

***INTERNATIONAL CYANIDE
MANAGEMENT INSTITUTE***

***Cyanide Code Compliance Audit
Gold Mining Operations***

***Summary Recertification
Audit Report***

***Acacia
North Mara Gold Mine
Tanzania***

9th – 13th February 2016



Name of Operation: North Mara Gold Mine
Name of Operation Owner: Acacia Mining PLC
Name of Operation Operator: Acacia Mining PLC
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Location detail and general description of operation:

Acacia Mining'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 one open pit deposit, Nyabirama and an underground mine at Gokona. The deposits 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 (Semi-Autogenous Grinding) mill feed stock pile while the oversize material is fed into a secondary cone 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 twelve cyclones for classification. The cyclone overflow is fed to two trash screens whilst the underflow reports to a scalping screen prior to gravity concentration. Screen overflow is recombined with gravity circuit tails and reports to 2 ball mills in closed circuit with the classification cyclones. The concentrate from the Knelson Concentrators is fed to the Acacia reactor in the gold room for gold recovery by intensive Cyanidation. Acacia



tailings are returned to the ball mill circuit and pregnant solution is pumped to electrowinning cells.

The trash screen overflow falls into a bunker whilst the underflow is fed to two thickeners. Thickened slurry is pumped to the CIL circuit and water recovered from the thickeners is pumped back to the mill circuit as process water. The CIL circuit consists of three pre-leach tanks and nine adsorption tanks. Carbon is transferred counter current to slurry flow by means of air lifts and is pumped from Tank 4 over the loaded carbon screen before being transferred to the acid wash section.

Residue from the CIL section is pumped to a cyanide detoxification circuit where WAD cyanide concentrations are reduced to less than 50ppm before final plant tailings are routed to the tailings storage facility (TSF). Following deposition, solution from the TSF supernatant pond is pumped back to the plant as process water.

Loaded carbon from the CIL circuit is acid treated using HCl before loaded gold is stripped from the carbon using the AARL (Anglo American Research Laboratory) elution process. Cyanide is not used in the elution circuit. Eluted carbon is regenerated in a rotary kiln and returned to the CIL circuit.

Eluate solution is passed to two electrowinning cells for gold recovery. Gold electroplates onto cathodes which are periodically removed and washed with high pressure spray water to produce a gold slime which is dewatered in a plate and frame filter press. The gold sludge filter cake is dried in calcine ovens and smelted on site before being dispatched as doré bars.



Auditor's Finding

This operation is

- in full compliance
- 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. These are documented in 5.2 below.

Audit Company: Eagle Environmental

Audit Team Leader: Arend Hoogervorst

E-mail: arend@eagleenv.co.za

Names and Signatures of Other Auditors:

Name : Dawid M. L Viljoen Signature  Date: 06/09/2016


Dates of Audit: 9th – 13th February 2016

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 7/8/2016

North Mara Mine

Signature of Lead Auditor

30th August 2016

Audit 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 and Acacia Mining, under an umbrella contract for all Barrick global subsidiaries, obtains its cyanide, on behalf of North Mara Gold Mine, from Orica, who produce 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 cyanide production facility is fully certified, under the ICMI code, and supplies solid sodium cyanide to African Barrick Gold and Acacia Mining for use at the 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:

A supply contract is in place with ICMI certified Orica who are responsible to supply and deliver sodium cyanide to the Port of Mombasa. The mine has a contract with certified transporters to transport the cyanide by road from the port to the mine. The services agreement in respect of global transportation, clearance and forwarding warehousing and distribution, consolidation services, concentrate and fuel transport between African Barrick Gold (Acting on behalf of North Mara Gold Mine) and Freight Forwarders Tanzania (FFT) and Freight Forwarders Kenya (FFK), covering transport of sodium cyanide to the Mine, contains no direct reference to sodium cyanide or the cyanide code. However, as Freight Forwarders Tanzania and Freight Forwarders Kenya are certified ICMI Transporters, this Standard of Practice is compliant. The certification includes all offloading and interim storage at the Magongo road in the Changamwe district in the Port of Mombasa area and transport to the site of North Mara.

