INTERNATIONAL CYANIDE MANAGEMENT INSTITUTE

Cyanide Code Compliance Audit
Gold Mining Operations

Summary Recertification Audit Report

African Barrick Gold
North Mara Gold Plant
Tanzania

14th – 18th May 2012
Name of Operation: North Mara Gold Mine
Name of Operation Owner: African Barrick Gold
Name of Operation Operator: African Barrick Gold
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Location detail and description of operation:
African Barrick Gold’s North Mara Gold Mine is located in the Tarime District, Mara, Tanzania. It is approximately 38 km south of the township of Tarime, 110km east of Musoma town centre and approximately 350km from Mwanza. It is located 100km east of Lake Victoria and 20km south of the Kenyan border.

The North Mara mine consists of three open pit deposits, Gokona, Nyabirama and Nyabigena. The open pits are exploited using traditional drilling and blasting techniques. Both oxide and sulphide reserves are mined and processed by conventional carbon-in-leach (CIL) technology.

The ore is hauled in 80 tonne dump trucks up to the Run of Mine (ROM) pad at Nyabirama. The ore is drawn out of the ROM bin and fed onto a vibrating grizzly screen by means of an apron feeder. The undersize material passes through the grizzly onto a conveyor belt while the oversize material passes through a jaw crusher which discharges onto the same conveyor belt. The ore is fed onto a banana screen via a two tier conveyor system. The undersize from the banana screen passes onto a conveyor belt which feeds the SAG mill feed stockpile while the oversize material is fed into a secondary crusher. The crushed ore from the secondary stockpile is tipped onto the SAG feed stockpile.

The ore is drawn from underneath the SAG mill feed stockpile onto the SAG mill feed conveyor belt by means of three vibrating feeders. It is fed into the SAG mill for primary grinding. The SAG mill discharge is pumped to a cluster of thirteen cyclones for classification. The cyclone overflow is fed onto the trash screen while the underflow is split between two ball mills for regrinding and onto a scalping screen. The discharge from the ball mill is pumped to the cyclone cluster for classification. The scalping screen underflow is fed into two Knelson Concentrators while the overflow is fed back into the SAG mill. The concentrate from the Knelson Concentrators is fed to the Acacia reactor in the gold room while the tails are fed back into the ball mills. The residue from the Acacia reactor is fed to the regrind mill and back into the CIL circuit.
The trash screen overflow falls into a bunker while the underflow is fed into the leach adsorption circuit comprising of three leach tanks and seven adsorption tanks which are in series. Loaded carbon is recovered from the first tank of the adsorption train and transferred to acid washing. The slurry from the final adsorption tank is fed into two thickeners via two carbon safety screens. The water recovered from the thickener overflow is recovered and used in the plant as process water while the thickened underflow is pumped to the Tailings Storage Facility (TSF).

The cathodes in the electro winning cells are washed with high pressure spray water and the gold slime is recovered in a plate and frame filter press. The gold sludge filter cake is dried in calcination ovens and smelted on site before being dispatched.
Auditor’s Finding

This operation is

☐ in full compliance

X in substantial compliance *(see below)

☐ not in compliance

with the International Cyanide Management Code.

* The Corrective Action Plan to bring an operation in substantial compliance into full compliance must be enclosed with this Summary Audit Report. The plan must be fully implemented within one year of the date of this audit.

This operation has experienced compliance problems during the previous three year audit cycle. The problems have related to consistency of WAD cyanide results and cyanide destruction and are discussed in Standards of Practice 4.1, 4.4, and 4.9. They are being addressed in an agreed Corrective Action Plan.

Audit Company: Eagle Environmental

Audit Team Leader: Arend Hoogervorst

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Names and Signatures of Other Auditors:

Name: Dawid M. L Viljoen Signature Date: 12/2/13

Dates of Audit: 14th – 18th May 2012

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 International Cyanide Management Code Verification Protocol for Gold Mine Operations and using standard and accepted practices for health, safety and environmental audits.

North Mara Gold Mine

Facility Signature of Lead Auditor Date: 12/2/13

North Mara Gold Mine Signature of Lead Auditor 12th February 2013
Auditor’s Findings

1. PRODUCTION: Encourage responsible cyanide manufacturing by purchasing from manufacturers who 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.

X in full compliance with

The operation is

☐ in substantial compliance with Standard of Practice 1.1

☐ not in compliance with

Basis for this Finding/Deficiencies Identified:
African Barrick Gold, under an umbrella contract for all Barrick global subsidiaries, obtains its cyanide, on behalf of North Mara Gold Mine, from Orica, who produce and transport the product. Orica is a signatory to the ICMI Cyanide Code, and the contract requires that the producer must comply to the provisions of the Cyanide Code. Orica’s Yarwun production facility is fully certified, as a cyanide production facility, under the ICMI code, and supplies solid sodium cyanide to African Barrick Gold for use at their North Mara Gold Mine.

