not hinder mining operations in the pit and must be developed safely.

In addition, dumping methods and equipment in use at a waste dump must meet required dumping rates of waste rock without interruption, and comply with limitations on dump capacity whilst maintaining dumping costs at the lowest level and labour/equipment productivities at the highest level. Modelling and assessment of waste dump stability is performed by specialists of the Geotechnical Structure Stability Laboratory of the Geomechanics and Subsoil Use Institute under KR NAS based on KGC's monitoring data.

Waste Rock Movement

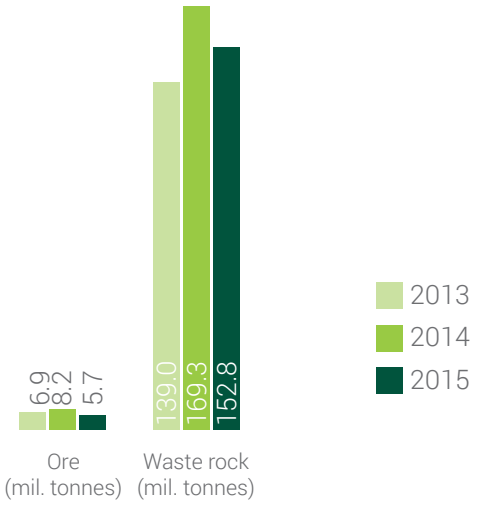
We continue to monitor all potential land and ice movements across the site, and to manage our ice and waste rock dumps to ensure safe mining practice and timely relocation of affected infrastructure.

During 2015, KGC continued to implement a number of controls aimed at reducing waste rock movement rates and decrease the associated risks. In particular, the reduction of waste placing to the Chon-Sarytor Valley, through a more even distribution of loads, construction of water diversion systems, and the introduction of automatic monitoring systems.

Acid Rock Drainage Testing

Acid rock drainage (ARD) describes contaminated water that can be generated from water contacting waste rock, and which can be acidic due to the reaction with sulfur-bearing rocks. It is a concern raised by some stakeholders, relevant both during mining and post closure. KGC has routinely monitored for ARD risk since the initial environmental impact assessment, taking into account the ore body, waste rock, and tailings. A number of independent assessments by international consultants concluded the ARD risk from KGC is low due to the high carbonate content of the deposits, which neutralizes acidity. ARD evaluation will continue and be a part of closure planning.

Fig. 4.15 Key Production Statistics



4.8 | TAILINGS MANAGEMENT

Tailings refers to the water and solid materials (together called slurry) that remain after recoverable metals and minerals of economic value are removed from the crushed rock ore by milling and processing.

KGC's tailings are carried via 6.7 km of pipeline from the mill to the tailings management facility (TMF) where they are deposited, settled, and contained. The liquid component is treated before discharge and the solid component retained until eventual reclamation and mine closure activities. The KGC TMF includes a set of twin tailings pipelines (main tailings line and a spare one), a tailings dam, a buttress and a shear key, monitoring equipment and instruments, an effluent treatment plant, and two diversion ditches to direct surface water around the TMF. In addition to general tailings management, two important issues we monitor and control include (i) cyanide containing solutions, which are securely contained within the TMF, and (ii) dam stability. These are discussed further below.

Cyanide Residue Management

The concentration of cyanide in the TMF is routinely monitored. In the tailings pond, there is some natural breakdown through chemical reaction and the effect of the sun's ultraviolet light. The liquid component is further treated by the effluent treatment plant (ETP) to reduce cyanide and metals for safe discharge to the environment. More discussion of the cyanide concentrations discharged to the external environment is provided in the Water Quality and Compliance section.

Geotechnical Monitoring and Stabilization

The dam is constructed and managed to safely retain tailings. It is 3,050 meters long with a maximum height under its crest of 37 meters at an elevation of 3,667 meters above sea level. The dam is constructed primarily of compacted granular fill, sourced locally. The dam surface is covered with an HDPE liner (a strong impermeable synthetic material) from the upstream slope to the toe of the dam, and then 100 meters into the tailings pond. This liner extends into the permafrost to minimize seepage through the dam. The height of the dam is increased over time to ensure sufficient volume for tailings storage. Along with the increase of the pond volume, the existing buttress downstream of the dam is also expanded, which helps to increase the strength and stability of the structure. In 2015, work was done on enforcement and extension of the dam body from the downstream slope side to the elevation of 3,663 meters.

Some movement of the KGC dam was first observed in 1999, and since then, Kyrgyz specialist organizations and international engineering experts have been consulted on management and mitigation. In response, a shear key and buttress were constructed along the downstream toe to reduce, and eventually eliminate, the movement of the dam. Since 2006, a trend of horizontal displacement reduction has been observed. An extensive network of sensitive instrumentation is in place to detect and record any movements of the dam structure.

Fig. 4.16 **Tailings Dam Monitoring Instrumentation (number of instruments)**

Type	Purpose	2013	2014	2015
Inclinometers	Measure horizontal displacement	48	50	50
Settling plates	Identify dam base settlement	28	28	28
Piezometers	Measure water levels in dam body and base	31	32	32
Thermistors	Dam body and base temperature	44	48	48

Fig. 4.17 **Key Characteristics of Kumtor's Tailings Management Facility (TMF)**

	Units	2013	2014	2015
Tailings discharged to Tailings Pond	mil. m^3	8.20	8.01	7.93
Net tailings remaining in Tailings Pond per year	mil. m^3	5.92	3.16	3.53
Total cumulative tailings in Tailings Pond at year end	mil. m^3	65.58	68.74	72.27
Total free water in Tailings Pond at year end	mil. m^3	4.89	4.16	3.89
Elevation of Tailings Dam Wall crest	masl	3,667.0	3,667.0	3,667.0
Peak water level in Tailings Pond during year	masl	3,659.96	3,661.03	3,661.73
Minimum water freeboard (dam crest level - peak water level)	m	7.04	5.97	5.27

Note: *masl = meters above mean sea level*

Tailings Balance

Accurate knowledge of what enters and leaves the TMF, and the volumes of liquid and solids it contains, are an important part of safe management. We survey the extent and depth of the pond, and we track the volume of tailings entering the TMF and volume of water leaving it, via the ETP and by evaporation from the pond surface. Tailings slurry, of which 49% by weight is solids, is continuously added to the TMF throughout mill operations (most of the year). Water treatment and removal (via the ETP) occurs only during summer months when the pond and Kumtor River is not frozen - usually May to October. Therefore, TMF water volume peaks in spring and reaches its lowest level at the start of winter.

Fig. 4.18 **Water Balance in TMF (m^3)**

	2013	2014	2015
Free water at start of year (January 1)	2,695,825	4,889,461	4,160,134
Water added in tailings	6,239,760	5,960,703	5,929,047
Net precipitation/runoff less evaporation	677,859	425,139	789,677
Water remaining in tailings voids	-1,667,683	-1,740,208	-1,696,810
Water discharged from Tailings Pond to Effluent Treatment Plant	-3,056,301	-4,920,891	-4,827,216
Adjustment based on bathymetric survey	0	-454,070	-464,382
Free water at the end of year (December 31)	4,889,461	4,160,134	3,890,449

CONCLUSIONS OF EXTERNAL EXPERTS

Geotechnical monitoring data is analyzed by the Institute of Rock Mechanics of the Kyrgyz National Academy of Sciences. In the Q4 report, they concluded: "The inclinometers have indicated consistent reduction of displacement rates from the crest to the shear key. Displacement rates have practically reduced to zero values at the very end of the shear key"; and "Overall tailings dam condition is assessed as suitable for operation."

The international engineering company, SLR Consulting Ltd (Canada), carried out inspection of the condition and safety of the TMF dam, providing recommendations for changes and improvement where appropriate. Their October 2015 report concluded: "The visual inspections of the dams and appurtenances of the Kumtor site indicated that the structures were in good condition and were functioning as required. It is recommended to continue with annual TMF inspections by third party technical consultants in view of continuous construction process of the tailing dam. KGC is doing an effective job of carrying out routine inspections, preparing monitoring records, reading instrumentation, and implementing the necessary procedures to operate the facility in a safe manner."

> "Tailings dam condition is assessed as suitable for operation."

4.9 | MINE CLOSURE

Background

The most recent Life-of-Mine plan is for open-pit mining to end in 2023 and milling operations to conclude in 2026. As agreed with Kyrgyz authorities and outlined in the Environmental Management Action Plan (EMAP), KGC is required to update the Conceptual Closure Plan (CCP) for the operation every three years, and complete a Final Closure Plan (FCP) two years prior to closure.This approach allows several years for testing and monitoring to evaluate the various options contemplated by the CCP, and time to consider any changes to the environmental, regulatory and social context that may have occurred over the life of the mine. KGC has prepared CCPs in 1999, 2004, 2008, 2011 and most recently in 2013.

The 2013 CCP covers the existing components of the KGC operations including the open pits, waste rock dumps, TMF and related water treatment facilities, and the mill complex and associated mine infrastructure. The plan also includes the prediction of post closure water quality in the central pit, revisions to waste rock dump management and reclamation in recognition that the dumps are likely to behave in a dynamic fashion during operations, as well as biodiversity and socioeconomic aspects of closure planning.

KGC's general objectives for closure planning include:

- Materially comply with regulatory requirements;
- Minimize residual environmental impacts;
- Ensure mine site features are geotechnically stable;
- Ensure the protection of public health and safety;
- Return the land to suitable post-mining land use;
- Identify and mitigate social risks/impacts on the community, the business and the overall success of the closure process.

All CCPs have been previously submitted to the relevant Kyrgyz agencies for their information and in 2014, the conceptual closure plan was also provided to the Government's international technical advisors involved in the ongoing negotiation to restructure Kyrgyzaltyn's ownership in Centerra and KGC.

Overview of Closure Strategy

Historical land use in the region was limited and the 2013 closure plan outlines a more diverse post-mining land use that utilizes the existing infrastructure that will remain at closure to support monitoring and maintenance of the facility as well as general environmental, meteorological, wildlife and glacier research and monitoring. Particular emphasis has been on maintaining positive benefits post closure for the Sarychat-Eertash Nature Reserve located in close proximity to the project area. However, the proposed final land use for all disturbed areas will need to be discussed and agreed with key stakeholders prior to closure.

At the end of the mining operations, part of the infrastructure (including high voltage power line, roads, and culverts) will remain in place. Material and equipment from the infrastructure decommissioning will be salvaged to the extent possible. Structural foundations will be levelled to the extent possible, graded and covered. Demolition waste will be taken to the industrial landfill. Potentially impacted soils in the vicinity of mining infrastructure will be tested and if found to be contaminated will be decontaminated or removed off site. The mine site area and decommissioned areas of the camp will be graded and contoured to blend in with the surrounding landscape.

The waste rock dumps at KGC occupy portions of three drainages including the Lysyi, Chon-Sarytor and Kichi-Sarytor Creeks, which discharge to the Kumtor River. Numerous acid rock drainage (ARD) characterization studies, including static and kinetic testing, have been performed on waste rock material generated at KGC. These studies have demonstrated that an overwhelming majority of the waste rock deposited at site has no ARD potential. Moreover, the excess of neutralizing waste rock suggests that limited and localized areas of acid generation will be neutralized within the dump. While ARD is not predicted from the waste dump facilities, sulphide oxidation is and will continue to occur and produce drainage waters that are approximately neutral, but potentially elevated in sulphate. As such, the primary focus of the waste rock dumps reclamation will be to ensure physical stability of the dumps. Further, the latest CCP now includes a financial obligation for strategic revegetation of the dumps post closure. Monitoring of the geotechnical stability of the waste dumps and glacier movement is envisaged for a ten-year post-closure period.

At the cessation of operations, the Central and Sarytor pits will begin to fill with groundwater, precipitation and runoff water from the up gradient glacial meltwaters. The pits are expected to fill and eventually overflow and water diversion structures will be constructed to channel and direct the overflow from the Central and Southwest pits to the environment (via Chon-Sarytor and Kichi-Sarytor Creeks, respectively). Closure plans for the open pits are based on maintaining public safety and minimizing environmental impacts of pit water overflow.

Closure planning for the tailings management facility (TMF) has focused on water management and ensuring that there is no risk of acid rock drainage (ARD) from the TMF.

> Mine Closure Plan priorities are safety and minimizing environmental impacts.

Based on the geochemical characterization of the KGC tailings, there is little to no risk of potential ARD occurring in the TMF and no special closure provisions for additional ARD prevention and control are required. A coarse inert cover will however be placed over the final tailings surface at closure to prevent erosion and dust generation from the facility. An additional cover of stockpiled soil/alluvial material will be placed on top of the inert TMF cover and re-vegetated. Prior to the placement of the TMF cover, the effluent treatment plant will be used to treat the water remaining in the tailings pond at the end of operations.

Also, in 2015 KGC continued to expand the scientific program to research and develop the best methods for land reclamation. This included collecting native plants and seeds and establishing trial plots with salvaged topsoil to test proposed seed species selection, topsoil addition rate, seeding rate and fertilization requirements. The studies are performed by the K. I. Skryabin Kyrgyz National Agrarian University (refer to case study).

Funding Closure Liabilities

As outlined in the current CCP, the uninflated life of mine close cost is estimated at $49.2 million. It is also estimated it would cost $42.8 million to rehabilitate the known impacts and disturbance as of December 31, 2013. KGC is required to re-calculate closure liability on an annual basis, in accordance with International Financial Reporting Standards to take account of future discount and inflation rates.

In 1995, KGC established a reclamation trust fund to accrue cash funds for mine closure liabilities. This is funded by sales revenue, annually in arrears. As of December 31, 2015, the balance in the fund was $18.9 million, with the remaining costs to be funded over the life of the mine.

IMPLEMENTATION OF THE REVEGETATION PROGRAM

KGC is carrying out a revegetation program at the mine – part of which includes field expeditions around the mine and high-mountain valleys. The aim of the expeditions is to determine the vegetation species suitable for the revegetation works at the mine site. The examination of the mine's vegetation and topsoil has been done by the members of the Skryabin Kyrgyz National Agrarian University in cooperation with the company's Environment Department.

The Agrarian University has been monitoring the soil at the mine since 2012. The scientific program on the most effective recultivation methods has included the collection of local plants and seeds, and the opening of test sites with different soil conditions. Seeds were collected at the mine and surrounding region.

In 2015, field expeditions continued to the pastures of the Suusamyr, Jumgal, and Kara-Kujur valleys, the climate conditions of which were most similar to the ones observed at the mine. At the test sites the researchers have checked soil composition, defined the types of plants with the highest germinative power and resistance to severe weather conditions, and determined appropriate seeding rates, timing for planting, and the necessity of fertilizer application. The researchers have identified three types of plants from high mountain valleys that can be used in the land reclamation at the mine (sheep's fescue, slender wheatgrass, and wild rye) out of the 115 cultures which grow on the mine and its surrounding region. This research is continuing and more extensive results will be presented in future.

FOR REFERENCE:

THE REVEGETATION PROGRAM is a set of operations aimed at improving environmental conditions and restoration of the land to a suitable post-mining landuse. After all the work is done, the reclaimed land and its surrounding areas should become an optimally organized and balanced stable landscape.

5 GLACIERS AND WATER MANAGEMENT

5.1 | WATER USE AND TREATMENT

We use water for operational activities, mostly in the mill, and for domestic use (drinking and sanitary) in the mining camp, offices, and workshops. We must also remove water from the mine pit in order to keep operations safe and stable.

Our main water management responsibilities are:

- Providing safe drinking water for our employees;
- Removing water and ice from the open pit to ensure access to ore, and stable and safe working conditions;
- Ensuring water returned to the natural environment is safe and meets defined quality criteria;
- Managing run-off to reduce sediment load entering local creeks and rivers.

An information brochure describing Water Management at KGC can be downloaded from our website at: **www.kumtor.kg/en/environment-protection/water-management**.

Water Sources

We have two primary sources of water at the mine site. Most of the water we use is extracted from Petrov Lake. We must also pump large volumes of water from the open mine pit to maintain stable and safe working conditions, some of which we can use at the mill, thus reducing our demand from the lake. In 2015, we extracted approximately 5.76 million m³ of water from Petrov Lake, which was very similar to the previous year (5.62 million m³). In 2015, we pumped a total of 11.54 million m³ of water from the pit, including groundwater and glacier melt water. Of this, 0.64 million m³ was used in the mill with the remaining approximately 10.9 million m³ discharged to the environment.

Operational Water Use

Our main use of water is as process water in the mill, for crushing the ore and processing it to produce gold. The mill used a total of 5.96 million m³ of 'make-up' water in 2015, of which 5.32 million m³ was from Petrov Lake and with the remainder collected from one of the mine pits. The use of pit water, which reduces our demand on Petrov Lake, has increased from zero in 2011 to 0.64 million m³ in 2015. In addition, nearly 5.33 million m³ of water was reused within the mill (approximately the same as previous years). Due to higher throughput at the Mill in 2015, intake of water from the Petrov Lake increased by 2.43%, or approximately 14,000 m³.

Drinking Water

We also use treated water from Petrov Lake for domestic uses (drinking and sanitary) at the mining camp, the mill, and other working buildings. Domestic water use in 2015, was about 174,549 m³, representing just 3% of the freshwater we collect from Petrov Lake. Drinking water quality is routinely monitored for safety and compliance.

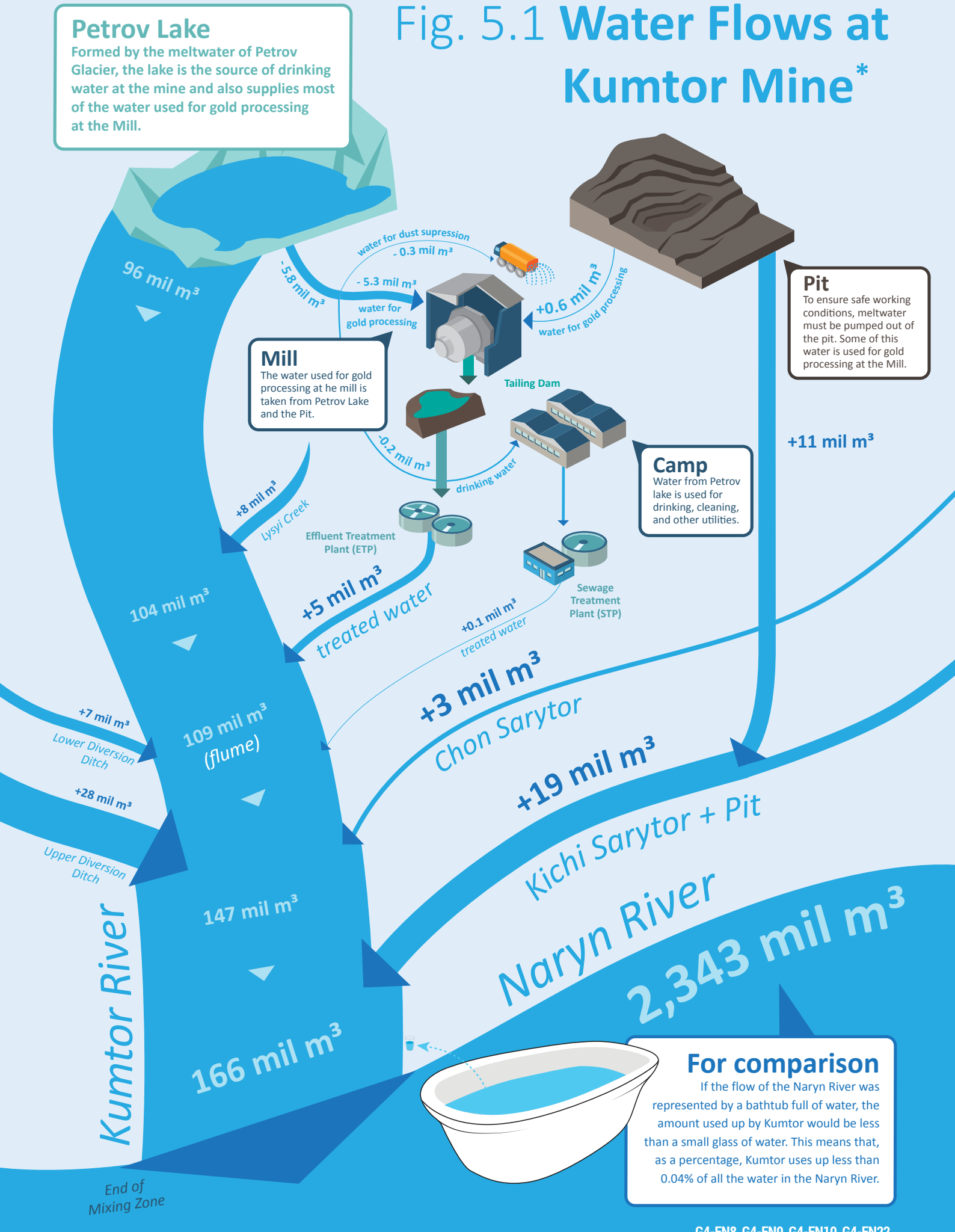
Pit Dewatering

We collect and discharge large quantities of water as a necessary part of our pit dewatering program to keep the pit stable and safe. Some dewatering occurs throughout the year, but most occurs during the summer period when large quantities of glacial melt water collects in the open pit. The majority of the pit water is discharged to the environment. In addition, nearly 0.64 million m³ of water collected in 2015 from the North pit is pumped to the mill to supplement process water.

Water Treatment

We source both industrial and drinking water from Petrov Lake, which is largely derived from glacial melt water. This means it exhibits naturally high concentrations of sediments, giving the lake a characteristic milky appearance, along with elevated background concentrations of some parameters such as iron, aluminium, and suspended solids.

Fig. 5.1 Water Flows at Kumtor Mine*



** These flows are indicative only and will vary year to year*

G4-EN8, G4-EN9, G4-EN10, G4-EN22

> “Kumtor treats its industrial and domestic effluents to meet prescribed standards prior to discharge.”

Fig. 5.2 **Water Usage at Kumtor Mine Site**

	Units	2013	2014	2015
Sources of Water				
Total Water Extracted from Petrov Lake	mil. m³	5.52	5.62	5.76
Pit water pumped to the Mill	mil. m³	0.99	0.56	0.64
Pit water pumped to the environment	mil. m³	10.9	8.2	10.9
Water used for Domestic Purposes				
Water Used for camp domestic purposes*	mil. m³	0.19	0.14	0.15
Water Used for Mill domestic purposes*	mil. m³	0.02	0.02	0.02
Water used for Process/Mill				
Raw water used at Mill (from Petrov Lake)	mil. m³	5.24	5.40	5.32
Total water used at Mill (Petrov Lake + Pit water)	mil. m³	6.24	5.96	5.96
Water internally recycled at Mill	mil. m³	5.57	5.50	5.33
Ore Feed to Mill	tonnes	5,596,251	5,839,623	5,782,419
Raw Water Intensity Ratio	Litres/tonne Mill Feed	937	924	921
Water used for Dust Suppression				
Water used for dust suppression	mil. m³	0.07	0.07	0.26
Wastewater Discharged to Environment				
Treated wastewater discharged from ETP	mil. m³	2.80	4.70	4.84
Treated wastewater discharged from STP	mil. m³	0.15	0.14	0.12

Process water does not require treatment. However, the water quality of Petrov Lake does not meet hygienic drinking water standards without treatment. We apply treatment methods standard for public supplies around the world. These include flocculation, filtration, chlorination, and ultra-violet treatment. In combination, these processes remove fine sediments (which may carry metals) and disinfect the water for safe storage and use.

Sewage Treatment

Sanitary waste water is treated at the sewage treatment plant (STP). This uses standard processes of biological treatment and chlorination. The biological treatment removes the 'oxygen demand' of organic matter, which would otherwise use up oxygen in the river and reduce its quality. Chlorination is provided to eliminate potentially harmful bacteria. Although challenging to operate at high altitude with low oxygen and harsh weather conditions, treatment is achieved successfully through careful design and management. During freezing winter conditions, treated effluent is stored in a holding pond prior to gradual discharge during summer. In 2015, approximately 125,100 m^3 of sewage was treated and discharged. The number was lower in comparison with the last year due to lower amount of people on site in 2015.

Industrial Wastewater Treatment

Industrial wastewater containing residual cyanide is a component of tailings slurry discharged by gravity flow from the mill to the tailings management facility (TMF).

The liquid component of tailings, approximately 51% of the slurry by weight, is pumped to, and treated in compliance with established standards, at the effluent treatment plant (ETP) before being safely discharged to Kumtor River. Due to the freezing winter conditions, the treatment and discharge of wastewater is restricted to the warmer season, typically from June to October.

The main stakeholder concern regarding wastewater from KGC is related to cyanide, an essential chemical used routinely in the processing of ore to recover gold. Cyanide can be toxic at higher concentrations.

7.9 million m^3 of tailings were discharged into the tailings pond in 2015. These tailings contain residual levels of cyanide and other constituents which could be harmful to the environment if discharged untreated. The solids component is retained in the TMF, while the majority of liquid component is pumped to and treated at the ETP to reduce and remove cyanide, metals, and other elevated contaminants prior to discharge. We use the patented INCO treatment process, and operate one of the largest such plants outside of North America.

In 2015, approximately 4.84 million m^3 of industrial wastewater from the tailings ponds was treated and discharged to the environment, 0.14 million m^3 more than in 2014.

Water Use Intensity

Our extraction of water from Petrov Lake has no measurable impact on average annual lake water levels and the level fluctuates naturally by about 2 m during the year.

Our total water extraction from Petrov Lake of 5.76 million m^3 in 2015 represents approximately 7% of its natural outflow to Kumtor River. We then returned 4.96 million m^3 as treated wastewater (STP plus ETP) making the net impact on Kumtor river flow near neutral.

Metallurgical challenges limit our ability to drive down our water use intensity by recycling effluents from our tailings pond back to the mill. Studies have shown that even low levels of cyanide in the tailings pond would adversely affect our gold recovery process. However, for the past few years we have been using water from pit dewatering in the mill. As a result, we are seeing a decreasing trend in the water use intensity of our operation, reflecting the positive impact of in-mill recycling and using an increasing proportion of water from pit dewatering.

Managing Run-Off

We continue to improve the management of surface run-off from snow and ice melt emanating above the rock dumps. As much as possible, we divert clean meltwater from Davydov and Sarytor glaciers away from the central valley and Sarytor rock dumps into the Kichi Sarytor stream. We also constructed a number of settlement ponds along Lysyi valley to collect large sediment particles. A pipeline diversion system was constructed in the end of 2015 in Lysyi Valley to direct ponded surface water around the Lysyi waste rock dump and decrease the potential for mobilization of contaminants.

5.2 | WATER QUALITY AND COMPLIANCE

Drinking Water

The water we use at the mine site for standard domestic use (for drinking, food preparation, personal hygiene and general cleaning of the mine camp and offices) is routinely tested against Kyrgyz, Canadian and World Health Organization (WHO) drinking water standards. Our drinking water is compliant with these standards, and therefore safe for all relevant uses.

End of Mixing Zone

We sample and test water quality at over 30 points across the Concession area, the key ones of which are listed and shown in the Environmental Monitoring Section. Sampling points are selected from a combination of legal obligations and additional commitments related to our environmental management responsibilities and programs.

Our main compliance point is where surface water converges downstream of our operations, below where treated water is discharged to the river and shortly after leaving the concession area (as shown in Figure 4.3).

This point, designated W1.5.1, and also referred to as 'End of Mixing Zone', was chosen by KGC to be protective of the intent of the Environmental Management Action Plan (EMAP) and the water quality in the Kumtor River. Any exceedance of water quality criteria at W1.5.1 triggers us to examine the data at W1.8, the monitoring point 1 km upstream of Naryn City, which is the nearest downstream community. Results for 2015 are presented in the bar chart, which includes the Kyrgyz maximum allowable concentration (MAC) values recommended for river basins providing public water supply.

Our results show that the majority of water quality parameters in 2015 were below the respective MAC values. This means we have been in material compliance with key water quality standards. However, we exceeded the MAC limits for iron, aluminium and manganese. Each of these are discussed further in this report.

Overall, the glacial origin of surface water sources in the Kumtor project area results in them having elevated sediment loading (suspended solids), visible in the generally milky appearance of the water. This sediment loading influences the total metal concentrations, resulting in elevated results for a variety of metal parameters such as aluminum, and iron. This naturally elevated background condition was documented in baseline monitoring prior to the start of KGC mining operations.

Elevated background concentrations are also reflected in water quality results from Petrov Lake, the source of Kumtor River and located upstream of the mine. The presence of sediments and associated metals is not indicative of poor environmental performance of Kumtor mine.

Kyrgyz standards refer to total metal concentrations, whereas international environmental water quality standards are more commonly based on dissolved metals, which is more indicative of environmental impact and risk. We take these aspects into consideration when evaluating water quality at KGC.

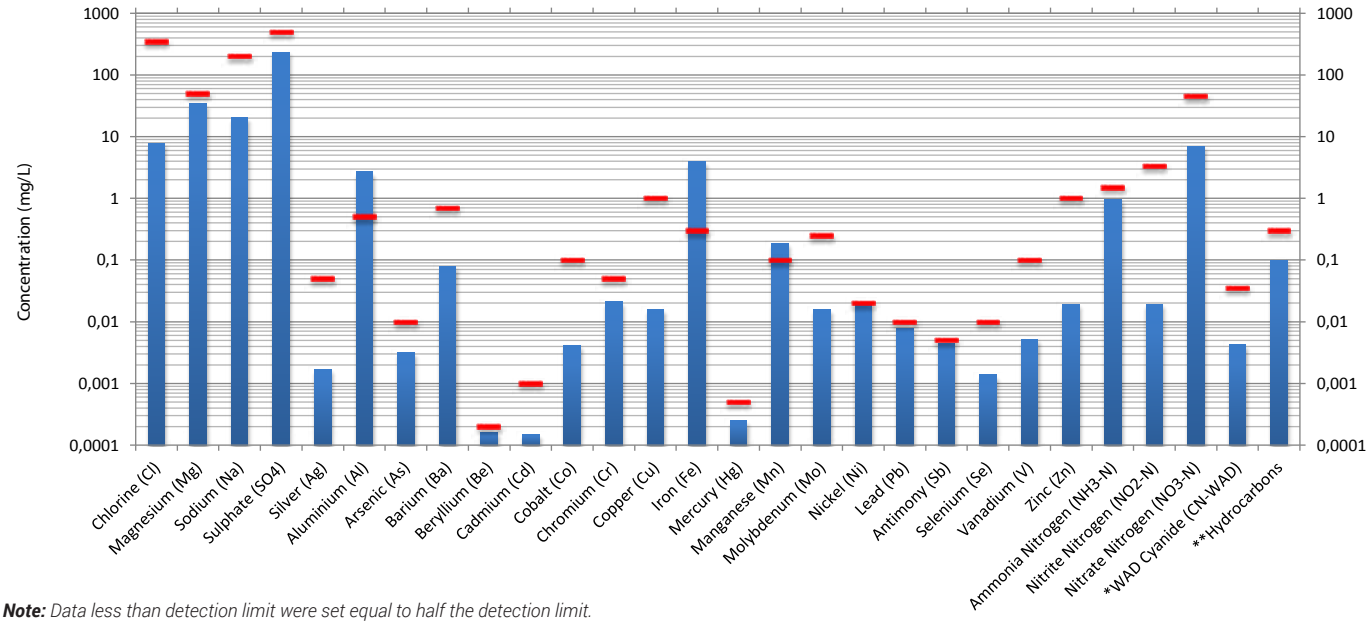
A review of results from 2015 shows the average total aluminum and iron concentrations exceeded the MAC standards. However, they remained consistent with the naturally high background concentrations in the region, which can be of the same order or higher. These results do not represent a significant risk to human health or the environment, as iron effects are mainly aesthetic (taste, visual appearance). These are some of the most abundant metals in the Earth's crust, and therefore not unusual to see at these concentrations.