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 North Mara Mine contract with Orica requires transport and delivery to the Port of Mombasa and this route forms a part of the Orica Australian Supply Chain (covering transport from Yarwun production facility to Port of Brisbane) and the Orica East African Supply Chain (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), in terms of Code compliance, and the Supply Chain is certified. North Mara is part of the agreement with Freight Forwarders Kenya and Freight Forwarders Tanzania to deliver goods including cyanide from the port of Mombasa or Dar Es Salaam to site at North Mara. FFK and FFT are certified as cyanide transporters. (The certification includes all offloading and interim storage at the Magongo road in the Changamwe district in the Port of Mombasa area and transport to the site of North Mara.) The latest variation agreement will cover compliance against the existing contract until December 2019.

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:

The original cyanide mixing and solution storage section (audited previously) was decommissioned around the middle of January 2016 and replaced with a completely new plant at a different location. The old plant is in the process of being decommissioned, as per the plant's decommissioning procedure. The new plant was designed and constructed by a number of different organisations including Marlyn Chemicals (A chemical design and engineering company based in South Africa), North Mara Plant Engineering and Processing Departments and the Marlyn Chemicals cyanide mixing and storage tanks design drawings were sighted. A S Automation Solutions issued a manufacturing certificate declaring the cyanide dilution system was fabricated in accordance with specifications. The civil design documentation for the Cyanide Tanks included the civil specifications such as slab specifications, and tank plinth reinforcement specifications. The new section used stainless steel piping and mono and hose pumps. The basic process flow diagram and pipe and Instrumentation diagram was sighted. A report, "Acacia Mining: North Mara Gold Plant, Structural Inspection of new Cyanide Plant", signed by a Mechanical Engineer indicated approvals covering foundations and plinths, bunds, steelwork, electrical cabling, piping, cyanide tanks and emergency shower.

The site uses dry cyanide briquettes and no liquid cyanide is delivered to site. The cyanide dry store is located next to the caustic soda store, away from any people. No surface water is in close proximity of the store. The dry storage shed roof is equipped with ventilation units at the apex. 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. The unloading procedure requires measurement of hydrogen cyanide gas before entering the store, as an additional precautionary measure. The new cyanide mixing and storage section is located next to the process water pond and next to the emergency events pond, and is away from people and surface water.

The automated cyanide mixing system shuts the water valve at 85% and this is backed up by closing the manual water valve, as required in the mixing procedure after mixing is completed. Level indicators were observed on the tanks. The tanks are placed on concrete plinths and inside a concrete bund.

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 Department. During site inspection, the use of three locks (keys held by security, process supervisor

and store supervisor) was noted and a key register in place, requiring completion when the dry solid cyanide store is to be accessed for any reason.

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 offloading from containers, mixing and disposal of packaging were sighted, reviewed and found to be clear and descriptive. All empty cyanide boxes and plastic liners are burned and the procedure requires supervising operators to remain until the boxes are completely burned out.

The mixing procedure spells out the sequence of tasks clearly to avoid spillages and releases and includes pre-work inspections, required PPE (Personal Protective Equipment), and the use of a Buddy. Other procedures (unloading cyanide containers and cyanide boxes and cleaning cyanide empty containers) spell out cyanide cleaning requirements.

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.

X 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:

There are 15 cyanide specific operational procedures, 34 CIL procedures, 23 elution procedures, 7 electrical procedures, 12 mechanical cyanide specific procedures, 4 environmental procedures relating to cyanide, and 13 TSF (Tailings Storage Facility) procedures. The operation inspects cyanide facilities on an established frequency sufficient to assure and document that they are functioning within design parameters. The main procedures used for operating the North Mara TSF are contained in the document: "North Mara – Gold Plant Dept., Standards And Procedures, TSF Operation".

The North Mara Gold Mine Tailings Storage Facility Management Audit Report, dated April 2015, and prepared by Knight Piésold contains detailed conclusions and recommendations. The recommendations raised a number of items and these are included in an on-going action plan. Two items were highlighted, the inhibiting security concerns over illegal miners and the management of the supernatant pool level. The water quality monitoring concludes that no significant contamination exists outside the TSF system, but recommends more effort is required to ensure that any seepage is managed away from runoff. The water management plan includes various action plans to reduce the pool levels. The strategies include:- the Eucalypt project - passive evaporation using trees to assist with water and salt removal (The trees have been planted and the pumping systems are expected to be installed in Quarter 1 of 2016); installation of an additional four evaporators; and a number of trenches and sumps constructed on the eastern side of the dam to prevent run-off water entering the TSF via the seepage trench system. An advanced Probabilistic Water Balance for the whole Mine to model water predictions and scenarios to predict TSF rate of rise and freeboard and develop pro-active action plans is in place. The control options are used to predict dam rises and freeboard and assist in making decisions regarding the TSF.

