

SUMMARY AUDIT REPORT TRANSPORTATION PROTOCOL

for the December 2012
International Cyanide Management Code Audit



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



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

May 28, 2013

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SUMMARY AUDIT REPORT TRANSPORTATION PROTOCOL

Name of Cyanide Transportation Facility: Boroo Supply Chain

Name of Facility Owner/Operator: Boroo Gold Company Ltd

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Boroo Gold Company (BGC) operates the Boroo Gold Project in northern Mongolia. BGC is a wholly owned subsidiary of Centerra Gold Inc., a Canadian based gold mining company.

BGC purchases cyanide from Anqing Shuguang Chemical Co. Ltd. as solid briquettes packed in 1,000 kg Intermediate Bulk Containers (IBCs). At the Chinese border town of Erlian, the IBC's are stored in a national hazardous goods warehouse and transferred into dedicated shipping containers owned by BGC and then trucked by Shuguang across the border to Zamiin-Uud where the containers are loaded onto railcars for transport to the Wood Marshalling Yard in Ulaanbaatar, Mongolia. At Ulaanbaatar, the shipment is transferred onto trucks and transported by road to the Boroo Mine site. BGC takes ownership of the cyanide when the containers are transferred onto the railcars at Zamiin-Uud. The Boroo Supply Chain includes all shipping and handling from the unloading of Shuguang's trucks at the Zamiin-Uud railway to delivery of the cyanide shipment at the mine, a distance of approximately 720 km.

BGC contracts Mongolistics Worldwide Co., Ltd. as the local freight forwarding agency. BGC retains overall responsibility for managing the cyanide shipment from Zamiin-Uud to the mine site.



This verification audit is limited to the 720 km section of the cyanide supply route covering the Boroo Supply Chain between Zamiin-Uud and the Boroo Mine as shown on the map.

SUMMARY AUDIT REPORT

Auditors' Finding

This operation is

- in full compliance**
in substantial compliance
not in compliance

with the International Cyanide Management Code.

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Date(s) of Audit: December 9 – December 17, 2012

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 Detailed 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 – Boroo Supply Chain**



Signature of Lead Auditor

28 May 2013



Signature of Auditor

28 May 2013

Boroo Supply Chain
May 28, 2013

SUMMARY AUDIT REPORT

1. TRANSPORT: **Transport cyanide in a manner that minimizes the potential for accidents and releases.**

Transport Practice 1.1: *Select cyanide transport routes to minimize the potential for accidents and releases.*

in full compliance with Transport Practice 1.1

The operation is in substantial compliance with
not in compliance with

Boroo Gold Company Ltd (BGC) purchases sodium cyanide only from Anqing Shuguang Chemical Co. Ltd. in 1000 kg IBCs (intermediate bulk containers). IBC's are loaded into 20' containers, transferred onto railcars and transported by rail to Ulaanbaatar. BGC is responsible for the cyanide transport and handling between the Zamiin-Uud railway yard, located approximately 11 km from the Chinese/Mongolian border, and the mine site.


The choice of routes along the Boroo Supply Chain is limited to a 580 km railway line between Zamiin-Uud and the Marshalling Yard in Ulaanbaatar (UB), and a 130 km paved and 10 km improved earth road between the UB Marshalling Yard and the mine site. An initial risk assessment was completed in 2003 that evaluated the hazards associated with the route. The Boroo Supply Chain route including the railway portion was reassessed and documented in December 2012. Permission to transport cyanide within Mongolia and approval of the transportation route is required from the Traffic Police and State Disaster Agency. The State Disaster Agency exercises control over the cyanide transportation in Mongolia, monitor the progress of the rail shipment and accompany the road convoys.

Although transport of the cyanide shipment by rail was in the charge of the Mongolian Railway Authority (MRA) and therefore not in BGC's control, a number of measures were taken by BGC to minimize potential risk. The Mongolian Railway follows CIM/SMGS rules for consignment and management of rail freight which includes international standards for handling and transporting dangerous goods.

The Ministry of Mineral Resources and Energy (MMRE) is notified of the shipment and prior to a shipment has to provide a letter to the Chinese Chemical Weapons Agency that the cyanide will only be used for gold processing. The State Specialized Inspection Agency (SSIA) reviews the permits, licences and approvals for completeness prior to the cyanide containers being sealed at the border and released for transport in Mongolia. BGC is required to notify national and local government agencies prior to a cyanide transport and obtain approval of the emergency response plan from the State Disaster Agency.

The BGC contracts with Monlogistics, a national freight forwarding company, to assist with the handling and transportation from ZamiinUud to their mine site.