The average total manganese concentration (0.19 mg/L) marginally exceeded its MAC Communal Use standard (0.1 mg/L) in 2015 at the EMZ. It should be noted that manganese occurs naturally in the environment, produced by erosion and weathering of rocks and minerals. The concentrations observed do not represent a significant risk to human health or the environment as manganese effects are primarily aesthetic in humans and livestock.

> "We follow a comprehensive program of sampling and analyses for water quality based on a network of more than 30 stations within the concession area."

> “Our drinking water is safe and compliant; All our wastewater is treated and is environmentally safe before discharge.”

Fig. 5.3 2015 Water Quality Data in the Kumtor River at the End of the Mixing Zone and Kumtor Concession Area (location W1.5.1)



Note: *Data less than detection limit were set equal to half the detection limit.*

** MAC is for Free Cyanide (CN-F). Measuring CN WAD is conservative as CN-F is always less than or equal to CN-WAD.*

*** Hydrocarbon fractions F1 (C6-C10) to F4 (C34-C50) were analyzed individually and all measured at less than laboratory method dection limit. The value reported above (0.1 mg/L) represents half of the highest detection limit (0.2 mg/L for F3 and F4). Other fractions had lower detection limits.*

As required by the EMAP, KGC is required to consider international - and particularly Canadian guidelines when interpreting water quality data. Presently there is no Canadian guideline for the maximum concentration of manganese allowable to protect livestock. There is a Canadian aesthetic guideline of 0.05 mg/L for distribution systems which is not based on toxicity but rather potential problems in restricted flow devices in water lines (Olkowski, 2009). Health Canada also assigns an aesthetic objective for human drinking water at 0.05 mg/L based on taste and staining of laundry and plumbing fixtures (Health Canada, 2014). There are no Canadian Environmental Quality Guidelines or United States Environmental Protection Agency (US EPA) guidelines for the protection of aquatic life or livestock (CCME, 1999). British Columbia has a chronic guideline for protection of freshwater aquatic life of 0.7 mg/L in soft water (25 mg/L as $CaCO_3$) and higher guidelines in higher hardness water (Nagpal, 2001). The average manganese levels in 2015 were well below the BC guideline for protection of aquatic life from long-term exposure.

Until 2014, KGC had been analyzing samples for oil and grease, with a laboratory detection limit of 2 mg/L. However, the applicable Kyrgyz MAC standard is 0.3 mg/L. As indicated in the 2014 AESR, an investigation into this matter suggested that our previous interpretation of the MAC for Communal Use streams and resulting laboratory analysis of “oil and grease” may not have been the most appropriate. Beginning in 2015, we have started analyzing for a broad range of petroleum hydrocarbons following the Canadian Council of Ministers of the Environment (CCME) Tier 1 method. Hydrocarbon fractions F1 (C6-C10) to F4 (C34-C50) were analyzed individually and all measured at less than laboratory method detection limit. The value reported in Figure 5.5 (0.1 mg/L) conservatively represents half of the highest detection limit (0.2 mg/L for F3 and F4). Other fractions had lower detection limits.

Effluent Treatment Plant Discharge

Given the extreme climate conditions at the mine site, KGC's effluent treatment plant (ETP), which treats the effluents contained in the tailings management facility (TMF), generally operates between June and October each year (when water is not frozen). In 2015, the average discharge rate was about 1,733 m³/h.

During the water treatment season, the Kumtor River, which receives treated discharge from the ETP, is not frozen and exhibits significant flow volumes. In 2015, the peak flow of the Kumtor River was recorded at 36.72 m³/s in July, and the minimum flow during the period of discharge was 1.5 m³/s.

The 2015 ETP discharge water quality results are presented in Figure 5.3 (note log scale). The results are compared to the MAD standards and discussed below.

The results show that treated effluent discharge concentration of cyanide and certain other key parameters met their respective MAD standards. However, the average total ammonia (as N) concentration (27 mg/L) – a by-product of the cyanide destruction process exceeded its MAD standard (23.48 mg/L). This is not considered to represent a significant risk to the environment as the unionised (toxic) portion of the ammonia is within EMAP standards and acute toxicity testing results by the United States Environmental Protection Agency (US EPA) suggest that total ammonia at the ETP discharge will not be toxic to aquatic life in the Kumtor River at concentrations up to 29 mg/L (Lorax, 2014). This assumes that the pH of the discharge is less than 7.8; this was the case, with an average discharge pH in 2015 of 7.4, and a maximum of 7.8. It should also be noted that the average ammonia (as N) concentration at the receiving environment compliance point (Kumtor River at W1.5.1) was 0.95 mg/L in 2015 (compared to an MAC standard of 1.5 mg/L). This is additional evidence that the discharge from the ETP is not causing adverse environmental effects.

Sewage Treatment Plant Discharge

In 2015, the average generation of wastewater and sewage was approximately 341 m³/day. The annual average STP discharge water quality met all required MAD standards as shown in Figure 5.4.

External Water Quality Testing

Our operations are routinely subject to inspections by local government agencies, who notify us of any concerns identified. We then respond or address concerns accordingly.

Monthly and Historic Results

Average monthly monitoring results are presented in the appendix. Monitoring results from previous years are presented in past annual environmental reports, which are also available on KGC's website.

References:

- Canadian Council of Ministers of the Environment (CCME), 1999. Canadian Environmental Quality Guidelines. http://ceqg-rcqe.ccme.ca/en/index.html#void;
- Health Canada, 2014. Guidelines for Canadian Drinking Water Quality: Summary Table. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario. http://www.hc-sc.gc.ca/ewh-semt/alt_formats/pdf/pubs/water-eau/sum_guide-res_recom/sum_guide-res_recom_2014-10_eng.pdf;
- Lorax Environmental Services Ltd., 2014. Proposed Un-ionized Ammonia; Ammonia-N and Sulphate Limits for T8.4 and Kumtor River at W1.5.1. Submitted to KGC 08 August 2014;
- Olkowski, A. A., 2009. Livestock Water Quality: A Field Guide for Cattle, Horses, Poultry, and Swine. Prepared in association with Agriculture and Agri-Food Canada, the University of Saskatchewan, and Saskatchewan Agriculture. First Edition: May 2009. http://www5.agr.gc.ca/resources/prod/doc/terr/pdf/lwq_guide_e.pdf (If above link doesn't work try this https://www.ag.ndsu.edu/waterquality/livestock/Livestock_Water_QualityFINALweb.pdf);
- Nagpal, NK. 2001. Ambient Water Quality Guidelines for Manganese. British Columbia Ministry of Environment and Lands. http://www.env.gov.bc.ca/wat/wq/BCguidelines/manganese/manganese.html.

DEMONSTRATION SCALE CONSTRUCTED WETLAND TREATMENT SYSTEM (CWTS) AT KUMTOR MINE

Wetlands are special environments that are home to aquatic plants and also a wide range of beneficial microbes that clean and purify the water. They are used around the world to treat waters from mining operations and many other industrial activities.

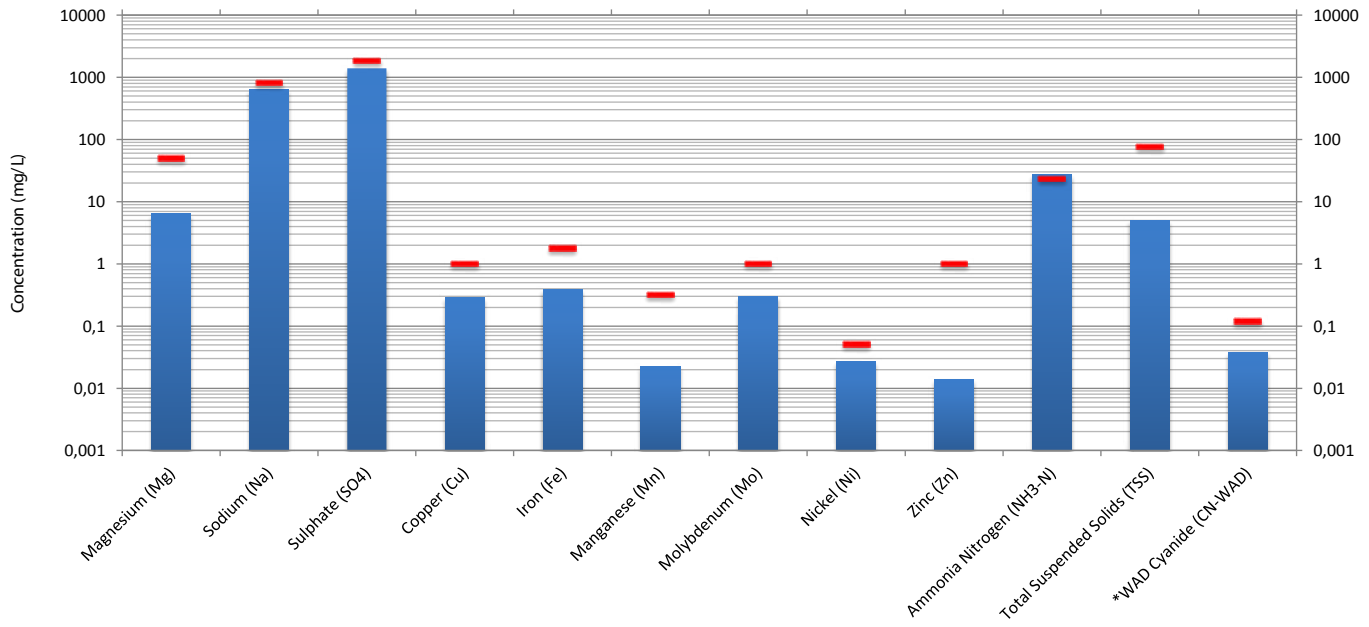
A constructed treatment wetland can clean water using plants, microbes, and soils from the local area. The water is treated using natural processes that typically do not require chemicals or electricity. It is the naturally present, helpful microbes in the wetland that do much of the work in treating the water, and the plants and soils give them a place to live and do their work.

There is a special group of these beneficial microbes that can clean ammonia from water. In 2014, a study was performed by international experts at Kumtor and the surrounding area to investigate if ammonia-cleaning microbes were naturally present in the area, and if so, what types of wetlands they prefer to live in. These beneficial microbes were found in many wetlands in the area, showing that it is possible to naturally treat ammonia from water at Kumtor. Although the water quality discharge from the Effluent Treatment Plant (ETP) is already good, materially complies with Kyrgyz Standards and does not represent a risk to the environment, this is an effort to improve the water quality even further.

Testing was done in the only cold-climate treatment wetlands pilot-facility in the world with the ability to test and optimize passive water treatment systems in a site-specific way. This controlled facility also used its laboratories to analyze how the treatment wetlands were performing, allowing for further optimization of the designs. The testing was done using the plants and microbes harvested from wetlands at Kumtor to see if a manmade wetland could be built to treat ammonia from water that is similar to the water at Kumtor. The testing showed very good results, with more than 20% reduction of ammonia concentrations in early stages of testing.

Based on the results of the scientific studies and testing, a demonstration size treatment wetland was built at Kumtor in the summer of 2015 to reduce the ammonia concentration in the ETP discharge. The wetland was built using local plants and soils that were identified by scientists to be homes to the naturally helpful ammonia-treating microbes. This demonstration treatment wetland receives some of the water from the effluent treatment plant, and its purpose is to refine calculations needed to size a full-scale treatment wetland that could treat all of the water from the effluent treatment plant if required. The preliminary results were promising and consistent with the performance achieved in the pilot-scale system.

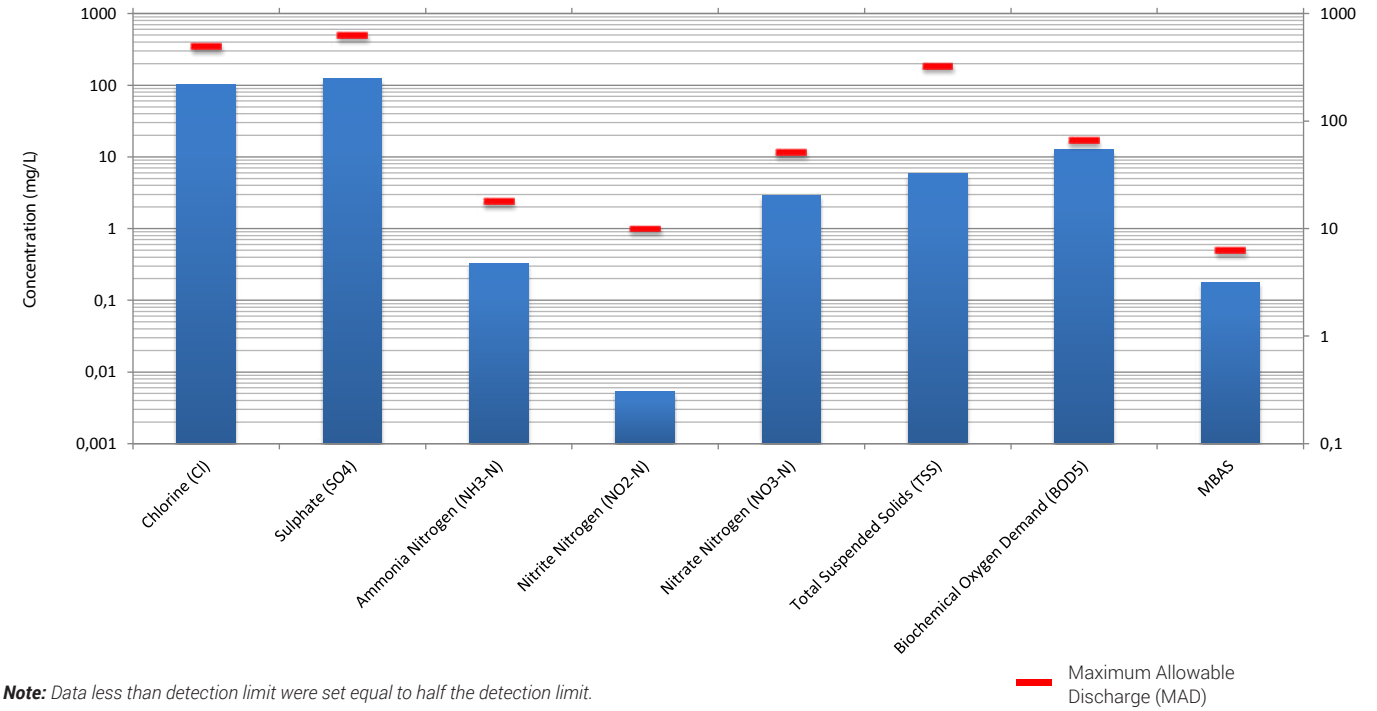
Fig. 5.4 2015 Water Quality Data at the Discharge Point of the Effluent Treatment Plant (location T8.4)



Note: *Data less than detection limit were set equal to half the detection limit.*

** MAC is for Free Cyanide (CN-F). Measuring CN WAD is conservative as CN-F is always less than or equal to CN-WAD*

Fig. 5.5 2015 Water Quality Data at the Discharge Point of the Sewage Treatment Plant (location SDP)



Note: *Data less than detection limit were set equal to half the detection limit.*

5.3 | GLACIER MANAGEMENT

Kumtor's high altitude mining operation is in close proximity to active glaciers, with part of the ore deposit and associated infrastructure extending beneath or affected by moving glaciers. Ice removal is required to provide safe access to ore and has been an approved part of mining since 1994. It is small compared to natural losses.

In response to stakeholder concerns and emerging legislation seeking a ban of glacial ice removal in the Kyrgyz Republic, we describe relevant information on our practices and put our impacts in the context of regional and global trends.

Ice Unloading

As visible in the aerial photo in the Environmental Monitoring section of this report (Figure 4.3), parts of five active glaciers are present within the Kumtor Concession area (Davydov, Lysyi, Sarytor, Petrov, Bordoo). Ice is also present in extensive ice fields in the southern and eastern part of the concession area.

The continuation of mining at Kumtor depends on our ability to manage and remove the ice in the vicinity of the open pit and other infrastructure throughout the life of the mine. We have also adjusted our practices over the years. In response to concerns raised by some stakeholders, we no longer deposit waste rock on glaciers and now segregate waste rock and ice and avoid co-disposal. Ice removed by Kumtor as part of its mining process is deposited back on other ice fields. In 2015, approximately 10 million tonnes of ice was removed from the Davydov Glacier and placed in these dedicated areas. Ice removal will need to continue in the future to provide ongoing safe access to the ore body as mining progresses.

Environmental Context

The impact of climate change has been observed in Central Asia over the past century. According to the United Nations Development Programme (UNDP), nearly 1/3 of the glacial area of Central Asia has disappeared since 1930, including the glaciers of the Kyrgyz Republic. The Kyrgyz government's 2009 submission to the United Nations Framework Convention on Climate Change (FCCC) reports that total glacier volume in year 2000 had reduced by about 20 percent since the 1960s. The same report predicts that, for the most likely climate change scenarios, the area of glaciation will reduce by between 64 and 95 percent between years 2000 and 2100.

It is estimated that approximately 200 million tonnes of ice is lost each year on the Ak-Skyirak mountain massif (on which Kumtor is located) due to climate change effects (Petrakov, 2013).

Glacier Monitoring & Studies

The nature of all glaciers is for them to move steadily downhill, much like a very slow-moving river. The movement of the Davydov and Lysyi glaciers has been monitored since 1995, before mining started, with Sarytor glacier included in recent years. Glacier flow rates typically follow a seasonal pattern, being faster in warmer months and slower in winter.

The Davydov glacier moves faster compared to the Lysyi and Sarytor glaciers, although its overall movement is not specifically monitored because ice is regularly unloaded from its base. In 2014-2015 the Lysyi Glacier moved 26 meters, and the Sary-Tor Glacier moved 13 meters. For comparison, the Chon-Kotur Glacier, located outside the concession area, moved 23 meters in the same period.

In 2014, Kumtor constructed an in-pit retaining buttress to reduce the movement rate of the south arm of the Davydov Glacier. Regular monitoring has shown this has been an effective engineering solution, and has reduced the quantity of ice that needs to be removed to ensure pit safety.

In 2014, we commenced a multi-year long-term (2014-2018) glacier and hydro-meteorological monitoring program covering KGC concession area and basins of Arabel and Uchkol rivers. The studies are conducted by the Institute of Water Problems and Hydropower under KR NAS with involvement of experts from MGU (Moscow State University, Russia). The monitoring program aims to assess the status of glaciers and trace the dynamics of their change (movement rate, linear retreat, and surface depression) and reflective properties of their surfaces (albedo) within the area of immediate anthropogenic impact by KGC and comparison of obtained data with similar observations undertaken on glaciers located at significant distances from the mine. Further information is contained in the case study in this chapter.

Fig. 5.6 Average Glacier Movement Speed (m/day)

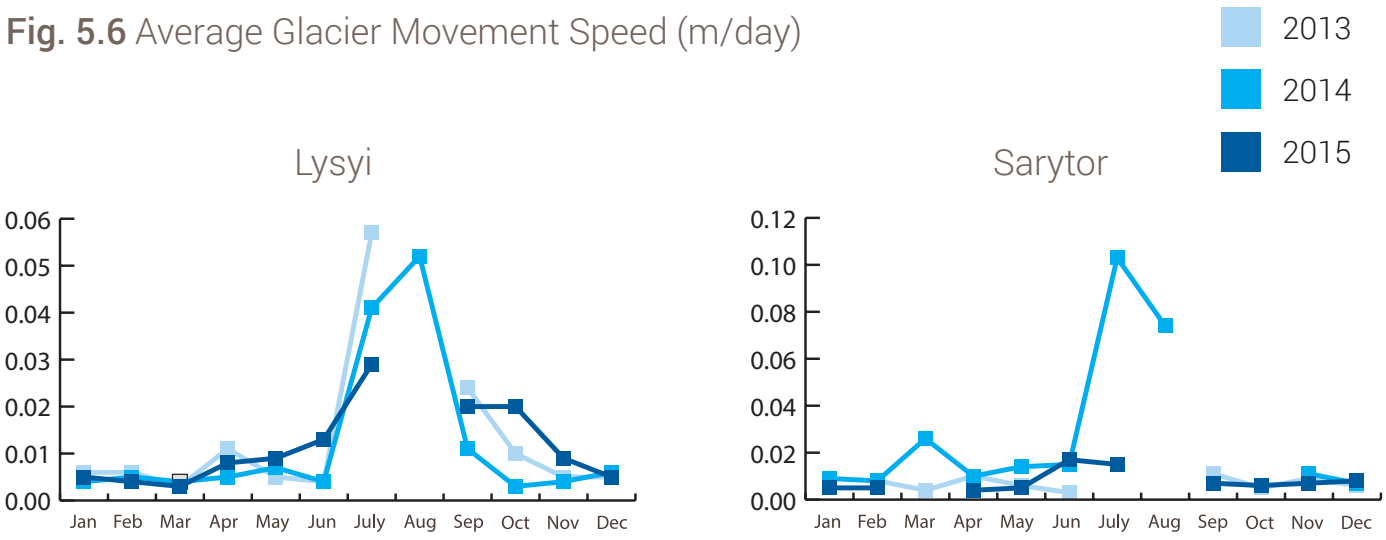


Fig. 5.7 **Retreating Glaciers in Kyrgyzstan**

	million tonnes/year
Annual average climate-change-induced ice loss on the Ak-Shyirak mountain massif (on which Kumtor is located)	200
Kumtor Ice Unloading in 2013	30
Kumtor Ice Unloading in 2014	14
Kumtor Ice Unloading in 2015	10

Regulatory Context

Measures to manage glaciers and ice have been a feature of mining operations at Kumtor from the beginning of the project in 1994, and the subject of frequent Kyrgyz regulatory oversight and approval, as well as review by international technical and environmental experts.

In late 2012, Kumtor received claims for alleged damage relating to disposal of waste rock on glaciers. These have not yet been resolved and we will continue to liaise with the Kyrgyz government on these and other matters.

Petrov Lake and Lake Out-Burst Risk

A related concern to that of retreating glaciers is that melting ice within natural moraine dams of high altitude lakes (normally at the foot of glaciers) could reduce dam stability and result in a sudden release of large volumes of water, known as a glacial lake out-burst flood (GLOF).

Petrov Lake, near Kumtor Mine, and which is the main source of its water supply, is such a high altitude lake contained by a natural moraine dam. Petrov Lake is at the foot of Petrov Glacier, which has demonstrated significant and continuing recession over recent decades.

We have supported or commissioned independent expert studies to better understand the characteristics of the moraine dam and the risks of a lake out-burst.

In response to the findings, we monitor movements of the moraine dam, commenced controlled reduction of water volumes in Petrov Lake, and commissioned an early warning system to detect any sudden unexpected increase in lake outflow. We will provide additional safeguards for mine infrastructure as appropriate, and continue to inform and liaise with Kyrgyz agencies on progress.

Glacier Research Projects

On July 7, 2015, the KR Government Order #313-r was issued to establish an Expert Research & Technical Group (ERTG) to study the current condition of the glaciers located in the Kumtor Mine area, determine the reasons behind the changes in the glacier condition and forecast further condition of the glaciers for the short-term and midterm perspectives for various mining options of the Kumtor Mine development.

To help support the objectives of this order, KGC continued funding the multi-year long-term (2014-2018) glacier and hydro-meteorological monitoring program covering KGC concession area and basins of Arabel and Uchkol rivers. The goal of the work performed in 2015 was to look into the impact of the KGC mining operations and regional climate change on the retreat of a few Ak-Shyirak massif glaciers by using glaciological methods. The study was conducted by two research groups. One group was represented by the Kyrgyz Institute of Water Problems and Hydropower (IWPH) of the KR National Academy of Sciences and the second group was represented by the research experts from the Moscow State University named after M.V. Lomonosov (Lomonosov MSU) and Institute of Geography, Russian Academy of Sciences.

In 2014, IWPH experts conducted a series of studies to assess the contribution of Kumtor Mine to glacier retreat. However, this assessment was based only on indirect data such as comparison of change in glacial area and melting rate as a function of distance from the Central Pit. In 2015, they made attempts to determine technogenic (human induced) impact using analysis of the reflective properties (albedo) of glaciers located at different distances from the main Kumtor pit.

KGC Impacts on Glaciers

Kumtor Mine's direct impact on surrounding glaciers is removal of ice from the Davydov Glacier to provide safe access to the ore. Between 2003-2013, the glacier volume loss due to mining operations was 5% of the total reduction of the Ak-Shyirak Massif, with the remaining 95% caused by climate change (Petrakov et al., 2013). However, it should be noted that the ice transported from the Davydov Glacier is not actually lost – but preserved in dedicated ice dumps. So the actual impacts from Kumtor are even smaller as climate change results in irrevocable ice loss, whilst the decrease due to the technogenic impact results in the shrinkage of the glacier volume but not in the loss of ice resources of the Ak-Shyirak Massif itself.

Kumtor Mine's indirect impact on glaciers relates to dust emissions from operations, estimated by some scholars to be 3 to 4 tonnes per day (Torgoev, Aleshin, 2001) or about 1,000 tonnes a year. For comparative purposes, the nival-glacial zone of the Tien Shan mountains accumulates a 1mm thick dust layer every year (Stepanov, 1961). Simple recalculation shows that this layer over an area of $1km^2$ is approximately 1,000 m^3 or slightly more than 2,000 tonnes when accounting for typical dust density. If applying this figure to the entire Ak-Shyirak Massif, dust emissions from Kumtor represent only 1/700th (0.14%) of dust impacts due to natural factors. The previous research undertaken by Kuzmichenko in 2012 supports this conclusion that the impact of dust emissions from mining operations on glaciers surrounding the pit was minor. This conclusion is also indirectly supported by analysis of core drilled from the Grigoriev Glacier located not far from the Kumtor concession zone which indicate that the layers of heavy dust contamination had formed on the Grigoriev Glacier before Kumtor Mine launched its operations. It should be stressed that heavy dust pollution of a glacier surface is characteristic of all glaciers located in continental regions with mountains surrounded by deserts - for example, Gulia Glacier located in Western Kun-Lun, a completely unsettled area.

Glacier surface contamination with dust supposedly results in decreased albedo and increased melting (Kronenberg, 2013). Therefore, to get a reasoned answer on the indirect contribution of KGC operations to glacier massif retreat, MSU staff conducted an areal ground-based albedo survey at Sarytor and Lysyi Glaciers, and at 5 glaciers located at a different distances from the Central Pit of the Kumtor Mine. The ground-based albedo survey was carried out with the use of specialized equipment called an Albedometer SP Lite2 (Kipp&Zonen) on 5 glaciers of Ak-Shyirak

Massif (Sarytor, Lysyi, Petrov, #354 -Bordu Yuzhnyi, and #27 in the Tez River basin) and 2 glaciers on the northern slope of Jetimbel Range (Zapadnyi Suek and #434). Figure 5.7 provides general information about the Glacier area, and distance between the Glacier centre and Central pit of the Kumtor Mine.

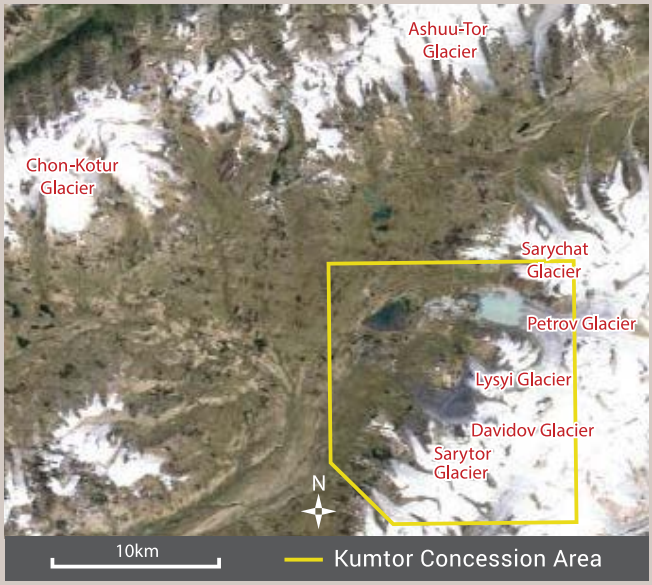
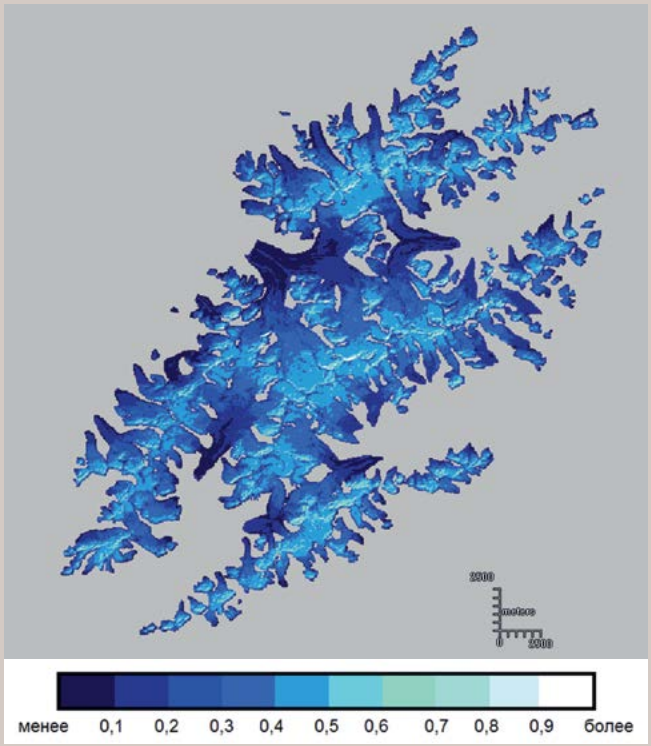


Fig. 5.8 **Glaciers Studies Near KGC**

	Glacier Area, km²	Distance between Glacier Centre and Central pit, km
Petrov	61.36	8.2
Lysyi	3.34	3.4
Sarytor	2.73	3.2
#354	6.59	7.2
#27	1	15.6
Zapadnyi Suek (419)	1.3 (1.4 acc. to Glacier Catalogue)	37.2
#434	0.95 (1.6 acc. to Glacier Catalogue)	26

Based on analysis of more than 500 albedo survey points located at distances varying from 3 to 37 km from the Central pit it, was established that mean albedo values for ice are low and vary between 0.16-0.18 which is not unusual for continental glaciers. The areal albedo survey on the Sarytor and Lysyi Glaciers enabled production of detailed surface albedo maps for these glaciers. It is clear that distribution of albedo values is not correlated with distance to the Central Pit but more dependent on change of surface type and partial coverage of glaciers with fresh snow. This is also supported by the studies conducted in 2015 by O. V. Tutubalina, Leading Researcher of Laboratory of Aerospace Techniques (Geography Department, Lomonosov MSU) who carried out a preliminary assessment of the feasibility to use satellite images to calculate albedo of the Ak-Shyirak Glacier Massif.

