



**REPORT**

# ICMI RECERTIFICATION SUMMARY REPORT

*Gorubso, Kardzhali*

Submitted to:

**International Cyanide Management Institute (ICMI)**

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United States of America

Submitted by:

**Golder Associates (UK) Ltd**

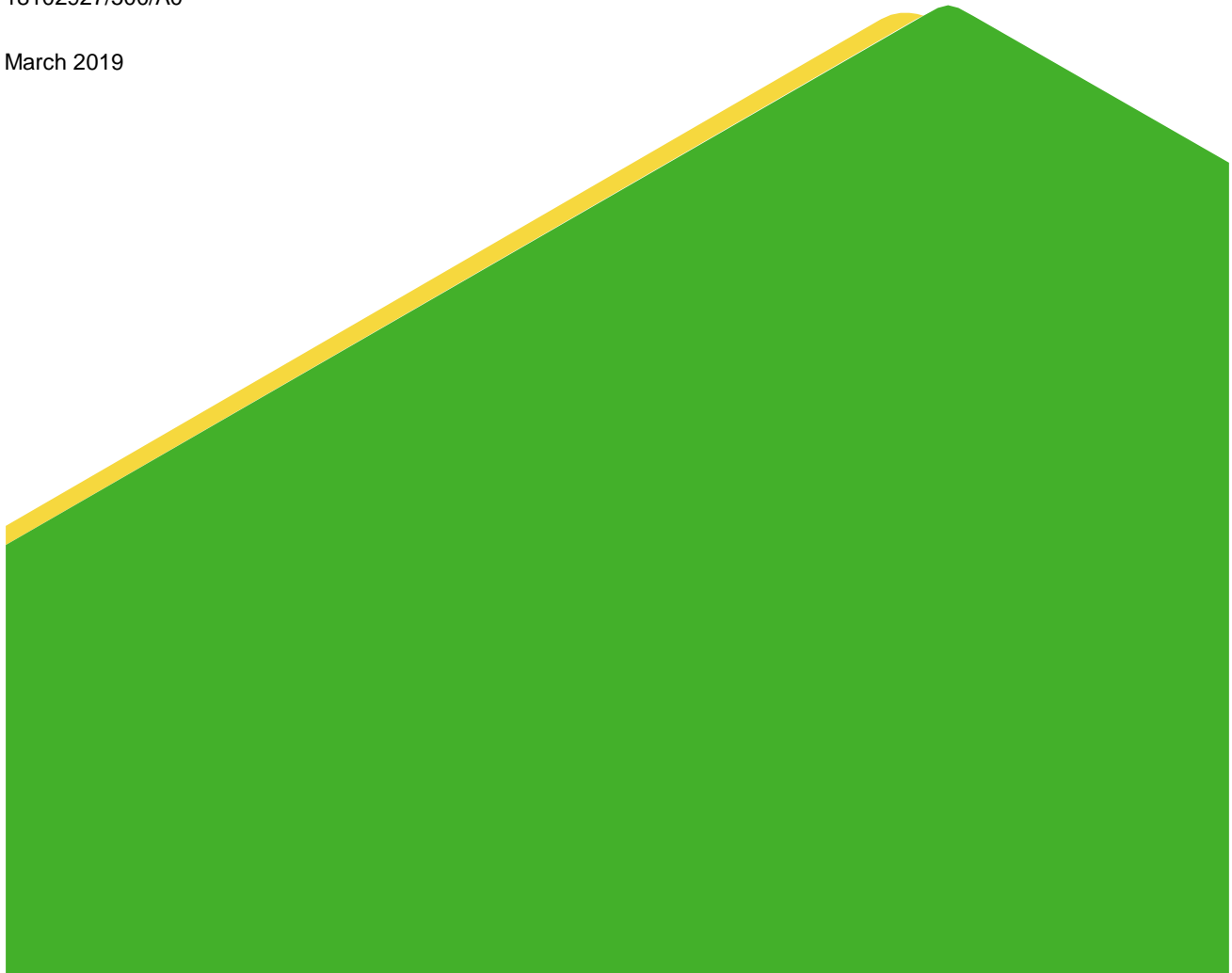
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## 1.0 SUMMARY AUDIT REPORT FOR GOLD MINING OPERATIONS

<b>Name of Mine:</b>	Gorubso Kardzhali AD
<b>Name of Mine Owner:</b>	Gorubso Kardzhali AD
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## 2.0 LOCATION DETAIL AND DESCRIPTION OF OPERATION

### 2.1 Mine Location

Gorubso Kardzhali is located in the town of Kardzhali in the southeast of Bulgaria. Kardzhali is located in the low eastern part of Rhodope Mountains, on both banks of the River Arda between the Kardzhali Reservoir to the west and the Studen Kladenet Reservoir to the east. The town is 260 km southeast of Sofia and approximately 100 km southeast of Plovdiv.

### 2.2 Background

Mined ore is hauled by trucks from Chula mine, to a stockpile at the subject site within the territory of the industrial site of Gorubso-Kardzhali AD.

The stockpile provides for the deposition of 3,000 tonnes (t) of ore. It is covered by a metal structure in order to prevent contamination by dust.

The ore is conveyed to the Crushing Plant from the stockpile, via the feeding hopper with feeder and rubber conveyor belt (RCB). The Crushing Plant features two stages of crushing; one jaw and one cone crusher with intermediate sieving, achieving a maximum size of the crushed materials of 25 mm.

The crushed ore is conveyed by means of an RCB to the Milling Plant and into an intermediate hopper with a capacity of 250 t, from which a feeder conveyor and an adjustable RCB (average productivity of 10 t/h) feeds it into the mill for fine milling. The mill is a ball type equipped with a sieve with openings diameter of 6 mm. The 'retained by the sieve' material is returned by means of an RCB back into the mill for re-milling.

Material that has passed through the sieve from the mill is conveyed by means of a vertical chamber pump to a vibration sieve with holes of 2.5 mm diameter. The sieve is equipped with polyurethane sieve plates, providing efficient sieving and long-term operational lifetime.

The material retained by the vibration sieve is returned via a belt conveyor for re-milling, while the material that has passed through the sieve in the form of pulp is conveyed into a chamber pump from which, via a pneumatic gate and a distribution box, it is conveyed for gravity enrichment to the Knelson concentrator.

The Knelson concentrator operates in a periodical mode of unloading of the achieved gravity gold-bearing concentrate. The work process period for unloading amounts to two hours, with a discontinuation of the process for 5 to 10 minutes. During the unloading, the supplied pulp is transferred back to the milling cycle by means of the automatic gate and the distribution box. The management and control of all the concentration processes are fully automated and visualized on a display on the control panel. For this purpose, the Knelson concentrator is equipped with an automatic compressor, providing compressed air for the operational control of the gates.

The gravity waste, as a flow of pulp from the discharge of the hydro-cyclone in the cycle of gravity, is initially sieved by a linear sieve (1) for removal of wooden fibre and other residues, which hinder the process of gold extraction according to the CIL-process (Carbon in Leach). The linear sieve is located in the vicinity of the existing mill next to the operational installation for gravity enrichment. The sieved pulp is pumped into the main CIL-circuit, which is located outside the existing building of the former enrichment factory.

The input into the installation pulp with solid matter contents (an average of 13% solid matter) is subjected to partial dewatering (thickening) in consideration of the requirements of the consequent operations. For this purpose, the pulp is input into a thickener (2), where, upon addition of lime and flocculant, the same is thickened to a controlled density within the range of 30 - 35% solid matter.

The thickener is of the lamellae type with high separation efficiency. The same has been designed with a reserve capacity for the compacted product, in order to be capable to accommodate pulp for more than 12 hours of operation of the CIL-installation in case of eventual discontinuation of the operations along the milling cycle.

The cleared water from the compactor (the so-called "top discharge"), with an average discharge rate of 45 m<sup>3</sup>/h, overflows into a collection tank (3) with a capacity of 60 m<sup>3</sup> and is returned for recycling into the milling process and the gravity enrichment

The installation consists of several basic technological units (modules), as described below.

### **1. Module: Reagent Facility**

The reagent facility comprises machinery and equipment for preliminary preparation and dosing of the reagent solutions.

The processes in the reagent facility are automatic and the supply of the solutions can be controlled both locally and remotely.

