

SUMMARY AUDIT REPORT - RECERTIFICATION TRANSPORTATION PROTOCOL

for the
International Cyanide Management Code Audit



Prepared for:
**Centerra Gold Inc. and
Kumtor Gold Company**



Submitted to:
International Cyanide Management Institute
888 16th Street, NW, Suite 303
Washington, D.C. 20006

SUMMARY AUDIT REPORT
17 August 2015



BluMetric Environmental Inc.
3108 Carp Road
P.O. Box 430, Ottawa
Ontario, Canada K0A 1L0
www.blumetric.ca

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TRANSPORTATION PROTOCOL - RECERTIFICATION

Name of Cyanide Transportation Facility: Kumtor Gold Company

Name of Facility Owner/Operator: Kumtor Gold Company

Name of Responsible Manager: Daniel Desjardins, President

Address: 24 Ibraimov Street

State/Province: Bishkek, Kyrgyz Republic, 720031

Country: Kyrgyzstan

Telephone: 996-312-90-07-07

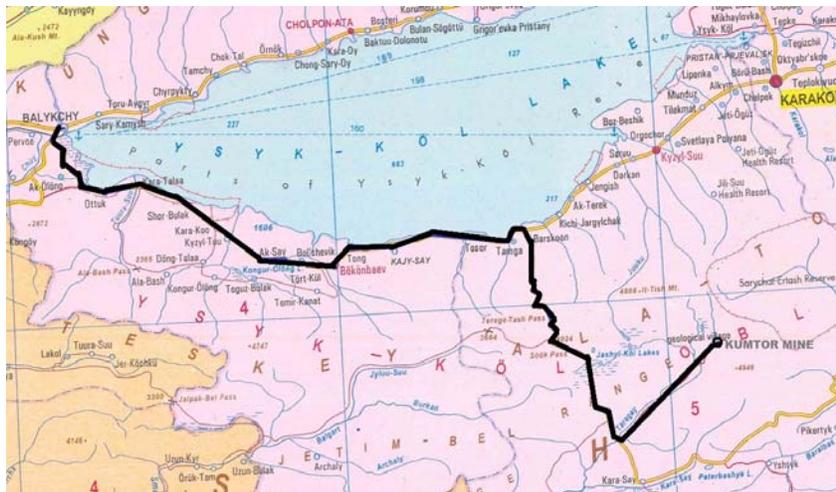
Fax: 996-312-59-15-26

E-Mail: daniel_desjardins@kumtor.com

Centerra Gold Inc. owns the Kumtor gold mine in Kyrgyzstan through its wholly owned subsidiary Kumtor Gold Company (KGC). The mine is located 390 kilometers from Bishkek, the capital of the Kyrgyz Republic (KR), situated on the northwest slope of the Ak-Shyirak mountain range of the Tian-Shan Mountains in the north-east quarter of the KR. The mine and ancillary services lie at an altitude of 3,600 m to 4,600 m.

KGC purchases cyanide in solid briquettes from Anqing Shuguang Chemical Co. Ltd. in 380 kg Intermediate Bulk Containers (IBCs), packed into locked and sealed 20 foot steel shipping containers. KGC receives and takes ownership of the cyanide delivered by railcar to their Balykchy Marshalling Yard (BMJ), located approximately 240 km from the mine site. KGC is responsible for the temporary storage of cyanide at BMJ and the transportation of cyanide from BMJ to the Kumtor mine site.

This ICMC verification audit is limited to the section of the cyanide transportation route between the BMJ site and the Kumtor mine, as shown in the following figure:



SUMMARY AUDIT REPORT

Auditors' Finding

The operation is **in full compliance with**
in substantial compliance with
not in compliance with

The International Cyanide Management Code and has maintained full compliance throughout the previous three-year audit cycle.

The Kumtor Transportation Operation has not experienced any cyanide incidents or compliance issues since the previous audit.