This study concluded that albedo depends mainly on the altitude of the glacier surface with no relationship to the distance from the Central Pit. So, both ground-based and satellite albedo measuring techniques produced similar results, - there is no relationship between glacier albedo and distance to the Central Pit, and technogenic impact on the mass balance of the Sarytor Glacier cannot be observed between the period 2004 and 2015.



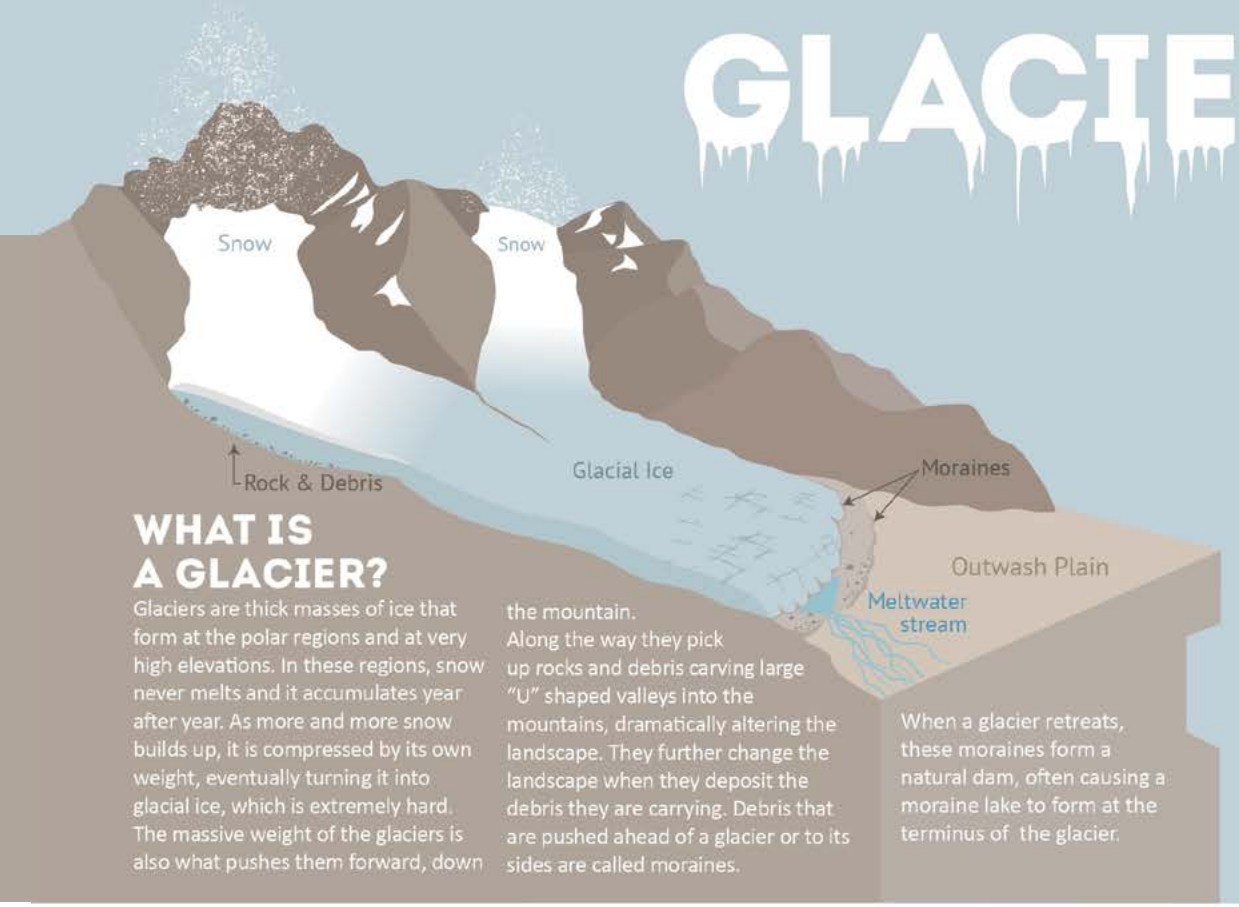
Glaciers and Climate Change

Various recent research projects (Farinotti et al., 2015; Huss, Farinotti, 2012) reported a 27% loss of glacier mass in the Tien Shan mountains during the period from 1961-2012, which is fourfold higher than average of the planet (except for Antarctic Continent and Greenland). Such a rapid retreat of glaciers in the Tien Shan is proposed to be driven primarily by an increase in the average summer air temperature that contributes to ablation of snow and ice. The same situation is characteristic of Ak-Shyirak glacier massif, with the rate of glacier retreat increasing from 0.12% per annum in 1943-1977 to 0.33% per annum in 1977-2003, and 0.59% per annum in 2003-2013.

For comparative purposes, the Petrov Glacier over the period 2003-2013 irrevocably lost between 360 million to 630 million m³ of ice (15-25% of the total deglaciation of the Ak-Shyirak Massif), depending on the calculation method used. In fact, the 4 largest glaciers of the Ak-Shyirak Massif represent 70-75% of the total massif deglaciation if the volume/area dependence method is applied.

The overall conclusion of the various glacier studies conducted to date is that except for the Davydov Glacier (as explained above), the current glacier retreat of the Ak-Shyirak massif is driven exclusively by regional climate change.

GLACIERS



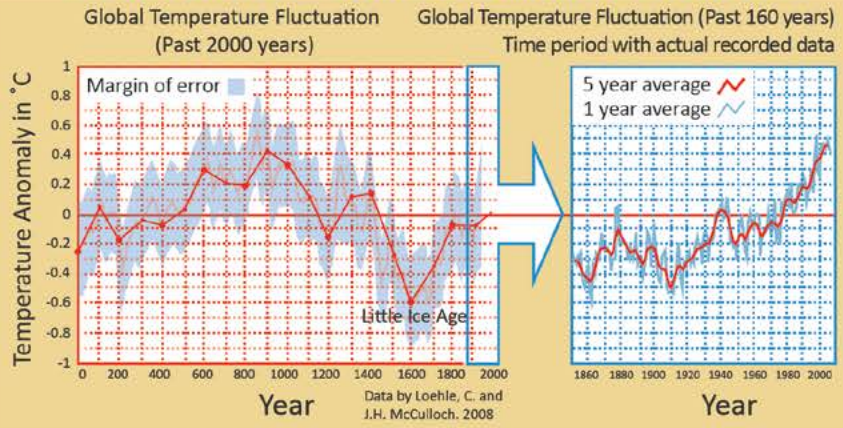
WHAT IS A GLACIER?

Glaciers are thick masses of ice that form at the polar regions and at very high elevations. In these regions, snow never melts and it accumulates year after year. As more and more snow builds up, it is compressed by its own weight, eventually turning it into glacial ice, which is extremely hard. The massive weight of the glaciers is also what pushes them forward, down the mountain.

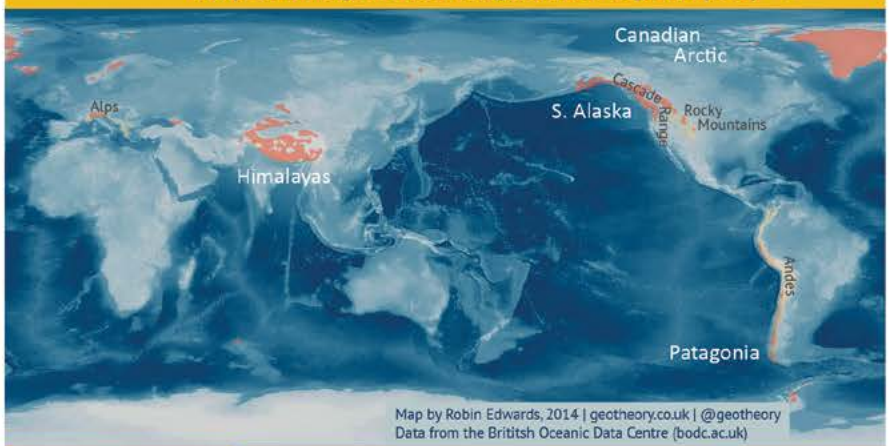
Along the way they pick up rocks and debris carving large "U" shaped valleys into the mountains, dramatically altering the landscape. They further change the landscape when they deposit the debris they are carrying. Debris that are pushed ahead of a glacier or to its sides are called moraines.

When a glacier retreats, these moraines form a natural dam, often causing a moraine lake to form at the terminus of the glacier.

OVERVIEW OF GLOBAL CLIMATE CHANGE



Map showing the worlds glaciated regions (red)



Glacial Ice Loss from 2003-2010

Region:	Ice Loss (tonnes/year)
Patagonia (S. America)	23 billion
Southern Alaska	46 billion
Canadian Arctic	67 billion

WARMING TREND

From 1550 to 1850 the world experienced temperatures cooler than previous eras as well as the present day. This time period is known as The Little Ice Age.

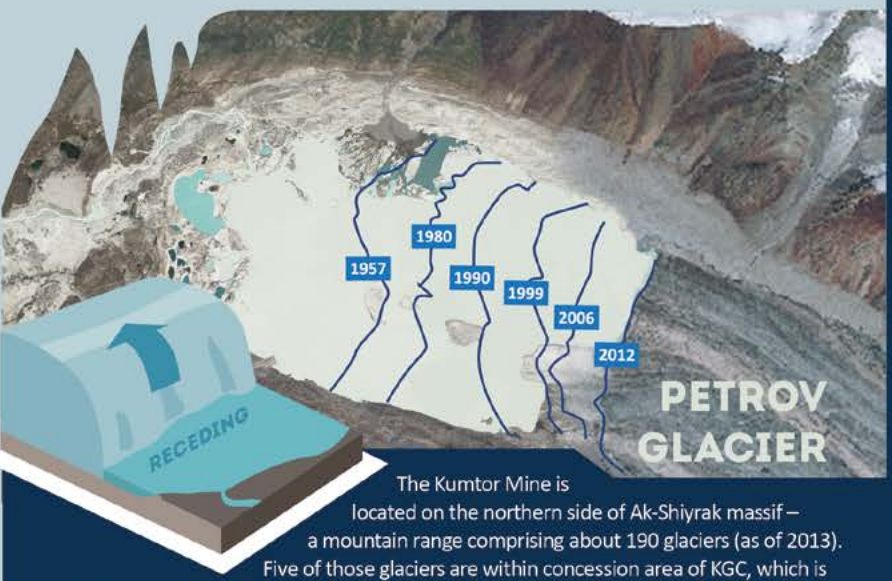
However, since then temperatures have been steadily rising, except for a few decades between 1950 and 1980, when the trend briefly reversed. In the long term, temperatures have continued to climb, leading to the melting of glaciers worldwide. Most of the major glaciated areas of the world have shrunk considerably since the 1980s and many glaciers have already dissapeared altogether.

The growing and receding of glaciers is a natural part of earth's cycle and is not alarming in and of itself, however it does present us with many challanges. As more glaciers melt, moraine lakes may overflow and burst - endangering people living downstream. People living in dry regions, who depend on glacial meltwater, will have to learn to make due with less. And eventually, as sea levels continue to rise, it may lead to the flooding in low-lying coastal cities.

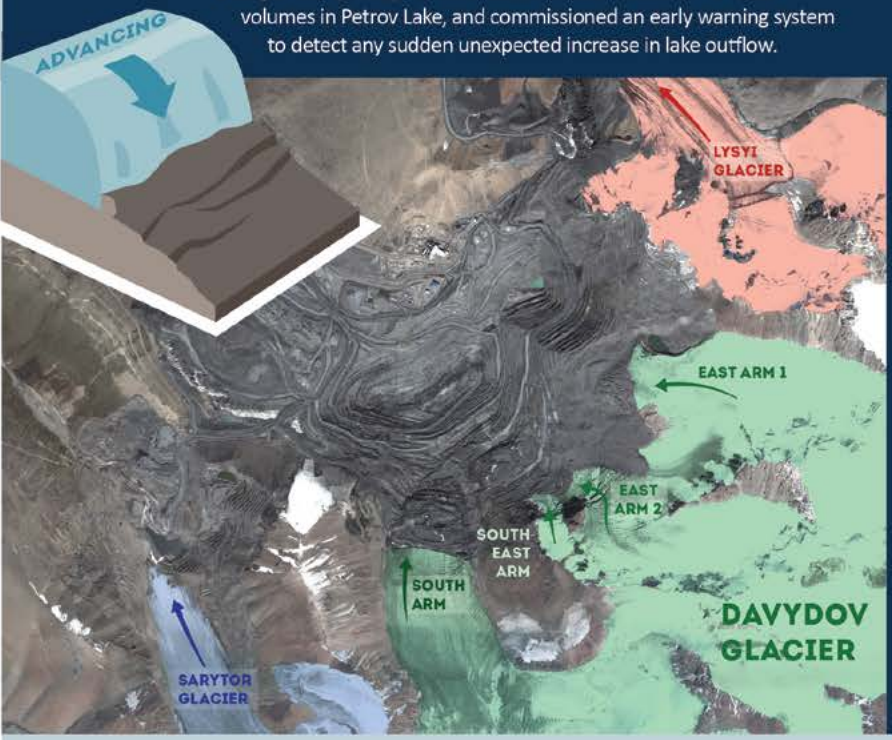
The glaciers of Greenland have been getting darker over the last few years, decreasing the amount of sunlight reflected back into space and thus increasing the melt-rate of the ice. According to Glaciology Professor Dr. Jason Box the darkening is likely due to soot, blown in from an increasing number of wildfires. Summer snowstorms that would might cover up the dark ice have also been scarce, so the ice continues to melt faster and faster.

Information is based on the article by Tom Bawden in The Idependent, 18/9/2014 http://www.independent.co.uk/environment/greenlands-dark-snow-may-start-global-warming-feedback-loop-9742159.html

GLACIERS AT AK-SHYIRAK MASSIV



The Kumtor Mine is located on the northern side of Ak-Shiyrak massif – a mountain range comprising about 190 glaciers (as of 2013). Five of those glaciers are within concession area of KGC, which is less than 6% of the whole glacial area of Ak-Shiyrak massif. The largest glacier in the concession area - Petrov Glacier - has been steadily receding since before 1950, its meltwater forming Petrov lake at the foot of the glacier. After a number of years studying the glacier and moraine dam holding the lake, in order to reduce the risk of a sudden flood, KGC has enlarged the spillway, commenced controlled reduction of water volumes in Petrov Lake, and commissioned an early warning system to detect any sudden unexpected increase in lake outflow.



GLACIAL MELT IN CENTRAL ASIA

Since 1930
All of Central Asia

33% reduction over 84 years (area)

1977-2007
Big Naryn Basin

23% reduction over 30 years (area)

1960-2000
Kyrgyzstan

20% reduction over 40 years (volume)

Glaciers on the Ak-Shyirak Massiv 2003-2013

5.9% reduction over 10 years (area)

Ice lost due to climate change

Ice removed by Kumtor to ensure safe operation of the mining pit. (0.4% of total glacial area)

Retreat of Jakobshavn Glacier in Greenland

Muir & Riggs Glaciers in Alaska

Retreat of Upsala Glacier in Patagonia

6.1 | STAKEHOLDER ENGAGEMENT

Effective stakeholder engagement is essential to managing our social responsibility. We have established structured processes to effectively listen to, and communicate with, our stakeholders, including regulators, shareholders, employees, local communities, small businesses, and the general public.

The process also includes bringing stakeholders together. Many of the projects described in this section have brought together communities, other supporting partners, the international aid community (see case study boxes), and government representatives.

Engagement Context

Our approach to engagement reflects our desire for respectful and meaningful dialogue within the complex social and political context of the Kyrgyz Republic. A third of the population lives below the national poverty line. Kyrgyzstan's Soviet past, along with uranium and other mining related environmental legacies, continue to shape perceptions of the industry today.

We have faced a series of allegations and claims regarding environmental impacts and technical aspects of the mine operation. This context means that public and media interest in KGC's activities remains high.

Structured Dialogue

Our local engagement is primarily through four Regional Information Centres. The Centres have been established in the Jeti-Oguz and Ton districts, and in the city of Balykchy. The main objective of the Centres is to provide information about KGC to local residents. This includes information related to our hiring procedures, human-resources policy, and job vacancy information. Community relations officers attend local community events, monitor the implementation of development projects funded by KGC, and act as a point of first contact for members of local communities.

In addition to these structured activities, other types of formal and informal engagement occur on a regular basis across our host communities, with a range of other stakeholders such as community leaders, community organizations (eg. schools, medical centres, youth groups), local small businesses, and agricultural representatives.

To ensure partnerships based on consensus we initiated an establishment of Regional Committees in Jeti-Oguz, Ton and Balykchy. Committees members are local authorities, heads of village councils, representatives of civil society organizations, members of different unions and others. In these meetings KGC management raised issues about operations, results of work and operations, as well as define plans of investment projects in liaison with local communities. Decisions are made together with representatives of each Committee so that KGC's investments meet expectations and needs of focus communities.

Public Communication

Adhering to the information transparency policy and main principles of the Extracting Industries Transparency Initiative (EITI), KGC recognizes the importance of providing accurate and objective information on the Company and satisfying the information needs of all stakeholders.

In recognition of the increased interest in KGC's activities, by the media we update on a regular basis our corporate website (**www.kumtor.kg**) in three languages (English, Russian, and Kyrgyz). On the website, we post news releases, downloadable reports, and media articles that feature KGC. Stakeholders can also have an access to the information describing our business, the work we do, and our environmental and social responsibility activities.

We commission films about our activities which we post on our website and through social media channels, such as Youtube and Facebook (as **Kumtor Gold Company**).

> In 2015 we continued to host one-day mine site visits for interested parties.

On a regular basis, we produce a multi-lingual newsletter, In Touch, and occasional brochures on specific issues, such as environmental and operational safety (all also available on our website). We have a free telephone number to allow members of the public to contact us, in order to express a concern or request information, and we also have an email address for this purpose, or can be contacted via our website.

In 2015 we initiated a number of interviews with department managers in Issyk-Kul radio on various topics. We informed the public about our community development programs, environment, compliance etc. On a quarterly basis we produce special issues of regional newspapers in Kyrgyz and Russian language about our activities and distribute them in focus areas.

In 2015 we continued to host one-day mine site visits for interested parties. We gave site tours for 58 groups, including state agencies, government, local authorities, partner organizations, teachers and students from Issyk-Kul-based and national universities. The program for these groups usually includes visits to all major locations of operation. Department managers escort groups to their locations and address their questions and concerns there and then. Every group visits Camp, Mill, Open Pit, Petrov Lake, Tailings Dam and Water treatment plants. Taking into account that our Marshalling yard is located in Balykchy city – employees of the Yard hosted separate open doors events to schoolchildren of Balykchy, where they got acquainted with the work process and got responses to their concerns. We will continue to organize visits to our sites for all interested parties.

KUMTOR AMBASSADORS PROGRAM

In 2015, we aimed to improve employee engagement with local communities and raise awareness of employees about Community Investment Projects, implemented and supported by KGC in Issyk-Kul region. KGC employs 3,741 people including contractors. It is one of the biggest stakeholder groups, who could provide accurate and credible information about KGC's activities to interested stakeholders. Moreover, while taking part in Kumtor Ambassadors Program employees learn about Company's projects, aimed at complex development of the Issyk-Kul region.

In 2015, employees and contractors of all divisions volunteered 2,000 hours to support the Program. More than 40 actions have taken place during the reporting period throughout Issyk-Kul and Chui regions. Some examples include:

- One day spent in mountainous areas at two kindergartens for children of shepherds, who move to pastures in the summer period. Kumtor Ambassadors played with children and organized a series of workshops on production of felt toys, bracelets, origami etc. The Foundation established those kindergartens throughout the Kyrgyz Republic and asked KGC to allocate books, stationery and educating materials to equip kindergartens in pastures of Jeti-Oguz and Ton districts;
- Guest lectures held by Balykchy Marshalling Yard employees in schools to raise awareness about KGC's activities, production process, and work done to minimize the effect of mining operations to environment;
- A number of clean-up days in beach areas. One of the clean-up days was held in a pass, where travelers, public transportation and KGC's transport stops for planned breaks;
- The request from the municipality of the remoted village in Ton district to build a playground for children was approved by KGC Donation Committee and employees decided to help villagers to clean up the area after construction works and paint installed equipment and benches. Employees organized an event with performances, contests, educational workshops and games for local children;
- Traditional distribution of gifts to vulnerable groups of children from the region were delivered to orphanage houses by our employees. They got acquainted with children and spent the whole day giving workshops, playing and talking to the children;
- A number of one-day mine site visits took place for representatives from schools, universities, organizations and business associations. Various employees escorted the groups during the visit to address raised questions and describe production process.

Issyk-Kul Regional Development Fund

As part of its Operating Agreement, KGC contributes 1% of gross annual revenues to the Issyk-Kul Development Fund. This fund is managed independently of KGC, and is governed by an oversight and steering committee, which includes local government representatives and NGOs. The fund is designed to develop the socioeconomic infrastructure in the Issyk-Kul Region in accordance to local and regional government priorities. Since the creation of the fund in 2009, KGC has invested more than $47.4 million into projects as diverse as kindergartens, schools, sports clubs, and irrigation infrastructure across the Issyk-Kul region. We understand that the Fund continues to be criticized for lack of transparency and that some stakeholders are expressing concerns about how project selections are made, and funds are being spent. We are aware of these concerns and continue to encourage the fund to be more transparent, and work closely with Transparency International (a global coalition against corruption) on this issue.

KGC has a seat at the IKDF Supervisory Board and has a right to coordinate 50% of overall funds to ensure a transparent and fair spending of the selected projects in the interests of social and economic development of the Issyk-Kul region, especially of communities located on the southern coast of Lake Issyk-Kul, including the town of Balykchy. The Supervisory Board meetings take place once in a quarter.

Fig. 6.1 Annual Contribution to Issyk-Kul Region Development Fund

units	2013	2014	2015
Million US$	7.8	7.4	7.1

Assessing Impacts

Apart from regular monitoring and evaluation processes embedded in each project and donation supported by the company, we regularly conduct impact assessment and perception study in our focus areas – Jeti-Oguz and Ton districts and the city of Balykchy. Our Stakeholder Engagement Strategy and plan are based on these studies and quarterly review of major stakeholders and their concerns, documented in internal online Kumtor-Connect software system, updated by regional community relations officers, and members of other departments dealing with publicity. Based on analysis and studies we have formulated a summary of stakeholder concerns in Fig. 6.2. (see p. 86).

Fig. 6.2 **Summary of Stakeholder Concerns**

Stakeholders	Topic	Report Section Where Discussed
Kyrgyz Republic Government and Parliament	■ Changing legal agreements ■ Claims and changes to the legislation (glaciers, Water Code) ■ Project benefits ■ Waste Management and permits for new waste dump ■ Compliance with regulations in new camp commissioning	■ President's Message ■ Economic Responsibility ■ Waste Rock and Ice ■ Social Responsibility
Various Commissions, Government Agencies and Local Communities	■ Economic benefits ■ Environmental impacts ■ Waste rock management ■ Tailings dam displacement ■ Impacts on glaciers ■ Glacial lake outburst flood ■ Mine closure and funding ■ Old camp relocation and construction of new camp	■ President's Message ■ Economic Responsibility ■ Social Responsibility ■ Environmental Sections ■ Case Studies ■ Tailings Management ■ Waste Rock and Ice ■ Mine Closure
Local Communities, Youth, Vulnerable Groups	■ Employment opportunities ■ Environmental impacts ■ Water resources ■ Community support, projects and donations	■ President's Message ■ Social Responsibility ■ Local Procurement ■ Water Use and Treatment
Local Businesses	■ Supplying goods and services	■ President's Message ■ Economic Responsibility ■ Local Procurement ■ Social Responsibility
Employees and Contractors	■ Employment conditions ■ Benefits ■ Health, safety and well-being	■ President's Message ■ People ■ Occupational Health & Safety
Conservation NGOs	■ Environmental impacts ■ Biodiversity strategy ■ Mine closure	■ President's Message ■ Environment sections ■ Mine Closure

KGC Grievance Mechanism

As the major company operating in the Kyrgyz Republic, KGC receives complaints and requests ranging from dust related to truck traffic, to requests for jobs and building hospitals or roads. We maintain an open dialogue with all stakeholders and listen to rational ideas. The measures taken by the company with regard to the dust on the technological road are highlighted in the Environmental Monitoring Section. KGC also experienced temporary road blocks in 2012 and 2013, but none in 2014 and 2015. Protests typically involved demands for a greater distribution of the mine's profits and benefits. Negotiations between Centerra and KR Government actively continued in 2015. Overall, we note that the frequency and scale of road blocks have been diminishing. Since 2013, we have been using a new IT-supported management system, Kumtor Connect, to further improve our approach and recording of stakeholder engagement, governance of community investment spending, and managing grievance and commitments.

Grievances on sustainability issues are dealt in accordance with the accepted grievance acceptance mechanisms, described further in the section. In 2015 KGC received 7 grievances and resolved all of them during the year.

KGC's Sustainable Development Department has four information centres in the Issyk-Kul region, and community representatives and local authorities contact our CROs for any information. In their turn, they report all issues raised by communities to the SD Director and VP on Risks, Compliance and SD. We have a free phone line available 24/7, our grievance acceptance mechanisms are available in all regional information centres.

We try to resolve each raised issue and concern, and provide requested information for every stakeholder group. All environment-related issues can be directly sent to the VP Risk & Compliance, and Environment Director via **environment@kumtor.com**. All grievances and issues raised are also reported directly to the KGC senior management.

KUMTOR GRIEVANCE PROCEDURE

Kumtor Gold Company works hard to follow national and international guidelines and to build good community relationships. However, in a company of Kumtor's size, grievances will inevitably arise from time to time. We care about our workers and our community and strive to respond to all legitimate grievances in a consistent and transparent manner.

To process everyone's complaints fairly we have a strict procedure in place:

1 RECEIVE COMPLAINT OF GRIEVANCE

Complaints and grievances can be made through an email or letter, over the phone, in person, or other ways not listed here. once the grievance has been logged, a response will be issued, in most cases, within 30 days.

2 LOG AND ACKNOWLEDGE

The complainant receives a receipt with a unique grievance number acknowledging that Kumtor has received the complaint and it is being processed. ***The complainant must sign off on the receipt to acknowledge they have received their grievance number.***

3 PRELIMINARY ASSESSMENT

The severity and applicability of the grievance is assessed. The investigational approach is decided and parties are assigned to carry out the investigation.

4 INVESTIGATE

The grievance is investigated and a decision as to the legitimacy of the grievance is reached. In legitimate circumstances, options for resolving the conflict are identified.

5 RESPOND

A response is issued, outlining the findings of the investigation and the proposed resolution of the conflict. ***The complainant must sign off on the response. This does not mean they agree with the proposed solutions, it only acknowledges that they received a response.***

Responses may include acknowledgment of fault; changes in company procedures; or in rare cases, some form of compensation

Complainant satisfied

Complainant NOT satisfied

7 GRIEVANCE RESOLVED SUCCESSFULLY

The complainant agrees to one of the proposed solutions.

6 CONSIDER REVIEW OR APPEAL

Other possiple solutions are proposed.

8 REDRESS GRIEVANCE

The agreed upon solution is implemented.

COMPLAINT CLOSED OUT

Conflict resolved

GRIEVANCE MAY BE REVIEWED BY INDEPENDENT THIRD PARTIES

Conflict cannot be resolved

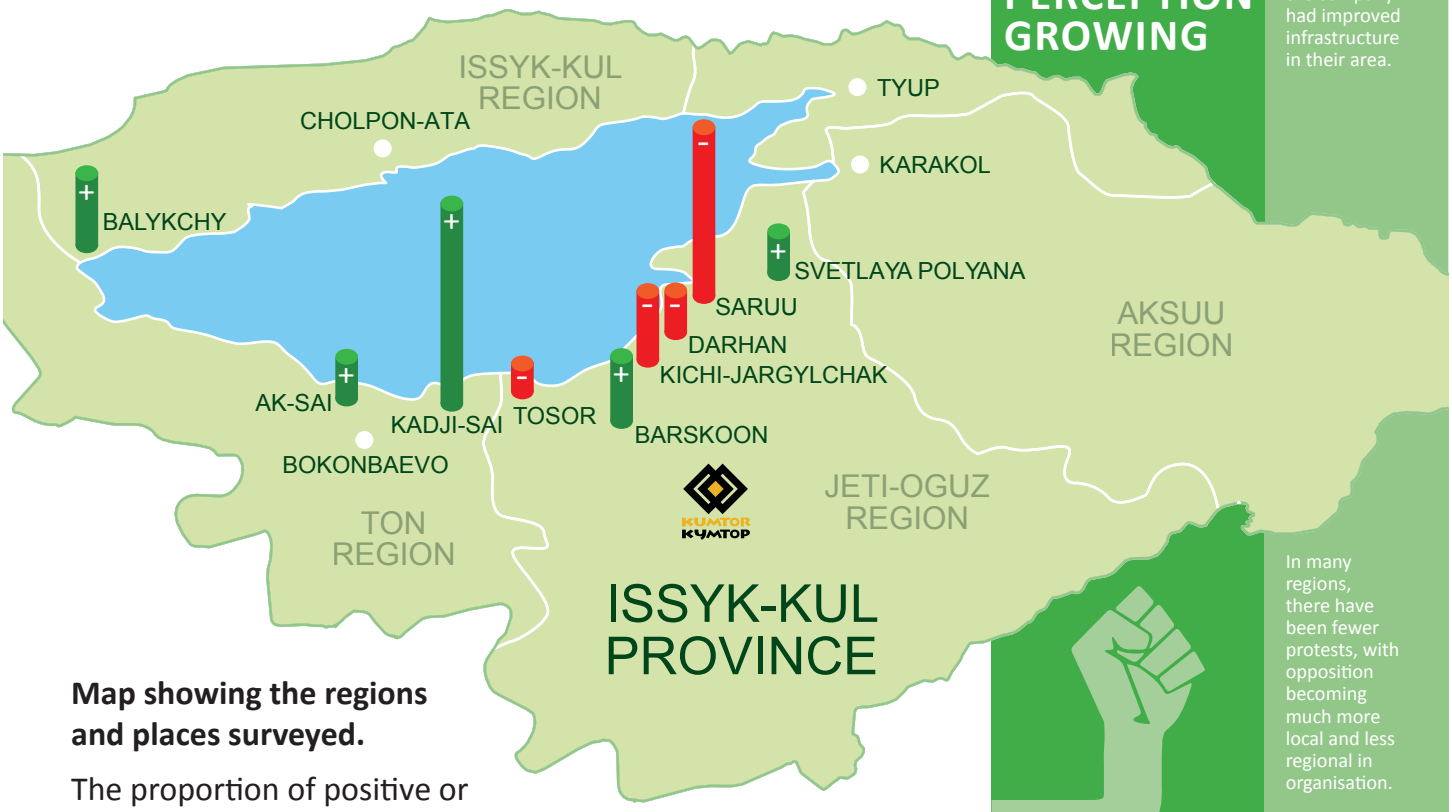
G4-EN34, G4-SO11

KUMTOR КУМТОР

We work hard to benefit the communities of which we are part. Over the past few years we have made significant steps in many areas, although there is still progress to be made.