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.

X in full compliance with

The operation is

☐ in substantial compliance with Standard of Practice 2.1

☐ not in compliance with
Basis for this Finding/Deficiencies Identified:
There is a formal contract between Orica and Barrick (on behalf of African Barrick Gold North Mara Gold Mine) which cover the responsibilities and requirements for safety, security, unloading, emergency response (spills prevention and clean-up), route planning and risk assessments, community liaison, emergency response resource access and availability, training, and communication.

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

X in full compliance with

The operation is □ in substantial compliance with Standard of Practice 2.2
□ not in compliance with

Basis for this Finding/Deficiencies Identified:
The contract with Orica requires that the transporters comply with all the provisions of the ICMI Cyanide Code. The Australian Supply Chain covers the transportation of solution sodium cyanide and solid sodium cyanide from the manufacturing facility in Yarwun, Australia, by road and rail direct to its end point users within Australia and the Port of Brisbane and was fully certified on 5th October 2010. Orica’s transport supply chain for East Africa was published on the ICMI website on May 19th 2011. The East Africa Supply Chain covers the transportation of solid sodium cyanide by ship from the Port of Brisbane, Australia to the Ports of Mombasa, Kenya and Dar es Salaam, Tanzania via the Mediterranean Shipping Company. Within Kenya and Tanzania solid sodium cyanide is transported by road to end point users by Freight Forwarders Kenya and Freight Forwarders Tanzania, both of whom are signatories to the ICMI Cyanide Code and were recertified in September 2011. The certification covers Allied Wharfage Ltd who provides interim warehousing and storage (for up to two weeks), and transportation is undertaken by a group associated company, Transeast Ltd. Transeast transport all cyanide for FFK from the AWL interim storage facility to North Mara.

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.

X in full compliance with
The operation is □ in substantial compliance with Standard of Practice 3.1  
□ not in compliance with

_Basis for this Finding/Deficiencies Identified:_
Documentation audited during the certification audit was confirmed for the cyanide mixing and storage tanks i.e. detailed, professionally designed, drawings for the cyanide mixing and storage areas were sighted which clearly indicated the structures were designed for sodium cyanide and located on concrete. There was no change in cyanide mixing and liquid storage, and a new solid cyanide box store was commissioned in 2009 which was checked in the site inspection. The cyanide dry store has adequate ventilation, is located next to the caustic soda store, away from any people. The store is bunded with retaining walls and a hump at the main door is in place to contain spillages and minimise potential for contact of solid cyanide with water. No surface water is in close proximity of the store. The cyanide mixing and reagent strength solution storage is situated next to the leach, is open with good ventilation and away from people. The Cyanide area has adequate controls and separation to prevent mixing with incompatible materials. The water fill valve is interlocked with the level measurement at 95% to prevent overfilling of the mixing tank. The manual valve is closed when tank level is at 80% during mixing, and opened after mixing again, where the interlock will close the valve at 95% and the manual valve will be closed at this point to prevent overflow in case of automatic valve failure. An alarm is included on the SCADA in the control room and is activated at 95%. Secondary containments built from concrete provide a competent barrier to leakages and provide adequate and appropriate containment for the tanks. The cyanide store is located within a high security area, with access control and security patrols. The store is kept locked with the key in the custody of the stores.

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

□ X in full compliance with

The operation is □ in substantial compliance with Standard of Practice 3.2  
□ not in compliance with

_Basis for this Finding/Deficiencies Identified:_
No liquid cyanide is delivered and all cyanide used is mixed from solid briquettes. The procedures covering unloading from containers, mixing and disposal of packaging were sighted, reviewed and found to be effective. The disposal of packaging procedure requires that the cyanide boxes and plastic bags are taken to a designated area inside the plant security area to be burnt twice per week.
The mixing procedure spells out the sequence of tasks clearly to avoid spillages and releases and includes pre-work inspections, required PPE, and the use of a buddy.

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 utilizing contingency planning and inspection and preventive maintenance procedures.