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Signature of Lead Auditor
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The road transportation route is mostly through unpopulated grassland. Governors of local soums (districts) are notified prior to cyanide shipments and Local Traffic police are involved with the convoy. Due to the remoteness of the route and the inadequate capacity of local communities to assist in emergencies, BGC has established the capacity and equipment to respond to all foreseeable emergency situations along the transport route. A BGC emergency response team accompanies the rail and road shipments, and includes their ambulance and doctor.

BGC consigns the rail transport of cyanide to the MRA and subcontracts the road transportation to Monlogistics. To ensure that cyanide is transported in a manner that minimizes the potential for accidents and releases, BGC oversees every part of the shipment between the Chinese/Mongolian Border and the mine site.

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.*

in full compliance with Transport Practice 1.2

The operation is in substantial compliance with
 not in compliance with

BGC have a contract agreement with Monlogistics to perform the inland transportation and related services with respect to the shipment of cyanide between Zamiin-Uud and the mine site. The responsibilities of Mongolistics include arranging police escort of the Shuguang convoy between the border crossing into Mongolia to the Zamiin-Uud Marshalling Yard. Monlogistics is also responsible for providing security; customs clearance; organizing police escort; securing permits, licences and approvals; ensuring appropriate signage is posted; ensuring appropriate PPE is used; and conducting preventative maintenance and inspections of vehicles. Monlogistics only uses experienced (minimum of 2 years experience) and licenced heavy goods vehicle drivers.

BGC provides Cyanide Safety Awareness Training for contractor drivers and MRA employees at Zamiin-Uud and Ulaan Baatar Marshalling Yards involved with cyanide container handling, prior to a cyanide shipment. The MRA provides pre-work induction training prior to loading the railcars.

Container handling operations at the rail marshalling yards are performed only by MRA crane operators and riggers. Materials handling and equipment operator training for railway employees is the responsibility of MRA, and supplemented with cyanide awareness training by BGC prior to the cyanide shipment.

BGC transport team ensures that Monlogistics meets the terms of the contract agreement by oversight and verification of the transport of cyanide throughout the Boroo Supply Route.

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

in full compliance with Transport Practice 1.3

The operation is in substantial compliance with
not in compliance with

The shipping containers, dedicated for use for the transport of cyanide to the Boroo mine, are owned by BGC, and include the CSC Safety Approval certificate and Customs international requirements.

The gross weight of each shipping container is recorded on the consignment packing list provided by the producer, and is well within the maximum rated load for the containers. The shipping containers are stored in a segregated area at the Boroo mine site. Each container is inspected to ensure it is in good condition prior to being shipped to Erlain, China for use in a cyanide shipment.

Safety measures for cyanide transport include thorough inspections and a preventative maintenance program for vehicles and lifting equipment. Inspections, including the condition of containers, are conducted. BGC limits the number of shipping containers that may be loaded onto a Monlogistics truck/trailer to a single container.

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

in full compliance with Transport Practice 1.4

The operation is in substantial compliance with
not in compliance with

BGC ensures that the cyanide is transported in a manner that maintains the integrity of the packaging. Cyanide is received as solid briquettes packed in plywood 1,000 kg Intermediate Bulk Containers (IBCs). These are packed and transported in sealed 20 foot shipping containers; 18 IBCs per container. Within each IBC, the briquettes are packaged in nylon super sacks enclosed in plastic (bag in a bag). The wooden IBCs are manufactured to specification in China by an ISO9001 certified producer. Each shipping container is sealed by Chinese customs in Erlain and again by the Mongolian SSIA after they clear customs in Zamiin-Uud. The seals are not broken until the containers are delivered to the Boroo Mine site. The containers are secured onto flatbed railcars during rail transport and onto truck trailers during road transport using twist locking devices. Wheel chucks are used during loading and unloading of vehicles. Driver inspection requirements are listed in BGC procedure.

Each IBC is clearly identified in English with "Sodium Cyanide", a UN 1689 placard label, the name of the supplier, name of purchaser, the cyanide batch number, and an IBC identification number. The contents of each shipping container is clearly identified by signage ("Poison" and UN 1689) posted on the side of each container.

Monlogistics have a maintenance and inspection program for their vehicle fleet.

Weather forecasts are continually monitored by BGC leading up to departure of the convoy, and ongoing monitoring and reporting of road conditions is undertaken. The Transportation Safety Officer has authority to delay or cancel a convoy if weather/road conditions are adverse. To ensure maximum visibility, cyanide transportation by road convoy is restricted to daylight hours.

All convoy drivers are subject to a blood-pressure and alcohol tests prior to start of a convoy. BGC has a zero tolerance for alcohol or drug abuse in the workplace. A photographic record of the cyanide shipment showing various activities conducted, including technical inspections, blood pressure and alcohol testing, and pre-departure safety meeting, is maintained by BGC.