Audit Company: BluMetric Environmental Inc.
3108 Carp Road
P.O. Box 430, Ottawa
Ontario, Canada K0A 1L0
www.blumetric.ca

Audit Team Leader: John Lambert, P.Geo, EP(CEA)
Auditor (Transportation): Lydia Renton, B.Sc., CIH, ROH, FAIHA
E-mail: jlambert@environcorp.com
lrenton@blumetric.ca

Date(s) of Audit: April 3 – April 7, 2015

I attest that I meet the criteria for knowledge, experience and conflict of interest for ICMC Verification Audit Team Leader, established by the International Cyanide Management Institute and that all members of the audit team meet the applicable criteria established by the *International Cyanide Management Institute* for ICMC Verification Auditors. I attest that this Summary Audit Findings Report accurately describes the findings of the verification audit. I further attest that the verification audit was conducted in a professional manner in accordance with the *International Cyanide Management ICMC Verification Protocol for Cyanide Transportation* and using standard and accepted practices for health, safety and environmental audits.

Name of Facility: **CENTERRA GOLD – Kumtor Gold Company**



Signature of Lead Auditor

17 August 2015



Signature of Auditor

17 August 2015

Weather and road conditions are constantly scrutinized by KGC prior to every convoy. Avalanche risk on the Technical Road is evaluated prior to convoys, and if required, forced avalanche discharge is carried out before the road is used.

KGC uses their Mack trucks to transport containers directly from BMY to the Kumtor Mine site, a distance of 240 km, and at an elevation climb to 4,600 m. The 240 km transport is carried out with two convoys at one time, typically takes 6 to 7 hours, at controlled speed, and includes specific inspection stops and rest breaks. The route has special safety concerns due to the distance, villages, animals, elevation, switchbacks, roads, bridges, and weather conditions.

KGC has strict procedures in place which require scheduled inspection of the bridges and road, regrading of the Technical Road and review of the weather conditions prior to each shipment. All bridges are inspected prior to each cyanide shipment. Since the certification audit, Kumtor has replaced one of the bridges.

Trained KGC BMY emergency responders and a contract paramedic travel with the convoy. Since the 2011 certification audit KGC uses trained security officers as emergency responders on the convoy instead of ERT members, and now use a contract paramedic rather than a full time paramedic from the medical clinic. Local medical facilities have been advised of the potential medical requirements in the instance of a cyanide spill; however, it is more likely that KGC medical staff will act and advise.

Since the certification audit, Centerra retained an independent auditor to conduct a Mining Road and Vehicle Safety Audit for the Kumtor Mine. There were no major findings identified KGC has held meetings with local communities to address the risks related to transport of sodium cyanide through their villages, although less frequently since the certification audit due to focus on government affairs. Since the certification audit, a KR-based research consultancy was retained to carry out *Community Perception Surveys* in 2012 and 2014, to test awareness of the company's development work. Visits to the Kumtor mine site are organized. Several local community representatives and/or authorities attended a visit arranged in 2014.

KGC does not subcontract cyanide handling or transport.

Transport Practice 1.2: *Ensure that personnel operating cyanide handling and transport equipment can perform their jobs with minimum risk to communities and the environment.*

The operation is **in full compliance with Transport Practice 1.2**
 in substantial compliance with
 not in compliance with

The procedures for cyanide handling and personnel training have not changed significantly since the 2011 certification audit. KGC staff drivers are trained for hazardous materials and cyanide transportation. All truck drivers undergo extensive driver education and on-road training; only the most experienced are chosen for cyanide, usually with at least 5 years of experience. All drivers and equipment operators involved with

cyanide transport have appropriate licenses, certificates, and permits. Cyanide awareness training for staff involved with cyanide handling and transport is conducted prior to each shipment, and documented.

KGC has work procedures for the various departments and checklists for marks of performance for the preparation of cyanide transport. They have competent operators and truck drivers to move containers from the train to the BMY hazardous goods interim storage warehouse and from the warehouse onto the truck trailers for transport to the Kumtor mine site. Attendance records for cyanide refresher training are maintained.