POSITIVE PERCEPTION GROWING

Over two thirds of respondents agreed either "absolutely" or "to some extent" that the company had improved infrastructure in their area.



Map showing the regions and places surveyed.

The proportion of positive or negative opinions about Kumtor are shown by the coloured bars.

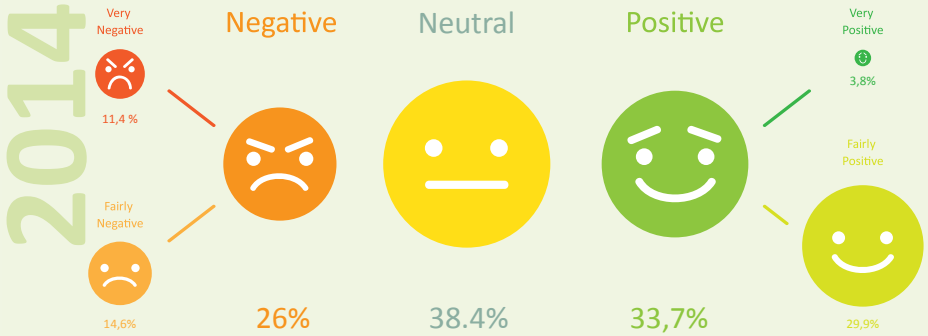
REDUCED NUMBER OF PROTESTS

In many regions, there have been fewer protests, with opposition becoming much more local and less regional in organisation.

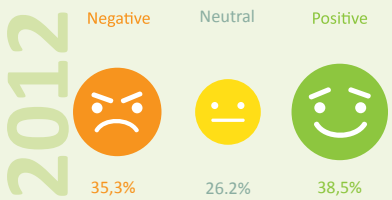
Highlights of perception survey conducted in July 2014 by Oxus International for Kumtor Gold Company. **For further information see www.kumtor.kg or contact info@kumtor.com**

PERCEPTIONS

General Perceptions of the company are improving, however there is a lot of room for progress.



Compared with 2012 (below) there is a shift towards neutrality on both ends of the spectrum.



G4-EC7, G4-EC8, G4-SO1

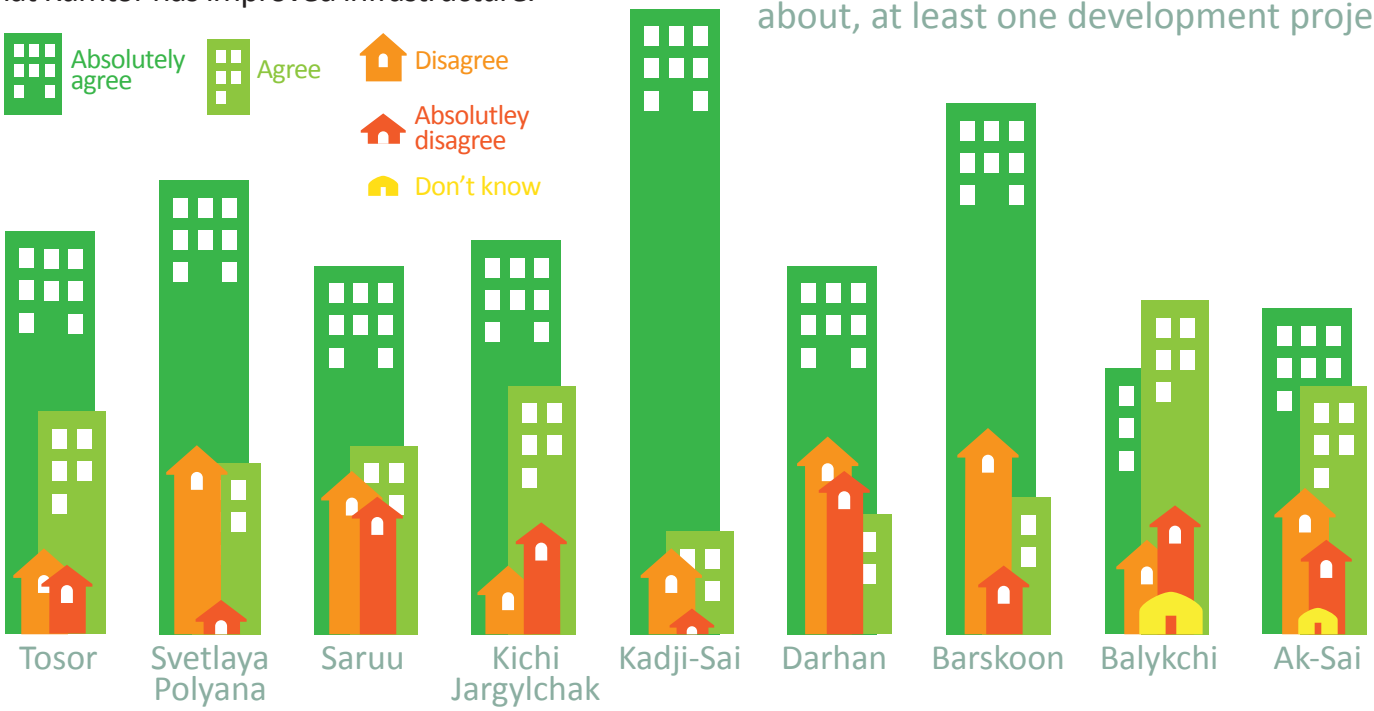
DEVELOPMENT

93%

of people surveyed knew, or had heard about, at least one development project.

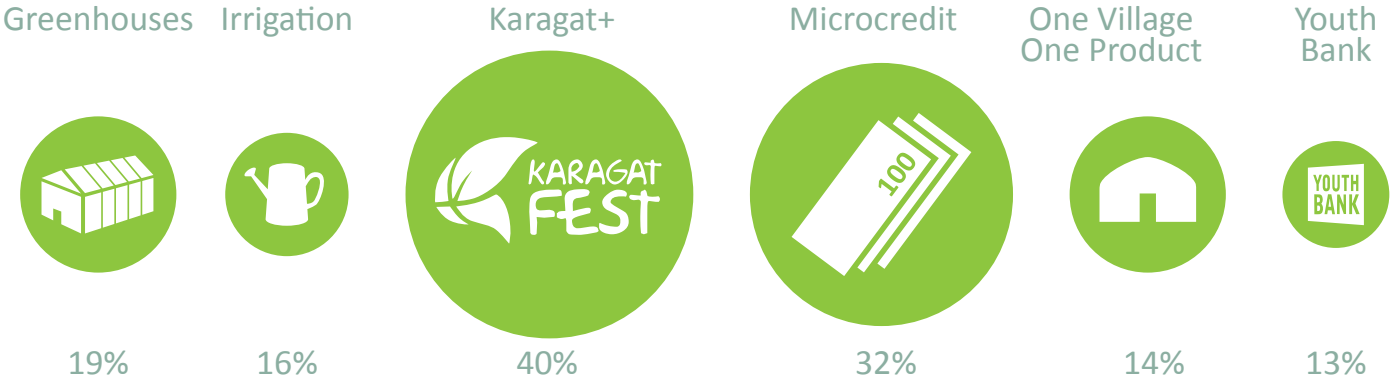
To what extent has Kumtor improved infrastructure in your area?

Even in areas of strong opposition, people agree that Kumtor has improved infrastructure.



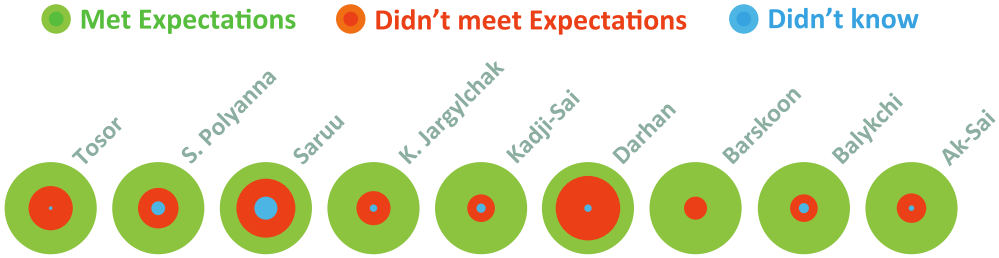
Project awareness

Projects supported by Kumtor are known thorughout the survey area.



Did Development Projects meet expectations?

Development projects met the expectations of the majority.



G4-EC7, G4-EC8

6.2 | COMMUNITY INVESTMENT PROJECTS

Our aim is for our community investments to generate sustainable local benefits. The overall budget of KGC's community development programs in 2015 was $2 million.

We believe that it is important to provide assistance to local communities in reaching their goals to develop local economy and well-being of Issyk-Kul citizens. Taking into account that the Mine Closure will have a direct impact on region's economy, we consider it a priority have a structured and planned approach in community investment projects, which is therefore a vital component in maintaining our social license to operate.

The current life of the Kumtor mine is expected to end in 2026. Given its size as a major employer, taxpayer, and purchaser, mine closure is expected to bring with it a negative economic impact in the Issyk-Kul region and across the country. In order to reduce this impact, the strategy of our community investments is to promote and develop a more diverse economy which will not be over-reliant on KGC. This approach would help lessen the effects of Kumtor's mine closure. We work in partnership with a number of international and local organizations to maximize the impact of our community investments. The partnerships focus mainly on the southern shore of Issyk-Kul Lake. Projects are developed taking into account stakeholder input, community needs, company risks, and availability of an experienced partner that can deliver against expected outcomes. Within the framework of implementing its programs in the region, the Company strictly follows the Sustainable Development Strategy of the Issyk-Kul Region that includes four main areas:

1. Support to business growth and diversification (especially small businesses and entrepreneurs);
2. Support to development of the agricultural sector;
3. Youth and educational projects;
4. Environmental protection projects.

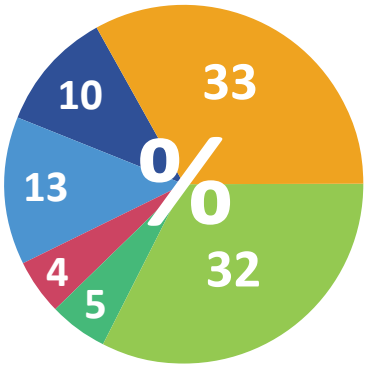
A key criterion for project selection is the principle of sustainability, which refers to the lasting effects of the project beyond the end of KGC's funding. If a project cannot be deemed to be sustainable and able to continue - or continue to generate benefits - beyond our funding period, then it will not be selected for implementation.

Fig. 6.3 **Sponsorships & Sustainable Development Projects**

units	2013	2014	2015
Million US$	5.9	4.5	2.0

KGC Investment in Sustainable Development 2015

1,725,157 USD
invested in total

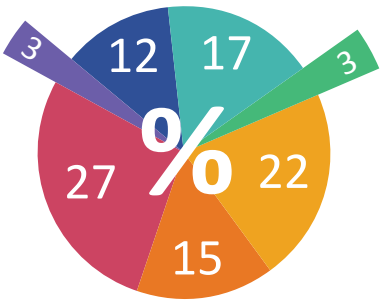


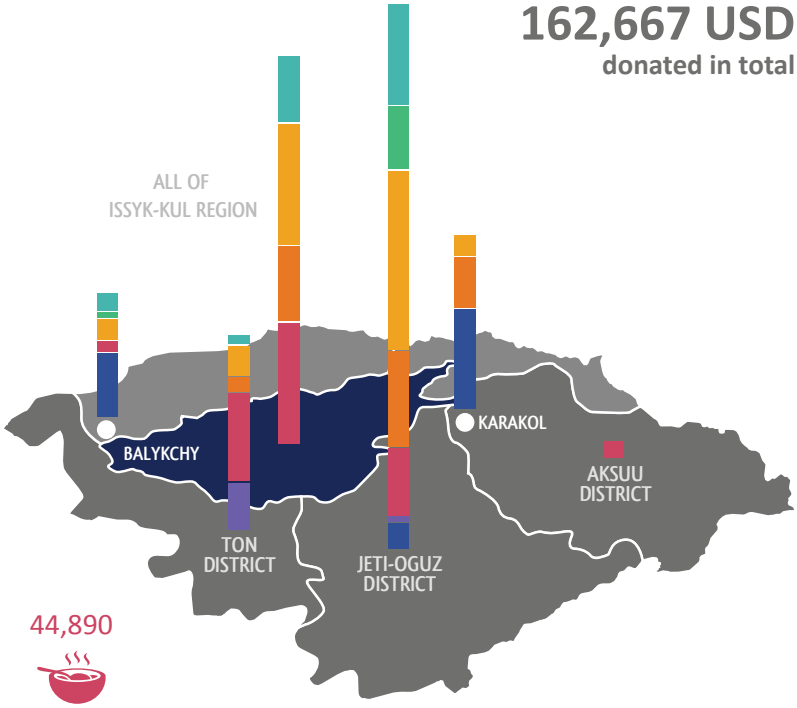
- Youth
- Agriculture
- Environment
- Vulnerable Groups
- Community Owned Projects
- Small-Medium Size Businesses

KGC Donations 2015

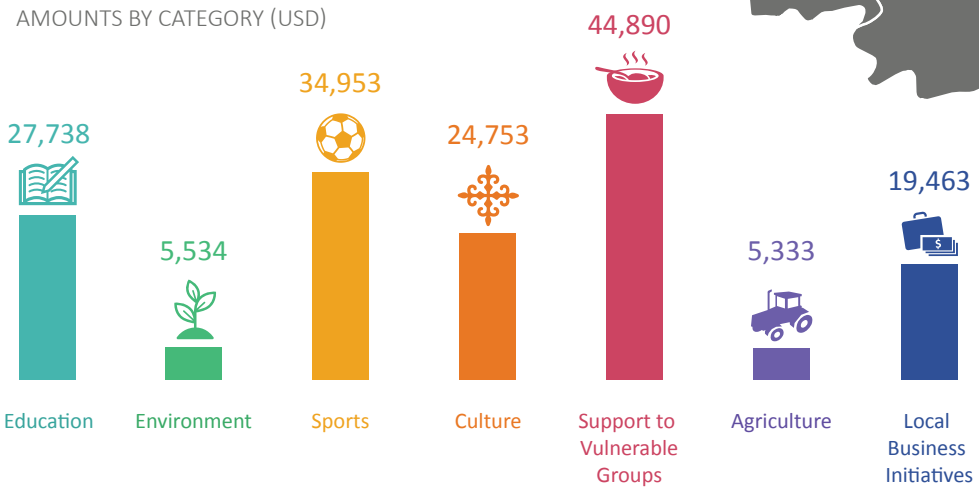
162,667 USD
donated in total

2015 DONATIONS BY REGION & CATEGORY (%)





AMOUNTS BY CATEGORY (USD)

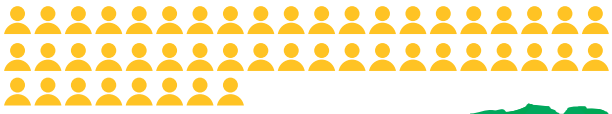


SUPPORTING EDUCATION AND BUILDING CAPACITY OF YOUTH IN THE ISSYK-KUL REGION

The project Youth Banks of the Issyk-Kul region was launched in 2013 and continued in 2015. The practical issues relating to the implementation of the project are dealt with by Eurasia Foundation of Central Asia. The Youth Banks are designed to address social problems faced by young people and promote such values as civic activity and personal responsibility. Youth Bank members are supposed to examine local needs, consider proposals made by young people, select and fund priority projects. Any Youth Bank composed of 8 to 10 volunteers functions as a local small grant board. All young people aged 14 to 25 who have challenging ideas with regard to communities' development are free to join the project. Initiatives may focus on infrastructure improvement, professional training or job-creating programs as well as organization of cultural, sports and other public events.

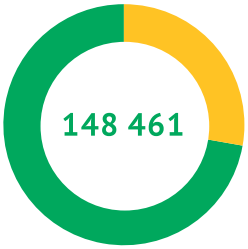
During the final stages of the Youth Banks project, KGC and EFCA found out that young people strive to develop more profit-oriented ideas. Taking into account that EFCA has educated youth on leadership, business planning and financial literacy trainings, it was decided to launch a new sustainable and income-generating project – Youth Mean Business. Nineteen projects received funding and now are fully realizing their potential and using the knowledge they gained from numerous management and business trainings. With the support of mentors, they will also contribute to economic development of the region and create new workplaces.

Project results



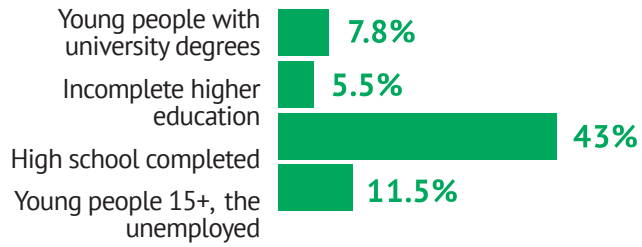
48 Youth Banks' members, 8 people (aged 14-28) per each locality

Population of six target areas



41 570
Young people aged 14-28 (28%)

Total Population



Youth Banks' members:

- Consider application from other young people
- Assess needs of their communities
- Select and support youth initiatives
- Implement their own projects

Focus groups:

- Youth
- Locals
- Local NGOs
- 2 city administrations
- 4 aiyl okmotus
- Initiative groups

Primary areas of supported projects

- Infrastructure
- Education
- Cultural and sport events
- Employment
- Training
- Ecology
- Support for people with disabilities
- Support for low-income families and orphans

Results:

6
Memoranda of Cooperation signed with the local governments

14
trainings and seminars were held for members of the Youth Banks on writing and selection of projects to attract resources, leadership, strategic planning, etc.

8
public hearings were held with participation of Youth Banks

203
small grants were issued for a total amount of $ 427,325

Over 600
people were involved in writing projects

Over 30,000
local people have benefited from the projects

6
Youth Banks offices were opened and equipped in the target areas

4
conferences were held with participation of over 500 people

15
schools and vocational schools were involved in the project

28
sports and playgrounds created

72
implemented projects received financing from local governments

About $64,000
local governments co-financing amounts

1
Youth Banks Public Foundation was officially registered

95
infrastructure projects were implemented

11
environmental projects were implemented

Over 20
contests, concerts, sports competitions were held in frames of small grants realization

Over 10
workshops were conducted by the authors of projects

Over 100
people gained access to water (drinking and irrigation)

REGIONAL SCHOLARSHIP PROGRAM

The Kumtor Regional Scholarship Program provides students completing high school and wishing to pursue a vocational career the opportunity to apply for one of 20 Scholarships. The successful applicants are under full scholarship that includes tuition, accommodation, meals and a monthly stipend while they attend Technical Vocational School #27 or Technical School #91 in Bishkek.

In 2015, full scholarships were awarded to 11 students to study at Technical School #91 where they graduate with the profession of Cook/Baker. Technical School #27 has worked closely with KGC to establish a program that incorporates school based instruction with practical training in the Heavy Duty workshop or the Mill Maintenance area at the Kumtor Mine site.

Currently KGC is sponsoring 32 students, with 12 in the first year, 11 in the second year and 9 in the third year. The program takes 3 years to complete with graduates earning the profession auto mechanic.

Supporting Businesses

We support the development of local businesses in a number of ways. Of these, one of the most important is our policy of supporting local procurement and encouraging new local suppliers to supply goods and services, as described in the Local Procurement section. However, we are aware of the risk of individual suppliers becoming overly dependent on business with KGC. Therefore, we work with suppliers to support them in improving business processes (such as quality management systems) and encourage them to seek additional customers apart from KGC. Another important initiative is our micro-financing and credit program, which supports and enables local microcredit agencies in Jeti-Oguz, Ton, and Balykchy by offering favorable lending rates for small enterprises and farming businesses. The interest rates of these programs are the lowest in Kyrgyzstan. Between 2006 and 2015, KGC invested more than $4 million. We are working hard to unite international organizations that invest in the Issyk-Kul Region to develop a comprehensive approach in addressing regional development issues.

We continued to purchase a range of natural jams from JICA's One Village – One Product Program members from different communities of Issyk-Kul. Equipment purchased by KGC in 2013 is still used by local producers in terms of both OVOP program and Karagat+ Project, which also continued its work in 2015. We co-financed drip-irrigation project of UNFAO in Kara-Bulun, Jeti-Oguz to establish the system in isolated area and help local community of farmers to develop their initiative. Fruit dryers established in six locations throughout the southern shore of Issyk-Kul continued to operate and produce dried fruits.

Donations and Charitable Support

In addition to our sustainable community development programs, we provide one-off donations, usually in form of in kind equipment or services. We receive many requests for support from across the country. Donation requests and proposals are reviewed on a monthly basis by our donations committee and may be supported as long as they are:

1. For local community groups or organizations, not individuals or companies;
2. Not for travel or medical expenses;
3. Not for funding of private businesses;
4. Not for religious or political purposes;
5. Not for government related costs.

In order to ensure a transparent and strictly governed donation process, a donation committee consisting of the vice-presidents of the company under the chairmanship of the KGC president, meets once a month to review all applications and approve those meeting the criteria. Our donations are not made in cash but rather through goods or equipment procured by KGC and provided to the recipients. Follow up monitoring visits ensure that the donations are used for the intended purpose.

A selection of examples of one-off donations during 2015 are:

- Construction of soccer field in Tilekmat village;
- Furniture for kindergarten in Barskoon;
- Construction of children playgrounds;
- Purchase of a fruit dryer for a municipality of Balykchy city;
- Hockey equipment for four teams from Svetlaya Polyana and Kyzyl Suu villages of Jeti-Oguz district;
- Purchase and delivery of traditional New Year and Children's day gifts to vulnerable groups;
- Equipment for an introduction of drip irrigation system in the Kadjy-Sai village park;
- Sports equipment for numerous schools of the region;
- Purchase of a fruit and vegetables cutting machine for a youth association of Jeti-Oguz;
- Furniture for a new-built school in Boz Beshik village of Jeti-Oguz district;
- Support of participation of children from the region in the environmental camp in Jeti-Oguz;
- Purchase of medals and prices for several sports competitions held in Jeti-Oguz, Ton, and Balykchy.

> “We receive many requests for support from across the country.
>
> Donation requests and proposals are reviewed on a monthly basis by our donations committee.”

HOW KUMTOR IS PROMOTING AGRICULTURAL DEVELOPMENT AROUND ISSYK KUL

provides
Financing
at 10% interest

working days and $173,545 invested in reservoir cleaning in 2015
48

farmers received loans to build storehouses (which now hold about 150 tonnes of fruits and vegetables)
7

$362,000 worth
Equipment
donated

Infrastructure
maintained or constructed

technical service station for repairing farm equipment built in Barskoon to serve nearby villages
1

other pieces of farm equipment
6

Seeders
6

farmers received loans to build greenhouses
8

615
thousand USD invested to reclaim 2,750 ha of land and improve irrigation on 750 ha since 2013

6
Plows

6
"Belarus" tractors

"Niva" combines
3

Training
imparted

20
reception points for fruits and berries from local farms

11
demo greenhouses (used to train 489 farmers since 2013)

44
drip-irrigation demo plots (used to train 1,689 farmers since 2013)

26
tonnes of high-grade potatoes of for planting (distributed to needy residents of the Jeti-Oguz Region)

28
thousand frost resistant, high-yield berry sapplings supplied to farmers

7
thousand more sapplings grown at 6 local nurseries

Crops
supplied

Results

Since the beginning of the Karagat+ project in 2013, 27 contracts have been signed with local producers, processors and wholesalers to supply a total of 745 tonnes of fruits and berries.

Water infrastructure rehabilitation projects implemented from 2013-2015

	Kumtor Contribution		Volume cleaned (1,000 m³)	Area now receiving irrigation in hectares (ha)	Number of people now receiving access to water
2015	$90,000	Tort-Kul	118	1,127	3,115
	1,450 L diesel fuel	Eshperov	3	687	595
		Darkhan	36	304	1,950
	$83,545	Kyzyl-Suu	43.5	1,062	240
		Saruu	27	270	150
2014	$242,000	Svyetlaya Polyana	30*	1,500	2,700
		Kabak & Chirak	pump repaired		3,390
2013	$200,000	Ak Dobo	25*	467	1,912
		Lipenka	14*	720	1,500

DRP volume after cleaning

GLOSSARY AND ABBREVIATIONS

Albedo - is the coefficient of spectral whiteness (reflection) of surface used as a key parameter in climate surveys to estimate the Earth's energy budget, radiation transfer in earth-atmosphere system and glacier balance

ARD - Acid rock drainage is a term used to describe the outflow of mine waters that have been acidified by contact and exposure to rocks, reducing the pH levels which, in turn, can release and mobilize metals into the environment.

Biodiversity - Short for "biological diversity," the variability among living organisms and the ecosystems of which they are part. This includes diversity within species, between species, and within ecosystems.

BMY - Balykchy Marshalling Yard.

Capacity Building - Activities and initiatives that strengthen the knowledge and skills of individuals and improve structure and processes such that communities can grow and develop in a sustainable way.

CCP or MCP - Conceptual Closure Plan (see also Closure Plan).

CJSC - Closed Joint Stock Company.

Closure Plan - A plan designed to ensure public safety and restore the physical, chemical, and biological quality of the area disturbed by mining to an acceptable level. It must aim at leaving the area in such a way that the rehabilitated property does not become a burden to society after the mining operation is over.

Code of Ethics - A policy that sets out Centerra's dedication to upholding high moral and ethical standards and specifies basic business conduct and behavior.

Collective Bargaining Agreement - An agreement between a company and one or more workers' organizations or, in absence of such organizations, the representatives of the workers duly elected and authorized by them in accordance with national laws and regulations.

Corporate Responsibility - A form of corporate self-regulation integrated into a business model where companies embrace the responsibility forth impact of their activities on the environment, consumers, employees, communities, and stakeholders.

Currencies - Kyrgyz som (KGS): 2015 average exchange rate 1 USD = 64.47 KGS.

Cyanide - A chemical compound containing carbon and nitrogen used to dissolve gold from ore EBRD - European Bank for Reconstruction and Development.

Derived Air Concentration (DAC) - A derived limit on the activity concentration in air (in Bq/m^3) of a specified radionuclide - calculated such that a typical worker, breathing air with constant contamination at the DAC while performing light physical activity for a working year, would receive the annual limit on intake for the radionuclide in question.

EBRD - European Bank for Reconstruction and Development.

Economic Value Retained - Component of GRI Economic Indicator EC1 and calculated as economic value generated less economic value distributed (see also **www.globalreporting.org** for further details).

EITI - Extractive Industries Transparency Initiative.

EMAP - Environmental Management Action Plan.

Engagement - A process of contact, dialogue, and interaction that ensures all parties of interest are informed and participate in decisions that affect their future.

Environmental Assessment -The process of identifying, predicting, evaluating, and mitigating the biophysical, social, and other relevant effects of development proposals prior to making major decisions and commitments.

Environmental Incident - An event that has caused or could cause environmental harm. Ranges in scale and severity from Type I (Insignificant) to Type V (Catastrophic).

Environmental Management System (EMS) - A framework developed by an organization to help improve its environmental performance by taking environmental considerations into account when making decisions and managing risks.

ETP - Effluent treatment plant

First Aid Injury (FA) - A work related injury that requires first aid treatment.

GDP - Gross Domestic Product.

GHG - Greenhouse gas - Emissions commonly reported as CO_2 equivalents (CO_2e).

GIIP - Good International Industry Practice. Defined in the International Finance Corporation Environmental, Health and Safety Guidelines for Mining as "the exercise of professional skill, diligence, prudence and foresight that would be reasonably expected from skilled and experienced professionals engaged in the same type of undertaking under the same or similar circumstances globally. The circumstances that skilled and experienced professionals may find when evaluating the range of pollution prevention and control techniques available to a project may include, but are not limited to, varying levels of environmental degradation and environmental assimilative capacity as well as varying levels of financial and technical feasibility."

GJ - Gigajoules (1GJ = one billion (10^9) joules).

Global Reporting Initiative (GRI) - A global network based organization that has developed a widely used sustainability reporting framework consisting of principles and indicators to measure and report on an organization's economic, environmental, and social performance (see also www.globalreporting.org for further details and definitions of the GRI framework and indicators).

Governance - A set of processes, customs, policies, laws, and institutions affecting the way a company is directed, administered, or controlled.

Hazard - A source of potential damage, harm, or adverse effects on something or someone under certain conditions at work.

HSE - Health, Safety and Environment.

ICMI - International Cyanide Management Institute.

IFC - International Finance Corporation, a member of the World Bank Group.

ISO - International Organization for Standardization, the world's largest developer of voluntary International Standards.

ISO 31000 standard - Standard developed by ISO Technical Management Board Working Group.

IWP & HP - Institute of Water Problems and Hydropower.

IUCN - International Union for Conservation of Nature

JSC - Joint Stock Company.

km - Kilometres/Kilometers.

KR - The Kyrgyz Republic.

KR NAS - Kyrgyz National Academy of Sciences.

KGC - Kumtor Gold Company.

Kyrgyz Som (KGS) - Currency of Kyrgyzstan (see 'Currencies' for exchange rate).

Liter/Litre - International System unit of volume.

Local Suppliers - Suppliers based in the same country as the operation that they supply.

Lost Time Injury (LTI) - A work related injury resulting in the employee being unable to attend work on the next calendar day after the day of the injury. If a suitably qualified company medical professional advises that the injured person is unable to attend work on the next calendar day after the injury, regardless of the injured person's next rostered shift, a lost time injury is deemed to have occurred. Site and company medical advisors will determine when a lost time injury is no longer recorded as a lost time injury. This includes fatalities.