#### **Installation for preparation of a solution of sodium cyanide**

The facilities for the preparation and supply of sodium cyanide consist of:

- Feeding hopper, cone-shaped type – serves for input of solid matter of the respective reagent;
- Water control – consists of sensors for measuring the bottom and top level and valves for opening and closing the water supply;
- Preparation (mixing) tank – the tank is equipped with low revolutions per minute mixer with screw electric motor. The tank is also equipped with a cover and serves for preparation of the solutions;
- Dosing tank – serves for supply of the reagent;
- Pumps – serve for conveying and supply of the reagent;

- Gas analyzer – serves for measuring the concentration of cyanides (as HCN); and
- pH meter – serves for measuring the value of pH in the tank for preparation of the solutions.

## **2. Module: Extraction**

The Extraction Module includes the processes of leaching, carbon absorption, and destruction of the cyanide.

The processes of leaching and carbon absorption are performed in one leaching (6) and five absorption (9) open reactors, each with a volume of 240 m<sup>3</sup>, installed in sequence. Each is equipped with a two-plain mechanical agitator (7, 8) to provide optimum mixing and good contact between the ore particles and the NaCN solution and, respectively, between the carbon and the cyanide-gold solution. The adsorption reactors are equipped with a system of pumps (11) and sieves (10), which provide for the conveyance of the carbon from the last to the first reactor, against the direction of the pulp flow. In order to accelerate the process, the pulp is aerated in the leaching reactor by supplying pressurized air.

The dissolved gold in the form of cyanide compounds is adsorbed from the solution on the active carbon granules, input into the cycle at the outlet of the adsorption reactors system. The carbon granules are pumped against the flow of the leached pulp to the inlet of the cycle from the adsorption reactors by means of a pumping system and retention sieves. The pumps convey the carbon against the flow of the pulp, and the sieves between the reactors serve to retain the carbon in the reactor, allowing the pulp to flow to the next reactor. The “loaded by gold” active carbon is separated on the sieve surface (12) from the pulp of the first reactor of the series of reactors for carbon adsorption and is conveyed for further processing (to the desorption or elution of the gold).

For the purpose of rendering the residual cyanide contents harmless after the cyanide extraction the so-called Inco-process is used. Destruction is achieved by the product that has passed through the sieve being conveyed to the reactor (dimensions of D x H = 6,7 x 7,3 m) for decomposition of the cyanides (31), where under intensive mixing and aeration a solution of sodium bisulfite (NaHSO<sub>3</sub>) is added (which provides the required quantity of SO<sub>2</sub> for the Inco-process) and, whenever necessary, copper sulfate (which acts as a catalyst). This leads to the destruction of the free and dissolved in low acid cyanide compounds and their transformation into harmless cyanates and thiocyanates. On the basis of the conducted extended technological tests by “Resource Development Inc. – USA”, the concentrations of cyanide in the final waste pulp at the inlet of the tailings pond do not exceed 0,5 mg/l, which is less than the requirements as per Directive 2006/21/EC.

## **3. Module: Elution**

The carbon granules with the adsorbed gold (the “loaded active carbon”) are conveyed into a column for flushing (14). The operational volume of the column amounts to approximately 3 m<sup>3</sup> (4 m height and 0,9 m diameter). It operates in a periodical mode with a duration of approximately 2 hours and 0.5 more hours for flushing and another 0,5 hours for emptying the column. The ratio of height/diameter of the column has been selected in such a manner, as to allow the conveyance by gravity of the carbon from the sieve and the maintenance of a circulation flow inside the column.

The process of elution (desorption or separation of the gold from the active carbon) is achieved in the column (15) with a capacity of approximately 1 ton of carbon. The process is cyclic by adding in sequence the various solutions – first, in a heat-exchanger a solution of sodium cyanide (0,1% by weight) and sodium hydroxide (2% by weight) at a temperature of approximately 90°C, followed by flushing with hot fresh pressurized water (at a temperature of 145°C and a pressure of 380 kPa). Upon its discharge from the top part of the column, the solution containing the gold elute passes through a screen filter and a heat-exchanger (23) and is then conveyed into the elute tank (16).

The elute, containing the dissolved gold, is then conveyed to the electrolysis department for electric extraction in an electrolysis bath (17). The process is cyclic with a total duration of approximately 8 hours at adjustable

parameters. Upon completion of the electrolytic separation of the gold, the cathodes are washed and the gold cake is collected at the bottom of the tank, installed under the electrolytic bath. Any accumulation of gold sediment in the collection tank (gold sludge) is conveyed in the form of a suspension to a small filter-press (18) for dewatering. The collected batch of gold cake is unloaded after filling of the filter press and is dried in an electric drier (19). According to its capacity, the drier comprises equipment of the laboratory type, which operates in periodical mode – one or, in exceptional cases, two operations per month. The duration of each operation varies within the range of 3 - 7 hours, while the output of dried gold cake amounts up to 20 kg.

The dried batch of gold cake is subjected to blending by fluxes (borax, soda, quartz sand) and melting in an induction furnace (20) with a maximum capacity of 20 dm<sup>3</sup>. The blending is performed on a “blending table” under ventilation. The induction furnace for the melting is of the laboratory type. The smelt of the so-called “dore alloy” is cast into ingots of approximately 500 ounces each (approximately 16.5 - 17.0 kg).

The table for the blending and the induction furnace is equipped with an aspiration system, with the vented gases passing via a gas-conduit through a sleeve filter of the cassette type and is exhausted via a chimney of 15 m height. Dust retained by the filter is returned to the blending stage in the gold sludge and the fluxes before the smelting.

After the elution of the gold the active carbon is regenerated by thermal processing in an electric resistance rotary furnace (26). The washed active carbon is removed from the elution column hydraulically and is dewatered by means of a sieve (24) before being fed into the feeding hopper (25) of the regeneration furnace. The regeneration (i.e. reactivation) of the carbon granules is achieved after their stay for approximately 15 minutes in the hot area of the furnace at a temperature of 750°C. The reactivated carbon is discharged from the furnace with a maximum temperature of 300°C and is then conveyed into the water environment of the cooling tank (27), from which it is conveyed by means of a pump onto a sieve for size sorting (28), before being fed again into the main process. Certain quantities of “fresh active carbon” are also fed via the cooling tank (27) to cover losses. In this way, the carbon is moisturized before being sieved and fed into the stage for leaching and adsorption.

After the detox plant the tailings is being discharged to a day pond, located 200 m from the detox plant, from where it is pumped to Kardzhali Tailings Storage Facility (TSF). The day pond is a concrete facility with aeration capability.