The TSF is a "work in progress" and operating parameters such as freeboard cyanide concentrations, design storm events, and pool size and location are included in operational procedures and discussed at meetings and reported on in annual audits.

The report, "North Mara Gold Mine seepage collection system construction report - North Mara Gold Mine Tailings Storage Facility", prepared by Coffey, dated 20 Nov 2015, details design changes relating to the lift and additional seepage management measures around the TSF, all of which have been completed. Permission was applied for to the Tanzanian Government to release more water from the water treatment reverse osmosis (RO) plant to assist in reducing the TSF pool and a decision is still awaited. This will result in improved pool management during the wet season.

The site uses the PRONTO computerised planned maintenance system (PMS) on the plant and TSF equipment and facilities. 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. Records were sampled covering the three year period. The plant will be stopped for planned maintenance or when inspections identify the need for a temporary shutdown to restore normal operations. The site's dynamic probabilistic water balance is used to determine conditions requiring the plant to be shutdown under conditions where the level in the TSF pool reaches certain heights which pose certain pre-identified risks.

A change management procedure is in place and functioning and change management exercises are signed off by Health, Safety and Environmental officials.

The plant power is supplied by 18 diesel generators with 15 units as standby for the national power grid. All generators form a part of the Pronto PMS system. The TSF freeboard is sufficient to handle the design storm event in the pool and this was confirmed by site inspection and in the Dynamic Probabilistic Water Balance. There is thus no need for emergency power on the TSF to prevent unintended releases.

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

X in full compliance with

- The operation is**
- in substantial compliance with **Standard of Practice 4.2**
 - not in compliance with

Basis for this Finding/Deficiencies Identified:

It was confirmed that ore is received from 2 different sources 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 and 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 in addition to leachwell tests. The plant upgrade project was commissioned and includes improved operating parameters. It was observed that there was better leach feed density control, classification efficiencies, grinding optimisation, gravity gold recovery optimisation, and pre-oxidation before adding cyanide.

The metallurgical test work report conducted on five composites of gold ore samples, from North Mara in February 2010 generated the characterisations that were used as inputs for the upgrade design of the plant.

Current feed consists of the blending of underground ore from the Gokona and open pit Nyabirama. The current cyanide consumption is consistent, with no significant variation in metallurgical performance and cyanide consumption. In bottle roll tests on cyanide recovery vs. consumption dated Sept 2014, the parameters were set at 230 ppm in CIL 1 and terminal cyanide was set at 130 in CIL 9. Cyanide consumption data for 2013 to date shows some variations evident but a downward trend since November 2014 is identifiable.

The basis of control is to achieve stable operating parameters and plant conditions. Cyanide addition control is based on TAC 1000, on-line free cyanide measurement linked to variable speed control on the dosing pumps. Manual titrations are used as a back-up for the TAC 1000 measurements. A detoxification plant was commissioned to reduce the



WAD cyanide to below 50ppm in the spigot discharge to the TSF. - Currently no additional control strategies are envisaged.

Cyanide addition control is based on TAC 1000 on-line free cyanide measurement, linked to variable speed control on the dosing pumps. Manual titrations are used as back-up for the TAC 1000 measurements and free cyanide in CIL no 12 is manually titrated two hourly. TAC1000 set points are changed, based on residual free cyanide values to optimise recovery. A WAD cyanide analyser on the line to the TSF is used to manage the cyanide destruction plant with outputs linked to the control room, where performance is monitored continuously.

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

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 GoldSim Probabilistic Water Balance model was used by African Barrick but was discontinued following the change to Acacia Mining. The GoldSim model used for part of the period under review was the same as for the previous recertification audit. The current model viewed was customised for the North Mara Mine. The model is based on a spreadsheet model and considers rainfall data from rainfall meters and data for the last 5 years are used. Data inputs are regularly calibrated.