LTI Frequency Rate - Number of LTIs x200,000/hours worked.

LTI Severity Rate - Number of days lost to injury x200,000/hours worked.

MAC - Maximum allowable concentration standards which apply at KGC's surface water quality compliance point (referred to as W.1.5.1) downstream of the Kumtor Mine.

MAD - Maximum allowable discharge standards which apply to treated effluent discharges from the effluent treatment plant and the sewage treatment plant.

MAE - Maximum allowable emission standards which apply to airborne emissions from Kumtor.

masl - Metres above sea level.

Materiality - The threshold at which an economic, environmental or social issue or indicator becomes sufficiently important that it warrants disclosure in the corporate responsibility report.

Medical Aid (MA) - A work related injury or illness that requires medical treatment administered by an off-site physician or by a registered medical personnel. Site and company medical advisors are to be consulted and a final decision as to how a medical aid injury is to be managed will be determined by the company medical team in consultation with senior site management.

Meter/Metre (m) - International System unit of length.

Millimeter/Millimetre (mm) - International System unit of length, 1000th of a metre.

NGO - Non-Governmental Organization, a not-for-profit group largely funded by private contributions and operating outside of institutionalized government or political structures. NGOs focus on environmental, social, and economic issues at local, regional, national and international levels.

Near Miss - An event not causing harm, but has the potential to cause injury.

Oblast - Administrative division, which in English translates as province or region.

OJSC - Open Joint Stock Company.

Open Pit - A mine where the minerals are mined entirely from the surface.

Ore - A naturally occurring solid material (usually rock) from which a metal or valuable mineral can be extracted profitably.

QA/QC - Quality assurance and quality control program for collection, handling, and analysis of samples to ensure a consistent approach and accurate results.

Reclamation - The restoration of a site after the completion of mining or exploration activity.

Reportable Injury - The sum of the number of Medical Aid Injuries and Lost Time Injuries in a given period.

Reportable Injury Frequency Rate (RIFR) - Number of Reportable Injuries per 200,000/Hours Worked

Responsible Mining - A comprehensive and transparent minerals activity that respects the rights of all stakeholders, especially those of local people, operates safely, protects the environment, minimizes the impact on human health, embraces the best international practices, and upholds the rule of law while generating benefits for host countries (see also Corporate Responsibility).

SAEL - Stewart Assay and Environmental Laboratories LLC (part of the ALS international group of laboratories), located in Kara-Balta, Kyrgyz Republic.

SAEPF - State Agency of Environment Protection and Forestry.

SCER - Sarychat-Eertash Reserve, a strictly protected Zapovednik neighboring Kumtor Concession. Sometimes referred to as SCEZ, with Zapovednik replacing Reserve. Zapovednik is a work of Russian origin meaning protected wilderness.

SEDAR - System for Electronic Document Analysis and Retrieval.

Significant Spill - Any spill that is Level III or higher, as defined by Centerra's incident reporting system, Level III spills are significant enough that they must be reported to Centerra's Board of Directors.

SME - Small or medium sized enterprise, referring usually to small businesses. Definitions vary, but typically they have less than 50 employees.

Stakeholder - Any person or group of people who may be affected in a good or bad way by the financial, safety, environmental, and social aspects of our operations and those who have an interest in or an influence on our activities.

Stakeholder Engagement -The communication with stakeholders, through various means, to find out what social and environmental issues matter most to them, with a view to a company improving decision-making and actions to address these concerns.

STP - Sewage Treatment Plant.

Sustainable Development - As used in the report Our Common Future (also known as the Brundtland Report): "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (see also Corporate Responsibility). Kumtor develops mineral deposits in a manner that does not restrict communities' efforts to sustain themselves and strives to catalyze economic activity that promotes long-term sustainability among our communities and their surroundings.

Sustainability - An approach to decision-making that integrates economic, environmental, and social considerations (see also Corporate Responsibility).

Tailings - The material that remains after recoverable metals or minerals of economic interest have been removed from ore through milling.

Threshold Limit Values (TLV) - The level/concentration of a chemical substance to which it is believed a worker can be exposed day after day for a working lifetime without adverse health effects.

TMF - The Tailings Management Facility is the combination of infrastructure to hold and manage semi-liquid tailings so as to avoid negative health and environmental impacts, consisting of delivery infrastructure, storage ponds, holding dam, water and waste treatment facilities, and discharge facilities for treated effluent.

TSP - Total suspended particulates.

USD - US Dollars.

WTP - Water Treatment Plant.

PERFORMANCE DATA

Economical and Operational Indicators

	2013	2014	2015
Gold Produced (kg)	18,674.60	17,657	16,195.40
Gold Sold (kg)	18,720.80	17,454	17,453.80
KGC's share in KR GDP (%)	7.7	7.4	6.8
KGC's share in the aggregate industrial output	24.0	23.1	22.5

Direct economic value generated and distributed

	2013	2014	2015
Revenues from Gold sales	810,943,801	694,590,808	604,521,845
Other income [a]	1,060,620	2,134,531	5,029,607
Operating costs (Goods and Services) [b]	293,540,903	288,327,187	235,845,312
Corporate administration costs	-	-	-
Exploration costs	6,111,584	-	-
Capital expenditure [c]	88,826,803	88,847,144	64,642,771
Other operating costs	2,868,852	1,845,042	1,572,558
Employee and contractor wages and benefits	115,142,726	118,579,207	105,111,954
Payments to providers of funds	200,000,000	-	-
Taxes and Royalties	113,532,132	97,242,713	84,633,058
Community donations and investments	6,240,535	5,114,257	2,203,078
Economic value retained	(14,259,114)	96,769,787	115,542,721

Notes:

** Data has been prepared on an accrual basis and non-cash costs have been ignored.*

a) *Other income includes income from financial investments, sale of assets, and other services.*

b) *Includes capitalized overburden stripping costs.*

c) *Excludes capitalized overburden stripping costs.*

Major consumables

	2013	2014	2015
Cement & lime	12,252	10,081	8,194
Reagents & chemicals	10,923	11,980	10,686
Grinding balls	8,587	8,628	8,025
Diesel	132,819,512	137,600,875	119,540,637
Explosives	39,470	39,869	30,149

Local procurement in context

	2013	2014	2015
Total Payments for Goods and Services[#]	413,494,920	377,760,751	279,731,777
Local Payments for Goods and Services[#]	71,541,577	79,750,616	59,336,002
Local Payments for Goods and Services as % of Total	17%	21%	21%
Local Payments for Goods and Services as % of Adjusted Gross*	59%	58%	57%

[#] These figures include the fees paid to the Kyrgyzaltyn Refinery

** Excluding original equipement manufacturer (OEM) capital equipment and parts, major consumables, and reagents that are not available for purchase in the Kyrgyz Republic and fuel import from Russia. This is slightly different to the figures included in the Direct Economic Value Generated and Distributed Table because it is based on actual invoices paid (including advance payments) and does not differentiate between operating costs and capital expenditure.*

Environmental Performance Indicators

	2013	2014	2015
Direct Energy Consumption (GJ)			
Diesel (litres/yr)	132,819,512	137,600,875	119,540,637
Petrol (litres/yr)	513,055	423,318	397,081
Explosives (tonnes/yr)	39,470	39,869	30,149
Indirect Energy Consumption (GJ)			
Electricity (GJ/yr)	993,947	1,006,518	1,021,070
Electricity (MWh)	276,096	279,588	283,631
Direct GHG Emissions (Scope 1) (tonnes CO_2e)	362,661	458,001	326,396
Indirect GHG Emissions (Scope 2) (tonnes CO_2e)	27,926	24,324	24,676
GHG intensity ratio (tonnes CO_2e/oz gold)	0.65	0.85	0.67

Notes: *The 2013 and 2014 Scope 1 emission calculations were updated to account for the explosives emission factors defined in Table 4 of the Australian Government Department of Climate Change, National Greenhouse Accounts (NGZ) Factors, Jan 2008.*

Kumtor Mine Emissions Table (tonnes/year)

Pollutant	MAE Standard	Actual 2014	Actual 2015
Dust that contains SiO_2 20-70%	1,189	1,089	1,113
Hydrogen cyanide	0.0007	0.0008	0.0008
Sodium hydroxide	0.3534	0.3600	0.3516
Calcium oxide dust (lime)	0.2416	0.2668	0.5892
Carbon (soot)	0.1434	0.1496	0.0837
Welding aerosol	0.2749	0.3258	0.3066
Manganous oxide	0.0373	0.0440	0.0416
Tetrafluorosilane (fluorides)	0.0126	0.0146	0.0136
Hydrocarbon	3.9384	3.7125	3.4827
Carbon oxide	53.4674	45.3154	48.8834
Nitrogen dioxide	98.0438	68.69346	79.2165
Hydrogen fluoride (fluorides)	0.0014	0.03857	0.036
Lead aerosol	0.0014	0.0014	0.00114
Sulfur dioxide	2.3134	2.4310	0.1233
Ammonia	0.8022	0.8175	0.7787
Hydrochloride	0.000026	0.000026	0.0000257
Silica compositions	0.0126	0.0146	0.0136
Total:	**1,348**	**1,212**	**1,248**

Waste management

	2013	2014	2015
Industrial waste - total (tonnes)	5,958	7,424	5,638
Industrial waste - recycled (tonnes)	4,712	7,795	5,563
Hazardous waste - total (tonnes)	85	125	110
Hazardous waste - recycled (tonnes)	22	25	13

Water Use and Treatment

	2013	2014	2015
Sources of Water			
Total Water Extracted from Petrov Lake	5.52	5.62	5.76
Pit water pumped to the Mill	0.99	0.56	0.64
Pit water pumped to the environment	10.9	8.2	10.9
Water used for Domestic Purposes			
Water Used for Camp domestic purposes (from Petrov Lake)	0.19	0.14	0.15
Water Used for MIll domestic purposes (from Petrov Lake)	0.02	0.02	0.019
Water used for Process/Mill			
Raw water used at Mill (from Petrov Lake)	5.24	5.4	5.32
Total water used at Mill (Petrov Lake + Pit water)	6.24	5.96	5.96
Water internally recycled at Mill	5.57	5.5	5.33
Ore Feed to Mill	5,596,251	5,839,623	5,782,419
Raw Water Intensity Ratio	937	924	921
Water used for Dust Supression			
Water used for Dust Supression	0.07	0.07	0.26
Wastewater Discharged to Environment			
Treated wastewater discharged from ETP	2.8	4.7	4.84
Treated wastewater discharged from STP	0.15	0.14	0.12

Social Performance Indicators

	2013	2014	2015
Training Hours by Gender			
Average/Employee			27.02943396
Total Employee Training Hours			71,628
Total Number of Employees			2,650
Average/Female Employee			6.433333333
Total Female Employee Training Hours			2,316
Total Number of Female Employees			360
Average/Male Employee			30.26768559
Total Male Employee Training Hours			69,313
Total Number of Male Employees			2,290
Training Hours by Employee Category			
Average/Senior Management			14.32653061
Total Training Hours Provided to Senior Management			702
Total Number of Senior Management			49
Average/Middle Management			18.44164038
Total Training Hours Provided to Middle Management			5,846
Total Number of Middle Management			317
Average/Funtional Employee			28,47241681
Total Training Hours Provided to Funtional Employees			65,031
Total Number of Funtional Employees			2,284
Health and Safety			
Annual medicals	2,201	2,398	2,440
Pre-employment medicals	132	238	424
Total visits	11,255	43,837	40,558
Reduction in overall vehicle accidents	17	17	12
Reduction in high-potential injury risk - light vehicle accidents	1	4	2
In-pit heavy versus light vehicle collisions	1	4	2
Injuries due to vehicle accidents	1	2	1
Hours worked	5,925,671	5,981,799	5,734,240
Lost time injuries (LTI's)	5	4	3
Medical aid	1	3	3
First aid	24	16	16
Days lost to injury	82	6,093	52
LTI frequency rate	0.77	0.13	0.10
LTI severity rate	2.77	203	1.81
Reportable Injury Rate (RIF)	0.20	0.23	0.21
Incidents w/Property damage	77	38	31

**The large variance in this table for days lost to injury and the 2014 LTI severity rate is due to the fatality and lost time injury that occurred when our subcontractor was climbing to service a Kumtor high altitude communications repeater. Based on international standards, an automatic 6,000 lost work days is counted for the fatality and 21 lost work days for the LTI.*

Employee Demographics

	2013	2014	2015
Standard national entry level wages and those paid by Kumtor			
Kyrgyz minimum wage per hour	5.18	5.40	5.8
Kumtor entry-level wage per hour	65.86	73.34	78.2
Kumtor entry-level to Kyrgyz minimum wage	13 : 1	14 : 1	13:01
Staffing at the Kumtor Mine (as at Dec each year)			
Kyrgyz national (Total)	2,597	2,550	2,470
-men	2,243	2,192	328
-women	354	358	2 142
Expat staff (Total)	103	99	80
-men	101	98	80
-women	2	1	0
Full time staff Total (Kyrgyz + Expat)	2,700	2,649	2,550
-men	2,344	2,290	2,222
-women	356	359	328
Contractors (Total)	1,130	1,178	1,191
-men	1,117	1,160	1,159
-women	13	18	32
Total staff (Full time staff + Contractors)	3,830	3,827	3,741
Proportion of Kyrgyz national as full time staff*	96%	96%	97%
Total Number and Rates of New Employee Hires and Employee Turnover by Gender and Region			
Bishkek	26	48	19
Bakykchi	32	9	2
Karakol	4	12	6
Jeti-Oguz	42	40	30
Ton	10	17	3
Other Regions	18	30	16
Women (from all)	16	28	11
Total	148	184	87
Employee Turnover (%)	4.17	6.15	5.64
Return to Work and Retention Rates After Parental Leave (Female employees)			
Entitled to parental Leave	22	27	22
Returned from parental leave	17	16	15

Notes:

** Number of employees for 2013 and 2014 changed due to clarifications and improvement of counting system and now are accurate.*

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G4-4	About Kumtor Mine;	-	2
G4-5	About Centerra;	-	2
G4-6	About Centerra;	-	2
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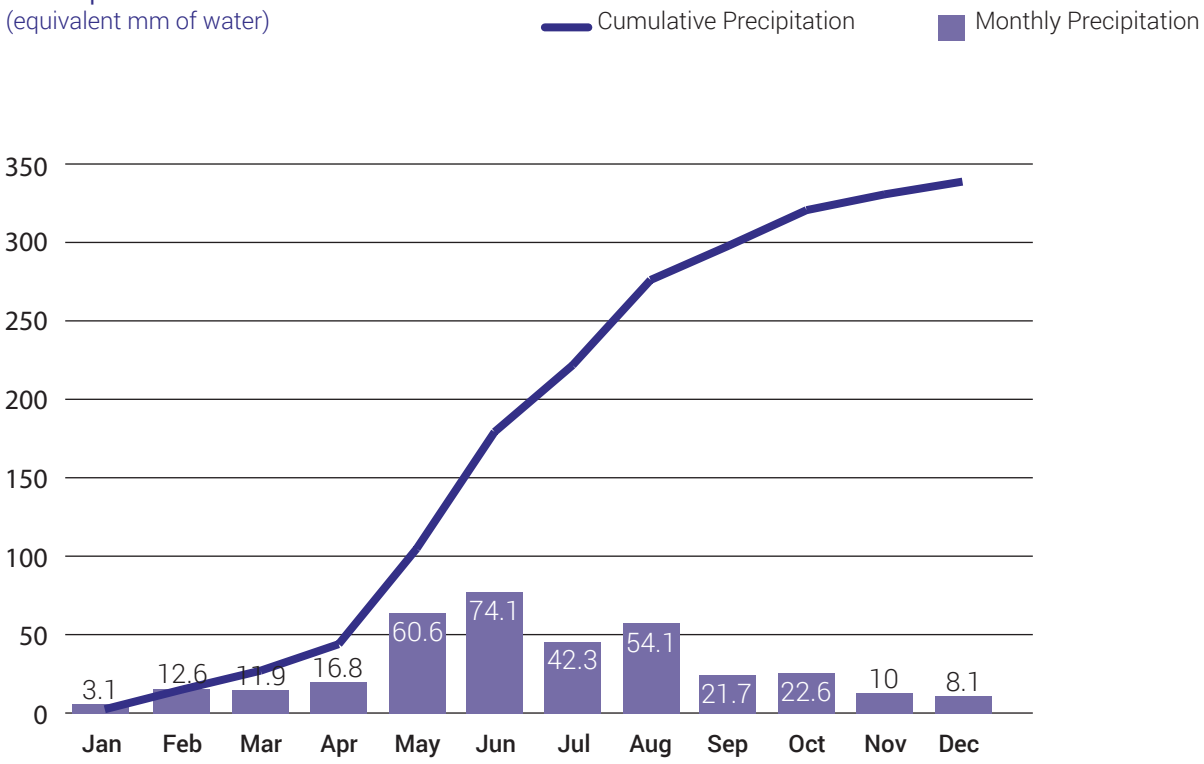
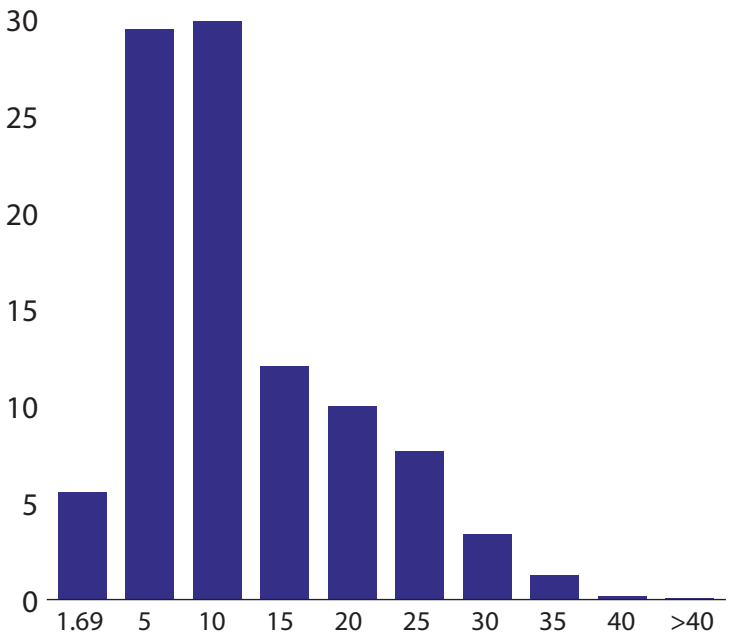
APPENDIX

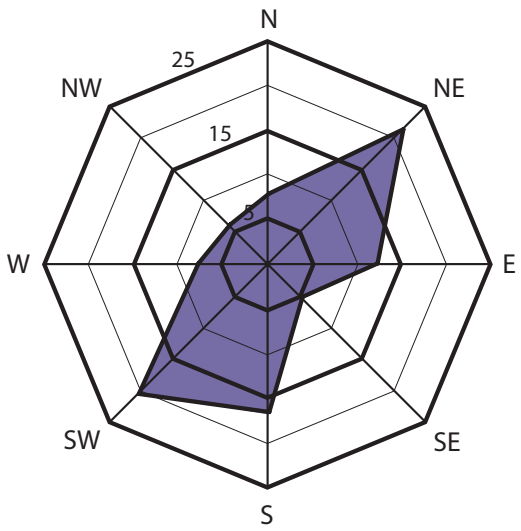
Precipitation 2015
(equivalent mm of water)



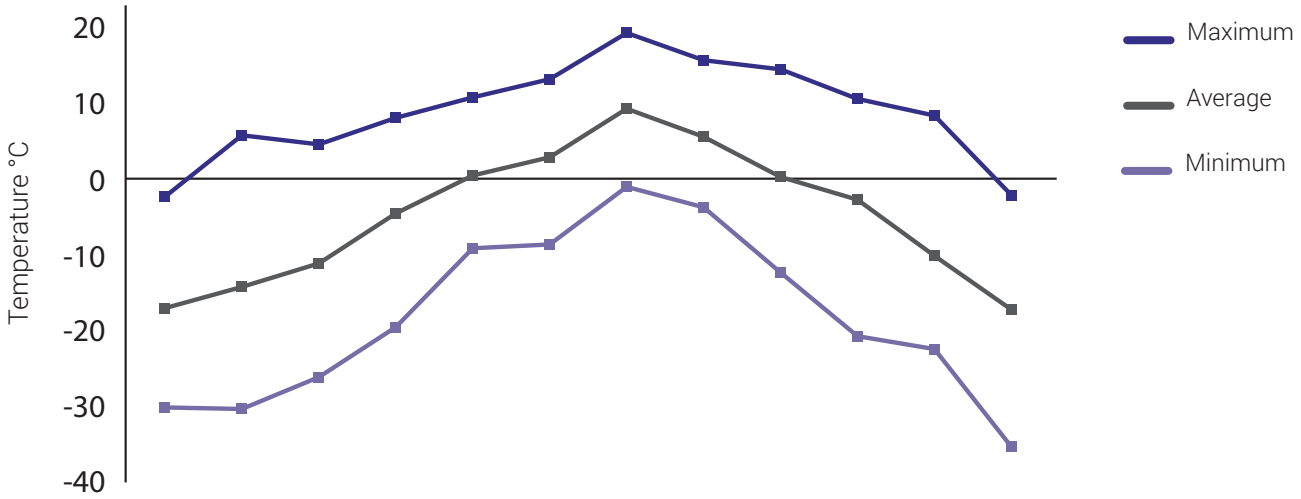
Wind Speed and Direction 2015
(km/hour)



Distribution of Wind Direction 2015 (%)



Average Monthly Temperatures in 2015



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Minimum	-30.3	-30.5	-26.3	-19.7	-9.3	-8.8	-1.2	-3.9	-12.5	-20.9	-22.6	-35.5
Maximum	-2.5	5.6	4.4	7.9	10.6	13	19.1	15.5	14.3	10.4	8.2	-2.3
Average	-17.2	-14.4	-11.3	-4.7	0.3	2.7	9.1	5.4	0.1	-2.9	-10.3	-17.4

Kumtor Weather Station Summary 2015

2015		HOURLY AVERAGE READINGS FOR 2015										AVERAGE 5 SECOND READING			
					TEMPERATURE °C										
		W. Spd. 10 m, km/h	W. dir. deg. True N	W. Spd. 0.5 m, km\h	Avg./h	Max., 5 s.	Min., 5 s.	Rel. hum., %	Dew.Point, 0C	Solar rad., KW/m³	hr./dg. Total precip., mm	Temp. 0C	Rel. hum., %	Dew.Point, 0C	Barom. Press., mbar
JAN	max	34.7	359.5	0.0	-4.0	-2.5	-4,5	89.0	-12.7	0.53		-4.2	88.3	-12.7	659.0
	min	0.1	0.2	0.0	-28.8	-27.9	-30,3	24.4	-38.2	0.002		-29.7	24.5	-38.0	646.5
	avg	6.6	130.7	0.0	-17.2	-15.9	-18,3	64.8	-24.0	0.09		-17.2	64.9	-24.0	651.8
	tot										3.1				
FEB	max	28.5	359.1	0.0	1.5	5.6	-1.6	95.0	-5.7	0.68		0.6	94.9	-5.8	657.6
	min	0.0	0.9	0.0	-28.2	-26.4	-30.5	28.9	-37.8	0.002		-27.5	24.0	-37.0	644.8
	avg	6.1	136.6	0.0	-14.4	-13.1	-15.6	70.3	-20.0	0.13		-14.4	70.1	-20.0	651.8
	tot										12.6				
MAR	max	47.1	359.5	0.0	3.3	4.4	2.7	95.3	-5.3	0.86		3.3	94.8	-5.0	663.5
	min	0.3	0.8	0.0	-25.0	-24.4	-26.3	21.7	-32.0	0.002		-25.6	23.9	-32.2	643.4
	avg	11.1	167.4	0.0	-11.3	-10.2	-12.2	64.8	-17.6	0.19		-11.2	64.7	-17.6	653.9
	tot										11.9				
APR	max	36.3	358.0	0.0	7.4	7.9	7.0	97.8	-0.9	1.04		7.4	97.6	54.3	671.3
	min	0.01	2.5	0.0	-18.9	-18.1	-19.7	28.0	-24.9	0.002		-19.0	29.8	-24.1	645.8
	avg	10.5	205.8	0.0	-4.7	-3.9	-5.4	68.8	-9.9	0.26		-4.7	68.9	-9.8	657.6
	tot										16.8				
MAY	max	36.6	360.0	0.3	9.6	10.6	9.2	98.6	1.5	1.07		9.88	98.70	2.75	664.70
	min	0.0	0.1	0.00	-8.8	-8.3	-9.3	24.8	-12.0	0.002		-8.84	23.81	-12.03	654.40
	avg	10.6	186.5	0.0	0.3	1.1	-0.3	72.7	-4.0	0.24		0.34	72.68	-4.03	659.22
	tot										60.6				
JUN	max	32.54	359.90	0.0	12.3	13.0	11.9	99.4	3.0	1.13		12.0	99.4	2.7	664.7
	min	0.17	1.24	0.00	-7.8	-7.2	-8.8	20.8	-10.0	0.002		-7.6	20.6	-10.3	651.5
	avg	10.01	173.70	0.0	2.7	3.5	1.9	71.7	-2.1	0.24		2.7	71.6	-2.1	659.2
	tot										74.1				
JUL	max	31.7	359.8	0.0	18.2	19.1	17.4	96.0	6.9	1.10		17.9	95.9	6.5	665.8
	min	0.0	0.9	0.0	-0.7	0.1	-1.2	17.5	-7.1	0.002		-0.4	17.6	-7.5	655.5
	avg	11.1	160.6	0.0	9.1	9.9	8.3	58.5	1.3	0.25		9.1	58.5	1.3	661.3
	tot										42.3				
AUG	max	44.3	359.9	0.00	14.37	15.45	13.51	99.60	6.97	1.01		14.5	99.6	7.2	665.7
	min	0.0	0.3	0.00	-3.42	-3.04	-3.89	12.96	-14.81	0.00		-3.4	13.7	-14.4	656.0
	avg	10.6	173.1	0.00	5.36	6.18	4.59	65.96	-0.70	0.22		5.4	65.9	-0.7	661.1
	tot										54.1				
SEP	max	40.0	1593.0	0.0	13.2	14.3	12.5	99.1	1.1	0.98		13.2	99.0	1.1	667.0
	min	0.0	3.8	0.00	-11.7	-11.1	-12.5	13.2	-17.1	0.002		-11.9	12.9	-17.3	655.8
	avg	11.4	181.1	0.0	0.1	1.0	-0.7	65.1	-6.0	0.22		0.1	64.9	-6.0	660.4
	tot										21.7				
OCT	max	36.3	359.8	0.0	9.9	10.4	9.7	98.3	-1.4	0.85		10.1	280.8	-1.6	665.1
	min	0.2	4.3	0.00	-19.9	-19.2	-20.9	14.7	-27.6	0.002		-20.1	14.8	-27.2	652.4
	avg	10.7	165.6	0.0	-2.9	-2.1	-3.7	64.3	-9.2	0.16		-2.9	64.6	-9.2	660.5
	tot										22.6				
NOV	max	41.2	359.8	0.0	6.4	8.2	4.3	96.0	-5.2	0.85		5.9	95.4	-4.8	663.4
	min	0.0	2.6	0.00	-20.9	-19.5	-22.6	26.7	-31.9	0.002		-20.7	27.2	-32.4	648.1
	avg	10.1	149.7	0.0	-10.3	-9.3	-11.3	66.2	-16.2	0.11		-10.3	66.3	-16.2	655.4
	tot										10.0				
DEC	max	30.6	358.6	0.0	-3.6	-2.3	-4.3	93.8	-6.8	0.53		-3.3	93.5	-6.7	661.5
	min	0.0	0.6	0.00	-34.5	-33.7	-35.5	29.1	-44.2	0.002		-34.4	29.7	-44.2	644.2
	avg	6.3	121.5	0.0	-17.4	-16.0	-18.7	65.2	-24.3	0.09		-17.4	65.2	-24.3	653.8
	tot										8.1				
Yearly	Max	47.1	1593.0	0.3	18.2	19.1	17.4	99.6	7.0	1.13		17.9	280.8	54.3	671.3
	Min	0.0	0.1	0.0	-34.5	-33.7	-35.5	13.0	-44.2	0.0		-34.4	12.9	-44.2	643.4
	Avg	15.4	208.8	0.0	-5.0	-4.0	-6.0	61.6	-12.5	0.36		-5.1	66.6	-10.9	657.0
	tot										338.0				

Radionuclides and Heavy Metals in Dust Samples - Mine Site

Station	Zn (ng/m³)	CN (ng/m³)	S (ng/m³)	As (ng/m³)	Ni (ng/m³)	Se (ng/m³)	U (ng/m³)	Sr-90 (mBq/m³)	Pb-210 (mBq/m³)	Ra-226 (mBq/m³)
TLV[1]	1,600,000	5,000,000	330,000	10,000	200,000	200,000	200,000			
DAC[2]								300,000	8,000	4,000
A1.1	13,587	0.328	308	3.02	9.2	0.190	1.58	0.066	0,656	0.013
A1.2a	3,130	0.129	43	1.42	10.3	0.136	1.81	0.065	0,711	0.039
A1.3a	1,755	0.190	247	2.85	8.9	0.152	1.96	0.063	0,697	0.025
A1.4	2,037	0.200	220	5.01	11.4	0.227	2.20	0.067	0,648	0.027
A1.5a	5,051	0.208	159	3.19	12.5	0.215	2.36	0.069	0,831	0.035
A1.6	4,242	0.263	24	4.54	10.5	0.197	2.43	0.066	0,493	0.007

Notes:

1. TLV's have been sourced from either the Agency for Toxic Substances and Disease Registry (ATSDR), or the Occupational Health & Safety Administration (OHSA). S and Zn TLV's have been adjusted using the molar ratios of SO_2 and ZnO.

2. DAC's have been sourced from the 1999 International Atomic Energy Agency (IAEA) safety standards.

Radionuclides and Heavy Metals in Dust Samples - Barskoon

Station	Zn (ng/m³)	CN (ng/m³)	S (ng/m³)	As (ng/m³)	Ni (ng/m³)	Se (ng/m³)	U (ng/m³)	Sr-90 (mBq/m³)	Pb-210 (mBq/m³)	Ra-226 (mBq/m³)
TLV1	1,600,000	5,000,000	330,000	10,000	200,000	200,000	200,000			
DAC2								300,000	8,000	4,000
Barskoon #1	10,821	0.925	694	6.47	9.7	0.231	2.31	0.462	0.647	0.416
Barskoon #2	8,848	0.922	599	6.45	11.5	0.277	2.77	0.461	0.645	0.184
Barskoon #3	16,111	0.923	600	9.69	14.8	0.323	3.42	0.462	0.508	0.092

Notes:

1. TLV's have been sourced from either the Agency for Toxic Substances and Disease Registry (ATSDR), or the Occupational Health & Safety Administration (OHSA). S and Zn TLV's have been adjusted using the molar ratios of SO_2 and ZnO.