The risk of direct contact with cyanide is mitigated, as each container is locked and sealed prior to arrival at BMY and at no time during transport are the container seals broken.

Similar to the process reviewed during the certification audit, cyanide refresher training is conducted. The audit team participated in a convoy. On the morning of the railcar offloading, a review of the instructions for off-loading was provided. On the morning of the convoy, a toolbox meeting review of transport and driving rules was conducted. All staff sign-in prior to a convoy, and all drivers' documents are verified with signatures. Only trained personnel transfer containers and travel in the truck convoy. All KGC staff undergo annual medical examinations, and prior to being permitted to drive to the mine were subject to a daily baseline medical test overseen by Kumtor nursing staff.

Transport Practice 1.3: Ensure that transport equipment is suitable for the cyanide shipment.

The operation is **in full compliance with Transport Practice 1.3**
in substantial compliance with
not in compliance with

The procedures for receiving cyanide for temporary storage at BMY have not changed significantly since the 2011 certification audit. On arrival of the cyanide consignment by rail at the BMY compound, the shipping containers are off-loaded from the railcars and all but eight containers are warehoused on-site prior to loading onto trucks for transport by road to the mine site. Eight containers are transferred directly onto truck/trailers for the first convoy. Since the certification audit, BMY has constructed a second rail spur within the BMY warehouse compound to facilitate off-loading and loading of containers onto rail cars.

KGC operates the BMY storage compound and owns, operates and maintains the equipment used to off-load the containers from the railcars and load the trucks, and also owns and operates the trucks that transport the containers to the mine. Since the certification audit, Kumtor has purchased four trucks. The trucks, tractor trailers and Sany Container Reach Stacker ("Buura") are inspected mechanically and maintained by Fleet Maintenance. A complete service history of work orders and maintenance records from 2011 was available for review.

The shipping containers are dedicated for cyanide. Each container is labeled with maximum gross and tare weights ratings. Since the certification audit, the containers were inspected and recertified to CSC Safety Approval standards. The certifications are valid until May 2016. Each empty container is inspected for possible residual cyanide prior to shipment back to the supplier. The cyanide placarding on empty containers is defaced to show the containers no longer contain cyanide.

The vehicles transporting hazardous goods, including cyanide, undergo the State Technical examination conducted by Traffic Safety Department two times per year. The Convoy Commander and Dispatcher independently conduct a final safety inspection of each loaded cyanide truck just prior to departure of a cyanide convoy to the mine site. KGC procedures specify that only one container is transported per truck. KGC uses equipment designed and maintained to operate within the loads it will be handling. The operation has procedures to verify the adequacy of the equipment for the load it must bear, and procedures to prevent overloading the transport vehicle.

KGC does not subcontract cyanide handling or transport.

Transport Practice 1.4: *Develop and implement a safety program for transport of cyanide.*

The operation is **in full compliance with Transport Practice 1.4**
 in substantial compliance with
 not in compliance with

KGC has continued to ensure that the cyanide is transported in a manner that maintains the integrity of their packaging. KGC receives sodium cyanide as solid briquettes packed in 380 kg Intermediate Bulk Containers (IBCs) that are transported in sealed 20-foot shipping containers, secured to the transport trailer by double-locked bolts and tie-down webbing. Within each IBC, the briquettes are packaged in heavy plastic that are enclosed in nylon super sacks (bag in a bag).

All IBC's and containers are clearly identified by signage and posted with international and local regulations to identify the shipment as sodium cyanide. The trucks that transport the cyanide containers to the mine site are placarded with international TDG signage and the UN#1689 product identifier.