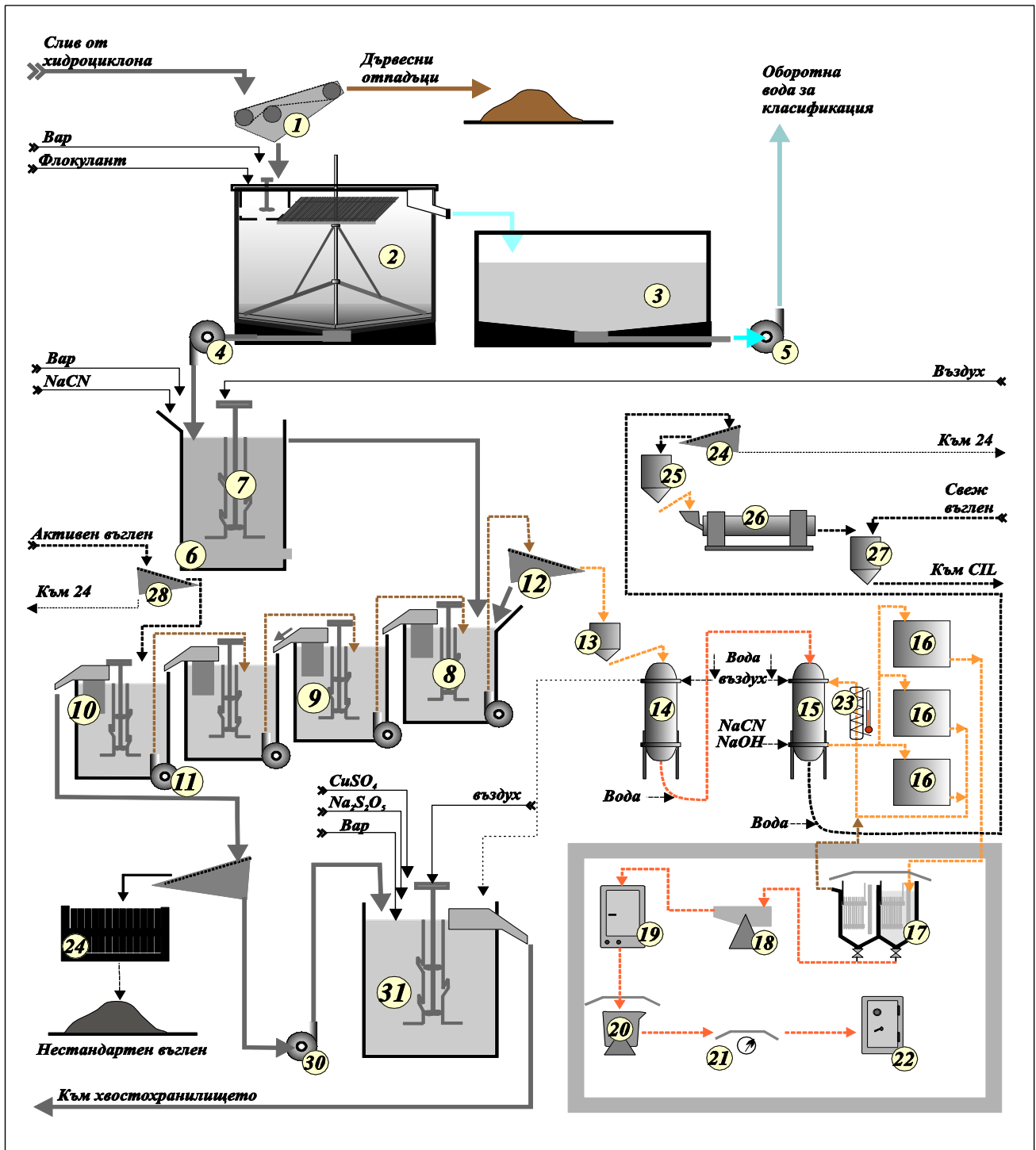


Figure 1: GK Process simplified flowsheet



### 3.0 SUMMARY AUDIT REPORT

#### 3.1 Auditors Findings

in full compliance with

**Gorubso Kardzhali AD is:**

in substantial compliance\* (see below) with

**The International  
Cyanide Management  
Code**

not in compliance with


This operation has maintained full compliance with the International Cyanide Management Code throughout the previous three-year audit cycle. The operation has experienced no significant cyanide incidents or compliance problems during the previous three-year audit cycle.

**Audit Company:** Golder Associates (UK) Ltd

**Audit Team Leader:** Sophie Wheeler

**Email:** swheeler@golder.com

#### 3.2 Name of Other Auditors

Name, Position	Signature
Kent Johnejack - ICMI Pre-certified Mine Technical Specialist	

#### 3.3 Dates of Audit

The Recertification Audit was undertaken over three days between 11 -13 September 2018.

I attest that I meet the criteria for knowledge, experience and conflict of interest for Code 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 Code Verification Auditors.

I attest that this Summary Audit 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 Mining Operations Verification Protocol and using standard and accepted practices for health, safety and environmental audits.

Gorubso Kardzhali



7 March 2019

Name of Facility

Signature of Lead Auditor

Date

## 4.0 PRINCIPLES

### PRINCIPLE 1 – PRODUCTION

#### Encourage Responsible Cyanide Manufacturing by Purchasing from Manufacturers that Operate in a Safe and Environmentally Protective Manner

**Standard of Practice 1.1: Purchase cyanide from manufacturers employing appropriate practices and procedures to limit exposure of their workforce to cyanide, and to prevent releases of cyanide to the environment**

in full compliance with

The operation is

in substantial compliance with

**Production Practice 1.1**

not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is in full compliance with Standard of Practice 1.1; purchase cyanide from manufacturers employing appropriate practices and procedures to limit exposure of their workforce to cyanide, and to prevent releases of cyanide to the environment.

Gorubso Kardzhali (GK) has purchased cyanide only from production company Draslovka during the recertification period under four annual extensions of the sales agreement. The auditors observed that the boxes of cyanide in the GK warehouse were only from Draslovka. Draslovka was first certified under the Code in March 2011, recertified in August 2014, and most recently recertified in September 2017, thus supporting a finding of full compliance.

## PRINCIPLE 2 – TRANSPORTATION

### Protect Communities and the Environment during Cyanide Transport

**Standard of Practice 2.1: Establish clear lines of responsibility for safety, security, release prevention, training and emergency response in written agreements with producers, distributors and transporters.**

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

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is in full compliance with Standard of Practice 2.1; establish clear lines of responsibility for safety, security release prevention, training and emergency response in written agreements with producers, distributors and transporters.

Section 5 of the annual sales agreement between GK and Draslovka specifies that the producer will use an ICMC-certified forwarding company. Draslovka has subcontracted cyanide transportation to the transport company CB SPED during the recertification period. CB SPED has developed a procedure entitled “Cyanide Control Plan for Sub-Contracted Operations” to ensure their subcontracted transporters comply with Code requirements. CB SPED was first certified in September 2012 and recertified in September 2015, thus supporting full compliance for this question.

**Standard of Practice 2.2: Require that cyanide transporters implement appropriate emergency response plans and capabilities and employ adequate measures for cyanide management**

**The operation is**  in full compliance with **Transport Practice 2.2**  
 in substantial compliance with  
 not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is in full compliance with Standard of Practice 2.2; require that cyanide transporters implement appropriate emergency response plans and capabilities and employ adequate measures for cyanide management.

GK contracts with the producer (Draslovka) who in turn contracts with a CB SPED. CB SPED was first certified in September 2012 and recertified in September 2015. CB Sped has in turn subcontracted to JS Euroline and BTL Moravia to deliver cyanide to GK. CB Sped manages their subcontractors' compliance with the Code using a procedure entitled “Cyanide Control Plan for Sub-Contracted Operations”. The auditors reviewed examples of Bills of Lading from throughout the recertification period to verify compliance.

## PRINCIPLE 3 – HANDLING AND STORAGE

### Protect Workers and the Environment during Cyanide Handling and Storage

**Standard of Practice 3.1: Design and construct unloading, storage and mixing facilities consistent with sound, accepted engineering practices, quality control/quality assurance procedures, spill prevention and spill containment measures.**

in full compliance with

**The operation is**

in substantial compliance with

**Handling and Storage Practice 3.1**

not in compliance with

#### Summarise the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 3.1: design and construct unloading, storage and mixing facilities consistent with sound accepted engineering practices, quality control/quality assurance procedures, spill prevention and spill containment measures.

GK has received only solid cyanide in boxes during the recertification period. The warehouse and the mixing area have not changed since the 2015 initial audit. Therefore, these facilities achieved compliance with respect to design and construction at that point in time and the findings of the 2015 initial audit are still valid. The auditors observed both areas to be in good condition with evidence of maintenance.

GK has located the warehouse and mixing area away from people and surface waters. The warehouse is locked and alarmed with motion sensors, while the plant building that contains the mixing area is clearly signed for authorised personal only. GK has made the neighbouring facilities in the industrial complex aware of emergency procedures for a cyanide release or exposure. An HCN monitor is located at the truck gate to the industrial complex as an additional precaution. The closest open water is the Arda River which is located approximately 600 metres from the warehouse and approximately 200 metres from the mixing area.

GK has level sensors in the cyanide mixing and storage tanks to prevent overfilling. The sensors have digital readouts at the tanks and report to the screen in the control room. GK staff stated that both sensors are set to automatically stop filling or transfer at the 90% level. The auditors observed the values on the digital readouts and screenshots to verify the level sensors were functional. The auditors also observed inspection and maintenance records from throughout the recertification period.

The mixing tank and storage tanks are installed on solid concrete bases to prevent seepage to the subsurface and within concrete secondary containment as a competent barrier to leakage. A sump installed in the low point of the secondary containment returns solutions to the detox circuit. These tanks and their containment have not changed since the 2015 initial audit and the auditors observed them to be in good condition.

GK manages cyanide with adequate ventilation, measures to prevent contact with water, appropriate security, and separately from incompatible materials. The warehouse has adequate ventilation from open windows with security bars. Operators wait 15 minutes after opening the door to the warehouse for additional air exchange and then enter with a portable Hydrogen Cyanide (HCN) monitor. The building housing the mixing area also doors and openings for air exchange and the mixing tank has a vent pipe to the roof. The auditors observed that the warehouse and building housing the mixing area are intact and competent to prevent contact of cyanide with water. The warehouse is locked and equipped with motion sensors and alarms. Access to the mixing area is limited by signage to authorised personnel. The industrial complex containing the warehouse and plant has a walled and fenced perimeter with limited access via gates with security staff. No other materials are stored at the cyanide warehouse or within the mixing area secondary containment.