☐ in full compliance with

The operation is ☒ in substantial compliance with Standard of Practice 4.1

☐ not in compliance with

Basis for this Finding/Deficiencies Identified:
The process plant has 12 specific operational procedures 38 procedures for the CIL cyanide areas, 23 elution procedures, 12 mechanical cyanide specific procedures, all supported by 13 environmental procedures. The operation identifies the assumptions and parameters on which the facility design was based and regulatory requirements (i.e. freeboard required for safe pond and impoundment operation; and the cyanide concentrations in tailings on which the facility’s wildlife protection measures were based) necessary to prevent or control cyanide releases. A TSF Management Plan is in place. On the Tailings Storage Facility (TSF), weekly pond level surveys are conducted in addition to pipeline inspections, embankment integrity, decant pond, and wildlife observations. A change management procedure is in place and functioning and change management exercises are signed off by Health, Safety and Environmental officials.
Throughout the site, preventative maintenance and inspections have been controlled by a software-based, Planned Maintenance System (PMS) called PRONTO. Key pumps, tanks, bunded areas, pipes and pipelines, and equipment were checked on the system and found to be systematically maintained through visual and mechanical checks, thickness tests and historical reviews. The newly commissioned detoxification plant has already been loaded on the PRONTO system.
Routine daily, weekly, monthly and annual inspection reports, monthly piezometer readings, legal inspections, and checklists for the TSF and the plant were sampled over the three years since certification. Operational weekly inspections include a checklist for the process pond. The level is measured by ultrasonic level detectors and displayed on the SCADA in the control room. However, the plant power is supplied by 18 diesel generators with 15 units as standby for the national power grid and all generators form part of the PM Pronto system. The TSF freeboard is sufficient to handle the design storm event in the pool.
However, As a result of changing ore characteristics and process philosophies, and changing terminal cyanide levels, there were a series of changes in compliance strategy.
which were not accurately reflected in operational procedures, to which multiple turnover of senior staff did not react appropriately to. A Corrective Action plan has been agreed to which will prevent a re-occurrence of the problems.

\textit{Standard of Practice 4.2: Introduce management and operating systems to minimize cyanide use, thereby limiting concentrations of cyanide in mill tailings.}

\textbf{X in full compliance with}

\begin{itemize}
\item [\square] in substantial compliance with \textbf{Standard of Practice 4.2}
\item [\square] not in compliance with
\item [\square] not subject to
\end{itemize}

\textit{Basis for this Finding/Deficiencies Identified:}

Ore is received from 3 different pits with 3 different grades per pit with variability in terms of mineralogy, recovery, hardness and reagent consumption. Non acid forming (NAF) and potential acid forming (PAF) ores are identified. Ore hardness varies from very hard to very soft in the pits. Test work to characterize the different ore types (diagnostic leach) was done, including predicting cyanide consumption as well as recovery performance. A geology program is in place for ore blends to control grade. Bottle roll tests on leach tails on extended leach are conducted as well as leach well tests. The results are used to predict and confirm recoveries in the process, linking it to the ore type. The new plant upgrade construction was completed and the sections are in the process of commissioning. Work is in progress to improve upstream prediction of cyanide consumption based on ore types and to optimise recoveries. The plant upgrade project is currently being commissioned and will include improved operating parameters - better leach feed density control, classification efficiencies, grinding optimisation, gravity gold recovery optimisation, and pre oxidation before adding cyanide.

The basis of control is to achieve stable operating parameters and plant conditions and will be implemented once the upgrade project is fully commissioned. TAC 2000 set points are changed based on residual free cyanide values to maintain optimal recovery for the specific ore mix. A detoxification plant has been commissioned to reduce the WAD cyanide to below 50ppm in the spigot discharge to the TSF. Further control strategies will be considered once the process is fully commissioned and is in steady state.

Cyanide addition control is based on TAC 2000 on line free cyanide measurement linked to variable speed control on the dosing pumps. Manual titrations are used as back up for the TAC 2000 measurements. Free cyanide in CIL no 10 is manually titrated two hourly, TAC2000 set points are changed based on residual free cyanide values to optimise recovery.

\textit{Standard of Practice 4.3: Implement a comprehensive water management program to protect against unintentional releases.}
The operation is  X in full compliance with

The operation is  in substantial compliance with Standard of Practice 4.3

 not in compliance with

Basis for this Finding/Deficiencies Identified:
The Mine uses the GoldSim probabilistic water balance, which is regularly updated and calibrated. The probabilistic water balance covers the whole mine. The model has two parts, a tracking model and predictive model incorporating all inflows and outflows for the process plant and the TSF. The water balance model accounts for all the applicable parameters identified in the Cyanide Code, and the site monitors the freeboard in its TSF, measures precipitation, and updates the model as necessary.

TSF Phreatic levels are measured and an annual TSF report is issued making recommendations which are included in a management procedure. The phreatic levels are used to predict evaporation and seepage. The current TSF freeboard is 2.7m which is above the 1:100, 24 hour storm event requirements. The GoldSim model has indicated that the minimum freeboard should be maintained at more than 500mm.