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

Summarize the basis for this Findings/Deficiencies Identified:

Not Applicable. BGC 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

The BGC cyanide transport team travelling with the shipment is equipped with radios, cell phones and satellite phones during the rail and road transport portions of the route. There are no blackout areas identified for cellular phone coverage along the route. The team is in constant communication with each other, with the BGC corporate office and with dispatch office to provide updates. The radio communication between each convoy vehicle with the lead vehicle is tested prior to departure of the convoy. The BGC ERP (in English and Mongolian) are available with the emergency response team that travels with the cyanide shipment.

The BGC Procurement Department maintains direct contact with the cyanide producer during its manufacture and travel to the Chinese border. BGC staff accompany the cyanide shipments, at the border, on the rail (special compartment) and on the convoy.

An inventory of the cyanide is conducted by a Shuguang representative when the IBCs are transferred into BGC's shipment containers. An inventory check is subsequently undertaken by BGC before the containers (packed 18 IBCs per container) are trucked to the Border for Customs clearance. BGC checks the contents of each container against the inventory and measures air-quality for potential hydrogen cyanide gas.

BGC obtains cyanide shipping documents from Shuguang. This documentation, together with the import licence, and other required documents are provided to Chinese Customs for freight clearance. On clearance, the Chinese Customs personnel seal each container and the seal remains intact until delivery to the Boroo Mine. An SSIA agent adds a Mongolian Seal on each container after the shipment clears Mongolian Customs. Mongolian Customs Agents inspect the shipment on delivery to the Mine site.

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.*

in full compliance with Transport Practice 2.1

The operation is in substantial compliance with
 not in compliance with

The posted cyanide shipping containers are transferred from trucks onto railcars at the Zamiin-Uud Marshalling Yard. BGC implemented a number of measures to alert workers and minimize the potential for accidental cyanide releases, including cyanide awareness training for railway operators involved with unloading of railcars and loading of convoy trucks. The MRA, as part of normal operating practice, documents their activities. BGC provides workers with appropriate PPE and have an emergency response team and equipment on site during the transfer. BGC checks each loaded railcar to ensure that adequate cyanide warning signage is posted and clearly visible on the containers.

The Zamiin-Uud and UB Marshalling Yards are surrounded by a high security walls, are well illuminated and have continuously monitored security cameras. For the cyanide shipment, security guards are posted to monitor the shipping containers during temporary storage at the rail yards.

The cyanide containers are segregated from other containers, and are expeditiously transferred to railcar and/or truck, and not stored for longer than 72 hours. This packaging provides protection from the rain or snow. Containers are stored above the ground to prevent water entering.

The potential for HCN gas generation is monitored using a multigas detector before the shipping containers are sealed in Erlian China. During shipping, interim storage at the rail marshalling yards, and at the mine site, the containers are stored in the open where natural ventilation occurs and the potential for HCN vapour buildup is low. The multigas detector is used whenever the container is opened to check for potential hydrogen cyanide gas.

The rail marshalling yards used for handling and interim storage of the cyanide shipping containers are concrete paved. The cyanide containers are off-loaded and stored in the Boroo mine reagent area which comprises a concrete containment pad located within a fenced, locked and guarded compound. There is no surface water in the proximity of the bermed, sloped pad.

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.*

in full compliance with Transport Practice 3.1

The operation is in substantial compliance with
 not in compliance with

BGC consigns the rail transport of cyanide to the Mongolian Railway Authority (MRA) and subcontracts the road transportation to Monlogistics. To ensure that cyanide is transported in a manner that minimizes the potential for accidents and releases, BGC oversees every part of the shipment between the Chinese/Mongolian Border and the mine site.

MRA operates within the Mongolian *Railway Goods Handling Procedures*, which includes specificity for shipping hazardous freight by rail, including cyanide, based on IFFA and GOST 19433-88 standard. The standard includes requirements for emergency response. Since the transport of the cyanide shipment by rail is in the charge of the MRA and therefore not in BGC's direct control, a number of measures were taken by BGC to minimize potential risk, including the provision of (and fully implementation if required) their own Emergency Response Plan (ERP). A similar arrangement is made by BGC for and with Monlogistics.

The ERP addresses people, environment and property. The ERP, available in both English and Mongolian, is reviewed annually and updated whenever there are changes that may alter the effectiveness of the plan. The ERP is approved by the Mongolian Disaster Agency, State Specialized Inspection Agency (SSIA) and Mine Rescue Department after each revision.