**Standard of Practice 3.2: Operate unloading storage and mixing facilities using inspections, preventative maintenance and contingency plans to prevent or contain releases and control and respond to worker exposures.**

in full compliance with

The operation is  in substantial compliance with **Handling and Storage Practice 3.2**

not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is in full compliance with Standard of Practice 3.2; operate unloading storage and mixing facilities using inspections, preventative maintenance and contingency plans to prevent or contain releases and control and respond to worker exposures.

GK prevents the re-use of empty boxes and bags by tracking them with a first-in first-out system. Empty boxes and bags are decontaminated in the mixing area with a ferrous sulphate solution with the wash water reporting to a sump and then to the detox circuit. After drying, the boxes and bags are returned to the warehouse to await offsite shipment for incineration by a hazardous waste management company permitted by the Bulgarian government. The auditors observed tracking logbooks, transfer forms, and shipping manifests from throughout the recertification period to verify compliance.

GK has developed and implemented Standard Operating Procedures (SOPs) to prevent exposures and releases during cyanide unloading and mixing activities. The operation of valves and couplings for mixing solid cyanide is addressed in the SOP P-3.2.5. Handling cyanide containers without rupturing or puncturing is addressed in the SOP P-3.2.2 for use of the forklift and SOP 3.2.3 for use of the electrical stacker. SOP P-3.2.1 specifies a stacking height of two boxes, but the auditors observed stacking only one box high during the site visit. SOP P-3.2.5 addresses the timely clean-up of any spills of cyanide during mixing. SOP P-3.2.5 addresses the proper Personal protective Equipment (PPE) for mixing and requires observation from a safe distance by the shift manager who remains in contact with the control room operator. The auditors observed a mixing event to verify compliance with the PPE and observation requirements.

Draslovka, GK's cyanide supplier, has not yet implemented the requirement for the addition of colorant dye. The auditors made GK aware that before July 1, 2019 either GK will have to add this dye at the time of mixing or Draslovka will have to add the dye during manufacturing.

## PRINCIPLE 4 – OPERATIONS

### Manage Cyanide Process Solutions and Waste Streams to Protect Human Health and the Environment

**Standard of Practice 4.1: Implement management and operating systems designed to protect human health and the environment including contingency planning and inspection and preventative maintenance procedures.**

in full compliance with

**The operation is**

in substantial compliance with

**Operations Practice 4.1**

not in compliance with

#### Summarise the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 4.1; implement management and operating systems designed to protect human health and the environment including contingency planning and inspection and preventative maintenance procedures

The GK cyanide facilities at the plant have not changed since the 2015 audit and are the cyanide storage warehouse, mixing area, Carbon in leach (CIL) area, stripping/elution area, cyanide destruction area, and the pipes, pumps, sumps, containments, etc. associated with these facilities. The GK mine is located elsewhere and no processing takes place at the mine.

The following facilities are not cyanide facilities because GK has designed and operated the plant to limit the effluent concentration from the cyanide destruction circuit to less than 0.5 ppm Weak Acid Dissociable (WAD) cyanide: pipeline from cyanide destruction area to day pond, day pond, day pond, pipelines to and from the tailing storage facility (TSF), and the TSF. GK provided WAD cyanide data from 2015 to 2018 representing shift, daily, and monthly samples analyzed at internal and external laboratories that showed values ranging from 0.49 to 0.32 ppm at the two endpoints (i.e., the cyanide destruction circuit and the TSF discharge). The same conclusion was reached in the 2015 audit. The crushing, milling, gravity concentration, and thickener circuits are also excluded from the list of cyanide facilities because no cyanide solutions are present.

GK has developed written management plans for their cyanide facilities that demonstrate an understanding of cyanide management to prevent releases and exposures. The highest level of management starts with the GK Environmental Policy followed by the GK Cyanide Management Plan, Plan for Monitoring the GK Industrial Area, as well as operating procedures, and instructions for the cyanide facilities. Key operating parameters for the plant, as defined in the plans, procedures, and instructions, are a pH of 11-12 for mixing; a leaching pH of 10.5-11.5 and 300 ppm free cyanide in tank 1; and a detox target pH of 8.5 and <0.5 ppm WAD cyanide in the effluent.

GK has implemented a written procedure for management of change. The auditors reviewed completed Change Control Forms signed by appropriate department managers, including the environmental and safety managers when applicable, to verify compliance.

GK has prepared contingency procedures and instructions in the event of upsets and inspections that identify deviations. These procedures and documents cover the key circuits at the plant, as well as temporary cessation due to stoppage of ore, water, or electricity.

GK has inspected the cyanide facilities on an established frequency during the recertification period that was sufficient to assure and document that they are functioning within design parameters. Inspections are documented using checklists, shift reports, and logbooks. Inspections frequencies are shift, daily, every 10 days, monthly, and per event depending on the facility and activity. Structural integrity of the process columns

is evaluated twice per year during internal inspections when tanks are drained and cleaned to repair coatings. Secondary containments, pipelines, pumps, and valves are inspected by mechanical maintenance staff monthly for their integrity and signs of deterioration and leakage. The auditors observed the cyanide facilities to be in good condition, indicating an effective inspection program.

GK has documented inspections using checklists, shift reports, and logbooks that include the date of inspection, the inspector’s name, deficiencies, and corrective actions. Deficiencies are noted on “mismatch” reports for action by the maintenance staff. The auditors reviewed examples of these documents from throughout the recertification period to verify compliance.

GK has implemented a program of preventative and corrective maintenance using an annual program based on the plant operation manual. The maintenance department has a daily morning meeting to schedule activities according to the annual program or in response to the “mismatch” reports resulting from inspections. The auditors observed the cyanide facilities to be in good condition, indicating an effective maintenance program.

The plant is supplied by two independent power lines with one in use that the other as backup. The switch over from one source to the other takes a few minutes and is practiced twice per year during planned plant shutdowns. In the unlikely event that both power sources failed, the plant is designed to shut down and fluid circulation simply ceases to prevent unintentional releases and exposures.

**Standard of Practice 4.2: Introduce management and operating systems to minimise cyanide use, thereby limiting concentrations of cyanide in mill tailings.**

in full compliance with

**The operation is**

in substantial compliance with

**Operations Practice 4.2**

not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is in full compliance with Standard of Practice 4.2; introduce management and operating systems to minimise cyanide use, thereby limiting concentrations of cyanide in mill tailings.

Prior to start-up, the operation determined an addition rate of 1,600 g/t ore. The actual addition rate of 750 grams/ton (g/t) since the start of operations has been less due to less copper in the ore than initially anticipated. GK staff stated that the ore characteristics have been generally stable since the start of operations and therefore cyanide use is generally constant. As part of the manual control strategy, samples are collected from the Leach Tank and Detox Tank hourly and the in the CIL Tank 5 each shift. The samples are analyzed for pH and titrated for cyanide concentration at the onsite laboratory with the results recorded in log sheets. Cyanide addition rates are adjusted slightly when needed to accommodate varying levels of interference from copper in the ore. The auditors observed log sheets from throughout the recertification period to verify compliance. It should be noted, however, that the main method to limit residual cyanide in the tailings is the cyanide destruction circuit.

**Standard of Practice 4.3: Implement a comprehensive water management programme to protect against unintentional releases.**

in full compliance with

**The operation is**

in substantial compliance with

**Operations Practice 4.3**

not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**



The operation is in full compliance with Standard of Practice 4.3; implement a comprehensive water management programme to protect against unintentional releases.

Based on WAD cyanide data less than 0.5 ppm from throughout the recertification period, the facilities after the cyanide destruction circuit were not classified as cyanide facilities. Because the day pond and TSF were not considered cyanide facilities, this question is inapplicable. It should be noted, however, that the day pond is a concrete vault with two full-time operators and therefore does need a water balance to prevent unintentional releases, which in any case would not be a cyanide-related incident; and that the TSF does have a water balance that is implemented to prevent unintentional releases, but any such release would not be a cyanide-related incident.