2. DAC's have been sourced from the 1999 International Atomic Energy Agency (IAEA) safety standards.

Sample Point W1.1 (2015)

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Field Data													
Temp	°C	3.70	1.10	3.40	3.70				6.90		6.30	3.60	
Cond-F	mS/cm	0.198	0.122	0.610	0.116				0.112		0.361	0.125	
pH-F	pH Unit	8.30	8.10	8.60	8.50				8.96		9.10	7.56	
Major Constituents													
Ca	mg/L		21.6	18.3	15.2		12.7	19.1	12.8	17.9	16.5	22.0	16.3
Cl	mg/L		0.700	0.700	0.800		0.500	0.900	0.700	0.700	0.700	0.700	0.800
CO_3	mg/L		0.500	0.500	0.500		0.500	0.500	0.500	0.500	0.500	0.500	0.500
HCO_3	mg/L		43.0	44.0	41.0		28.0	40.0	31.0	33.0	36.0	40.0	39.0
K	mg/L		1.91	1.91	1.82		1.23	2.29	4.49	3.66	2.39	2.36	1.75
Mg	mg/L		3.48	3.32	2.64		2.32	3.80	3.65	4.81	3.19	3.59	2.74
Na	mg/L		2.28	2.20	1.98		1.28	1.80	3.52	3.10	2.35	2.48	1.99
SO_4	mg/L		15.0	14.0	15.0		12.0	18.0	12.0	13.0	16.0	16.0	15.0
T-Hardness	mg/L		50.0	50.0	50.0		30.0	55.0	42.0	43.0	43.0	50.0	48.0
T-Alkalinity	mg/L		35.2	35.8	33.8		22.8	33.4	25.8	27.0	30.2	32.6	32.4
Total Metals													
Ag	mg/L		0.00150	0.00150	0.00150		0.00150	0.00150	0.00150	0.00150	0.00150	0.00150	0.00150
Al	mg/L		0.810	0.360	0.230		0.330	2.24	2.52	6.66	7.50	1.43	1.52
As	mg/L		0.000500	0.000500	0.000500		0.000500	0.00200	0.00300	0.00300	0.00400	0.000500	0.00100
Ba	mg/L		0.0370	0.0260	0.0230		0.0190	0.0630	0.0790	0.164	0.158	0.0500	0.0540
Be	mg/L		0.000100	0.000100	0.000100		0.000700	0.000100	0.000200	0.000300	0.000100	0.000100	0.000100
Cd	mg/L		0.000150	0.000150	0.000150		0.000150	0.000150	0.000150	0.000150	0.000150	0.000150	0.000150
Co	mg/L		0.00200	0.00200	0.00200		0.00200	0.00200	0.00200	0.00200	0.00200	0.00200	0.00200
Cr	mg/L		0.0100	0.0340	0.0330		0.0250	0.00400	0.00400	0.00400	0.00400	0.00400	0.00400
Cu	mg/L		0.122	0.0140	0.0150		0.00700	0.00500	0.00250	0.0150	0.0110	0.00250	0.00250
F	mg/L												
Fe	mg/L		0.833	0.375	0.401		0.346	3.01	2.27	6.69	4.25	0.873	0.788
Hg	mg/L		0.000250	0.000250	0.000250		0.000250	0.000250	0.000250	0.000250	0.000250	0.000250	0.000250
Mn	mg/L		0.0230	0.0120	0.0100		0.0120	0.0720	0.0720	0.155	0.109	0.0210	0.0210
Mo	mg/L		0.00600	0.00600	0.00200		0.00500	0.00200	0.00200	0.00500	0.00200	0.00400	0.00200
Ni	mg/L		0.0180	0.0130	0.00800		0.00700	0.0100	0.00250	0.0140	0.0130	0.0200	0.00500
Pb	mg/L			0.00300	0.00100		0.00200	0.0130	0.00800	0.0100	0.00900	0.00400	0.00100
Sb	mg/L		0.00100	0.00100	0.000500		0.000500	0.000500	0.00500	0.00100	0.000500	0.00200	0.000500
Se	mg/L		0.000500	0.000500	0.000500		0.000500	0.000500	0.000500	0.000500	0.000500	0.000500	0.000500
Si	mg/L												
V	mg/L		0.00300	0.00300	0.00300		0.00300	0.00300	0.00300	0.0100	0.00700	0.00300	0.00300
Zn	mg/L		0.0660	0.0130	0.0150		0.00800	0.0200	0.0140	0.0440	0.0200	0.00600	0.00700
Nutrients													
Un-ionized NH_3													
NH_3	mg/L		0.0200	0.140	0.0200		0.0800	0.0200	0.0200	0.100	0.0800	0.0200	0.0200
NO_2-N	mg/L		0.000500	0.000500	0.000500		0.00300	0.00400	0.00400	0.00200	0.00600	0.00200	0.00200
NO_3-N	mg/L		0.300	0.300	0.300		0.200	0.300	0.400	0.300	0.300	0.300	0.400
T-PO_4	mg/L												
TKN	mg/L												
Solids													
Turb-L	NTU		18.0	12.0	8.10		11.0	75.0	370	220	160		
TDS	mg/L		89.0	40.0	78.0		56.0	121	187	141	135	70.0	73.0
TSS	mg/L		0.500	2.00	1.00		2.00	26.0	125	106	44.0	5.00	0.500
Trace Constituents													
CN-F	mg/L		0.00250	0.00250	0.00250		0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250
CN-T	mg/L		0.00250	0.00250	0.00250		0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250
CN-WAD	mg/L		0.00250	0.00250	0.00250		0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250

Sample Point W1.3 (2015)

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Field Data													
Temp	°C				0.400	1.50		10.2	5.90		3.70		
Cond-F	mS/cm				0.410	0.538		0.168	1.12		0.341		
pH-F	pH Unit				8.30	8.27		8.64	8.95		8.50		
Major Constituents													
Ca	mg/L				44.4		40.1	21.2	13.7	18.1	43.9		
Cl	mg/L				6.50		6.80	0.800	0.700	0.700	2.20		
CO_3	mg/L				0.500		0.500	0.500	0.500	0.500	0.500		
HCO_3	mg/L				94.0		68.0	46.0	34.0	37.0	72.0		
K	mg/L				3.98		1.30	2.46	3.93	2.91	1.95		
Mg	mg/L				20.2		7.76	4.06	3.53	4.26	15.7		
Na	mg/L				4.92		3.64	2.16	3.18	2.73	3.12		
SO_4	mg/L				100		61.0	19.0	13.0	14.0	78.0		
T-Hardness	mg/L				525		130	60.0	46.0	46.0	150		
T-Alkalinity	mg/L				76.5		55.0	37.8	28.2	30.2	58.5		
Total Metals													
Ag	mg/L				0.00150		0.00150	0.00150	0.00150	0.00150	0.00150		
Al	mg/L				5.37		0.460	5.05	5.68	7.93	9.23		
As	mg/L				0.00600		0.000500	0.00400	0.00400	0.00300	0.00700		
Ba	mg/L				0.166		0.0390	0.100	0.121	0.178	0.179		
Be	mg/L				0.000400		0.000100	0.000100	0.000400	0.000300	0.000100		
Cd	mg/L				0.000150		0.000150	0.000150	0.000150	0.000150	0.000150		
Co	mg/L				0.00600		0.00200	0.00200	0.00200	0.00500	0.00500		
Cr	mg/L				0.0390		0.0200	0.0100	0.00400	0.00400	0.0150		
Cu	mg/L				0.0250		0.167	0.0160	0.00250	0.0150	0.00250		
F	mg/L												
Fe	mg/L				10.9		0.415	6.81	5.46	7.39	7.15		
Hg	mg/L				0.000250		0.000250	0.000250	0.000250	0.000250	0.000250		
Mn	mg/L				0.278		0.0570	0.168	0.127	0.169	0.194		
Mo	mg/L				0.00200		0.00200	0.00500	0.00200	0.00200	0.00500		
Ni	mg/L				0.0170		0.0110	0.0210	0.00600	0.0130	0.0180		
Pb	mg/L				0.00800		0.00100	0.0160	0.0150	0.0110	0.0170		
Sb	mg/L				0.000500		0.000500	0.000500	0.000500	0.00100	0.00100		
Se	mg/L				0.000500		0.000500	0.000500	0.000500	0.000500	0.000500		
Si	mg/L												
V	mg/L				0.00900		0.00300	0.00900	0.00800	0.0120	0.0100		
Zn	mg/L				0.0330		0.0100	0.0530	0.0220	0.0390	0.0290		
Nutrients													
Un-ionized NH_3													
NH_3	mg/L				0.0200		0.0600	0.0600	0.0200	0.0200	0.0400		
NO_2-N	mg/L				0.000500		0.00100	0.00500	0.00300	0.00300	0.00800		
NO_3-N	mg/L				0.600		0.0500	0.300	0.300	0.200	0.800		
T-PO_4	mg/L												
TKN	mg/L												
Solids													
Turb-L	NTU				280		20.0	190	320	260	170		
TDS	mg/L				286		174	106	147	121	218		
TSS	mg/L				282		28.0	258	140	167	158		
Trace Constituents													
CN-F	mg/L				0.00250		0.00250	0.00250	0.00250	0.00250	0.00250		
CN-T	mg/L				0.00250		0.00250	0.00250	0.00250	0.00250	0.00250		
CN-WAD	mg/L				0.00250		0.00250	0.00250	0.00250	0.00250	0.00250		

Sample Point W3.4 (2015)

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Field Data													
Temp	°C												
Cond-F	mS/cm	1,76											
pH-F	pH Unit												
Major Constituents													
Ca	mg/L				86.7	91.9	99.7	117	141	152	167	183	208
Cl	mg/L				6.63	4.25	4.33	3.08	4.18	6.10	8.54	8.23	12.6
CO_3	mg/L				0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500
HCO_3	mg/L				146	128	117	94.6	112	144	204	263	415
K	mg/L				3.57	2.96	3.24	3.88	4.14	4.83	4.82	5.80	8.52
Mg	mg/L				46.1	57.7	51.0	68.6	74.8	89.9	96.9	114	126
Na	mg/L				7.97	5.27	4.86	3.67	3.80	5.60	9.60	11.3	20.5
SO_4	mg/L				236	298	325	415	501	493	537	596	528
T-Hardness	mg/L				400	556	475	540	644	713	730	844	1030
T-Alkalinity	mg/L				121	105	96.8	77.4	92.1	118	168	216	341
Total Metals													
Ag	mg/L				0.00150	0.00150	0.00150	0.00150	0.00150	0.00150	0.00150	0.00150	0.00150
Al	mg/L				3.73	1.62	6.77	32.9	13.7	16.5	2.71	0.278	0.776
As	mg/L				0.00500	0.00213	0.0100	0.0488	0.0189	0.0263	0.00520	0.000625	0.00163
Ba	mg/L				0.105	0.0545	0.136	0.776	0.318	0.426	0.0652	0.0255	0.0575
Be	mg/L				0.000233	0.000100	0.000550	0.00200	0.00108	0.00105	0.000160	0.000100	0.000100
Cd	mg/L				0.000150	0.000150	0.000150	0.000300	0.000263	0.000238	0.000150	0.000150	0.000150
Co	mg/L				0.00433	0.00200	0.00775	0.0392	0.0245	0.0198	0.00380	0.00200	0.00200
Cr	mg/L				0.0333	0.0165	0.0320	0.0628	0.00725	0.0238	0.00780	0.00400	0.00400
Cu	mg/L				0.0135	0.0295	0.0461	0.0924	0.0800	0.0439	0.00850	0.00250	0.00363
F	mg/L												
Fe	mg/L				7.36	2.92	13.3	67.5	26.1	36.8	4.66	0.524	1.04
Hg	mg/L				0.000250	0.000225	0.000250	0.000250	0.000250	0.000250	0.000300	0.000313	0.000525
Mn	mg/L				0.211	0.122	0.355	1.72	1.24	0.718	0.160	0.0488	0.0630
Mo	mg/L				0.00467	0.00675	0.0138	0.0258	0.0200	0.0330	0.0138	0.0135	0.00925
Ni	mg/L				0.0137	0.0130	0.0358	0.108	0.0830	0.0753	0.0194	0.0213	0.0120
Pb	mg/L				0.00533	0.00425	0.0183	0.0396	0.0130	0.0180	0.00700	0.00375	0.00625
Sb	mg/L				0.000500	0.000625	0.000625	0.00100	0.00163	0.00138	0.000700	0.00263	0.00150
Se	mg/L				0.000500	0.00183	0.00300	0.00380	0.00325	0.00500	0.00660	0.00275	0.00338
Si	mg/L												
V	mg/L				0.00633	0.00300	0.0108	0.0518	0.0195	0.0278	0.00460	0.00300	0.00300
Zn	mg/L				0.0257	0.0205	0.0383	0.132	0.0693	0.0660	0.0144	0.0168	0.00725
Nutrients													
Un-ionized NH_3													
NH_3	mg/L				0.0667	0.120	0.120	0.312	0.270	0.235	0.0720	0.0200	0.0200
NO_2-N	mg/L				0.00200	0.000500	0.00500	0.0280	0.0131	0.00263	0.00480	0.00225	0.00225
NO_3-N	mg/L				1.07	1.68	11.1	3.04	2.95	4.70	4.70	2.73	1.68
T-PO_4	mg/L												
TKN	mg/L												
Solids													
Turb-L	NTU				192	73.8	443	2210	1260	804	123		
TDS	mg/L				517	574	629	746	907	988	1020	1110	1270
TSS	mg/L				199	71.3	457	2370	1940	1500	225	20.0	14.8
Trace Constituents													
CN-F	mg/L				0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250
CN-T	mg/L				0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00538	0.00613
CN-WAD	mg/L				0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250

Sample Point T8.1 (2015)

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Field Data													
Temp	°C	-0.200	1.77	1.78	1.91	5.94	9.93	12.6	12.3	6.33	3.25	1.47	1.07
Cond-F	mS/cm	4.21	4.39	4.41	3.99	3.26	3.00	3.01	3.64	3.62	3.97	3.66	3.88
pH-F	pH Unit	10.5	10.3	10.3	10.2	9.89	9.90	10.3	11.0	10.5	10.7	10.5	10.6
Major Constituents													
Ca	mg/L	291	286	289	157	178	166	160	176	207	236	228	197
Cl	mg/L	24.5	23.8	23.8	17.7	16.0	17.8	19.3	19.5	19.3	20.0	22.8	22.3
CO_3	mg/L	68.0	70.8	76.3	51.6	60.6	28.3	7.50	4.13	14.0	2.75	8.25	17.3
HCO_3	mg/L	1.25	3.83	1.94	14.5	2.60	29.5	72.0	97.0	68.5	102	91.0	79.3
K	mg/L	135	147	151	87.5	102	102	101	106	108	116	125	117
Mg	mg/L	6.79	6.99	7.24	6.42	4.78	5.16	5.23	6.29	8.38	8.11	8.85	7.39
Na	mg/L	676	715	747	425	509	508	490	505	572	564	600	579
SO_4	mg/L	1770	1720	1670	1060	1070	1110	1150	1220	1380	1370	1520	1480
T-Hardness	mg/L	688	688	684	591	435	425	463	506	542	606	581	558
T-Alkalinity	mg/L	116	122	131	103	107	71.5	71.9	85.6	79.8	87.5	88.0	93.3
Total Metals													
Ag	mg/L	0.144	0.125	0.150	0.0952	0.101	0.101	0.115	0.102	0.0903	0.0978	0.0993	0.0917
Al	mg/L	0.210	0.288	0.244	0.389	0.364	0.185	0.238	0.170	0.137	0.700	0.200	0.133
As	mg/L		0.00650	0.00525	0.00400	0.00280	0.00188	0.00195	0.00175	0.00233	0.00808	0.0120	0.0173
Ba	mg/L	0.0515	0.0583	0.0488	0.0465	0.0410	0.0285	0.0300	0.0258	0.0253	0.0695	0.0458	0.0357
Be	mg/L	0.000100	0.000100	0.000100	0.000100	0.000100	0.000100	0.000100	0.000100	0.000100	0.000100	0.000100	0.000100
Cd	mg/L	0.00100	0.00178	0.00191	0.00120	0.00122	0.00125	0.00158	0.00120	0.00113	0.00123	0.00173	0.00167
Co	mg/L	0.0505	0.0392	0.0538	0.0478	0.0330	0.0505	0.0615	0.0575	0.0620	0.0658	0.0678	0.0463
Cr	mg/L	0.00700	0.00483	0.0268	0.0299	0.00880	0.0165	0.0163	0.0123	0.00400	0.00400	0.00400	0.00767
Cu	mg/L	34.1	36.4	36.3	24.8	27.8	28.1	29.3	26.2	27.4	29.4	36.5	37.2
F	mg/L										35.3		
Fe	mg/L	2.62	2.30	2.97	2.61	1.60	1.43	1.11	1.35	0.736	1.98	1.64	1.94
Hg	mg/L	0.00500	0.0138	0.0107	0.00316	0.00672	0.00858	0.00868	0.00424	0.00690	0.00658	0.00895	0.00890
Mn	mg/L	0.0135	0.0212	0.0199	0.0222	0.0154	0.00625	0.00975	0.0338	0.0297	0.0368	0.0265	0.0213
Mo	mg/L	0.483	0.527	0.491	0.305	0.317	0.325	0.357	0.341	0.341	0.358	0.403	0.393
Ni	mg/L	0.736	0.738	0.751	0.552	0.576	0.569	0.629	0.612	0.620	0.594	0.711	0.595
Pb	mg/L	0.0100	0.0100	0.00175	0.00364	0.00240	0.00700	0.00650	0.00475	0.00267	0.00650	0.00400	0.00800
Sb	mg/L	0.330	0.340	0.334	0.214	0.217	0.208	0.223	0.168	0.213	0.590	1.11	1.54
Se	mg/L	0.0450	0.0470	0.0429	0.0285	0.0294	0.0308	0.0415	0.0320	0.0363	0.0420	0.0305	0.0353
Si	mg/L	3.54	4.04	3.94	3.63								
V	mg/L	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300
Zn	mg/L	0.336	0.369	0.330	0.244	0.217	0.193	0.152	0.0430	0.0157	0.0110	0.00875	0.00533
Nutrients													
Un-ionized NH_3													
NH_3	mg/L	23.5	20.5	22.5	15.3	15.9	11.2	14.3	13.1	16.1	13.0	14.8	14.9
NO_2-N	mg/L	0.420	0.383	0.434	0.0736	0.0613	0.396	0.409	1.08	1.34	1.11	0.739	0.723
NO_3-N	mg/L	30.0	31.2	31.6	22.0	23.0	23.3	23.5	22.4	21.5	20.6	22.1	23.7
T-PO_4	mg/L	0.0300	0.0367	0.0250	0.0317								
TKN	mg/L					9.74	63.0	52.0	51.8	53.3	52.6	74.3	87.0
Solids													
Turb-L	NTU	0.250	4.92	0.200	12.2	7.10	6.85	4.70	5.40	37.5	43.3		
TDS	mg/L	3090	3440	3330	2250	2400	2260	2410	2560	3020	2800	2800	2890
TSS	mg/L	0.500	8.67	1.19	6.55	11.4	6.75	4.50	2.63	33.3	65.0	4.50	0.667
Trace Constituents													
CN-F	mg/L	14.0	17.7	19.6	13.9	19.4	12.4	8.08	5.02	3.75	5.72	8.18	11.3
CN-T	mg/L	75.4	66.7	76.0	53.7	48.8	44.1	37.7	36.9	32.7	40.5	50.6	74.6
CN-WAD	mg/L	60.4	57.8	66.3	45.1	43.7	40.4	35.0	34.3	30.3	38.3	46.5	60.0

Sample Point T8.4 (2015)

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Field Data													
Temp	°C						9.65	12.9	12.3	10.1			
Cond-F	mS/cm						3.43	3.44	3.79	3.72			
pH-F	pH Unit						7.42	7.49	7.43	7.44			
Major Constituents													
Ca	mg/L						145	155	148	177			
Cl	mg/L						16.3	18.3	19.3	18.7			
CO_3	mg/L						5.38	14.9	1.88	0.500			
HCO_3	mg/L						67.0	60.8	64.5	51.7			
K	mg/L						82.4	106	98.0	105			
Mg	mg/L						5.84	5.59	5.84	8.80			
Na	mg/L						582	691	607	660			
SO_4	mg/L						1280	1360	1440	1540			
T-Hardness	mg/L						384	406	426	450			
T-Alkalinity	mg/L						63.7	83.5	55.5	42.9			
Total Metals													
Ag	mg/L						0.00150	0.00150	0.00150	0.00150			
Al	mg/L						0.125	0.150	0.130	0.103			
As	mg/L						0.00250	0.00138	0.00113	0.000833			
Ba	mg/L						0.0290	0.0283	0.0210	0.0190			
Be	mg/L						0.000100	0.000100	0.000100	0.000100			
Cd	mg/L						0.00103	0.000975	0.00160	0.00103			
Co	mg/L						0.0338	0.0503	0.0623	0.0690			
Cr	mg/L						0.0220	0.0168	0.0145	0.00400			
Cu	mg/L						0.301	0.295	0.292	0.252			
F	mg/L												
Fe	mg/L						0.438	0.423	0.372	0.301			
Hg	mg/L						0.00488	0.00508	0.00435	0.00450			
Mn	mg/L						0.0210	0.0145	0.0290	0.0253			
Mo	mg/L						0.268	0.312	0.295	0.318			
Ni	mg/L						0.0230	0.0245	0.0295	0.0313			
Pb	mg/L						0.00100	0.00550	0.00250	0.00200			
Sb	mg/L						0.106	0.134	0.175	0.132			
Se	mg/L						0.0183	0.0283	0.0433	0.0330			
Si	mg/L												
V	mg/L						0.00300	0.00300	0.00300	0.00300			
Zn	mg/L						0.0148	0.0188	0.00925	0.0117			
Nutrients													
Un-ionized NH_3													
NH_3	mg/L						26.5	27.0	28.0	27.0			
NO_2-N	mg/L						0.353	0.360	0.540	0.773			
NO_3-N	mg/L						18.8	22.3	21.5	20.0			
T-PO4	mg/L												
TKN	mg/L												
Solids													
Turb-L	NTU						8.95	1.08	1.83	2.50			
TDS	mg/L						2250	2640	2730	2960			
TSS	mg/L						10.3	4.13	2.38	2.83			
Trace Constituents													
CN-F	mg/L						0.00438	0.00250	0.00250	0.00250			
CN-T	mg/L						0.0825	0.221	0.418	0.152			
CN-WAD	mg/L						0.0355	0.0325	0.0423	0.0440			

Sample Point W1.4 (2015)

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Field Data													
Temp	°C				0.800	4.80		9.70	8.60		3.80		
Cond-F	mS/cm				0.459	0.241		0.295	0.559		0.343		
pH-F	pH Unit				8.40	8.25		8.44	8.91		8.20		
Major Constituents													
Ca	mg/L				44.0		53.3	33.8	21.4	44.9	35.8		
Cl	mg/L				6.50		4.80	1.30	1.40	2.30	2.10		
CO_3	mg/L				0.500		0.500	0.500	0.500	0.500	0.500		
HCO_3	mg/L				94.0		66.0	54.0	37.0	48.0	64.0		
K	mg/L				3.91		13.5	3.88	4.90	8.84	2.37		
Mg	mg/L				19.9		10.8	8.37	4.83	12.4	10.4		
Na	mg/L				4.84		89.6	16.9	22.7	48.0	5.22		
SO_4	mg/L				100		260	83.0	81.0	146	58.0		
T-Hardness	mg/L				210		180	110	85.0	120	110		
T-Alkalinity	mg/L				77.0		53.5	44.8	30.6	39.0	52.5		
Total Metals													
Ag	mg/L				0.00150		0.00150	0.00150	0.00150	0.00150	0.00150		
Al	mg/L				5.28		1.40	14.9	1.86	7.09	7.18		
As	mg/L				0.00500		0.000500	0.0180	0.00300	0.00400	0.00600		
Ba	mg/L				0.166		0.0570	0.314	0.0750	0.155	0.140		
Be	mg/L				0.000400		0.000100	0.00100	0.000100	0.000400	0.000100		
Cd	mg/L				0.000150		0.000150	0.000150	0.000150	0.000150	0.000150		
Co	mg/L				0.00600		0.00800	0.0170	0.00200	0.00800	0.00400		
Cr	mg/L				0.0410		0.0210	0.0290	0.00400	0.00400	0.0150		
Cu	mg/L				0.0190		0.176	0.0450	0.0110	0.0290	0.00250		
F	mg/L												
Fe	mg/L				10.5		0.475	27.9	2.07	7.77	5.37		
Hg	mg/L				0.000250		0.000250	0.000250	0.000250	0.000250	0.000250		
Mn	mg/L				0.313		0.100	0.618	0.0930	0.186	0.136		
Mo	mg/L				0.00200		0.00800	0.0200	0.00900	0.0250	0.00500		
Ni	mg/L				0.0160		0.0180	0.0530	0.00600	0.0160	0.0150		
Pb	mg/L				0.00900		0.00200	0.0450	0.0110	0.0100	0.0100		
Sb	mg/L				0.000500		0.000500	0.00300	0.00400	0.00900	0.00200		
Se	mg/L				0.000500		0.00200	0.000500	0.000500	0.00100	0.000500		
Si	mg/L												
V	mg/L				0.00300		0.00300	0.0270	0.00300	0.0110	0.00700		
Zn	mg/L				0.0450		0.0220	0.0730	0.0110	0.0390	0.0280		
Nutrients													
Un-ionized NH_3													
NH_3	mg/L				0.0600		3.60	0.640	0.960	1.94	0.220		
NO_2-N	mg/L				0.00400		0.0880	0.0260	0.0340	0.0860	0.00800		
NO_3-N	mg/L				0.600		2.60	1.10	1.30	2.20	0.600		
T-PO4	mg/L												
TKN	mg/L												
Solids													
Turb-L	NTU				260		60.0	800	330	260	150		
TDS	mg/L				285		514	158	220	347	178		
TSS	mg/L				295		128	1190	287	287	156		
Trace Constituents													
CN-F	mg/L				0.00250		0.00250	0.00250	0.00250	0.00250	0.00250		
CN-T	mg/L				0.00250		0.0240	0.0120	0.0150	0.0170	0.00250		
CN-WAD	mg/L				0.00250		0.0150	0.00250	0.00900	0.00250	0.00250		

Sample Point W4.1 (2015)

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Field Data													
Temp	°C							8.50		5.30			
Cond-F	mS/cm							0.197		0.119			
pH-F	pH Unit							8.10		8.80			
Major Constituents													
Ca	mg/L						24.3	14.8		20.8			
Cl	mg/L						9.00	1.60		4.80			
CO_3	mg/L						0.500	0.500		0.500			
HCO_3	mg/L						56.0	44.0		47.0			
K	mg/L						0.480	0.480		0.571			
Mg	mg/L						3.07	1.75		3.29			
Na	mg/L						1.95	1.17		1.86			
SO_4	mg/L						9.00	5.00		7.00			
T-Hardness	mg/L						65.0	44.0		55.0			
T-Alkalinity	mg/L						46.0	36.2		38.8			
Total Metals													
Ag	mg/L												
Al	mg/L						0.100	0.190		0.100			
As	mg/L							0.000500					
Ba	mg/L						0.0120	0.0130		0.00700			
Be	mg/L						0.000100	0.000100		0.000100			
Cd	mg/L						0.000150	0.000150		0.000150			
Co	mg/L												
Cr	mg/L												
Cu	mg/L						0.0340	0.00700		0.00250			
F	mg/L												
Fe	mg/L						0.178	0.503		0.308			
Hg	mg/L						0.000250	0.000250		0.000250			
Mn	mg/L												
Mo	mg/L												
Ni	mg/L						0.0120	0.00900		0.00700			
Pb	mg/L						0.00100	0.00400		0.00100			
Sb	mg/L							0.00300					
Se	mg/L							0.000500					
Si	mg/L												
V	mg/L												
Zn	mg/L						0.00600	0.0110		0.00500			
Nutrients													
Un-ionized NH_3													
NH_3	mg/L						0.0200	0.100		0.0200			
NO_2-N	mg/L						0.00100	0.000500		0.00300			
NO_3-N	mg/L						0.0500	0.200		0.0500			
T-PO_4	mg/L												
TKN	mg/L												
Solids													
Turb-L	NTU						3.30	3.40		2.90			
TDS	mg/L						97.0	47.0		66.0			
TSS	mg/L						0.500	4.00		2.00			
Trace Constituents													
CN-F	mg/L												
CN-T	mg/L												
CN-WAD	mg/L												

Sample Point W4.3.1 (2015)

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Field Data													
Temp	°C							8.50		10.3			
Cond-F	mS/cm							0.190		0.252			
pH-F	pH Unit							8.10		9.00			
Major Constituents													
Ca	mg/L						35.3	17.0		28.3			
Cl	mg/L						12.0	2.00		6.70			
CO_3	mg/L						0.500	0.500		7.00			
HCO_3	mg/L						80.0	48.0		52.0			
K	mg/L						0.960	0.530		0.860			
Mg	mg/L						4.56	2.06		4.53			
Na	mg/L						2.84	1.28		2.59			
SO_4	mg/L						12.0	6.00		11.0			
T-Hardness	mg/L						95.0	50.0		75.0			
T-Alkalinity	mg/L						66.0	39.5		54.5			
Total Metals													
Ag	mg/L												
Al	mg/L						0.0400	0.160		0.230			
As	mg/L							0.000500					
Ba	mg/L						0.0180	0.0140		0.0190			
Be	mg/L						0.000100	0.000100		0.000100			
Cd	mg/L						0.000150	0.000150		0.000150			
Co	mg/L												
Cr	mg/L												
Cu	mg/L						0.0450	0.00250		0.00250			
F	mg/L												
Fe	mg/L						0.137	0.292		0.479			
Hg	mg/L						0.000250	0.000250		0.000250			
Mn	mg/L												
Mo	mg/L												
Ni	mg/L						0.0240	0.0140		0.00700			
Pb	mg/L						0.00100	0.00600		0.00300			
Sb	mg/L							0.00200					
Se	mg/L							0.000500					
Si	mg/L												
V	mg/L												
Zn	mg/L						0.0100	0.0130		0.0160			
Nutrients													
Un-ionized NH_3													
NH_3	mg/L						0.0200	0.0600		0.0200			
NO_2-N	mg/L						0.000500	0.000500		0.00400			
NO_3-N	mg/L						0.200	0.100		26.0			
T-PO4	mg/L												
TKN	mg/L												
Solids													
Turb-L	NTU						3.20	2.00		4.60			
TDS	mg/L						131	59.0		115			
TSS	mg/L						1.00	2.00		6.00			
Trace Constituents													
CN-F	mg/L												
CN-T	mg/L												
CN-WAD	mg/L												