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

The operation is  X in full compliance with

The operation is  in substantial compliance with Standard of Practice 4.4

 not in compliance with

Basis for this Finding/Deficiencies Identified:
At the certification audit, done in 2008, full compliance for this Practice resulted from Environmental Department pond data indicating WAD cyanide levels of less than 50mg/l WAD cyanide. There appears to have been some confusion over what the compliance point on the TSF was. A review of sample data over the 3 year period since certification shows that samples from the decant tower (apparently the compliance point) were stopped from March 2009 leaving a significant gap in compliance data. The reasons for the change in sampling position and frequency is unclear but it may be due to: frequent changes in staff, particularly management, lack of understanding of Cyanide Code compliance philosophy for the TSF; changes in operational parameters as a result of changing ore characteristics; and changing terminal cyanide levels causing a series of changes in compliance strategy which included changing the appropriate point of compliance. Daily samples from the decant pump in the plant were taken from the beginning of September 2011. Back up samples from the spigot feeding the TSF were taken daily but indicate exceedances of the 50mg/l WAD values at the discharge and thus over the beach. The average value since certification was 48.34 mg/l WAD CN and the
average value taken from the decant tower and decant return water pump delivery was 5.2mg/l WAD CN. The cyanide detoxification facility has been commissioned and currently, only a month of WAD cyanide data is available which is showing below 50ppm WAD cyanide levels being released.

Bird mortality inspections are held twice daily by the Environmental department and all incidents recorded. There have been no cyanide related mortalities recorded since certification, as the large TSF pool contains low level cyanide values. Wildlife observation, including wildlife mortality incidents, forms a part of the TSF daily inspections.

A project, changing the process flow to improve metallurgical efficiencies, was initiated to increase the viability and sustainability of North Mara Mine. The change in process flow involved amongst other things, the conversion of the post-leach thickeners into pre-leach thickeners. A dilution facility in the tailings line, which was in the thickener underflow line at the time, was removed as part of the change. This dilution facility was used (and referred to in the certification audit) to reduce WAD CN in the tails to less than 50 mg/l, but occasionally resulted in higher WAD CN in the discharge to the TSF after the removal of the facility. The North Mara GM Project Management procedure includes change management, thus the mine foresaw the increase in WAD CN in tailings as a result of process design changes and increased cyanide demand by the ore. As a preventative measure to manage risk to wildlife, they therefore planned installation of a detoxification plant on the tailings stream, including an on-line WAD 1000 analyser, to ensure that the WAD cyanide contents discharged at the spigot at the tailings storage facility were managed at less than 50 mg/l. The project construction was completed in June 2012. However, the commissioning of the Detox plant took longer than planned, resulting in the WAD CN being higher than 50 mg/l in the tail slurry pumped to the TSF. The delayed start-up of the oxygen plant in September 2012, which is critical to the efficient operation of the detoxification plant, limited online control of WAD CN from the time the thickener switch-over was made till the final commissioning of the oxygen plant. As mitigation, the Mine undertook a sampling exercise to quantify the risk to wildlife at the TSF discharge, and concluded that the WAD CN was diluted and hydrolysed within 2 m of entering the pool. In the meantime, the pool size also increased, minimising the time where tailings slurry runs across the beach and poses a risk to wildlife. The Detoxification plant commissioning is now completed and the sample results indicate that the tailings slurry has been consistently detoxified to less than 50 mg/l WAD CN since October 2012. Mitigation measures during the commissioning period, included the quantification study of the dilution of slurry cyanide entering the pool, conducting shifty wildlife inspections, and the increased pool size to minimise the slurry exposure between the spigot and the pool.

Deficiencies are that there:

- were significant gaps in continuity of WAD cyanide monitoring data pertaining to the supernatant pond, demonstrating Code compliance to this Standard of Practice over the three year period since certification.

Although there were periods of non-compliance, the auditors are satisfied that the operation has shown good faith in correcting the problems as quickly as practically possible, and that the commissioning delays could not be anticipated. Furthermore, there
were control measures, monitoring and management actions in place which appropriately managed the identified risks to wildlife and health safety and the environment generally. A Corrective Action Plan has been agreed upon which would involve the confirmation of appropriate code compliant sampling points, to take into account the changing pond characteristics relating to changing ores and TSF management and the documentation thereof.

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

**X in full compliance with**

The operation is

☐ in substantial compliance with Standard of Practice 4.5

☐ not in compliance with

**Basis for this Finding/Deficiencies Identified:**
There is no direct discharge to surface water and the nearest river, the Mara river, is 2 kms away. Samples for 2010 to 2012 (weekly) up and downstream of the Mara River are taken quarterly and all values are less than limits of detection 0.008 mg/l WAD CN. No indirect discharge takes place to the Mara river. This is confirmed by up and downstream sampling of the river, as well as boreholes downstream of the TSF.