**Standard of Practice 4.4: Implement measures to protect birds, other wildlife and livestock from adverse effects of cyanide process solutions.**

in full compliance with

**The operation is**  in substantial compliance with **Operations Practice 4.4**

not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is in full compliance with Standard of Practice 4.4; implement measures to protect birds, other wildlife and livestock from adverse effects of cyanide process solutions.

GK has implemented cyanide destruction at the plant to protect wildlife and livestock from exposure to cyanide solutions. The only open waters are the day pond and TSF. Because the cyanide concentrations in these open waters have been well less than 50 parts per million (ppm) (less than 0.5 ppm) throughout the recertification period, no other protective measures have been needed and no wildlife mortality has occurred due to cyanide exposure. The auditors reviewed analytical data to verify compliance. Ponding and overspray are inapplicable because the operation does not have a heap leach facility.

**Standard of Practice 4.5: Implement measures to protect fish and wildlife from direct or indirect discharges of cyanide process solutions to surface water.**

in full compliance with

**The operation is**  in substantial compliance with **Operations Practice 4.5**

not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is in full compliance with Standard of Practice 4.5; implement a comprehensive water management programme to protect against unintentional releases.

GK has a direct discharge to surface water in a ditch at the toe of the TSF that was less than 0.5 mg/L WAD cyanide during the recertification period based on daily analyses from the internal laboratory and monthly analyses by an external laboratory.

GK does not have an established mixing zone for the direct discharge to surface water from the ditch at the toe of the TSF. The results for free cyanide during the recertification period were less than 0.022 milligrams per litre (mg/L) from both the internal and external laboratory analyses.

GK does not have an indirect discharge to surface water. If there were seepage from the TSF, it would mix in the same ditch where the direct discharge to surface water is monitored and free cyanide concentrations were



less than 0.022 mg/L during the recertification period. Because the free cyanide concentrations were less than the threshold, GK is not engaged in any remedial activity.

**Standard of Practice 4.6: Implement measures designed to manage seepage from cyanide facilities to protect the beneficial uses of groundwater.**

in full compliance with

The operation is

in substantial compliance with

**Operations Practice 4.6**

not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is in full compliance with Standard of Practice 4.6; implement measures designed to manage seepage from cyanide facilities to protect the beneficial uses of groundwater.

GK has implemented measures to protect groundwater beneath and immediately downgradient of the plant. The primary measure is cyanide destruction at the plant. Other measures include installing pipelines and vessels in the plant over concrete floors and constructing the day pond out of concrete along with groundwater monitoring.

GK staff stated there are no actual beneficial uses for groundwater in the vicinity of the plant. Nonetheless, GK staff stated that the Integrated Pollution Prevention Control permit for the plant specified a limit of 50 micrograms per litre ( $\mu\text{g/L}$ ) for WAD cyanide in groundwater. GK has installed three groundwater monitoring wells at the plant site: MK-1 (upgradient), MK-2 (downgradient), and MK-3 (upgradient). These wells are monitored twice yearly in accordance with the permit, but with cyanide analysis required only once every 5 years. The most recent result in the downgradient monitoring well (MK-2) in March 2015 was non-detect for WAD cyanide.

GK does not use mill tailings as underground mine backfill.

GK has not caused cyanide concentrations in groundwater at the plant to exceed standards and therefore the operation is not engaged in remedial activity.

**Standard of Practice 4.7: Provide spill prevention or containment measures for process tanks and pipelines.**

in full compliance with

The operation is

in substantial compliance with

**Operations Practice 4.7**

not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is in full compliance with Standard of Practice 4.7; Provide spill prevention or containment measures for process tanks and pipelines.

The measures to prevent or contain releases from cyanide-related tanks, vessels, containments, and pipelines have not changed since the 2015 initial audit. The auditors observed these measures to be in good condition during the current site visit. The auditors also noted that the sumps have automatic pumps to return solutions to the detox tank. Therefore, the findings of the 2015 initial audit are still valid and repeated below for completeness.

*Spill prevention and containment measures are provided for all cyanide unloading, storage, mixing and process solution tanks. Secondary containments are present for the cyanide mixing and storage tank, the CILs and detox tank, the elution area, the electrowinning area.*

*Secondary containments for cyanide, storage, mixing and process tanks are sized to hold a volume greater than that of the largest tank and any piping draining back to the tank.*

*All secondary containments are equipped with sumps that would collect any cyanide solution or cyanide contaminated water and send it to the detox tank and are therefore compliant with the Code.*

*All cyanide process solution pipelines are contained within the mill building and would report to the respective sumps of the area they are related to.*

*There are no cyanide pipelines that present a risk to surface water and therefore no evaluation for special protection need is necessary.*

*All cyanide containing tanks and pipelines are made of carbon steel, stainless steel, black tin or HDPE, and are therefore compatible with cyanide and high pH conditions.*

**Standard of Practice 4.8: Implement quality control/quality assurance procedures to confirm that cyanide facilities are constructed according to accepted engineering standards and specifications.**

in full compliance with

**The operation is**

in substantial compliance with

**Operations Practice 4.8**

not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is in full compliance with Standard of Practice 4.8; implement quality control/quality assurance procedures to confirm that cyanide facilities are constructed according to accepted engineering standards and specifications.

There have been no changes to the cyanide facilities since the 2015 initial audit. Therefore, the findings of the 2015 initial audit are still valid and repeated below for completeness.

*Quality control and quality assurance programs were implemented during the construction of new cyanide facilities and when modifications have been made to existing cyanide facilities.*

*There is evidence of quality assurance/quality control (QA/QC) control during construction of the following facilities: Mill building, including all tanks and pipes, and for mixing and reagent storing, CIL and leaching, detox as well as elution area.*

*The quality control and quality assurance programs addressed the suitability of materials and adequacy of soil compaction for earthworks such as tank foundations and liners, and for construction of cyanide storage and process tanks.*

*Where no actual proof of QA/QC was available, GK provided the auditors with declaration of conformity by independent engineers indicating that for these facilities their continued operation within established parameters will protect cyanide exposures and releases- this was done for the day pond, the cyanide warehouse, and earthworks/civil works undertaken during plant refurbishment.*

*Appropriately qualified personnel reviewed the cyanide facility construction and provided documentation that the facility was built as proposed and approved, where appropriate.*

**Standard of Practice 4.9: Implement monitoring programs to evaluate the effects of cyanide use on wildlife, surface and groundwater quality.**

in full compliance with

**The operation is**

in substantial compliance with

**Operations Practice 4.9**

not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

GK implement monitoring programs to evaluate the effects of cyanide use on wildlife, surface and groundwater quality.

GK has developed a written monitoring plan and schedule updated yearly for monitoring surface and groundwater. This plan is accompanied by detailed procedures for monitoring activities, laboratory analyses, and evaluation of the results. These documents were prepared and regularly reviewed by appropriately qualified personnel, including the plant quality engineer (a degreed mining engineer), the plant ecologist (a degreed chemical engineer), and the plant environmental manager (a degreed mining engineer). The accredited external laboratory has developed its own procedures. The monitoring plan specifies the sampling, preservation, custody, and shipping protocols, as well as the cyanide species to be analysed. GK provided figures and a map showing surface water and groundwater monitoring locations.

GK documents sampling conditions, such as weather and other anomalies that might influence results were documented. The auditors reviewed field sampling logbooks from the internal laboratory and field sampling forms from the external laboratory from throughout the recertification period to verify compliance.

The only open waters are the day pond at the plant and the TSF, both of which are not considered as cyanide facilities because WAD cyanide concentrations were less than 0.5 mg/L throughout the recertification period. Nonetheless, GK documents daily inspections for wildlife mortalities at the TSF. Wildlife is not monitored at the day pond because it is a fenced concrete pool that is always staffed with two operators. GK staff stated that no wildlife mortalities occurred during the recertification period.

GK monitors surface water, groundwater, and wildlife at frequencies adequate to characterize the medium being monitored and to identify changes in a timely manner. Surface water is monitored on shift, daily, and monthly, while groundwater is monitored every 6 months. Wildlife at the TSF is monitored daily.

## PRINCIPLE 5 – DECOMMISSIONING

### Protect Communities and the Environment from Cyanide through Development and Implementation of Decommissioning Plans for Cyanide Facilities.