Sample Point W2.6 (2015)

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Field Data													
Temp	°C	0.450	0.800	1.15	1.02	1.78	4.45	7.76	8.23	7.20	1.28	0.940	0.620
Cond-F	mS/cm	3.63	4.52	4.07	3.21	2.18	2.25	2.18	2.94	3.22	2.84	2.46	3.86
pH-F	pH Unit	7.66	8.12	7.82	7.95	8.25	8.09	8.04	8.04	8.01	8.06	8.11	7.59
Major Constituents													
Ca	mg/L	1100	563	554	436	325	318	272	352	420	477	517	672
Cl	mg/L	58.0	26.0	26.5	20.5	13.3	15.0	12.2	15.8	22.3	23.0	24.0	29.3
CO_3	mg/L	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500
HCO_3	mg/L	700	447	463	371	255	238	234	263	310	345	417	507
K	mg/L	92.3	49.0	48.8	37.0	23.0	20.8	19.3	25.7	31.3	37.7	47.1	53.2
Mg	mg/L	689	362	368	268	172	154	142	190	266	303	355	425
Na	mg/L	87.7	46.6	46.6	35.0	22.4	20.9	19.4	25.1	31.6	39.0	46.4	56.3
SO_4	mg/L	3460	1720	1790	1430	938	938	864	1090	1400	1510	1950	2040
T-Hardness	mg/L	4830	2660	2780	2450	2220	1390	1330	1630	2200	2350	2700	3100
T-Alkalinity	mg/L	574	369	378	306	209	197	191	214	253	283	343	428
Total Metals													
Ag	mg/L	0.00150	0.00150	0.00150	0.00150	0.00150	0.00150	0.00150	0.00150	0.00150	0.00238	0.00150	0.00150
Al	mg/L	0.110	0.523	0.635	8.58	10.0	62.1	64.0	38.9	15.9	13.3	1.29	2.98
As	mg/L	0.0200	0.00200	0.00208	0.00925	0.00388	0.0545	0.0496	0.0258	0.0143	0.0110	0.00300	0.00450
Ba	mg/L	0.0580	0.0360	0.0265	0.0913	0.154	0.523	0.506	0.355	0.172	0.171	0.0603	0.122
Be	mg/L	0.000100	0.000100	0.000100	0.000350	0.000550	0.00280	0.00292	0.00170	0.000625	0.000325	0.000100	0.000100
Cd	mg/L	0.00100	0.000600	0.000288	0.000475	0.000188	0.000850	0.000740	0.000525	0.000413	0.000350	0.000500	0.000500
Co	mg/L	0.0370	0.0237	0.0253	0.0228	0.0218	0.0565	0.0516	0.0353	0.0188	0.0230	0.0210	0.0193
Cr	mg/L	0.00400	0.00533	0.0283	0.0378	0.0223	0.113	0.106	0.0550	0.0248	0.0180	0.00400	0.00675
Cu	mg/L	0.0890	0.0265	0.00988	0.0169	0.0246	0.127	0.114	0.0693	0.0328	0.0499	0.00600	0.00363
F	mg/L												
Fe	mg/L	0.188	0.892	0.969	13.0	15.4	99.9	96.7	59.9	22.6	17.8	1.79	3.61
Hg	mg/L	0.00500	0.000333	0.000225	0.000250	0.000200	0.000250	0.000250	0.000250	0.000225	0.000250	0.000367	0.000463
Mn	mg/L	2.76	1.68	1.76	1.47	1.36	2.68	2.44	1.94	1.16	1.33	1.37	1.60
Mo	mg/L	0.109	0.0700	0.0688	0.0415	0.0283	0.0310	0.0278	0.0388	0.0423	0.0520	0.0620	0.0755
Ni	mg/L	0.264	0.175	0.174	0.132	0.0825	0.171	0.141	0.109	0.0798	0.108	0.128	0.118
Pb	mg/L	0.0100	0.00500	0.0130	0.0115	0.00400	0.0578	0.0664	0.0310	0.0170	0.0120	0.00400	0.00625
Sb	mg/L	0.0100	0.00633	0.00625	0.00525	0.00275	0.00200	0.00130	0.00225	0.00475	0.00475	0.00633	0.00625
Se	mg/L	0.0100	0.00767	0.00775	0.00625	0.00375	0.00675	0.00370	0.00425	0.00925	0.0145	0.0160	0.0185
Si	mg/L												
V	mg/L	0.00300	0.00300	0.00300	0.0140	0.0145	0.0978	0.102	0.0610	0.0263	0.0205	0.00300	0.00425
Zn	mg/L	0.0160	0.0817	0.0163	0.0500	0.0653	0.254	0.248	0.148	0.0588	0.0513	0.0183	0.0250
Nutrients													
Un-ionized NH3													
NH3	mg/L	13.5	9.50	10.1	7.50	3.75	4.10	3.50	4.58	5.45	6.55	7.40	8.98
NO_2-N	mg/L	0.000500	0.000500	0.000500	0.00113	0.00513	0.0203	0.0256	0.0183	0.00563	0.00600	0.00267	0.00250
NO3-N	mg/L	250	121	121	90.5	54.8	51.0	50.6	71.8	99.5	129	134	155
T-PO4	mg/L												
TKN	mg/L												
Solids													
Turb-L	NTU	26.0	16.8	36.0	601	1400	2160	2600	2180	644	514		
TDS	mg/L	7490	3980	3980	3280	2100	1900	1780	2290	3130	3580	3970	4740
TSS	mg/L	56.0	21.0	49.5	757	2170	4430	4170	2600	1190	988	72.7	105
Trace Constituents													
CN-F	mg/L	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250
CN-T	mg/L	0.00250	0.00250	0.00250	0.00250	0.00250	0.00313	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250
CN-WAD	mg/L	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250

Sample Point POR(1) (2015)

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Field Data													
Temp	°C	2.30	2.77	2.28	3.08	3.54	4.34	3.22	4.90	5.82	5.40	0.650	
Cond-F	mS/cm	1.26	1.27	1.14	1.07	1.06	0.921	0.859	0.866	1.04	1.04	1.39	
pH-F	pH Unit	8.60	8.77	8.27	7.97	8.17	8.21	8.22	8.20	8.19	8.47	8.09	
Major Constituents													
Ca	mg/L	144	154	155	123	178	156	83.5	73.1	118	142	173	
Cl	mg/L	7.30	7.30	7.68	7.72	10.9	9.18	2.38	2.25	4.25	7.98	8.50	
CO_3	mg/L	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	
HCO_3	mg/L	110	120	120	116	111	104	57.0	66.0	85.5	113	155	
K	mg/L	10.5	8.40	8.22	6.10	7.55	6.24	3.32	2.92	4.69	6.30	7.36	
Mg	mg/L	75.6	68.3	73.4	77.2	92.0	104	63.8	53.7	85.3	82.0	91.0	
Na	mg/L	42.9	42.7	44.8	33.6	22.3	12.3	4.12	3.19	8.79	20.2	25.1	
SO_4	mg/L	550	510	511	491	570	643	347	300	423	494	730	
T-Hardness	mg/L	650	600	644	675	750	806	440	381	538	613	813	
T-Alkalinity	mg/L	88.5	99.5	99.1	95.1	91.7	85.4	46.6	54.0	70.4	92.0	127	
Total Metals													
Ag	mg/L	0.00150	0.00150	0.00150	0.00150	0.00150	0.00188	0.00150	0.00150	0.00150	0.00150	0.00150	
Al	mg/L	0.390	0.120	0.0925	1.87	0.637	1.55	8.29	6.36	2.37	0.780	0.415	
As	mg/L	0.0200	0.0170	0.0203	0.0180	0.0117	0.00438	0.00970	0.00925	0.00598	0.0103	0.00850	
Ba	mg/L	0.125	0.0280	0.0275	0.0546	0.0347	0.0398	0.113	0.0855	0.0500	0.0345	0.0265	
Be	mg/L	0.000100	0.000100	0.000100	0.000140	0.000100	0.000100	0.000100	0.000400	0.000100	0.000100	0.000100	
Cd	mg/L		0.000150	0.000150	0.000150	0.000400	0.000150	0.000150	0.000150	0.000263	0.000375	0.000550	
Co	mg/L	0.00200	0.00500	0.00250	0.00400	0.00200	0.00625	0.0284	0.0183	0.0115	0.00200	0.00300	
Cr	mg/L	0.00400	0.00400	0.0328	0.0322	0.0123	0.0258	0.0280	0.0140	0.0113	0.00625	0.00400	
Cu	mg/L		0.00600	0.00875	0.00920	0.00367	0.0134	0.0268	0.0298	0.0123	0.00975	0.00250	
F	mg/L												
Fe	mg/L	1.33	0.294	0.286	3.60	1.07	3.24	17.3	13.2	3.82	1.28	0.726	
Hg	mg/L		0.000600	0.000250	0.000250	0.000217	0.000250	0.000250	0.000250	0.000250	0.000313	0.000250	
Mn	mg/L	0.112	0.0810	0.154	0.300	0.214	0.437	1.43	0.917	0.591	0.194	0.214	
Mo	mg/L	0.0340	0.0510	0.0538	0.0522	0.0500	0.0418	0.0138	0.0165	0.0463	0.0868	0.0830	
Ni	mg/L	0.0640	0.0540	0.0715	0.0456	0.0477	0.0713	0.139	0.0823	0.0778	0.0495	0.0375	
Pb	mg/L	0.0100	0.00100	0.00400	0.00380	0.00233	0.00275	0.0214	0.0103	0.00575	0.00575	0.00400	
Sb	mg/L	0.0600	0.0400	0.0440	0.0289	0.0220	0.0103	0.00200	0.00350	0.0158	0.0245	0.0240	
Se	mg/L		0.000500	0.00100	0.00180	0.00600	0.00625	0.00190	0.00200	0.00350	0.00575	0.000750	
Si	mg/L												
V	mg/L	0.00300	0.00300	0.00300	0.00520	0.00300	0.00300	0.0110	0.00675	0.00400	0.00300	0.00300	
Zn	mg/L	0.0210	0.0100	0.0120	0.0280	0.0173	0.0180	0.0500	0.0345	0.0170	0.0100	0.0280	
Nutrients													
Un-ionized NH_3													
NH_3	mg/L	6.60	2.10	1.53	1.62	1.47	1.09	0.420	0.270	0.720	1.01	1.78	
NO_2-N	mg/L	0.00300	0.000500	0.000500	0.00210	0.000500	0.00163	0.0141	0.00950	0.00225	0.0138	0.00250	
NO_3-N	mg/L		3.90	2.65	2.90	7.90	6.78	3.14	2.83	4.25	5.78	6.25	
T-PO_4	mg/L												
TKN	mg/L												
Solids													
Turb-L	NTU	61.0	5.40	8.38	61.4	25.5	55.0	346	248	76.8	19.0		
TDS	mg/L	1030	979	933	1100	1020	1110	617	524	733	922	1150	
TSS	mg/L	53.0	9.00	12.5	86.4	46.7	60.3	450	300	93.8	21.3	19.5	
Trace Constituents													
CN-F	mg/L	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	
CN-T	mg/L		0.0110	0.00713	0.00360	0.00250	0.00363	0.00250	0.00250	0.00450	0.00388	0.0145	
CN-WAD	mg/L		0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00975	

Sample Point SWS.3 (2015)

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Field Data													
Temp	°C		1.50	1.70	2.00	2.60	5.80	4.80	4.60	6.67	7.38	4.24	0.500
Cond-F	mS/cm		1.27	1.25	0.794	0.906	0.842	0.999	0.973	0.985	0.833	1.54	1.43
pH-F	pH Unit		8.70	8.76	8.14	8.17	8.05	8.26	8.24	8.16	8.23	8.57	8.32
Major Constituents													
Ca	mg/L		146	162	156	125	140	146	82.4	73.1	160	179	170
Cl	mg/L		7.30	7.65	7.85	7.72	8.80	8.33	2.32	2.48	8.70	8.70	8.87
CO_3	mg/L		0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500
HCO_3	mg/L		110	113	121	111	123	108	65.2	68.5	133	123	233
K	mg/L		10.8	9.23	8.25	6.21	4.89	5.21	2.81	2.66	4.27	6.83	7.64
Mg	mg/L		77.9	75.7	72.8	55.3	74.9	121	88.1	67.0	157	112	88.1
Na	mg/L		43.4	45.5	45.2	30.1	16.0	9.48	3.10	2.97	8.21	21.6	24.2
SO_4	mg/L		580	535	508	418	433	636	434	346	704	570	703
T-Hardness	mg/L		650	613	638	615	575	894	555	444	870	706	808
T-Alkalinity	mg/L		90.5	93.5	99.5	91.3	99.3	89.5	53.3	56.0	110	101	193
Total Metals													
Ag	mg/L		0.00150	0.00150	0.00150	0.00150	0.00150	0.00150	0.00150	0.00150	0.00150	0.00150	0.00150
Al	mg/L		0.370	0.185	0.128	2.77	1.41	3.86	12.4	5.19	1.14	0.920	0.450
As	mg/L		0.0200	0.0245	0.0170	0.0190	0.00250	0.00625	0.0150	0.00800	0.00320	0.00800	0.00567
Ba	mg/L		0.0860	0.0485	0.0275	0.0558	0.0435	0.0573	0.151	0.0773	0.0466	0.0428	0.0290
Be	mg/L		0.000100	0.000100	0.000100	0.000340	0.000100	0.000100	0.000860	0.000200	0.000100	0.000100	0.000100
Cd	mg/L			0.000150	0.000188	0.000150	0.000150	0.000150	0.000270	0.000363	0.000150	0.000338	0.000367
Co	mg/L		0.00200	0.00500	0.00350	0.00420	0.00400	0.0105	0.0354	0.0158	0.00840	0.00250	0.00267
Cr	mg/L		0.00400	0.00650	0.0370	0.0300	0.0225	0.0303	0.0436	0.0128	0.0100	0.00600	0.00400
Cu	mg/L		0.132	0.0308	0.00588	0.0120	0.00475	0.0485	0.0426	0.0191	0.00720	0.00600	0.00250
F	mg/L												
Fe	mg/L		1.02	0.707	0.327	5.33	2.38	7.09	36.8	10.4	2.18	1.29	0.783
Hg	mg/L			0.000475	0.000250	0.000250	0.000200	0.000250	0.000250	0.000250	0.000250	0.000250	0.000250
Mn	mg/L		0.0900	0.0875	0.0835	0.210	0.250	0.665	2.00	0.902	0.654	0.205	0.205
Mo	mg/L		0.0330	0.0485	0.0595	0.0414	0.0205	0.0313	0.0130	0.0145	0.0246	0.0820	0.0760
Ni	mg/L		0.0430	0.0540	0.0785	0.0506	0.0300	0.0768	0.117	0.0738	0.0604	0.0508	0.0363
Pb	mg/L		0.0100	0.00200	0.00125	0.00700	0.00200	0.00700	0.0358	0.00925	0.00280	0.0193	0.00333
Sb	mg/L		0.0600	0.0515	0.0385	0.0302	0.00900	0.00950	0.00180	0.00350	0.00720	0.0223	0.0200
Se	mg/L			0.00150	0.000625	0.00160	0.00275	0.00525	0.00260	0.00175	0.00360	0.00725	0.00333
Si	mg/L												
V	mg/L		0.00300	0.00300	0.00300	0.00600	0.00300	0.00500	0.0173	0.00500	0.00300	0.00300	0.00300
Zn	mg/L		0.0100	0.0130	0.00875	0.0314	0.0155	0.0318	0.0820	0.0290	0.0110	0.0110	0.0157
Nutrients													
Un-ionized NH_3													
NH3	mg/L			2.32	1.58	1.76	0.620	0.620	0.328	0.250	0.336	0.820	2.38
NO_2 N	mg/L		0.000500	0.00675	0.000500	0.00560	0.00300	0.00300	0.0234	0.00725	0.00190	0.0138	0.00633
NO_2^--N	mg/L			5.35	2.80	3.44	3.45	5.43	2.20	2.30	2.80	5.60	7.67
T-PO_4	mg/L												
TKN	mg/L												
Solids													
Turb-L	NTU		46.0	13.0	6.73	161	41.0	115	1240	220	41.4	21.8	
TDS	mg/L		1080	1030	915	779	822	1140	760	600	1270	1040	1170
TSS	mg/L		27.0	15.0	7.25	266	62.5	192	1610	294	49.6	26.0	18.0
Trace Constituents													
CN-F	mg/L		0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250
CN-T	mg/L			0.0165	0.00538	0.00320	0.00250	0.00250	0.00250	0.00250	0.00250	0.00313	0.00250
CN-WAD	mg/L			0.00375	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250

Sample Point SWW1 (2015)

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Field Data													
Temp	°C					5.65	4.00	4.98	2.90	6.90			
Cond-F	mS/cm					1.23	1.31	1.48	0.849	1.17			
pH-F	pH Unit					8.37	8.08	8.15	8.25	8.18			
Major Constituents													
Ca	mg/L					48.8	104	109	62.7	136			
Cl	mg/L					1.90	2.85	2.76	2.13	6.30			
CO_3	mg/L					0.500	0.500	0.500	0.500	0.500			
HCO_3	mg/L					60.0	115	81.6	63.0	161			
K	mg/L					1.74	2.48	2.16	1.72	4.01			
Mg	mg/L					45.3	229	170	83.3	251			
Na	mg/L					1.93	2.54	1.94	1.63	3.90			
SO_4	mg/L					210	968	786	391	940			
T-Hardness	mg/L					310	1150	930	488	1160			
T-Alkalinity	mg/L					49.8	94.1	67.1	51.8	131			
Total Metals													
Ag	mg/L					0.00150	0.00150	0.00150	0.00150	0.00150			
Al	mg/L					1.69	3.51	5.68	1.53	0.463			
As	mg/L					0.00250	0.00288	0.00660	0.00163	0.000750			
Ba	mg/L					0.0405	0.0473	0.0896	0.0408	0.0298			
Be	mg/L					0.000100	0.000100	0.000275	0.000100	0.000100			
Cd	mg/L					0.000225	0.000150	0.000150	0.000150	0.000150			
Co	mg/L					0.00350	0.0150	0.0238	0.00650	0.00825			
Cr	mg/L					0.0130	0.0263	0.0238	0.0113	0.0103			
Cu	mg/L					0.00575	0.0144	0.0481	0.0368	0.00588			
F	mg/L												
Fe	mg/L					3.80	6.18	10.9	2.72	0.808			
Hg	mg/L					0.000250	0.000250	0.000250	0.000250	0.000250			
Mn	mg/L					0.303	1.39	1.70	0.597	0.883			
Mo	mg/L					0.00450	0.00900	0.00420	0.00575	0.00525			
Ni	mg/L					0.0170	0.0963	0.117	0.0475	0.0608			
Pb	mg/L					0.00250	0.00425	0.0176	0.00425	0.00275			
Sb	mg/L					0.000500	0.00138	0.000600	0.00200	0.000500			
Se	mg/L					0.00125	0.00300	0.00240	0.00113	0.00275			
Si	mg/L												
V	mg/L					0.00300	0.00525	0.00880	0.00300	0.00300			
Zn	mg/L					0.0125	0.0603	0.0314	0.0113	0.0125			
Nutrients													
Un-ionized NH_3													
NH_3	mg/L					0.0800	0.140	0.168	0.0800	0.145			
NO_2^--N	mg/L					0.00125	0.00213	0.00970	0.00125	0.00113			
NO_2^--N	mg/L					0.650	0.975	0.780	0.600	1.08			
T-PO_4	mg/L												
TKN	mg/L												
Solids													
Turb-L	NTU					134	100	1200	69.3	9.08			
TDS	mg/L					411	1680	1340	665	1630			
TSS	mg/L					104	138	556	118	12.8			
Trace Constituents													
CN-F	mg/L					0.00250	0.00250	0.00250	0.00250	0.00250			
CN-T	mg/L					0.00250	0.00250	0.00250	0.00250	0.00250			
CN-WAD	mg/L					0.00250	0.00250	0.00250	0.00250	0.00250			

Sample Point W1.5.1 (2015)

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Field Data													
Temp	°C					3.43	5.90	7.68	4.60	5.33	1.13	0.500	
Cond-F	mS/cm					0.482	0.684	0.434	0.355	0.583	0.467	0.724	
pH-F	pH Unit					8.31	8.21	8.48	7.38	8.00	8.44	8.60	
Major Constituents													
Ca	mg/L				110	76.2	49.2	40.6	31.2	50.9	84.2	95.1	
Cl	mg/L				11.7	12.6	7.02	2.47	1.74	4.00	5.84	6.37	
CO_3	mg/L				0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	
HCO_3	mg/L				133	96.3	74.0	56.7	47.4	56.7	70.0	110	
K	mg/L				8.20	3.58	6.39	5.22	27.5	10.6	4.71	6.14	
Mg	mg/L				49.8	30.7	18.8	18.7	10.2	18.4	44.1	44.3	
Na	mg/L				14.2	8.03	36.0	26.2	18.5	58.0	11.4	11.2	
SO_4	mg/L				335	153	174	137	93.6	206	243	225	
T-Hardness	mg/L				802	300	202	170	124	187	348	358	
T-Alkalinity	mg/L				109	79.0	60.3	46.9	38.9	46.3	77.0	90.2	
Total Metals													
Ag	mg/L				0.00166	0.00150	0.00150	0.00150	0.00150	0.00150	0.00240	0.00200	
Al	mg/L				0.415	2.76	4.17	7.51	5.57	3.65	3.42	0.527	
As	mg/L				0.00131	0.00533	0.00420	0.00820	0.00400	0.00300	0.00440	0.00100	
Ba	mg/L				0.0401	0.0677	0.0880	0.162	0.141	0.103	0.0888	0.0463	
Be	mg/L				0.000100	0.000100	0.000220	0.000367	0.000240	0.000100	0.000180	0.000100	
Cd	mg/L				0.000150	0.000150	0.000150	0.000150	0.000150	0.000150	0.000150	0.000150	
Co	mg/L				0.00200	0.00333	0.00620	0.0103	0.00600	0.00867	0.00200	0.00200	
Cr	mg/L				0.0284	0.0190	0.0272	0.0337	0.0184	0.00567	0.00600	0.00400	
Cu	mg/L				0.00928	0.0127	0.0236	0.0253	0.0268	0.0220	0.0198	0.00250	
F	mg/L										0.00250		
Fe	mg/L				0.754	5.55	7.29	13.2	7.07	4.08	3.08	0.627	
Hg	mg/L				0.000250	0.000250	0.000250	0.000250	0.000250	0.000250	0.000250	0.000250	
Mn	mg/L				0.144	0.180	0.245	0.462	0.260	0.159	0.121	0.0667	
Mo	mg/L				0.0105	0.0107	0.0218	0.0160	0.0124	0.0320	0.0268	0.0130	
Ni	mg/L				0.0161	0.0220	0.0240	0.0340	0.0182	0.0173	0.0236	0.0137	
Pb	mg/L				0.00431	0.0110	0.00640	0.0143	0.0172	0.00500	0.00740	0.00567	
Sb	mg/L				0.00344	0.00333	0.00540	0.00500	0.00280	0.0107	0.00560	0.00300	
Se	mg/L				0.000781	0.00150	0.00170	0.00117	0.000600	0.00300	0.00170	0.00317	
Si	mg/L												
V	mg/L				0.00300	0.00433	0.00740	0.0127	0.00800	0.00567	0.00400	0.00300	
Zn	mg/L				0.0133	0.0177	0.0260	0.0390	0.0296	0.0217	0.0142	0.00867	
Nutrients													
Un-ionized NH_3													
NH_3	mg/L				0.970	0.427	1.44	0.987	0.752	2.21	0.420	0.507	
NO_2-N	mg/L				0.000969	0.00150	0.0264	0.0170	0.0676	0.0780	0.00480	0.00267	
NO_3-N	mg/L				11.5	3.17	2.68	1.90	1.64	3.90	6.62	10.6	
T-PO_4	mg/L				0.0467	0.140	0.240	0.413	0.228	0.117	0.0780	0.0267	
TKN	mg/L												
Solids													
Turb-L	NTU				23.6	93.3	173	263	322	163	90.2		
TDS	mg/L				745	355	367	284	220	405	514	525	
TSS	mg/L				20.6	161	267	604	358	136	78.0	12.0	
Trace Constituents													
CN-F	mg/L				0.00250	0.00250	0.00300	0.00250	0.00250	0.00250	0.00250	0.00250	
CN-T	mg/L				0.00250	0.00500	0.0188	0.0237	0.0182	0.0490	0.00250	0.00250	
CN-WAD	mg/L				0.00250	0.00250	0.00760	0.00583	0.00610	0.0110	0.00250	0.00250	

Sample Point W1.6 (2015)

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Field Data													
Temp	°C				0.100		6.00	9.40	4.10	5.50	0.200		
Cond-F	mS/cm				0.876		0.879	0.396	0.327	0.595	0.596		
pH-F	pH Unit				8.47		8.37	8.71	7.00	8.47	8.37		
Major Constituents													
Ca	mg/L				137	54.1	46.1		27.6	51.7	79.7		
Cl	mg/L				13.0	9.90	4.30		1.80	3.20	6.50		
CO_3	mg/L				0.500	0.500	0.500		0.500	0.500	0.500		
HCO_3	mg/L				140	96.0	74.0		54.0	66.0	105		
K	mg/L				8.28	2.04	5.17		3.78	7.12	3.93		
Mg	mg/L				50.0	18.3	19.2		9.19	22.1	33.2		
Na	mg/L				16.0	5.03	28.0		16.7	35.8	10.2		
SO_4	mg/L				300						180		
T-Hardness	mg/L				525	190	200		130	180	275		
T-Alkalinity	mg/L				114	78.0	60.7		43.8	53.5	84.5		
Total Metals													
Ag	mg/L				0.00150	0.00150	0.00150		0.00150	0.00150	0.00150		
Al	mg/L				0.570	0.290	13.9		6.32	3.84	13.5		
As	mg/L				0.00100	0.000500	0.0130		0.00600	0.00300	0.0140		
Ba	mg/L				0.0610	0.0330	0.214		0.147	0.0990	0.249		
Be	mg/L				0.000100	0.000100	0.000550		0.000300	0.000100	0.000200		
Cd	mg/L				0.000150	0.000150	0.000150		0.000150		0.000150		
Co	mg/L				0.00200	0.00200	0.0140		0.00600	0.00600	0.0110		
Cr	mg/L				0.0310	0.0110	0.0470		0.00400	0.00400	0.0170		
Cu	mg/L				0.00600	0.00250	0.0305		0.0130	0.0300	0.0270		
F	mg/L												
Fe	mg/L				1.16	0.438	25.5		9.25	4.38	17.3		
Hg	mg/L				0.000250	0.000250	0.000250		0.000250	0.000250	0.000250		
Mn	mg/L				0.119	0.0400	0.509		0.302	0.162	0.410		
Mo	mg/L				0.0120	0.00400	0.0205		0.0110	0.0220	0.0120		
Ni	mg/L				0.0150	0.00250	0.0370		0.0160	0.0190	0.0290		
Pb	mg/L				0.00100	0.00100	0.0160		0.0150	0.00700	0.0200		
Sb	mg/L				0.00300	0.000500	0.00500		0.00300	0.00700	0.00300		
Se	mg/L				0.000500	0.000500	0.00175		0.000500	0.00300	0.00400		
Si	mg/L												
V	mg/L				0.00300	0.00300	0.0245		0.0100	0.00300	0.0200		
Zn	mg/L				0.0150	0.00500	0.0800		0.0270	0.0270	0.0490		
Nutrients													
Un-ionized NH_3													
NH_3	mg/L				0.840	0.140	1.23		0.680	1.20	0.460		
NO_2-N	mg/L				0.000500	0.00100	0.0220		0.0180	0.0520	0.00600		
NO_3-N	mg/L				9.40	1.80	2.05		1.50	2.60	5.60		
T-PO_4	mg/L												
TKN	mg/L												
Solids													
Turb-L	NTU				18.0	37.0	387		270	130	450		
TDS	mg/L				682	251	341		217	372	400		
TSS	mg/L				19.0	45.0	791		504	123	375		
Trace Constituents													
CN-F	mg/L				0.00250	0.00250	0.00250		0.00250	0.00250	0.00250		
CN-T	mg/L				0.00250	0.00250	0.0120		0.0190	0.0200	0.00250		
CN-WAD	mg/L				0.00250	0.00250	0.00525		0.00700	0.0100	0.00250		

Sample Point W6.1 (2015)

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Field Data													
Temp	°C				0.100		8.50	9.50	8.20	10.1	1.60		
Cond-F	mS/cm				0.444		0.166	0.195	0.128	0.233	0.333		
pH-F	pH Unit				8.10		8.30	7.91	7.30	8.28	8.61		
Major Constituents													
Ca	mg/L				85.1	33.6	25.1		19.0	32.7	45.3		
Cl	mg/L				21.0	5.40	1.40		1.00	2.10	4.70		
CO_3	mg/L				0.500	0.500	0.500		0.500	0.500	0.500		
HCO_3	mg/L				98.0	80.0	61.0		54.0	68.0	105		
K	mg/L				4.64	0.900	1.23		1.79	1.42	1.03		
Mg	mg/L				10.6	3.98	3.04		2.74	5.28	6.24		
Na	mg/L				8.26	2.23	1.54		1.38	2.26	3.16		
SO_4	mg/L				99.0	14.0	12.0		12.0	21.0	33.0		
T-Hardness	mg/L				220	90.0	70.0		65.0	80.0	120		
T-Alkalinity	mg/L				80.5	66.0	50.7		44.6	56.5	86.0		
Total Metals													
Ag	mg/L												
Al	mg/L				0.200	0.170	1.69		3.53	2.76	0.600		
As	mg/L					0.000500	0.00125						
Ba	mg/L				0.0360	0.0280	0.0205		0.0300	0.0290	0.0210		
Be	mg/L				0.000100	0.000100	0.000150		0.000400	0.000300	0.000100		
Cd	mg/L				0.000150	0.000150	0.000150		0.000150	0.000150	0.000150		
Co	mg/L												
Cr	mg/L												
Cu	mg/L				0.00250	0.0120	0.00425		0.00600	0.0100	0.00250		
F	mg/L												
Fe	mg/L				0.392	0.245	2.71		5.48	4.14	0.402		
Hg	mg/L				0.000250		0.000250		0.000250	0.000250	0.000250		
Mn	mg/L						0.0120						
Mo	mg/L												
Ni	mg/L				0.0160	0.00250	0.0200		0.0100	0.0100	0.0120		
Pb	mg/L				0.00300	0.00100	0.0145		0.0110	0.00500	0.00500		
Sb	mg/L					0.000500	0.000750						
Se	mg/L					0.000500	0.000750						
Si	mg/L												
V	mg/L								0.00300				
Zn	mg/L				0.0510	0.00400	0.0160		0.0160	0.0250	0.0100		
Nutrients													
Un-ionized NH_3													
NH_3	mg/L				0.200	0.0200	0.0200		0.120	0.0800	0.140		
NO_2-N	mg/L				0.000500	0.00100	0.00375		0.00200	0.00200	0.00400		
NO_3-N	mg/L				0.300	0.100	0.250		0.300	0.100	0.200		
T-PO_4	mg/L												
TKN	mg/L												
Solids													
Turb-L	NTU				4.90	8.50	50.7		140	65.0	6.30		
TDS	mg/L				332	112	90.5		89.0	110	158		
TSS	mg/L				2.00	11.0	52.5		198	42.0	3.00		
Trace Constituents													
CN-F	mg/L				0.00250	0.00250	0.00250		0.00250	0.00250	0.00250		
CN-T	mg/L				0.00250	0.00250	0.00250		0.00250	0.00250	0.00250		
CN-WAD	mg/L				0.00250	0.00250	0.00250		0.00250	0.00250	0.00250		