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

**X in full compliance with**

The operation is

☐ in substantial compliance with Standard of Practice 4.6

☐ not in compliance with

**Basis for this Finding/Deficiencies Identified**
There are no beneficial uses of groundwater identified or specified by the jurisdiction. Three dewatering pumps are used, returning water from the cut off trenches and seepage catchment systems to the TSF. A Borehole downstream of the plant close to the Geology core yard is in place and sampled for WAD CN analyses. This and 14 other boreholes indicate values lower than limits of detection of 0.001 mg/l WAD CN with the exception of a few outliers. Samples sampled show values lower than limits of detection of 0.001 mg/l WAD CN with the exception of two outliers.

Practice 4.7: Provide spill prevention or containment measures for process tanks and pipelines.
X in full compliance with

The operation is □ in substantial compliance with **Standard of Practice 4.7**
□ not in compliance with

**Basis for this Finding/Deficiencies Identified:**
Confirming certification findings, all tanks are placed inside bunds serving as secondary containment. All bunds are equipped with sumps and dedicated sump pumps returning any spillage back to the process. The cyanide storage tank is placed on a solid concrete base. The cyanide mixing and storage tanks are seated on a reinforced concrete slab. Lysimeters have been installed under the leach tanks within the ring beams to enable monitoring for any leakage. The operation has developed a monitoring and action plan for the ring beams. To date the Lysimeters have been dry and no sample has been recovered, indicating that no cyanide solution has been released through the base of the tanks. The new detoxification section bunds are equipped with sump pumps returning spillages to the process. Cyanide tanks and pipelines are manufactured from materials such as carbon steel, stainless steel and HDPE which are compatible with cyanide and high pH conditions.

Plant slurry and cyanide solution lines inside the plant are installed above concrete bunds or concrete floors. Planned inspections are conducted shiftly to look for leaks on the pipes as a spill prevention measure. The slurry pipeline between the plant and the TSF is running inside a lined trench (inside the plant) and an unlined trench (from the plant fence to the TSF). Daily inspections are conducted on the TSF tailings line as well as the return water line. All tailings lines are inspected via the Pronto Preventative Maintenance system.

No special areas posing a risk to surface water have been identified and there are no rivers close by.

**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.**

X in full compliance with

The operation is □ in substantial compliance with **Standard of Practice 4.8**
□ not in compliance with

**Basis for this Finding/Deficiencies Identified:**
The TSF extension Quality Assurance/Quality Control (QA/QC) program and tests were confirmed in annual the TSF audit report for 2010. The latest TSF annual review and report for 2012 includes a review of the design and construction of the TSF lift.
The plant was declared as built to design specifications by the original construction Company Ausenco and signed off by competent persons. Reference is also made to QA/QC programs followed during construction and commissioning.

The new process upgrade plant, including CIL tanks and bunds, and a complete detoxification plant was completed and the construction subject to a QA/QC program.

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

☐ in full compliance with

**The operation is X in substantial compliance with Standard of Practice 4.9**

☐ not in compliance with

*Basis for this Finding/Deficiencies Identified:*

Water sampling procedures and a monitoring program are in place to sample both surface and groundwater for cyanide. The sampling procedures specify roles and responsibilities, actions and methods, cleaning of equipment, preparation, sample labelling, sampling, cyanide sample preservation, the sampling packaging and transportation, and notification of the laboratory. Monitoring, sample preservation and custody and chain of custody procedures were developed by the appropriately qualified personnel. Surface water is sampled monthly, boreholes quarterly and wildlife monitoring twice daily.

However, due to changing staff and lack of clarity in sampling and procedures, this resulted in changes which affected the validity of the data. A Corrective Action Plan has been agreed to which will correct the problems and prevent re-occurrence.

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.*

**X in full compliance with**

*The operation is ☐ in substantial compliance with Standard of Practice 5.1*

☐ not in compliance with

*Basis for this Finding/Deficiencies Identified:*

The International Cyanide Management Code Compliance Project: North Mara Decontamination and Decommissioning Plan, includes details of cyanide
decontamination and decommissioning. An implementation schedule is in place and the details in the Plan are reviewed annually.