**Standard of Practice 5.1: Plan and implement procedures for effective decommissioning of cyanide facilities to protect human health, wildlife and livestock.**

in full compliance with

The operation is  in substantial compliance with **Decommissioning Practice 5.1**

not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is in full compliance with Standard of Practice 5.1; plan and implement procedures for effective decommissioning of cyanide facilities to protect human health, wildlife and livestock.

GK has developed a written procedure to decommission cyanide facilities when operations cease. The auditors verified that the procedure includes an accurate list of the cyanide facilities to be decommissioned. The procedure states that all equipment in contact with cyanide solutions will be washed prior to dismantling with the wash water detoxified in the cyanide destruction circuit and disposed at the TSF. The procedure also states that unused chemicals will be returned to the supplier or surrendered for further disposal to an appropriately certified company for disposal.

GK has developed an implementation schedule in text form for decommissioning activities. The general timeframes described in the procedure and the detailed sequencing information for each piece of equipment in the cost estimate are the equivalent of a schedule.

GK has reviewed its decommissioning procedures for cyanide facilities at the beginning of the current audit cycle even though there have been no changes to the process circuits. The auditors observed the original 2012 procedure and the current 2015 procedure to verify compliance.

**Standard of Practice 5.2: Establish an assurance mechanism capable of fully funding cyanide related decommissioning activities.**

in full compliance with

The operation is  in substantial compliance with **Decommissioning Practice 5.2**

not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is in full compliance with Standard of Practice 5.2; establish an assurance mechanism capable of fully funding cyanide related decommissioning activities.

GK has estimated the cost to fully fund third party implementation of the cyanide-related decommissioning. The unit costs are based on regional rates published by the local government for construction. The line items are specific to each piece of cyanide related equipment and the activities to wash them and take them apart.

GK has reviewed its decommissioning cost estimate for cyanide facilities at the beginning of the current audit cycle even though there have been no changes to the process circuits. The auditors observed the original 2012 cost estimate and the current 2015 cost estimate to verify compliance.

GK has established a financial mechanism as required by the applicable jurisdiction to cover the estimated costs for the cyanide-related decommissioning. The Ministry of Economics and Energy requires GK to place money in an account in April each year to cover rehabilitation of the mine and process plant. The General Manager stated GK is current on its deposits and that the amount currently in the account is approximately 2.5 times greater than the estimated decommissioning cost.

## PRINCIPLE 6 – WORKER SAFETY

### Protect Workers' Health and Safety from Exposure to Cyanide

**Standard of Practice 6.1: Identify potential cyanide exposure scenarios and take measures as necessary to eliminated, reduce and control them.**

in full compliance with

**The operation is**

in substantial compliance with

**Worker Safety Practice 6.1**

not in compliance with

#### Summarise the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 6.1; identify potential cyanide exposure scenarios and take measure as necessary to eliminate, reduce and control them.

GK has developed procedures describing how cyanide-related tasks such as unloading, mixing, plant operations, and equipment decontamination prior to maintenance should be conducted to minimise worker exposure. The SOPs have detailed sections on cyanide first aid procedures and PPE requirements.

The plans and procedures have been developed for cyanide unloading, process tasks, confined spaces, and equipment decontamination.

Pre-work inspections checklists are detailed for Preparation and Mixing Area, the Leach and Carbon Absorption Area, the Elution and Carbon Desorption Area and the Day pond area. Following the inspection by the area supervisor written instruction is given to all workers at the beginning of each shift to each worker which includes first aid procedures, fire instructions, pH adjustment and HCN levels and alarms and any specific issues noted in the preshift inspections. This instruction is read by the shift manager and signed by the worker(s) at the beginning of every shift. The worker instructions were reviewed as part of the audit.

The procedures and plans detail the risks involved with each task and adequately describe safe work practices. Each procedure details task specific PPE requirements, personnel responsibilities for the task, and the detailed procedures to appropriately conduct the task. Verification included review of the written procedures and plans.

GK has a change management procedure. The procedure details the types of actions that require the procedure to be implemented. It details that a review of the changes to be made should be carried out and any changes that must be implemented following the completion of the work. A Management of Change Approval form details the change owner, the description of the change and the benefits of the change. The auditors reviewed completed management of change documentation.

GK solicits and actively considers worker input in developing and evaluating health and safety procedures. Health and safety meetings take place on a daily basis. During these meetings workers views are sought. The auditors reviewed meeting records.

**Standard of Practice 6.2: Operate and monitor cyanide facilities to protect worker health and safety and periodically evaluate the effectiveness of health and safety measures.**

in full compliance with

**The operation is**

in substantial compliance with

**Worker Safety Practice 6.2**

not in compliance with

#### Summarise the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 6.2; operate and monitor cyanide facilities to protect worker health and safety and periodically evaluate the effectiveness of health and safety measures.

GK has determined the appropriate pH for limiting the evolution of HCN gas during mixing and production activities.

The SOP 'The preparation of sodium cyanide solution' states that the pH of the solutions before mixing must be at pH 11-12. The SOP 'Instructions for managing the production process in the leach cycle' details a pH level of 10.5-11.5 for the solution in the leaching process.

GK uses fixed or personal monitoring devices to confirm that controls are adequate to limit worker exposure to HCN gas and sodium, calcium or potassium cyanide dust to 10 parts per million on an instantaneous basis and 4.7 parts per million continuously over an 8-hour period. The fixed monitors are set to alarm at 2 ppm (a red light flashes and an audible alarm goes off), at 4 ppm (the same light flashes and the audible alarm is louder) and at 7.5 ppm (the same light flashes and the audible alarm is very loud). The 7.5 ppm warning is the evacuation alarm. The alarm details are explained in the 'Instruction for the preparation of sodium cyanide' and other SOPs and is displayed by the mixing tanks. The lower alarm values are used to stop and investigate. These personal monitors alarm at 10 ppm with an audible alarm and flashing light. The 10 ppm is used to signal the need to evacuate.

GK has identified that there are no areas and activities where workers may be exposed to cyanide in excess of 10 ppm on an instantaneous basis and 4.7 ppm continuously over an 8-hour period and require the use of personal protective equipment in these areas or when performing these activities.

HCN monitoring equipment is maintained, tested and calibrated as directed by the manufacturer (Dräger) and records are retained for at least one year. Calibration of the four fixed monitors and the two portable monitors is undertaken every six months by Dräger Safety Bulgaria. The calibration certificates for 2016, 2017 and 2018 were reviewed and found to be compliant.

Warning signs have been placed where cyanide is used advising workers that cyanide is present, and that smoking, open flames and eating and drinking are not allowed. The signage is in appropriate places and placed so it is clearly identified.

The showers and low pressure eyewash stations are inspected by the shift leader at the beginning of every shift as well as the emergency response equipment, the pH meters, the HCN fixed monitors, tank inspections and bund inspection. A form is filled in and retained as part of these inspections and these records were reviewed as part of the audit.

Showers, low pressure eye wash stations and dry powder or non-acidic sodium bicarbonate fire extinguishers are located at strategic locations throughout the operation. All fire extinguishers in the cyanide facility contain dry powder ABC. These are checked annually by the company Hristo Banev. Records from the last inspection by Hristo Banev were reviewed.

The local fire brigade visit GK regularly and have advised regarding the location and number of fire extinguishers.

The contents of unloading, storage, mixing and process tanks and piping containing cyanide are identified to alert workers to their content, and the direction of cyanide flow in pipes is designated.

The pipes from the mixing and storage tanks were followed along their length to confirm that they are adequately labelled and the direction of flow was marked with arrows. The mixing and storage tank and pipes are colour coded and all high strength cyanide containing pipes and tanks are coloured red. Workers and visitors are taught that this colour indicates that the pipe contains cyanide in induction training.

MSDS, first aid procedures and other health and Safety related information is presented in Bulgarian, the language of the workforce, and are present in areas where cyanide is managed. All workers speak Bulgarian.

GK has written procedures in place that are being implemented to investigate and evaluate cyanide exposure incidents to determine if their programs and procedures to protect worker health and safety, and to respond to cyanide exposures, are adequate. GK has a written accident and incident procedure. The procedure states that following an incident, accident or malfunction a specialist work group is to be formed to investigate the reasons for the incident.

**Standard of Practice 6.3: Develop and implement emergency response plans and procedures to respond to worker exposure to cyanide.**

in full compliance with

**The operation is**

in substantial compliance with

**Worker Safety Practice 6.3**

not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is in full compliance with Standard of Practice 6.3; develop and implement emergency response plans and procedures to respond to worker exposure to cyanide.