Sample Point W1.7 (2015)

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Field Data													
Temp	°C				0.900		10.0	10.8	6.20	9.30	0.800		
Cond-F	mS/cm				0.519		0.368	0.380	0.237	0.460	0.512		
pH-F	pH Unit				8.10		8.10	8.57	7.20	8.35	8.41		
Major Constituents													
Ca	mg/L				78.6	43.8	37.7		24.2	57.1	72.7		
Cl	mg/L				18.0	8.50	4.20		1.90	4.40	8.80		
CO_3	mg/L				0.500	0.500	0.500		0.500	0.500	0.500		
HCO_3	mg/L				130	90.0	74.0		58.0	86.0	125		
K	mg/L				4.67	1.37	2.64		2.39	5.23	2.87		
Mg	mg/L				24.0	8.91	9.86		5.90	19.4	24.9		
Na	mg/L				15.7	3.95	11.4		8.31	25.3	11.1		
SO_4	mg/L				116						130		
T-Hardness	mg/L				250	130	130		90.0	180	240		
T-Alkalinity	mg/L				104	74.0	60.7		47.4	70.5	101		
Total Metals													
Ag	mg/L				0.00150	0.00150	0.00150		0.00150	0.00150	0.00150		
Al	mg/L				1.11	0.510	5.03		3.17	3.97	3.74		
As	mg/L				0.00200	0.000500	0.00425		0.00300	0.00300	0.00500		
Ba	mg/L				0.0530	0.0230	0.0840		0.0640	0.0930	0.0970		
Be	mg/L				0.000100	0.000100	0.000550		0.000300	0.000100	0.000100		
Cd	mg/L				0.000150	0.000150	0.000150		0.000150	0.000150	0.000150		
Co	mg/L				0.00200	0.00200	0.00550		0.00200	0.00500	0.00200		
Cr	mg/L				0.0340	0.0110	0.0345		0.00400	0.00400	0.00400		
Cu	mg/L				0.0130	0.00250	0.0113		0.00700	0.0160	0.0100		
F	mg/L												
Fe	mg/L				2.20	0.825	8.67		4.76	5.20	3.79		
Hg	mg/L				0.000250	0.000250	0.000250		0.000250	0.000250	0.000250		
Mn	mg/L				0.102	0.0280	0.223		0.169	0.138	0.114		
Mo	mg/L				0.00600	0.00500	0.00800		0.00500	0.0170	0.0120		
Ni	mg/L				0.0110	0.00250	0.0180		0.0130	0.0200	0.0120		
Pb	mg/L				0.00700	0.00100	0.0140		0.0120	0.00700	0.0100		
Sb	mg/L				0.000500	0.00200	0.00450		0.00200	0.00300	0.00300		
Se	mg/L				0.000500	0.000500	0.00125		0.000500	0.000500	0.000500		
Si	mg/L												
V	mg/L				0.00300	0.00300	0.0100		0.00300	0.00600	0.00300		
Zn	mg/L				0.0180	0.00600	0.0285		0.0170	0.0270	0.0230		
Nutrients													
Un-ionized NH_3													
NH_3	mg/L				0.200	0.140	0.320		0.300	1.08	0.220		
NO_2-N	mg/L				0.00100	0.00100	0.0115		0.00700	0.0300	0.00500		
NO_3-N	mg/L				2.10	0.700	1.10		0.800	2.00	2.20		
T-PO_4	mg/L												
TKN	mg/L												
Solids													
Turb-L	NTU				29.0	24.0	193		270	150	90.0		
TDS	mg/L				2060	176	187		149	321	351		
TSS	mg/L				55.0	24.0	286		333	158	80.0		
Trace Constituents													
CN-F	mg/L				0.00250	0.00250	0.00250		0.00250	0.00250	0.00250		
CN-T	mg/L				0.00250	0.00250	0.00250		0.0130	0.0100	0.00250		
CN-WAD	mg/L				0.00250	0.00250	0.00250		0.00250	0.00250	0.00250		

Sample Point W1.8 (2015)

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Field Data													
Temp	°C												
Cond-F	mS/cm												
pH-F	pH Unit												
Major Constituents													
Ca	mg/L	65.4	55.0	59.9	48.5	46.2	41.4	38.4	46.9	53.5	58.8		54.5
Cl	mg/L	5.90	6.60	6.30	6.15	4.53	2.73	1.78	3.63	4.10	4.97		5.40
CO_3	mg/L	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500		0.500
HCO_3	mg/L	140	145	145	138	127	104	93.5	122	125	138		150
K	mg/L	2.17	1.35	1.75	1.87	1.75	1.34	1.59	1.72	1.76	1.50		1.58
Mg	mg/L	17.9	16.0	17.6	14.9	12.8	10.5	9.45	12.6	16.9	16.4		15.8
Na	mg/L	10.4	9.37	10.6	8.79	5.62	5.06	4.38	6.27	8.52	8.55		8.42
SO_4	mg/L	63.0	57.0	51.0	57.8	44.0	42.5	39.5	56.8	64.0	63.7		70.0
T-Hardness	mg/L	180	180	190	208	173	138	123	150	177	180		190
T-Alkalinity	mg/L	115	119	118	114	103	86.3	76.6	101	103	113		122
Total Metals													
Ag	mg/L	0.00150	0.00150	0.00150	0.00213	0.00300	0.00313	0.00150	0.00150	0.00333	0.00150		0.00150
Al	mg/L	0.0500	0.0800	0.330	2.28	6.83	3.30	17.0	2.83	0.457	0.240		0.0700
As	mg/L	0.0200	0.00125	0.000500	0.00250	0.00483	0.00288	0.0111	0.00253	0.000667	0.00333		0.000500
Ba	mg/L	0.0490	0.0530	0.0655	0.0778	0.140	0.0810	0.220	0.0895	0.0583	0.0530		0.0540
Be	mg/L	0.000100	0.000100	0.000100	0.000250	0.000400	0.000100	0.00103	0.000125	0.000100	0.000100		0.000100
Cd	mg/L	0.00100	0.000150	0.000150	0.000150	0.000150	0.000150	0.000150	0.000150	0.000150	0.000150		0.000150
Co	mg/L	0.00200	0.00200	0.00200	0.00300	0.00733	0.00200	0.0148	0.00325	0.00200	0.00200		0.00200
Cr	mg/L	0.00400	0.00400	0.0305	0.0248	0.0207	0.0180	0.0458	0.0130	0.00633	0.00400		0.00400
Cu	mg/L	0.00250	0.00250	0.0175	0.00700	0.0178	0.00525	0.0345	0.00438	0.00250	0.00333		0.00250
F	mg/L												
Fe	mg/L	0.0990	0.172	0.468	3.47	11.1	5.11	26.6	4.55	0.714	0.237		0.0780
Hg	mg/L	0.00500	0.000250	0.000250	0.000250	0.000250	0.000250	0.000250	0.000250	0.000217	0.000250		0.000250
Mn	mg/L	0.00700	0.00900	0.0215	0.123	0.372	0.175	0.663	0.168	0.0337	0.0137		0.0110
Mo	mg/L	0.00200	0.00300	0.00200	0.00200	0.00200	0.00250	0.00250	0.00300	0.00433	0.00200		0.00200
Ni	mg/L	0.00250	0.00375	0.00475	0.00688	0.0152	0.0140	0.0325	0.0105	0.00433	0.00767		0.00250
Pb	mg/L	0.0100	0.00200	0.00150	0.00550	0.0113	0.00575	0.0218	0.00725	0.0107	0.00733		0.0120
Sb	mg/L	0.0100	0.000750	0.00125	0.000875	0.000500	0.000625	0.000875	0.000500	0.000800	0.000500		0.000500
Se	mg/L	0.0100	0.000500	0.000500	0.000500	0.000500	0.000625	0.000500	0.000875	0.000500	0.00133		0.000500
Si	mg/L												
V	mg/L	0.00300	0.00300	0.00300	0.00600	0.0143	0.00500	0.0328	0.00550	0.00300	0.00300		0.00300
Zn	mg/L	0.0140	0.00750	0.00450	0.0190	0.0343	0.0210	0.0768	0.0200	0.00900	0.00733		0.0560
Nutrients													
Un-ionized NH_3													
NH_3	mg/L	0.0200	0.0600	0.0800	0.0200	0.133	0.110	0.245	0.140	0.100	0.0600		0.0200
NO_2-N	mg/L	0.000500	0.000500	0.00175	0.00138	0.00533	0.00275	0.0300	0.0130	0.00767	0.0213		0.00200
NO_3-N	mg/L	0.800	0.750	0.650	0.625	0.533	0.500	0.650	0.750	0.867	0.567		0.800
T-PO_4	mg/L	0.0200	0.0125	0.0250	0.170	0.457	0.265	0.600	0.560	0.117	0.0500		0.0300
TKN	mg/L												
Solids													
Turb-L	NTU	2.10	2.55	15.4	88.3	310	213	1170	520	11.2	3.33		
TDS	mg/L	216	230	220	231	203	171	157	194	224	236		224
TSS	mg/L	0.500	6.50	27.0	208	617	390	1230	593	39.0	6.33		4.00
Trace Constituents													
CN-F	mg/L	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250		0.00250
CN-T	mg/L	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250		0.00250
CN-WAD	mg/L	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250		0.00250

Sample Point W1.8F (2015)

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Field Data													
Temp	°C												
Cond-F	mS/cm												
pH-F	pH Unit												
Major Constituents													
Ca	mg/L	60.0	56.1	61.0	46.3	46.6	44.7	38.0	41.6	51.8	58.5		59.4
Cl	mg/L	6.70	6.30	6.30	6.50	4.93	2.53	1.70	2.53	4.10	5.03		6.10
CO_3	mg/L	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500		0.500
HCO_3	mg/L	145	140	143	136	123	104	92.0	99.5	125	138		160
K	mg/L	1.79	1.59	1.83	1.83	1.82	1.39	1.57	1.63	1.65	1.52		1.66
Mg	mg/L	17.0	16.4	18.0	14.1	12.8	11.3	9.53	11.0	16.4	16.5		17.3
Na	mg/L	10.7	9.45	10.8	8.93	6.09	5.38	4.36	5.63	8.28	8.57		9.58
SO_4	mg/L	65.0	64.0	60.0	57.5	43.0	42.0	39.5	49.8	63.7	63.7		75.0
T-Hardness	mg/L	180	180	185	205	167	133	125	140	173	180		210
T-Alkalinity	mg/L	117	116	116	113	101	85.3	75.6	82.5	103	113		129
Total Metals													
Ag	mg/L	0.00150	0.00150	0.00150	0.00150	0.00150	0.00150	0.00150	0.00150	0.00150	0.00150		0.00150
Al	mg/L	0.0300	0.0850	0.260	2.31	8.89	3.50	20.6	3.99	0.320	0.427		0.0500
As	mg/L	0.0200	0.000500	0.000500	0.00275	0.00667	0.00313	0.0104	0.00360	0.000500	0.00333		0.000500
Ba	mg/L	0.0480	0.0525	0.0655	0.0788	0.164	0.0793	0.260	0.114	0.0553	0.0587		0.0530
Be	mg/L	0.000100	0.000100	0.000100	0.000150	0.000467	0.000150	0.00105	0.000250	0.000100	0.000100		0.000100
Cd	mg/L	0.00100	0.000150	0.000150	0.000150	0.000200	0.000150	0.000150	0.000150	0.000150	0.000150		0.000150
Co	mg/L	0.00200	0.00200	0.00200	0.00275	0.00800	0.00250	0.0178	0.00375	0.00200	0.00200		0.00200
Cr	mg/L	0.00400	0.00400	0.0335	0.0320	0.0233	0.0185	0.0543	0.0135	0.00767	0.00400		0.00400
Cu	mg/L	0.00250	0.00250	0.0190	0.00663	0.0198	0.00513	0.0403	0.00463	0.00250	0.00433		0.00250
F	mg/L												
Fe	mg/L	0.0840	0.164	0.391	3.47	13.7	5.25	31.7	6.33	0.460	0.612		0.0970
Hg	mg/L	0.00500	0.000250	0.000250	0.000250	0.000250	0.000250	0.000250	0.000250	0.000217	0.000250		0.000250
Mn	mg/L	0.00700	0.00900	0.0185	0.123	0.452	0.158	0.801	0.233	0.0217	0.0643		0.0110
Mo	mg/L	0.00200	0.00400	0.00200	0.00200	0.00267	0.00375	0.00200	0.00200	0.00367	0.00200		0.00200
Ni	mg/L	0.00250	0.00375	0.00425	0.00838	0.0172	0.0135	0.0373	0.0115	0.00433	0.00700		0.00250
Pb	mg/L	0.0100	0.00750	0.00100	0.00600	0.0123	0.00600	0.0243	0.0100	0.00167	0.00900		0.0130
Sb	mg/L	0.0100	0.000500	0.00125	0.00150	0.00433	0.00263	0.000500	0.000625	0.000500	0.000667		0.000500
Se	mg/L	0.0100	0.000500	0.000500	0.000500	0.000500	0.000875	0.000500	0.000875	0.000500	0.00150		0.00100
Si	mg/L												
V	mg/L	0.00300	0.00300	0.00300	0.00575	0.0160	0.00525	0.0400	0.00675	0.00300	0.00300		0.00300
Zn	mg/L	0.0170	0.0100	0.00525	0.0228	0.0487	0.0208	0.0860	0.0278	0.00900	0.00967		0.0590
Nutrients													
Un-ionized NH_3													
NH_3	mg/L	0.0600	0.0600	0.100	0.0200	0.107	0.135	0.120	0.170	0.0867	0.0533		0.0200
NO_2-N	mg/L	0.000500	0.000500	0.00175	0.000750	0.00383	0.00425	0.0300	0.0168	0.00867	0.0413		0.00200
NO_3-N	mg/L	0.800	0.750	0.650	0.625	0.533	0.500	0.550	0.625	0.867	0.500		0.900
T-PO_4	mg/L	0.0300	0.00750	0.0250	0.153	0.483	0.245	0.740	0.355	0.0500	0.0833		0.0400
TKN	mg/L												
Solids													
Turb-L	NTU	2.50	2.45	16.0	104	378	218	1330	568	11.4	5.53		
TDS	mg/L	272	226	226	238	202	174	154	181	227	237		252
TSS	mg/L	0.500	4.50	21.0	186	623	332	1460	607	18.7	47.3		1.00
Trace Constituents													
CN-F	mg/L	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250		0.00250
CN-T	mg/L	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250		0.00250
CN-WAD	mg/L	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250		0.00250

Sample Point P5.2 (2015)

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Field Data													
Temp	°C	9.20	8.77	9.88	10.3	9.30	11.5						
Cond-F	mS/cm	0.134	0.135	0.111	0.124	0.117	0.111						
pH-F	pH Unit	7.60	7.90	8.06	8.15	7.58	7.45						
Major Constituents													
Ca	mg/L			21.4		15.5							
Cl	mg/L			1.30		1.20							
CO_3	mg/L			0.500		0.500							
HCO_3	mg/L			28.0		21.0							
K	mg/L			1.72		1.26							
Mg	mg/L			3.45		2.54							
Na	mg/L			2.72		2.21							
SO_4	mg/L			24.0		24.0							
T-Hardness	mg/L			50.0		43.0							
T-Alkalinity	mg/L			23.2		17.4							
Total Metals													
Ag	mg/L			0.00150		0.00150							
Al	mg/L		0.0850	0.0800	0.128	0.339	0.208	0.295	0.153	0.158	0.166	0.0550	0.0800
As	mg/L			0.000500		0.000500							
Ba	mg/L			0.0190		0.0170							
Be	mg/L			0.000100		0.000100							
Cd	mg/L			0.000150		0.000150							
Co	mg/L			0.00200		0.00200							
Cr	mg/L			0.0360		0.00900							
Cu	mg/L		0.0737	0.0344	0.0119	0.0803	0.0196	0.0123	0.0148	0.0480	0.0387	0.0245	0.0260
F	mg/L										0.0210		
Fe	mg/L		0.206	0.132	0.129	0.160	0.145	0.203	0.188	0.356	0.335	0.200	0.142
Hg	mg/L			0.000250		0.000250							
Mn	mg/L			0.00300		0.00300	0.00300						
Mo	mg/L			0.00600		0.00200							
Ni	mg/L			0.0110		0.00250							
Pb	mg/L			0.00100		0.00200							
Sb	mg/L			0.00700		0.000500							
Se	mg/L			0.000500		0.000500							
Si	mg/L												
V	mg/L			0.00300		0.00300							
Zn	mg/L			0.0170		0.0100							
Nutrients													
Un-ionized NH_3													
NH_3	mg/L			0.0200		0.0400							
NO_2-N	mg/L			0.0260		0.00100							
NO_3-N	mg/L			0.200		0.300							
T-PO4	mg/L			0.0100		0.00500							
TKN	mg/L												
Solids													
Turb-L	NTU		0.300	0.340	0.425	1.84	1.20	0.350	2.78	2.80	2.34		
TDS	mg/L		85.3	74.0	73.5	66.0	70.0	74.0	66.8	69.3	71.5	67.8	75.7
TSS	mg/L		0.500	0.500	0.875	2.25	0.900	0.500	1.13	2.00	0.500	0.500	0.667
Trace Constituents													
CN-F	mg/L												
CN-T	mg/L												
CN-WAD	mg/L												

Sample Point P5.3 (2015)

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Field Data													
Temp	°C	11.8	12.7	11.7	12.1	12.3	13.8	14.4	13.7	13.7	10.9	10.6	11.5
Cond-F	mS/cm	0.131	0.133	0.133	0.121	0.115	0.118	0.139	0.122	0.0979	0.112	0.111	0.123
pH-F	pH Unit	8.60	7.70	7.96	7.78	7.71	7.93	7.89	7.80	7.40	7.32	7.26	7.30
Major Constituents													
Ca	mg/L			20.0		15.8	19.2					21.5	
Cl	mg/L			2.30		1.70	1.60					0.900	
CO_3	mg/L			0.500		0.500	0.500					0.500	
HCO_3	mg/L			27.0		26.0	26.0					27.0	
K	mg/L			1.65		1.35	1.54					1.90	
Mg	mg/L			3.21		2.69	3.26					3.63	
Na	mg/L			3.04		2.68	2.68					2.72	
SO_4	mg/L			29.0		22.0	28.0					27.0	
T-Hardness	mg/L			50.0		45.0	55.0					48.0	
T-Alkalinity	mg/L			22.0		21.0	21.6					21.8	
Total Metals													
Ag	mg/L			0.00150		0.00150	0.00150					0.0260	
Al	mg/L		0.297	0.314	0.325	0.250	0.0980	0.115	0.0535	0.0890	0.168	0.0575	0.0933
As	mg/L			0.000500		0.000500	0.000500					0.000500	
Ba	mg/L			0.0180		0.0210	0.0270					0.0200	
Be	mg/L			0.000100		0.000100	0.000100					0.000100	
Cd	mg/L			0.000150		0.000150	0.000150					0.000150	
Co	mg/L			0.00200		0.00200	0.00200					0.00200	
Cr	mg/L			0.0260		0.0110	0.00400					0.00400	
Cu	mg/L		0.0290	0.104	0.0176	0.153	0.0207	0.0203	0.0131	0.0230	0.0217	0.0123	0.0113
F	mg/L										0.0550		
Fe	mg/L		0.228	0.322	0.170	0.267	0.128	0.158	0.0993	0.139	0.118	0.0950	0.0787
Hg	mg/L			0.000250		0.000250	0.000250					0.000250	
Mn	mg/L			0.00400		0.00300	0.00400					0.00400	
Mo	mg/L			0.00600		0.00600	0.00200					0.00600	
Ni	mg/L			0.0120		0.00700	0.00250					0.0150	
Pb	mg/L			0.00100		0.00400	0.00100					0.00400	
Sb	mg/L			0.000500		0.00500	0.000500					0.000500	
Se	mg/L			0.000500		0.000500	0.000500					0.00300	
Si	mg/L												
V	mg/L			0.00300		0.00300	0.00300					0.00300	
Zn	mg/L			0.0200		0.00800	0.0100					0.0110	
Nutrients													
Un-ionized NH_3													
NH_3	mg/L			0.0200		0.0200	0.0200					0.0600	
NO_2-N	mg/L			0.000500		0.00100	0.0220					0.00300	
NO_3-N	mg/L			0.500		0.300	0.400					0.300	
T-PO_4	mg/L			0.00500		0.00500	0.0100					0.00500	
TKN	mg/L												
Solids													
Turb-L	NTU		2.83	1.70	1.25	1.70	0.220	0.250	0.375	1.13	2.31		
TDS	mg/L		86.0	67.4	78.5	66.0	69.2	77.0	65.0	69.7	69.5	66.0	71.0
TSS	mg/L		1.33	1.40	1.25	1.50	0.500	0.667	0.500	1.00	3.13	0.625	0.500
Trace Constituents													
CN-F	mg/L		0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250
CN-T	mg/L		0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250
CN-WAD	mg/L		0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250	0.00250

Sample Point SDP

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Field Data													
Temp	°C						7.00	7.90	10.8	4.70			
Cond-F	mS/cm						0.880	0.863	0.937	0.823			
pH-F	pH Unit						8.50	8.55	9.45	8.33			
Major Constituents													
Ca	mg/L						151	116	94.2	94.2			
Cl	mg/L						210	92.5	73.3	72.3			
CO_3	mg/L						1.75	0.500	0.500	0.500			
HCO_3	mg/L						195	220	188	175			
K	mg/L						4.37	4.25	7.28	8.28			
Mg	mg/L						47.1	39.7	28.3	30.1			
Na	mg/L						52.0	36.5	73.2	56.0			
SO_4	mg/L						118	112	137	123			
T-Hardness	mg/L						600	400	300	350			
T-Alkalinity	mg/L						163	184	154	144			
Total Metals													
Ag	mg/L						0.00150			0.00150			
Al	mg/L						0.0500			0.100			
As	mg/L						0.00500			0.00300			
Ba	mg/L						0.0500			0.0400			
Be	mg/L						0.000100			0.000100			
Cd	mg/L						0.000150			0.000150			
Co	mg/L						0.00200			0.00200			
Cr	mg/L						0.00400			0.00400			
Cu	mg/L						0.0130			0.00250			
F	mg/L												
Fe	mg/L						0.504			0.221			
Hg	mg/L												
Mn	mg/L						0.581			0.170			
Mo	mg/L						0.00500			0.00400			
Ni	mg/L						0.0110			0.0170			
Pb	mg/L						0.00200			0.00100			
Sb	mg/L						0.00100			0.000500			
Se	mg/L						0.000500			0.00200			
Si	mg/L												
V	mg/L						0.00300			0.00300			
Zn	mg/L						0.0170			0.0340			
Nutrients													
Un-ionized NH_3													
NH_3	mg/L						0.300	0.410	0.355	0.260			
NO_2 N	mg/L						0.00350	0.0135	0.00475	0.00183			
NO_3-N	mg/L						0.125	1.43	3.45	4.90			
T-PO_4	mg/L						1.15	1.25	0.950	0.767			
TKN	mg/L												
Solids													
Turb-L	NTU						4.25	4.10	2.90	1.87			
TDS	mg/L						857	539	518	542			
TSS	mg/L						6.50	3.50	7.50	4.67			
Trace Constituents													
CN-F	mg/L												
CN-T	mg/L												
CN-WAD	mg/L												

Sample Point TPX-FILTER (2015)

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Field Data													
Temp	°C	16.8	18.2	18.6	18.5	21.0	18.5	16.1	17.1	14.3	14.1		16.4
Cond-F	mS/cm	3.61	3.58	3.66	3.60	3.70	3.90	4.16	5.40	4.84	3.98		4.10
pH-F	pH Unit	11.2	11.0	11.2	11.0	11.3	11.4	11.5	11.3	11.0	11.5	11.6	11.6
Major Constituents													
Ca	mg/L												
Cl	mg/L												
CO_3	mg/L												
HCO_3	mg/L												
K	mg/L												
Mg	mg/L												
Na	mg/L	422	503	486	436	557							
SO_4	mg/L	388	365	886	607	616	1590	1210	2050	1560	610	320	378
T-Hardness	mg/L												
T-Alkalinity	mg/L												
Total Metals													
Ag	mg/L												
Al	mg/L												
As	mg/L												
Ba	mg/L												
Be	mg/L												
Cd	mg/L												
Co	mg/L												
Cr	mg/L												
Cu	mg/L												
F	mg/L												
Fe	mg/L												
Hg	mg/L												
Mn	mg/L												
Mo	mg/L												
Ni	mg/L												
Pb	mg/L												
Sb	mg/L												
Se	mg/L												
Si	mg/L												
V	mg/L												
Zn	mg/L												
Nutrients													
Un-ionized NH_3													
NH3	mg/L	9.90	11.6	12.3	12.5	10.1	12.0	9.40	8.13	6.33	7.20	9.03	12.5
NO_2-N	mg/L						0.00200	0.0505	0.0293	0.0970	0.0390	0.0407	0.0733
NO_3-N	mg/L						22.5	20.5	19.0	18.2	20.8	34.0	33.7
T-PO_4	mg/L						86.0						
TKN	mg/L					11.3	98.0	67.7	64.0	28.3	47.0	96.3	98.0
Solids													
Turb-L	NTU												
TDS	mg/L												
TSS	mg/L												
Trace Constituents													
CN-F	mg/L	32.6	41.0	22.8	31.6	45.2	35.8	50.3	38.0	29.8	33.0	31.6	30.7
CN-T	mg/L	157	127	83.1	93.7	148	179	168	130	147	184	184	182
CN-WAD	mg/L	89.2	92.0	62.3	65.7	73.5	55.7	82.2	60.2	69.3	110	111	109

MAD and MAC Limits

Parameter	Units	T8.4 (MAD Limit)	SDP (MAC Limit)	W1.5.1 (MAC Limit - Communal Use)
Chlorine (Cl)	mg/L		350	350
Magnesium (Mg)	mg/L	50		50
Sodium (Na)	mg/L	809.31		200
Sulphate (SO4)	mg/L	1843.9	500	500
Silver (Ag)	mg/L			0.05
Aluminium (Al)	mg/L			0.5
Arsenic (As)	mg/L			0.01
Boron (B)	mg/L			0.5
Barium (Ba)	mg/L			0.7
Beryllium (Be)	mg/L			0.0002
Bismuth (Bi)	mg/L			0.1
Cadmium (Cd)	mg/L			0.001
Cobalt (Co)	mg/L			0.1
Chromium (Cr)	mg/L			0.05
Copper (Cu)	mg/L	1		1
Fluorine (F)	mg/L			1.5
Iron (Fe)	mg/L	1.8		0.3
Mercury (Hg)	mg/L			0.0005
Manganese (Mn)	mg/L	0.317		0.1
Molybdenum (Mo)	mg/L	1.023		0.25
Nickel (Ni)	mg/L	0.051		0.02
Lead (Pb)	mg/L			0.01
Antimony (Sb)	mg/L			0.005
Selenium (Se)	mg/L			0.01
Silicon (Si)	mg/L			10
Vanadium (V)	mg/L			0.1
Zinc (Zn)	mg/L	1		1
Ammonia Nitrogen (NH_3-N)	mg/L	23.48	2.4	1.5
Nitrite Nitrogen (NO_2^--N)	mg/L		1	3.3
Nitrate Nitrogen (NO_3^--N)	mg/L		11.75	45
WAD Cyanide (CN-WAD)	mg/L	0.12		0.035
Free Cyanide (CN-F)	mg/L	0.12		
Total Suspended Solids (TSS)	mg/L	77.7	185.6	
Biochemical Oxygen Demand (BOD5)	mg/L		17.043	
MBAS	mg/L		0.5	0.5
Hydrocarbons	mg/L			0.3

Laboratory Detection Limit

Parameter	Units	Method Detection Limit
Major Constituents		
Ca	mg/L	0.05
Cl	mg/L	0.5
CO_3	mg/L	1
HCO_3	mg/L	1
K	mg/L	0.09
Mg	mg/L	0.05
Na	mg/L	0.05
SO_4	mg/L	0.1
T-Hardness	mg/L	1
T-Alkalinity	mg/L	1
Total Metals		
Ag	mg/L	0.003
Al	mg/L	0.03
As	mg/L	0.0003
Ba	mg/L	0.001
Be	mg/L	0.0002
Cd	mg/L	0.0003
Co	mg/L	0.004
Cr	mg/L	0.008
Cu	mg/L	0.005
F	mg/L	0.005
Fe	mg/L	0.001
Hg	mg/L	0.0003
Mn	mg/L	0.001
Mo	mg/L	0.004
Ni	mg/L	0.005
Pb	mg/L	0.002
Sb	mg/L	0.001
Se	mg/L	0.001
Si	mg/L	
V	mg/L	0.006
Zn	mg/L	0.001
Nutrients		
Un-ionized NH_3		
NH_3	mg/L	0.04
NO_2^--N	mg/L	0.001
NO_3^--N	mg/L	0.1
T-PO_4	mg/L	0.01
TKN	mg/L	
Solids		
Turb-L	NTU	0.35
TDS	mg/L	1
TSS	mg/L	1
Trace Constituents		
CN-F	mg/L	0.005
CN-T	mg/L	0.005
CN-WAD	mg/L	0.005

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Certain information contained or incorporated by reference herein may include "forward-looking-statements" within the meaning of certain securities laws. Such forward-looking statements involve risks, uncertainties, and other factors that could cause actual results, performance, prospects, and opportunities to differ materially from those expressed or implied by such forward-looking statements.

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