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

X in full compliance with

The operation is

☐ in substantial compliance with **Standard of Practice 5.2**

☐ not in compliance with

*Basis for this Finding/Deficiencies Identified:*
The North Mara Gold Mine closure costs document, dated 2011, includes an estimate for cyanide decontamination costs. There are no jurisdictional requirements for the decommissioning of the cyanide related activities. The closure plan for the site has yet to be approved by the Government. A Statement of Financial Strength for the ICMI (using an attestation standard established by the American Institute of Certified Public Accountants), prepared by US Certified Public Accountants, dated 30 April 2010, indicates that Barrick has sufficient financial strength for its cyanide decommissioning activities at North Mara.

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 eliminate, reduce or control them.*

X in full compliance with

The operation is

☐ in substantial compliance with **Standard of Practice 6.1**

☐ not in compliance with

*Basis for this Finding/Deficiencies Identified:*
The process plant has 12 specific operational procedures 38 procedures for the CIL cyanide areas, 23 elution procedures, 12 mechanical cyanide specific procedures, all supported by 13 environmental procedures. All procedures include standard requirements for pre-work inspections and appropriate personal protective equipment. A TSF Management Plan is in place. On the Tailings Storage Facility (TSF), weekly pond level surveys are conducted in addition to pipeline inspections, embankment integrity, decant pond, and wildlife observations. A change management procedure is in place and functioning and change management exercises are signed off by Health, Safety and Environmental officials.

Key pumps, tanks, bunded areas, pipes and pipelines, and equipment were checked on the system and found to be systematically maintained through visual and mechanical checks,
thickness tests and historical reviews. The newly commissioned detoxification plant has already been loaded on the PRONTO system. Use is made of toolbox talks, safety reps meeting, risk assessments and safety meetings to discuss health and safety procedures.

*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.*

**X in full compliance with**

**The operation is**

☐ in substantial compliance with *Standard of Practice 6.2*

☐ not in compliance with

*Basis for this Finding/Deficiencies Identified:*
The leach pH is controlled at 10.5 by the addition of dry lime to the mill feed, as per process description which details the process operating parameters, including lime concentration and pH between 10.5 to 11.0. The plant uses personal HCN gas monitors and no fixed HCN gas monitors are used. Due cost and remoteness considerations of calibration of the units, they are replaced at the time when the manufacturers calibration period expires. Hotspot surveys are conducted and a recent survey picked up high values at the mixing tanks and cyanide dosing area upper stair walkway. Signs are placed at the dosing point and mixing area to warn workers. Signage was observed during the site inspections and included no eating / drinking signs. The comprehensive induction programmes details PPE requirements for the plant and TSF. Eating and drinking is only allowed in designated areas and reinforcement of this forms part of the induction training. On-going inspections and checks are also used to monitor and check facilities and that emergency response equipment is functioning. Safety equipment such as safety showers, low pressure eye wash stations, and fire extinguishers are numerous and adequately signposted. A site wide pipe labelling system is in operation which includes directional flow signage. MSDS’s are available in English, which is the operational language used on site, but Swahili is the local language and Swahili signs were observed. Formal employee interviews were used to check awareness and sensitivity to health and safety measures and the response from employees and contractors alike, was found to be appropriate and acceptable. Accident and incident reporting and investigation procedures were found to be in place and effective.

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

**X in full compliance with**
The operation is □ in substantial compliance with Standard of Practice 6.3
□ not in compliance with

Basis for this Finding/Deficiencies Identified:
The presence of cyanide emergency stations including antidote kits, Oxyviva kits (medical oxygen), and water was confirmed. Radios are primarily used for normal and emergency communication. There are 6 cyanide emergency PPE boxes in place on the plant. All cyanide antidote Tripacks are stored as per manufacturers recommendations, refrigerated, and inspected weekly and kept at the clinic, at the top of the leach, Gold Room and the Supervisors office. All plant workers are trained in cyanide first aid and form part of the response team. The plant responders can only administer oxygen. The mine on-site clinic, close to the plant main entrance, is equipped to handle cyanide patients (inhalation - 3 patients, ingestion and exposure to liquids - 3 patients). A Paramedic and a Mine Emergency Team is on standby and will accompany the ambulance to the site of a cyanide incident. Cyanide emergency procedures form part of the site-wide emergency preparedness plan which covers the whole site and includes the cyanide facilities. No local hospitals or clinics are used for cyanide exposure patients. Patients are transported by air to Aga Khan Hospital in Dar es Salaam or Nairobi hospital, Kenya. The site Medical Superintendent will decide whether to evacuate the patient or not. A risk assessment was conducted to identify what type of medical emergencies could occur which include cyanide. There is a regional Barrick air evacuation back up service. Equipment is regularly checked and tested and mock drills are held on site and in conjunction with the Clinic. Interviews confirmed employee knowledge of cyanide hazards, and emergency response.

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.