GK has oxygen and resuscitators (manufactured by MediSelect) and four Self Contained Breathing Apparatus (SCBAs) manufactured by SCOTT.

GK has the necessary equipment for emergency response to a worker exposure to cyanide. GK has cell and landline telephone communication systems that are used in the event of an emergency. Verification was from visual observation of the cells and telephones.

GK inspects its first aid equipment regularly. GK has medical oxygen available for the treatment of cyanide exposure victims. The oxygen is kept in the emergency response cupboard in the mill. It is inspected once a month by the Safety Department and a checklist is filled in, these records were reviewed. At the same time a separate inspection is undertaken of the SCBA units. Other general first aid kits are checked every month by the Safety department.

GK has developed an Emergency Response Plan titled 'Internal Emergency Plan For Actions in Case Of Disasters and Emergencies in Gorubso-Kardzhali AD, Kardzhali' (Emergency Response Plan or Plan) to address potential accidental releases of cyanide

GK have written procedures to transport workers exposure to cyanide. In the event of cyanide exposure incident the patient would be removed from the area, their clothes would be removed, they would be washed with water, treated with oxygen, and transported to the hospital. The emergency response team are trained in the use of the oxygen and there are always two people from the emergency response team on any one shift.

GK has a formalised arrangement with Atanas Dafovski, GK has a letter, dated 14 September 2018, from the Atanas Dafovski hospital in Kardzhali stating they are aware of the use of cyanide at GK and they are able to treat cyanide exposure victims at the hospital.

GK conducts cyanide exposure and release mock drills on a regular basis to test the relevant emergency procedures. Six mock drills are undertaken annually.



## PRINCIPLE 7 – EMERGENCY RESPONSE

### Protect Communities and the Environment through the Development of Emergency Response Strategies and Capabilities

**Standard of Practice 7.1: Prepare detailed emergency response plans for potential cyanide releases.**

in full compliance with

**The operation is**  in substantial compliance with **Emergency Response Practice 7.1**

not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is in full with Standard of Practice 7.1; prepare detailed emergency response plans for potential cyanide releases.

GK has developed an Emergency Response Plan titled 'Internal Emergency Plan For Actions In Case Of Disasters and Emergencies In Gorubso- Kardzhali AD, Kardzhali' (Emergency Response Plan or Plan) to address potential accidental releases of cyanide. The ER plan includes:

- Section 1: Plan for actions in case of major catastrophes;
- Section 2: Plan for actions in case of earthquakes;
- Section 3: Rescue and emergency actions in case of radiation;
- Section 4: Rescue and emergency actions in case of ionizing radiation;
- Section 5: Plan for actions in case of fire;
- Section 6: Plan for actions in case of flood and Plan for actions in case of severe flood (associated with local dam failure);
- Section 7: Plan for actions of accidents related to hazardous substances including sodium cyanide; and
- Section 8: Plan of action in case of terrorist attack.

The procedures address specific response actions for clearing site personnel from the area of exposure; first aid measures for cyanide exposure; decontamination procedures; control of releases at their source and containment; as well as the assessment, mitigation and future prevention of releases. Verification was by review of these documents and interview with safety and process personnel.

**Standard of Practice 7.2: Involve site personnel and stakeholders in the planning process.**

in full compliance with

**The operation is**  in substantial compliance with **Emergency Response Practice 7.2**

not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is in full compliance with Standard of Practice 7.2; involve site personnel and stakeholders in the planning process.

GK has involved its workforce and stakeholders, including potentially affected communities, in the cyanide emergency response planning.

GK has involved the workforce in emergency response planning during regular safety meetings, where workers have the opportunity to raise concerns or make comments on the emergency response planning.

Neighbouring facilities have been sent a copy of the Emergency Response plan (ERP) and the opportunity to take part in mock drills. GK would telephone the neighbouring facilities in the event of an emergency and also calls them every time the site wide emergency sirens are tested.

GK has involved local response agencies such as outside responders and medical facilities in the cyanide emergency planning and response process.

The local fire department visit GK once a year. The fire department has familiarised themselves with the site and the ERP and have been given a copy. The Fire Department has advised the site regarding the number of fire extinguishers, fire hydrants that are required.

GK has a letter, dated 14 September 2018, from the Atanas Dafovski hospital in Kardzhali stating they are aware of the use of cyanide at GK and that they are able to treat cyanide exposure victims at the hospital.

GK engages in consultation or communication with stakeholders to keep the ERP current. Emergency actions are detailed on the company website along with details to the process undertaken at the facility. GK liaises with the local fire department, neighbouring facilities and non-government organisations.

**Standard of Practice 7.3: Designate appropriate personnel and commit necessary equipment and resources for emergency response.**

in full compliance with

**The operation is**  in substantial compliance with **Emergency Response Practice 7.3**

not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is in full compliance with Standard of Practice 7.3; designate appropriate personnel and commit necessary equipment and resources for emergency response.

GK has committed in their emergency response plans and procedures the necessary emergency response equipment and first aid equipment to treat and to coordinate transportation to the local hospital. The GK Emergency Response Procedure describes the roles and responsibilities for the emergency response coordinators (including the primary and alternate coordinators).

The ERP states that regular training of site personnel must be carried out regarding emergency response training.

GK has identified its Emergency Response team (ERT) and emergency coordinators and has an updated list of them including their name and contact information in Emergency Response Plan.

GK confirmed that outside entities included in the ERP are aware of their involvement and are included as a necessary in mock drills or implementation exercises.

The EPR details a list of tools, materials and PPE and fire fighting equipment and details a list of medical supplies and first aid kits.

The two cupboards and one room containing emergency response equipment are inspected every month by the Safety Manager. In addition the cupboards are tagged and the tags are inspected daily as part of the shift inspection. Records of inspections were reviewed for 2015, 2016 2017 and 2018. SOP P-6.3.1.2.2 details the inspection procedures for first aid equipment.

The local fire department visit GK once a year. The fire department has familiarised themselves with the site and undertaken familiarisation exercises. They have been given a copy of the ERP.

GK has a letter from the local hospital in Kardzhali stating they are aware of the use of cyanide at GK and they are able to treat cyanide exposure victims at the hospital.

The Municipal authority have been sent ERP, to help warn the town if there are issues arising from the use of cyanide.

**Standard of Practice 7.4: Develop procedures for internal and external emergency notification and reporting.**

in full compliance with

**The operation is**  in substantial compliance with **Emergency Response Practice 7.4**

not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is in full compliance with Standard of Practice 7.4; develop procedures for internal and external emergency notification and reporting.

The ERP includes procedures and contact information for notifying GK management, Regional Government, the Municipal Fire Department, the civil protection department, the emergency services, and local police.

The ERP includes procedures and contact information for notifying potentially affected communities of the cyanide-related incident and any necessary response measures and for communications with the media. Control room operators would use a site wide loud speaker system and sirens to alert workers and the nearby community and other facilities. Neighbouring facilities would also be contacted directly by telephone. In case of wider impact the civil protection department of the local authority would be involved in response measures and communication with the media.

**Standard of Practice 7.5: Incorporate in response plans and remediation measures monitoring elements that account for the additional hazards of using cyanide treatment chemicals.**

in full compliance with

**The operation is**  in substantial compliance with **Emergency Response Practice 7.5**

not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is in full compliance with Standard of Practice 7.5; incorporate in response plans and remediation measures monitoring elements that account for the additional hazards of using cyanide treatment chemicals.

The ERP describes specific remediation measures as appropriate for likely cyanide release scenarios, such as: recovery of solutions or solids; decontamination of soils or other contaminated media; management and/or disposal of spill clean-up debris. No neutralisation of spills occurs at the mine.

Procedures require securing the area, excluding access without PPE, use absorbent dependent on spillage; disposal and decontamination of equipment.

There are no surface water channels at the Site and therefore the statement that GK prohibits the use of chemicals such as sodium hypochlorite, ferrous sulphate and hydrogen peroxide to treat cyanide that has been released into surface water is not applicable.

The documents titled 'Measures, clean up spills/discharges of dangerous substances on the production site (including contained areas) and treatment of waste' and sampling procedures in case of an accident with dangerous substances' address the potential need for environmental monitoring to identify the extent and effects of a cyanide release, and include sampling methodologies, parameters and, where practical, possible sampling locations.