Vehicle inspection procedures continue to follow those used during the certification audit. BMV uses only the newest, most reliable trucks in Kumtor's fleet for cyanide transport. Four new Mack tractors had been purchased since the last certification audit. Since the certification audit, KGC continues to improve aspects of its safety program for cyanide transport. The program includes mechanical checks of trucks and trailers prior to each departure of a cyanide convoy to the mine, visual inspections of trucks on route during convoy rest stops, assigning only the newest and most reliable trucks for cyanide convoys, using only approved parts for truck repair and maintenance, limiting and monitoring the driver hours and convoy speed, prescribing designated rest stops, driver use of "nap-zappers", ensuring secure loads, continually monitoring weather and road conditions, mandatory medical and alcohol test prior to convoy departure, and conducting a safety

meeting prior to convoy departure. Records documenting these procedures were available for the past three years.

Transport Practice 1.5: *Follow international standards for transportation of cyanide by sea and air.*

The operation is **in full compliance with Transport Practice 1.5**
 in substantial compliance with
 not in compliance with

Not Applicable. KGC does not transport cyanide by sea or air.

Transport Practice 1.6: *Track cyanide shipments to prevent losses during transport.*

The operation is **in full compliance with Transport Practice 1.6**
 in substantial compliance with
 not in compliance with

KGC maintains communication via radio in each transport vehicle of the convoy, the BMY Dispatch and mine site security for the duration and complete convoy route. There are no blackout areas. The convoy commander and security personnel also have cell phones. There is frequent communication between drivers and the convoy commander during transportation, and with Dispatch. Procedures are in place to track the progress of the cyanide shipment, including confirmation at specific locations along the route. Since the 2011 certification audit, GPS systems are installed in each truck to track location and monitor vehicle speed.

KGC conducts an inventory of containers and in conjunction with a Shuguang representation confirms the integrity of container seals prior to unloading at the BMY freight train area and verifies receipt of each container against the Bill of Lading. The inventory is further confirmed during transfer from the railcar into the interim storage warehouse and onto the trucks, and again on delivery at the Kumtor mine site. Shipping records are included with the shipment from BMY to the Kumtor mine site. KGC tracks the inventory and movement of cyanide to the Mill through a computerized system.

Records of all cyanide shipments over the past 3 years were available for review. Material Safety Data Sheets (MSDS) are available with the transport at all times.

2. INTERIM STORAGE: *Design, construct and operate cyanide trans-shipping depots and interim storage sites to prevent releases and exposures.*

Transport Practice 2.1: *Store cyanide in a manner that minimizes the potential for accidental releases.*

The operation is **in full compliance with Transport Practice 2.1**
 in substantial compliance with
 not in compliance with

Cyanide containers unloaded from the railcars at BMY are stored in the hazardous goods interim storage warehouse, dedicated for storage of cyanide during cyanide shipments. This facility was newly commissioned just prior to the 2011 certification audit, and underwent a full design/construction and commissioning review and sign-off. In 2012 the warehouse was upgraded with a new roof. The warehouse has a lined, curbed concrete floor and perimeter containment wall, and is approved for temporary cyanide storage by the Kyrgyz government. A sump pit is located just outside the warehouse and verified as dry prior to any hazardous goods storage. Beside the warehouse is a curbed, concrete reagent spill containment pad, with a separate sump pit, where full cyanide shipping containers on truck/trailers are parked overnight prior to the departure of a convoy.

When cyanide is stored in the warehouse, cyanide warning signs are posted. There is signage displaying requirements for use of personal protective equipment and prohibition for smoking, eating and drinking. All workers at BMY are trained in cyanide hazard recognition and safely working around cyanide.

The interim storage warehouse is locked and sealed to prevent unauthorized access when cyanide is present. BMY is surrounded by a security fence and security guards maintain the entrance 24 hours a day, and man three watch towers. Since the 2011 certification audit, KGC has upgraded the security monitoring system in the yard from nine security cameras to a total of 50, with viewing on high definition screens in the security office. Since the certification audit, KGC also contracts militia guards to monitor the BMY yard when cyanide is stored.