X in full compliance with

The operation is □ in substantial compliance with Standard of Practice 7.1
□ not in compliance with

Basis for this Finding/Deficiencies Identified:
There is an Emergency Crisis Management Plan (June 2012, revision 3), which includes site-specific cyanide emergency scenarios and responses. Cyanide first aid procedures are included in the Plan. The Plan combines existing procedural responses and emergency provisions to deal with the various scenarios and includes and identifies the emergency
response team and coordinators who are on all shifts. These preparations are regularly reviewed in the light of changes, mock drill learning points and employee feedback.

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

X in full compliance with

The operation is □ not in substantial compliance with Standard of Practice 7.2 □ not in compliance with

Basis for this Finding/Deficiencies Identified:
The Emergency Crisis Management Plan (ECMP) is discussed at safety meetings and tool box meetings. The workforce is involved in the testing of the plan through emergency drill feedback. No communities are directly involved with the ERP but they are briefed through the community dialogue structures.

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

X in full compliance with

The operation is □ not in substantial compliance with Standard of Practice 7.3 □ not in compliance with

Basis for this Finding/Deficiencies Identified:
The ECMP designates emergency controllers and the cyanide emergency response team and the roles and responsibilities of the controllers and team are defined in the Plan. The emergency response team will commit the resources necessary to deal with the emergency. Competency of emergency response coordinators is checked through mock drills. The Plan includes emergency response training be undertaken. Emergency equipment lists were checked and site inspections confirmed availability and readiness. The Plan includes contact references (telephone, cell phone, etc) of internal and external resources for the various scenarios, particularly with detail where external resources and skills might be needed. Emergency Team members were checked and training records and assessments showed the individuals to be prepared and equipped for cyanide emergencies. Periodic full scale drills are held to ensure that roles and responsibilities are understood and clearly implemented.

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

X in full compliance with
The operation is □ in substantial compliance with Standard of Practice 7.4

□ not in compliance with

Basis for this Finding/Deficiencies Identified:
The Emergency Preparedness Plan includes full details of appropriate emergency contacts and reporting, media communication and the call-out procedure and contact information lists which are updated regularly.

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

X in full compliance with

The operation is □ in substantial compliance with Standard of Practice 7.5

□ not in compliance with

Basis for this Finding/Deficiencies Identified:
The ECMP includes clean-up and neutralisation of solid or solution spills, sampling and monitoring, PPE and materials to be used. The use of treatment chemicals such as ferrous sulphate and hydrogen peroxide in surface water is prohibited, unless human life is under direct threat. The ECMP also includes provision for alternative drinking water supplies as necessary.

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

X in full compliance with

The operation is □ in substantial compliance with Standard of Practice 7.6

□ not in compliance with

Basis for this Finding/Deficiencies Identified:
The ECMP is reviewed at least annually and at any time major changes occur in operations on the mine site. The General Manager is responsible for ensuring that emergency drills are periodically conducted in all work areas and this recommended at 6 monthly intervals. The Manager: EHS is responsible for implementing all agreed changes arising from exercise evaluations and monitoring their installation, documentation and progress.
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.

X in full compliance with

The operation is

☐ in substantial compliance with Standard of Practice 8.1

☐ not in compliance with

Basis for this Finding/Deficiencies Identified:
All people working on the plant receive cyanide training (includes process, maintenance, contractors, security) The training matrix includes the compulsory sodium cyanide module. refresher training is done 6 monthly. Records are retained for at least 3 years.

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.

X in full compliance with

The operation is

☐ in substantial compliance with Standard of Practice 8.2

☐ not in compliance with

Basis for this Finding/Deficiencies Identified:
The training matrix includes operational task training and required SOP training modules for each job. Unloading and mixing is included in the training matrix and all process staff are trained in cyanide mixing as part of their compulsory training. The index of training covered in the production task training was reviewed. Training is provided by the Plant Training Officer, a qualified Metallurgist, with 5 years operational experience in running the different sections of the plant as well as in a supervisory position. All staff are trained before being allowed to enter the plant. All new employees will do the cyanide and safe work practice module and need the sign off by the training officer before being allowed into the plant. The employee receives the appropriate SOP's and works under the supervisor as part of on-the-job training. Once ready to take over the shift, he is tested and signed off as competent by the training officer. Task observations are used to evaluate the continued competence of the individual. If deviations are identified, these are first discussed with the supervisor and the SOP is re-trained or refreshed with the individual, as appropriate. Records are retained for at least 3 years.
Standard of Practice 8.3: Train appropriate workers and personnel to respond to worker exposures and environmental releases of cyanide.