**Standard of Practice 7.6: Periodically evaluate response procedures and capabilities and revise them as needed.**

in full compliance with

**The operation is**  in substantial compliance with **Emergency Response Practice 7.6**

not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is in full compliance with Standard of Practice 7.6; periodically evaluate response procedures and capabilities and revise them as needed.

Under Bulgarian legislation the ERP is required to be updated annually. The current version of the Emergency Response plan is dated March 2018. The SOP Assessment and Review of the Emergency Plan states that the plan will be reviewed annually.

Six or seven mock cyanide drills are conducted annually as part of the ERP evaluation process. Mock drills have included a variety of drill scenarios involving both spills and cyanide exposure. One drill involved representatives from one of the neighbouring companies.

The assessment and review of the Emergency Response Plan document states in Section 7 that in the event of an incident or failure a working group will investigate the incident and update the emergency plan as required. No cyanide related incidents or accidents have occurred and therefore no such review has been conducted.

## PRINCIPLE 8 – TRAINING

### Train Workers and Emergency Response Personnel to Manage Cyanide in a Safe and Environmentally Protective Manner

**Standard of Practice 8.1: Train workers to understand the hazards associated with cyanide use.**

in full compliance with

**The operation is**

in substantial compliance with

**Training Practice 8.1**

not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is in full compliance with Standard of Practice 8.1; train workers to understand the hazards associated with cyanide use.

GK provides initial training and refresher training to all employees and contractors, with the potential to be exposed to cyanide, on cyanide hazard recognition, cyanide first aid treatment, and spill response.

Task specific refresher training is provided by supervisors every three months. This includes going over safety instructions, and any specific safety measures in certain areas. This is required under Bulgarian safety laws – Health and Safety Conditions of Work. Workers are required to sign to show they have received this training.

Cyanide training records are retained detailing who was present at the training, the date it was given and the topic.

**Standard of Practice 8.2: Train appropriate personnel to operate the facility according to systems and procedures that protect human health, the community and the environment.**

in full compliance with

**The operation is**

in substantial compliance with

**Training Practice 8.2**

not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is in full compliance with Standard of Practice 8.2; Train appropriate personnel to operate the facility according to systems and procedures that protect human health, the community and the environment.

GK trains workers to perform their normal production tasks, including unloading, mixing, production and maintenance, with minimum risk to worker health and safety in a manner that prevents unplanned cyanide releases. New employees receive induction training, training regarding working with hazardous chemicals and specific training which include training on SOPs.

As part of the task specific training the trainer details the dangerous chemicals used in the technical process in the whole plant not just the area the worker is being trained to work in.

Training elements necessary for each job involving cyanide are identified in training materials. Training is undertaken on specific SOPs.

Refresher training is provided annually. The presentations ‘General Safety Instruction’ presentation and ‘Training for Safe Operation when working with hazardous chemicals’ are presented to workers annually.

GK requires observes workers and gets them to complete verbal tests to evaluate the effectiveness of cyanide training. No written tests are undertaken.

Training records documenting the training received are retained throughout an individual's employment. Training records include the names of the employee and the trainer, the date of training, and the topics covered. Records were reviewed and three workers people were crossed checked to see that they had received the appropriate training.

**Standard of Practice 8.3: Train appropriate workers and personnel to respond to worker exposures and environmental releases of cyanide.**

in full compliance with

**The operation is**

in substantial compliance with

**Training Practice 8.3**

not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is in full compliance with Standard of Practice 8.3; train appropriate workers and personnel to respond to worker exposures and environmental releases of cyanide.

All cyanide unloading, mixing, production and maintenance personnel are trained in the procedures to be followed if cyanide is released.

The document titled 'Programme for the undertaking of training for safe use of working with dangerous goods' has two specific topic that trainers have to cover with employees in task specific training relating to cyanide being released.

Site cyanide response personnel, including unloading, mixing, production and maintenance workers are trained in decontamination and first aid procedures.

Refresher training for response to cyanide exposures and releases which includes cyanide hazard recognition training and cyanide related emergency response procedures is conducted annually.

Simulated cyanide emergency drills are periodically conducted for training purposes. Seven mock drills have been undertaken so far each year and have included a variety of drill scenarios. In addition one drill involved the cyanide transporter, CB SPED and one included representatives from the neighbouring companies.

Cyanide emergency drills are evaluated from a training perspective to determine if personnel have the knowledge and skills required for effective response. Training procedures are revised if deficiencies are identified. After each mock drill an assessment is made as to whether any additional training is required following the findings of the drill.

Records are retained documenting cyanide training, including the names of the employee and the trainer, the date of training, the topics covered, and how the employee demonstrated an understanding of the training materials.

GK requires workers to complete verbal tests to evaluate the effectiveness of cyanide training and a mark is given to each employee which is recorded. These marks are recorded in the workers training record. No written tests are undertaken.

## PRINCIPLE 9 – DIALOGUE

### Engage in Public Consultation and Disclosure

**Standard of Practice 9.1: Provide stakeholders the opportunity to communicate issues of concern.**

in full compliance with

**The operation is**

in substantial compliance with

**Dialogue Practice 9.1**

not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is in full compliance with Standard of Practice 9.1; provide stakeholders with the opportunity to communicate issues of concern.

GK provides the opportunity for stakeholders to communicate issues of concern regarding the management of cyanide.

Stakeholders or members of the public can visit GK or telephone the company at any time to share concerns. GK has a complaints book where any complaints are logged. No complaints have been received over the last three years.

The GK website has a contacts page where stakeholders can obtain information on how to contact the site. In addition, members of the public or stakeholders can also contact the Regional Inspectorate of Environment and Water (Haskovo) or the Kardzhali Municipality and the District Government, who will contact GK on their behalf.

Annually, a meeting is held with the NGO known as the Public Council of Kardzhali who make inspections relating the GK's permits (Integrated Pollution Prevention Control permit, European Union Seveso Directive, Hazardous Chemicals and Air Emissions).

GK has regular contact with their neighbouring facilities, Monek Yug and Pnevmatika-Serta, and have provided them with GK's Summary Emergency Response Plan which details Actions to be taken in case of an emergency. Monek Yug, the closet neighbour, took part in one of the mock drills conducted at the cyanide warehouse.

GK has provided Emergency Response information to the two companies that have sub-contractors present at the site – Top Trading plc a joinery company and K & K a mechanical parts company.

**Standard of Practice 9.2: Initiate dialogue describing cyanide management procedures and responsively address identified concerns.**

in full compliance with

**The operation is**

in substantial compliance with

**Dialogue Practice 9.2**

not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is in full compliance with Standard of Practice 9.2; initiate dialogue describing cyanide management procedures and responsively address identified concerns.

GK initiates face-to face interactions with stakeholders and responds to concerns.

GK's website has information on health and safety, the environment and details on the International Cyanide Management Code. Minutes of meetings with Non Government organisations (NGOs) are available on the website.



The Regional Ministry of Environment and Water visit GK annually and they produce spot check reports which are publicly available on the ministry website and also GK website.

Regular meetings have taken place with stakeholders – the Public Council of Kardzhali. These meetings have included discussion on cyanide use and the company's permits and controls at GK.

GK have regular meetings with their neighbouring facilities, Monek Yug and Pnevmatika-Serta and have provided them with information regarding the use of cyanide.

**Standard of Practice 9.3: Make appropriate operational and environmental information regarding cyanide available to stakeholders.**

in full compliance with

**The operation is**

in substantial compliance with

**Dialogue Practice 9.3**

not in compliance with

**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is in full compliance with Standard of Practice 9.3; make appropriate operational and environmental information regarding cyanide available to stakeholders.

The population is generally literate. GK provides information on cyanide in written format as described above as well as verbally during meetings with stakeholders as described in 9.2. GK has also visited local gypsies that live (illegally) close to the tailings facility. GK has also spoken with the local Municipality regarding the gypsy presence in this area. GK knows that the gypsies have a separate water supply and do not use the tailings facility as such.

GK makes information publicly available cyanide release or exposure incidents on their website.

In addition, GK produces an Annual Environmental Report that is available on the 'Executive Environmental Agency' <http://eea.government.bg/bg/r/r-kpkz/godishni-dokladi/> website and the GK website. This report sets out the emissions and monitoring data that is undertaken as part of their Integrated Pollution Prevention Control permit it states whether any incidents have occurred at the facility.

No cyanide release and exposure incidents have occurred at the facility since operations began.

## Signature Page

### Golder Associates (UK) Ltd



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SW/DH/es

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