To prevent the potential for build-up of hydrogen cyanide gas, the interim storage warehouse is equipped with a supply and exhaust ventilation system. At the mine site, the containers are stored outdoors, and therefore natural ventilation occurs. In each instance, a direct-reading HCN meter is used to check for HCN gas prior to entry to the warehouse or container.

During temporary storage of cyanide at BMY, the potential for cyanide to come into contact with water is minimal, as the cyanide remains packed in the original IBC boxes, which are locked and sealed in the shipping containers, which are themselves protected from contact by water by the roof, walls and concrete floor of the warehouse. The warehouse concrete floor, the reagent concrete pad and the mine storage concrete pad provide secondary containment, with sump pit protection, in the event of a spill.

3. EMERGENCY RESPONSE: *Protect communities and the environment through the development of emergency response strategies and capabilities*

Transport Practice 3.1: *Prepare detailed emergency response plans for potential cyanide releases.*

The operation is **in full compliance with Transport Practice 3.1**
 in substantial compliance with
 not in compliance with

Since the certification audit, the KGC BMY ERP “Emergency Response Plan” was incorporated as a separate, succinct section within the KGC ERP. BMY updates their ERP in synergy with the KGC ERP, which has been updated three times since the 2011 certification audit. The Overall ERP and the BMY ERP are aligned for instructions with respect to cyanide. The BMY ERP was developed to identify certain types of potential emergency situations at the BMY base and surroundings and was developed to inform employees and other people close to the BMY operations on how to deal with emergencies. The Overall KGC ERP dictates the correct procedures and action to follow to minimize damages and injuries, with further documentation for sodium cyanide transportation provided in the KGC “Dangerous Goods” binder, both definitive documents for risk mitigation and emergency preparedness. In Kyrgyzstan, Kumtor continues as solely responsible for response and remediation actions, as adequate local infrastructure is lacking.

Since the certification audit, cyanide antidote kits (nitrate ampoules, Na-thiosulphate) have been replaced by Cyanokit® (hydroxocobalamin for injection), to be used only by trained medical providers, with appropriate documented protocol.

KGC has produced detailed plans for convoy transport through villages as well as emergency response, and staff are trained and prepared with appropriate equipment. A paramedic has travelled with the convoy for the last three years. Emergency Response Team (ERT) training is carried out biweekly. Emergency response equipment is inspected prior to each convoy. Since the 2011 certification audit, additional traffic police have been retained to assist during the convoy.

The BMY ERP addresses all highly toxic and dangerous substances and is specific for 98% sodium cyanide briquettes transported in plastic in IBC boxes within shipping containers on Mack truck trailers. There are specific actions identified in the event of a cyanide spill at BMY (on-site) or in transit or in the community. The BMY ERP identifies actions for cyanide in the dry, solid form; for a cyanide spill with water contact; and for evolution of hydrogen cyanide gas.

The BMY ERP has generic and specific descriptions of chemical response, and includes specific roles and responsibilities for cyanide spills and releases, both at BMY and in transit (on site and in the community). Additional guidance is outlined in operating instructions which are referenced within the ERP.

Outside responders do not have specific roles in the ERP as they generally do not have the infrastructure or capacity to assist. KGC has therefore developed the capability (equipment, trained response and medical staff) and the ERT to take the lead during an emergency. However; KGC would immediately notify government bodies and/or location medical centres, as appropriate. The KGC ERP provides additional contact information since the 2011 certification audit, and includes the contacts for the villages along the transportation route, for the medical centres, and for chief administrative officers and regional government.

Transport Practice 3.2: *Designate appropriate response personnel and commit necessary resource, for emergency response.*

The operation is **in full compliance with Transport Practice 3.2**
in substantial compliance with
not in compliance with

KGC BMY has a trained volunteer ERT of nine members, an increase from eight members at the time of the 2011 certification audit. KR regulation approves the formation of the BMY ERT, and has been renewed annually since the certification audit. Quarterly training plans (which were annual at the time of the 2011 certification audit) are developed and include specific aspects for first aid, theory and practical exercises on a biweekly basis. All of this training is undertaken at BMY, a change since the 2011 certification audit, when ERT members also trained monthly at the Kumtor mine site. The training includes and addresses calling for assistance, use of PPE, first aid for various chemicals, including cyanide exposure and measures to halt cyanide spread.