X in full compliance with

The operation is □ in substantial compliance with Standard of Practice 8.3

□ not in compliance with

Basis for this Finding/Deficiencies Identified:
All process operators working on the plant receives cyanide training. The sodium cyanide course includes procedures to follow when cyanide is released, and how to clean up both solid as well as liquid cyanide spillages. All people working on the plant, (including process, maintenance, contractors, security) reacting as first responders, receive cyanide training. The cyanide training module including procedures to decontaminate persons and to apply cyanide first aid. A Mine emergency response team is trained in cyanide emergencies using the cyanide module.
No local community or offsite emergency responders are involved in the plant ECMP. Periodic mock drills are undertaken and the training officer attends these drills and evaluates response and performance. Training records were checked to confirm attendance and successful completion. General cyanide worker refresher training is scheduled annually. Records are retained for at least 3 years.


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

X in full compliance with

The operation is □ in substantial compliance with Standard of Practice 9.1

□ not in compliance with

Basis for this Finding/Deficiencies Identified:
Dialogue is two way and thus the forum for receiving issues and presenting responses is the same. Following 2009, conflict issues (not related to cyanide) resulted in the stagnation of dialogue, but it was resumed in late 2010. A key area in the re-engagement program has been cyanide awareness. Committees are in place in each of the 10 villages, including a water committee. Re engagement with small scale miners is in progress, with cyanide dialogue included in the process. 23 Villages were identified in 2 districts. High level meetings were held with the 2 districts (Tarime and Rorya). 18 villages (Sirari, Magena, Remagwe, Ng'ereg'ere, Bukwe, Gamasara, Nyamisangura, Surubu,
Sombanyasoko, Bisarwi, Nyarwana, Weigita, Nkerege, Kembwi, Kewania, Matongo, Kerende, Nyamwaga) were involved so far in meetings, which included presentations. The Village Councils, which included teachers and health practitioners, were involved in the meetings. Questions that were raised included fears regarding the evaporation of cyanide and unrelated questions to roads. One request was that the village nurse be trained in cyanide first aid. PowerPoint presentations and a Swahili leaflet are handed out. The leaflets are in cartoon format with pictures and words. The PowerPoint presentation contains pictures from the cyanide awareness module. Presentations to schools in the area of the plant (16) were held using the same presentations and handouts. A visit by the Prime Minister, other high level dignitaries and other Parliamentarians were held and they received a standard presentation on the operations which included cyanide management.

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

X in full compliance with

The operation is □ in substantial compliance with Standard of Practice 9.2

□ not in compliance with

Basis for this Finding/Deficiencies Identified:
Dialogue is two way and thus the forum for receiving issues and presenting responses is the same. Following 2009, conflict issues (not related to cyanide) resulted in the stagnation of dialogue, but it was resumed in late 2010. A key area in the re-engagement program has been cyanide awareness. Committees are in place in each of the 10 villages, including a water committee. Re engagement with small scale miners is in progress, with cyanide dialogue included in the process. 23 Villages were identified in 2 districts. High level meetings were held with the 2 districts (Tarime and Rorya). 18 villages (Sirari, Magena, Remagwe, Ng'ereg'ere, Bukwe, Gamasara, Nyamisangura, Surubu, Sombanyasoko, Bisarwi, Nyarwana, Weigita, Nkerege, Kembwi, Kewania, Matongo, Kerende, Nyamwaga) were involved so far in meetings, which included presentations. The Village Councils, which included teachers and health practitioners, were involved in the meetings. Questions that were raised included fears regarding the evaporation of cyanide and unrelated questions to roads. One request was that the village nurse be trained in cyanide first aid. PowerPoint presentations and a Swahili leaflet are handed out. The leaflets are in cartoon format with pictures and words. The PowerPoint presentation contains pictures from the cyanide awareness module. Presentations to schools in the area of the plant (16) were held using the same presentations and handouts. A visit by the Prime Minister, other high level dignitaries and other Parliamentarians were held and they received a standard presentation on the operations which included cyanide management.
Standard of Practice 9.3: Make appropriate operational and environmental information regarding cyanide available to stakeholders.

X in full compliance with

The operation is □ in substantial compliance with Standard of Practice 9.3

□ not in compliance with

Basis for this Finding/Deficiencies Identified:
Swahili leaflets are handed out to schools and communities. The leaflets are in cartoon format with pictures and words in Swahili. Most communication taking place is verbal and on a one to one basis and in small groups, as a significant section of the population (50%) may have problems with literacy. Pictures are also used in the presentations to visually demonstrate to the audience certain points and principles. The operation has the mechanisms and procedures to make information publicly available following a cyanide release or exposure incidents, but no such incidents have occurred to date. The Barrick website, www.barrick.com, contains Global Reporting Initiative performance data which includes health, safety and environmental statistics since 2004.