The previous GoldSim model used the 1:100 year, 24 hour storm event and the current spreadsheet model uses 200% of the maximum rainfall measured in the past five years. The impact of the shutdown /power outage of the seepage pumps, evaporators and the return water pumps can be simulated in the model which indicated an overflow of the seepage system occurring within 36 hours. Sufficient freeboard exist on the TSF to accommodate the design storm events used as per the 1:100 year, 24 hour storm event.

The current, mine-wide probabilistic water balance model includes the Mine Reverse Osmosis plant water treatment capacity, as per the Tanzanian legal water licence agreements. Phreatic levels are measured and an annual TSF report is issued making recommendations which are included in a management procedure. The pond is managed to maximum elevation of the clay to minimise seepage. Freeboard and pool levels are surveyed daily and reported against minimum freeboard parameters.

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

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:

The compliance point is the TSF Spigot and the Gold Plant is designed with a detoxification section to reduce the WAD cyanide in the feed to the TSF spigot to less than 50 mg/l. The WAD cyanide daily samples average is 14.6 with the minimum being below detection limits. Exceedances were investigated and traced to the operating issues with one particular unit of the oxygen plant. These issues (38) occurred between 22 February and 22 July 2014, after which date, one exceedance of 52 mg/l WAD cyanide occurred as a result of a further technical issue with the oxygen plant. The technical issues were resolved during 2014 and the values since were all below 50 mg/l WAD CN. It was noted that the TSF also receives pit water from the Mine. The TSF pool values for the period varied between below the limits of detection and 1.5 mg/l WAD cyanide. Weekly samples since 22 Feb 2013 were reviewed. Exceedances are routinely reported in the daily environmental report and investigated.

The Process Water Pond is fed by the TSF pool reclaim water and the pre-leach thickener overflow which is low in cyanide. It was confirmed in the TSF decant that the maximum WAD cyanide levels are less than 2 mg/l, thus the process water pond values cannot be more than the input levels.

Bird mortality inspections are undertaken daily by the Environmental Department and all incidents are recorded, including observation of any bird species present. The one bird mortality noted was investigated and was found to be not linked to any WAD cyanide poisoning. In addition, TSF daily inspections include wildlife mortalities and no cyanide related mortalities have been recorded since certification. TSF reports for 2013 to 2016 were reviewed. It is therefore concluded that the WAD cyanide levels in the TSF are effective in preventing significant wildlife mortalities.

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. The North Mara annual Environmental Monitoring and compliance reports for 2013 and 2014 were reviewed. The Water chemistry changed at surface sites in and around the TSF and the Mara River during 2014. However, a map in the 2014 report indicated that no indirect flow is physically possible to the Mara River. Seepage collection systems are in place to collect any seepage.



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

It is reported that the water management plan identifies beneficial uses which includes the use of groundwater by the surrounding communities as drinking water. The Tanzanian Bureau of Standards (TBS) specify drinking water quality for total cyanide as not more than 0.2 mg/l total cyanide. Seepage management measures constructed includes additional facilities described in the report, "North Mara Gold Mine seepage collection system construction report - North Mara Gold Mine Tailings Storage Facility" by Coffey, dated 20 Nov 2015. The report details design changes relating to the lift and additional seepage management measures around the TSF. The additional measures have been successfully completed.

There are boreholes downstream of the plant and the sample results for 2014 and 2015 were reviewed and all values showed figures of less than limits of detection of 0.001 mg/l total cyanide.

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:

Adequate spill prevention and containment measures have been provided around the cyanide unloading, storage, mixing and leach facilities at North Mara. The cyanide mixing and storage tanks are seated on a reinforced concrete slab. The leach tanks are seated on ring beams. 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.

All of the secondary containments for cyanide unloading, storage, mixing and process tanks are sized to hold a volume greater than that of the largest tank within the containment and any piping draining back to the tank, and with additional capacity for

the design storm event. The bund sump pumps return any spillages to the process in the thickener bund, leach / CIL, gold room, eluate / eluant, cyanide mixing and storage, mill sumps and thickener bunds. The detoxification section bunds are equipped with sump pumps which also return spillages to the process.