A KGC physician /advisor and paramedic provided the cyanide response protocol and cyanide response training to the medical staff and to the ERT prior to the 2015 cyanide shipment. Training materials and records are retained for the security/ERT staff who accompanies the transport convoy. The KGC BMY safety coordinator provides training, and the KGC Security maintain the emergency response equipment, personal protective equipment and spill kit in their convoy vehicle.

A detailed listing of ERT equipment and inventory requirement is provided, and verified and documented on the day prior to a convoy. KGC has two fully-equipped ambulances. Appropriate emergency response and health and safety equipment, including PPE is available during unloading, loading and transport. Each emergency kit is inspected and documented. There is duplicate equipment to ensure appropriate PPE available. The SCBA's are inspected monthly, and used quarterly, to ensure the quality of the compressed breathing air. The BMY facility has a First Aid building adjacent to the chemical reagent pad that includes emergency shower and eye wash stations, first aid equipment, PPE and spill materials. This equipment also includes SCBAs that are readily available and carried with the convoy. Records of equipment inspections for the past 3 years were available for review.

Every KGC employee receives initial cyanide awareness training. There is mandatory annual cyanide awareness refresher training for every KGC employee who has the potential to handle or be in the presence of cyanide.

Transport Practice 3.3: ***Develop procedures for internal and external emergency notification and reporting.***

The operation is **in full compliance with Transport Practice 3.3**
in substantial compliance with
not in compliance with

KGC has procedures and current contact information for notifying regulatory agencies, and medical facilities if an emergency were to occur. Similar to the 2011 certification audit, KGC has detailed internal procedures and current information for external emergency procedures for notification purposes. KGC staff travel with the sodium cyanide shipment from BMY to the Kumtor mine. Regulatory authorities, security and the police/militia are also involved and/or present during each cyanide convoy.

Transport Practice 3.4: ***Develop procedures for remediation of releases that recognize the additional hazards of cyanide treatment chemicals.***

The operation is **in full compliance with Transport Practice 3.4**
in substantial compliance with
not in compliance with

KGC's spill remediation procedures include recovery of solids, and disposal of spill clean-up debris. The hazard of sodium cyanide is recognized and the risk is mitigated due to the primary transportation of the sodium cyanide IBCs in sealed and locked containers. KGC does not permit the use of neutralization chemicals for spill clean-up, as per their 2011 certification audit, except for addressing spills at the Kumtor mine storage pad where, as a Kyrgyz regulatory requirement, ferric sulphate is to be available for use to neutralize a spill.

Transport Practice 3.5: ***Periodically evaluate response procedures and capabilities and revise them as needed.***

The operation is **in full compliance with Transport Practice 3.5**
in substantial compliance with
not in compliance with

The Kumtor Emergency Response Plan is updated on a regular basis. KGC has revised their Emergency Response Plan (version 12, July 2015) three times since the 2011 certification audit, as KR regulation requires the Emergency Response Plan to be reviewed and submitted annually.

Mock emergency drills are planned and conducted quarterly in addition to regular ERT training. During the audit, it was verified that emergency situation drills involving cyanide/chemical scenarios were practiced annually since the certification audit, documented, reviewed, lessons learned discussed, actions developed and recommendations carried out.

CLOSING STATEMENT

The statements made in this report, and the conclusions presented in this report represent our professional opinion and are based on the conditions observed on the dates set out in the report, the information available at time this report was prepared, the scope of work, and any limiting conditions noted herein.

BluMetric provides no assurances regarding changes to conditions subsequent to the time of the assessment. BluMetric makes no warranty as to the accuracy or completeness of the information provided by others or of the conclusions and recommendations predicated on the accuracy of that information.

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