In Mongolia, BGC is jointly responsible for response and remediation actions, as local infrastructure is lacking in most areas. Due to the remoteness of the route and the inadequate capacity of local communities to assist in emergencies, BGC has established the capacity and equipment to respond to all foreseeable emergency situations along the transport route. The BGC ERP considers all aspects of the transport infrastructure, including the weather conditions, road conditions, road gradient, proximity to population and animals. The ERP identifies actions for cyanide spills in its potential various forms. A BGC emergency response team accompanies the rail and road shipments, including their ambulance and doctor as part of the road convoy.

Staff are trained and prepared for a cyanide emergency and are provided with appropriate PPE, spill response and first aid supplies. Emergency Response Team (ERT) training is carried out weekly. BGC anticipates the scrutiny of this transport and includes Procurement staff, BGC security, ERT and other staff for the 720 km journey.

Both the railcars and the transport vehicles with attached flat-bed trailers are designed for transportation of loads in sea containers. The temporary storage of cyanide at the railyards is managed by MRA but BGC provides additional ERT capability during handling and additional security during storage.

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

in full compliance with Transport Practice 3.2

The operation is in substantial compliance with
 not in compliance with

The BGC ERP is documented and well-developed. It specifically addresses the roles, duties and responsibilities of all staff involved with cyanide during transport and in emergency situations. BGC maintains extensive and ongoing skills training and awareness programs, including cyanide, for employees as well as contractors and visitors. Emergency Response training, both theory and practical, is carried out, and includes hazmat response, emergency response and first aid (including specific requirements for cyanide first aid).

Monlogistics includes procedural requirements for safe transportation of cyanide which address general safety requirements, vehicle maintenance and inspection, driver qualification and experience, alcohol tolerance, and convoy protocols.

The procedure specifies the requirement for a full equipped Emergency Spill Response Kit to accompany each dangerous goods transport. A detailed listing of ERT resources, including health and safety equipment and PPE, consumables and inventory requirement, is provided and available during unloading, loading and transport by rail and convoy. BGC has a fully equipped emergency response trailer, fire truck and ambulance, first aid equipment (including cyanide antidote kit and oxygen), PPE and spill materials.

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

in full compliance with Transport Practice 3.3

The operation is in substantial compliance with
 not in compliance with

BGC has detailed internal procedures and current contact information for notifying regulatory agencies, international reporting, external aid, the State Disaster Agency and medical facilities if an emergency occurred.

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

in full compliance with Transport Practice 3.4

The operation is in substantial compliance with
 not in compliance with

The ERP, supplemented by a SOP, provides guidance for various spill occurrences, including specific scenarios and individual response mechanisms provided for cyanide. Neutralization is prohibited for use during transport. Staff responsibilities for spill cleanup including the sampling strategies are identified. The procedure provides specific guidance for the end point of remediation. The soil and water quality guidance values are specified.

Sodium hypochlorite (dilute) would be used to cleanup after solid cyanide has been removed, and only on mine site land. This would be evaluated in the instance of off-mine site land affected, with consideration of surface water bodies in the immediate vicinity.

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

in full compliance with Transport Practice 3.5

The operation is in substantial compliance with
 not in compliance with

BGC wrote their Emergency Response Plan and Training Manual in 2003 and have updated both on a regular basis. The current version is dated 8 November 2012. There is a Mongolian regulation which requires Emergency Response Plans for potential accidents to be reviewed and submitted for review and approval by the Mongolian Disaster Agency, State Specialized Inspection Agency (SSIA) and Mine Rescue Department after each revision.

Mock emergency scenarios conducted during the last two years have tested response to chemical (cyanide) spills for various situations, and include reports with an evaluation.

BGC published “For Safe and Responsible Mining in Mongolia”, which explicitly addresses use of sodium cyanide in their operations. In the publication, BGC stated “As a first step in the management of cyanide, the Company strictly complies with national laws and regulations the management of cyanide as is the case with all aspects of its operations. In addition, the Company has voluntarily made a commitment to comply with the strictest cyanide management standards that are available (ICMI). Audits are conducted on a frequent basis to ensure that cyanide management continues to be in accordance with these standards. Centerra Gold is a signatory company of International Cyanide Management Code”.

A full day training session on “Cyanide Safety” was organized at the Boroo mine site on 20 October, 2011, as one of a training series organized by the National Committee responsible for policy coordination of toxic and hazardous chemical substances and the Ministry of Nature, Environment and Tourism. There was extensive favorable media and newspaper coverage.

The BGC ERT is part of an annual Mine Rescue Competition, which includes ERTs from other gold mining companies and its sister, Centerra’s Kumtor Gold Company.

BGC indicated that there has not been any cyanide-related emergency that required implementation of the ERP since mine opening (in over 10 years).

CLOSING STATEMENT (Project CB9338-00-01)

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.

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