The slurry pipeline between the plant and the TSF runs 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 and the return water line. The plant slurry and cyanide solution lines inside the plant are installed above concrete bunds or concrete floors. Planned inspections are conducted shiftily to look for leaks on the pipes as a spill prevention measure. The plant pipelines are inspected as per the schedules on the Pronto PMS. The new cyanide mixing and storage area pipelines are routed along the pipe gantry. In areas where the lines run over unprotected soil, the cyanide pipelines are constructed of a stainless steel pipe-in-pipe system, draining back to the cyanide mixing sump in case of any leaks into the secondary containment pipe.

Cyanide tanks and pipelines are manufactured from materials compatible with cyanide and high pH conditions, i.e. HDPE, mild steel and stainless steel.

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:

In a previous certification audit, it was confirmed that the plant was declared as built to design specifications by the original construction Company Ausenco and signed off by competent persons. Reference was also made to QA / QC programs followed during construction and commissioning.

A Tanks Inspection and Fitness-for-Service Report dated April 2013 and signed by a qualified Mechanical Engineer confirmed the fit-for purpose condition of tanks and pipes. The African Barrick Gold North Mara Gold Plant Structural inspection and maintenance management reports dated January 2014 were signed off by competent persons. The Acacia Mining: North Mara Gold Plant, Structural Inspection of the new Cyanide Plant Report, dated November 2015, and signed by a qualified Mechanical Engineer was a construction approval covered foundations and plinths, bunds, steelwork, electrical cabling, piping, cyanide tanks and emergency showers.

The TSF is a “work in progress” and operating parameters and reviews are included in operational procedures and discussed at meetings and reported on in annual audits. The North Mara Gold Mine Tailings Storage Facility Management Audit Report, dated April 2015, and prepared by Knight Piésold contains detailed conclusions and recommendations. The recommendations raised a number of items and these are included

in an on-going action plan. Two items were highlighted, the inhibiting security concerns over illegal miners and the management of the supernatant pool level. The water quality monitoring concludes that no significant contamination exists outside the TSF system, but recommends more effort is required to ensure that any seepage is managed away from runoff. The water management plan includes various action plans to reduce the pool levels. The strategies include:- the Eucalypt project - passive evaporation using trees to assist with water and salt removal (The trees have been planted and the pumping systems are expected to be installed in Quarter 1 of 2016); installation of an additional four evaporators; and a number of trenches and sumps constructed on the eastern side of the dam to prevent run off water entering the TSF via the seepage trench system.

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

X in full compliance with

The operation is in substantial compliance with **Standard of Practice 4.9**
 not in compliance with

Basis for this Finding/Deficiencies Identified:

Sampling procedures for cyanide in ground and surface water are in place. A printed map of sample points confirming up and down stream locations of the site was viewed. The procedures specify how the samples should be taken, sample preservation and stabilisation, and chain of custody procedures. The procedures were developed by an appropriately qualified person, in accordance with standard methods for water and wastewater developed by the American Public Health Association, American Waterworks Association and American Environment Federation and accredited to ISO 17025.

Rivers are sampled monthly, boreholes are sampled quarterly, and wildlife mortality monitored twice daily. TSF spigots are sampled daily for WAD cyanide, and the TSF decant pool is sampled weekly. The monitoring and inspection frequencies are deemed adequate to characterize the medium being monitored and to identify changes in a timely manner.

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 Acacia Mining North Mara Gold Mine, International Cyanide Management Code Compliance Project, North Mara Decontamination and Decommissioning Plan, dated 2016, includes details of cyanide decontamination and decommissioning. An implementation schedule is in place and the details in the Plan are reviewed as per the controlled document requirements.

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

in full compliance with

The operation is **X in substantial compliance with Standard of Practice 5.2**

not in compliance with

Basis for this Finding/Deficiencies Identified:

The updated cyanide decommissioning costs from the 2014 BRCE (Barrick Reclamation Cost Estimator) reclamation cost model was \$US 295,912.00 which is drawn from line 13 of the Solution Management sheet.

Mine owners, Barrick, previously provided for these costs through a Corporate Guarantee. Acacia Mining is a now a separate, Tanzanian-registered company and is currently negotiating approval of an Acacia specific financial assurance mechanism with the Government.

The Tanzanian Government required a bank guarantee for the three Acacia mines for the cost of the rehabilitation of its three mines. The draft financial assurance mechanism sent to the Government dated 9 June 2015 was sighted. It was reported that the mechanism documentation has been informally accepted.

The Mine has finalised a rehabilitation bond with the Metropolitan Tanzania Insurance Company which includes the cyanide decommissioning costs. A formal signed approval of the mechanism is still awaited from the Ministry. A Corrective Action Plan has been agreed covering the obtaining of the formal government approval.

The rehabilitation bond is in place and functional and demonstrates the company's good faith in meeting the requirements. The mechanism is meeting the spirit and nature of the Code requirements and there is no immediate or substantial risk to health, safety or the environment. If the formal confirmation is not received within the CAP time period, a Statement of Financial Strength will be submitted as an alternative.



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:

There are 15 cyanide specific operational procedures, 34 CIL procedures, 23 elution procedures, 7 electrical procedures, 12 mechanical cyanide specific procedures, 4 Environmental procedures relating to cyanide, and 13 TSF (Tailings Storage Facility) procedures. The procedures all include the requirements for the appropriate use of PPE (Personal Protective Equipment) and the use of appropriate pre-work inspections. In addition, the Pronto PMS work order specifies preparatory work to be done prior to maintenance. A number of procedures were specifically sampled and reviewed for the minimisation of worker exposure and these included cyanide transportation, vessel entry, clearance certificates, cyanide mixing procedure, unloading cyanide containers and cyanide boxes, isolation and logout procedures, and cleaning of cyanide storage and mixing tanks. These were found to be satisfactory.

A change management procedure is in place and functioning and change management exercises are signed off by Health, Safety and Environmental officials. The primary tool used by the Mine and workers to give input into Safety and Health issues are the toolbox talks. Specifically, in this context, use is also made of safety reps meetings, risk assessments and safety meetings to discuss health and safety procedures. Toolbox talks notes and reports were sampled and reviewed from 2013, 2014, 2015. This was further verified during interviews with employees that they can discuss safety during their safety and toolbox meetings.

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. Cyanide mixing includes the addition of 2 bags of NaOH to the water before adding cyanide briquettes.

The mine has identified the potential HCN gas hot spots and has located fixed monitors in those areas. Fixed HCN (Hydrogen Cyanide) gas monitors are located at dosing points at the leach (2), the cyanide bag breaker (1), at the cyanide mixing facility (1), the Detoxification plant (1), and Gold room (1). There are also Personal HCN gas monitors in the form of 25 PAC 7000 units and 6 X-AM 5000 units available for use in the plant. Monitors are set to alarm at 10 parts per million on an instantaneous basis and 4.7 parts per million continuously over an 8-hour period. Calibration records for all gas monitors were reviewed and found Code compliant.

During the site inspection, the use of the appropriate warning signage on the plant, the dry cyanide store and the new cyanide mixing and storage area was observed. Cyanide first aid response information and MSDSs are available at the cyanide dry store and the mixing areas in both English and Swahili. The workforce speaks both English and Swahili.

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 located appropriately and adequately signposted.

A site wide pipe colour coding system is in operation which includes cyanide pipe colour coding and directional flow signage. 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:

Radios are used for communication of incidents and the clinic, Emergency Response Team (ERT), and Security are all on Channel 1 which is used for emergencies. There are six cyanide emergency Personal Protective Equipment (PPE) boxes in place on the plant (Cyanide Mixing, Top of CIL, Detox plant, outside of the Gold room and at cyanide storage shed) which also include medical oxygen (Oxyvivas). Antidote kits (Cyanokits) are kept in three fridges exceeding the manufacturers recommendations (Gold Room, CIL and Supervisors Office). The clinic uses Meditrack (Pharmaceutical tracking and ordering



software) and weekly inspections of antidotes. Potable running water is available throughout the plant. All plant workers are trained in cyanide first aid and form part of the response team. The plant first responders are the only persons administering oxygen. Cyanide emergency procedures form a part of the site-wide emergency preparedness plan which covers the whole site and includes the cyanide facilities. The mine on-site clinic close to the plant main entrance is equipped to handle 3 cyanide patients (inhalation - 3 patients, ingestion and exposure to liquids - 3 patients), A Doctor, Nurse and a Mine Emergency Team is on standby 24 hours a day and will accompany the ambulance to the site of the cyanide incident.

Cyanide patients are transported by Amref Flying Doctors (a contract is in place) to the Aga Kahn Hospital in Dar Es Salaam or the Nairobi Hospital in Kenya. The Medical Officer in charge of the Mine Site health facility will make the decision on whether to evacuate the patient or not. A medical evacuation procedure details the transportation of exposed workers by land or by air. The Nairobi hospital was confirmed as adequate to handle cyanide patients originally via e-mail in 2008. The Clinic Doctor, during interview, confirmed that no changes had taken place since the original e-mail. At the Aga Khan hospital in Dar Es Salaam, the Emergency Unit doctor at the hospital was confirmed as a cyanide treatment specialist and he also trained the medical staff at the North Mara Clinic in Cyanide Case Management and issued proficiency certificates. When interviewed the Medical Officer in charge indicated that any cyanide patient sent to the Dar Es Salaam Hospital would be accompanied by the cyanide protocol and at least 4 units of Cyanokit antidote. If necessary, a North Mara Cyanide-trained Doctor would also accompany the patient. Discussions held with the Emergency Unit doctor during the cyanide management case training confirmed the abilities of the Aga Khan Hospital to handle cyanide referrals. The site Clinic is involved in the mock emergency drills and all staff receive cyanide training by the Process Plant Training Department. It was confirmed by the Doctor during interview that documented inspection checklists and inspections of the cyanide emergency equipment take place and samples of these documents were sighted. Equipment is regularly checked and tested and mock drills are held on site and in conjunction with the clinic.

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:

The North Mara Mine Crisis Management Plan 2013 and an Aid Memoire dated May 2013 and the North Mara Gold Mine Emergency Response Plan (updated 2015) are in place and functional, and 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 in substantial compliance with **Standard of Practice 7.2**
 not in compliance with

Basis for this Finding/Deficiencies Identified:

The Emergency Response Plan (ERP) is briefed to the workforce via the management structures and toolbox meetings. The Mine Emergency Response Team (ERT) and Clinic is involved in the ERP via drills and debriefings following drills. No communities are directly involved with the ERP but they are briefed through the community dialogue structures. The Mine does not make use of the external emergency response sources. The appropriate cyanide emergency response training is included in the induction program.

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 in substantial compliance with **Standard of Practice 7.3**
 not in compliance with

Basis for this Finding/Deficiencies Identified:

Using a Mining Emergency Duty Card system, the ERP designates the roles and responsibilities of the controllers and ERT in the Plan. The ERT is a mine wide team fully trained in cyanide emergencies. No outside responders are involved in the emergency plan. The ERT facilities are situated 1km away from the plant. ERT Listing and Contact Details are detailed in a list in the ERP p6: ERT Listing and Contact Details. The Plant trains all staff in basic cyanide emergency response. The additionally trained cyanide first aiders will act as first responders until the Mine ERT arrives. Emergency

equipment lists were checked and site inspections confirmed availability and readiness. 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 and the Crisis Management Plan include full details of appropriate emergency contacts and reporting, media communication and the call-out procedure and contact information lists.

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 Emergency Preparedness Plan links to operational and environmental procedures which cover clean-up and neutralisation of solid or solution spills, sampling, PPE and materials to be used. The use of treatment chemicals such as ferrous sulphate, hydrogen peroxide and hypochlorite in surface water is prohibited. The Plan includes provision for alternative drinking water supplies, as appropriate to the situation.

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 Emergency Preparedness Plan is reviewed as changes take effect or at least annually in terms of a continuous improvement requirement and the procedures are reviewed after every incident or drill. Reports were sighted of learning points emerging from the various drills.

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 hazard recognition training (including process, maintenance, contractors, and security). The training matrix records, including the compulsory sodium cyanide module, including (six monthly) refresher dates and test scores were sighted and reviewed. Hard copy and electronic training records are kept and training records are kept 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 process training matrix, including operational task training and the required SOPs (Standard Operating Procedures) training modules for each job. It was confirmed that unloading and mixing is included in the training matrix and that all process staff are trained in cyanide mixing as part of the compulsory training. The training matrix was sampled electronically and it was confirmed that training for individuals per job category and per shifts A, B and C is undertaken.



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. He is also registered as a Professional Engineer. All staff are trained before being allowed to enter the plant. All new employees will work through cyanide and safe work practice modules and need the sign off by the training officer before being allowed into the plant. The employee receives the appropriate SOP's and work under the supervisor as part of on-the-job training. Once ready to take over the shift, the employee is tested and signed off as competent by the training officer. Sighted and sampled records for 2014 to date confirming that all employees receive training before being allowed to operate a cyanide section on the plant.

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. Refresher training was done for the new cyanide plant. The Planned Task Observation (PTO) system is managed by the Section Leader Metallurgy. The plant target is to do one PTO per day. Records sampled indicated that the target was consistently exceeded.

Records are retained for at least 3 years (verified during review of the interviewees training records) and include 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.

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 using the Sodium Cyanide Training Manual. The December 2015 training manual updates were sighted and reviewed. The sodium cyanide training includes procedures to follow when cyanide is released, how to clean up both solid and liquid cyanide spillages, and procedures to decontaminate persons and to apply cyanide first aid. The ERT is trained as per the training matrix. This was confirmed in the up to date training records sampled for 2015. Staff take part in drills as part of their training.

The ERT receives an on-site refresher weekly, as ongoing training, and is involved in mock drills and development of the ERP. The flying doctor service and Nairobi hospital are made aware and receives the medical protocol for cyanide treatment. There are no community members involved in the emergency response. Periodic mock drills are undertaken and training personnel attend these drills and formally evaluate response and performance. The drills were attended by all relevant staff including training staff and medical Doctors, ERT, Plant Management and security staff. Furthermore, the drills

reviewed covered different scenarios including spillage of cyanide. The Training officer is always present at drills and the drills are reviewed and participants debriefed, including Mine ERT and the Clinic. Appropriate training is given to address problems identified at the drills. Records are retained for at least 3 years, (verified during review of the interviewees training records) and include the names of the employees involved and the trainer, the date of training, and the topics covered.

9. DIALOGUE: Engage in public consultation and disclosure.

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. The community relations have improved significantly since the previous certification and community dialogue has now commenced again. (This is after civil unrest stopped dialogue for safety reasons.)

Presentations on cyanide awareness were given to village representatives in June 2015 at communities along the roads from Tarime to Rorya districts covering the cyanide transport route. The presentation included District Administrative Secretaries. A total of some 500 Community members attended the presentations. Concerns raised during the meetings included: identification of trucks carrying cyanide into and from the plant, and parking of vehicles close to communities for lunch breaks. The presentations were made available to the community representatives. Electronic attendance lists for villages given the above presentations were sighted and sampled. The villages identified include: Tarime halmashauri, Remagwe, Nkende & Magena, Sirari, Nyairoma & Ng'ereng'ere, Rorya Halmashairi, Mika & Bukwe, Gamasara & Nyamisangura, Nyasoro, Sombanyasoko, Bisarwi, Surubu, Nkerege & Kembwi, Keisaka & Weigita, Nyarwana, Nyakunguru, Nyangoto, Matongo, Kewanja & Yabichune. Security issues are making community affairs very difficult and the amount of community interaction is limited.

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. The community relations have improved significantly since the previous certification and community dialogue has now commenced again. (This is after civil unrest stopped dialogue for safety reasons.)

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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:

Most communication taking place is verbal, mainly using Swahili, and on a one-to-one basis or in small groups, as a significant section of the population (approximately 50%) may have problems with literacy. Pictures are also used in the presentations to visually demonstrate to the audience certain points and principles. Swahili leaflets on cyanide handed out to schools and communities were sighted. The leaflets are in cartoon format with pictures and words in Swahili. The cartoons are also included in the English cyanide presentation. The cyanide presentation in Swahili was also sighted.

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. The change from African Barrick Gold to Acacia Mining PLC continued the previous approach by Barrick Gold. A copy of reporting in the Acacia Mining PLC Annual Report and Accounts 2014 was noted under the performance review section.