

***INTERNATIONAL CYANIDE
MANAGEMENT INSTITUTE***

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

Recertification Summary Audit Report

***AngloGold Ashanti
Noligwa Gold Plant
South Africa***

6th – 9th June 2017

***For the
International Cyanide Management Code***



Name of Operation: AngloGold Ashanti Noligwa Gold Plant
Vaal River South

Name of Operation Owner: AngloGold Ashanti South African Region
Metallurgy

Name of Operation Operator: AngloGold Ashanti South African Region
Metallurgy – Vaal River South

Name of Responsible Manager: Mr Julius Lawrence

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Location detail and description of operation:

Noligwa gold plant was commissioned in 1971 and treats approximately 200 000 tons per month of reef material from the Great Noligwa, Kopanang and Moab Khotsong mines. Following milling in two run-of-mine mills, the slurry is thickened before being pumped to the uranium section for uranium extraction.

The uranium plant residue at pH 1.5 -2.5 is returned to the gold plant where it is neutralised with lime in the neutralisation section. The pH neutralisation occurs in stages to pH 7.5, pH 9.5 and final pH 10.5 respectively in air agitated pachucas. The neutralised slurry at pH 10.5 is pumped to the leach section for cyanide addition and gold extraction.

Liquid sodium cyanide is added to the leach feed slurry with cyanide dosing control being achieved by means of an on-line auto analyser integrated into a dosing control loop linked to the dry tonnage feed to the leach section. Gold leaching takes place in a series of mechanically agitated tanks and air agitated pachucas.



The dissolved gold in the leached slurry is recovered onto activated carbon in the CIP (carbon in pulp) section consisting of eight mechanically agitated adsorption tanks. The gold loaded carbon is screened out of the slurry before being washed and transferred to the elution circuit.

In the elution circuit the carbon is washed with a hot caustic solution to strip the gold back into solution following which the gold bearing solution passes through the electrowinning section where the gold is plated onto stainless steel cathodes and smelted to produce gold bullion for refining.

The slurry exiting the adsorption section is pumped to the floatation neutralisation section. Backfill material for use as underground support is produced from the neutralised floatation residue material. The initial acidification with barren solution from the South Uranium Plant effectively destroys the residual cyanide in the material used to produce the backfill. The neutralised residue material (Monitored for WAD (Weak Acid Dissociable) Cyanide, Free Cyanide with a WAD Cyanide analyser) not taken for backfill production is pumped to the final residue stream exiting the plant to the Mispah TSF (Tailings Storage Facility).

Low grade waste rock is also treated in the Noligwa gold plant through the low grade Mispah milling and recovery circuit. Following run-of-mine milling, the slurry is subjected to a cyanide leach followed by gold adsorption in a carousel operated CIP plant. Cyanide dosing control to the Mispah leach circuit is achieved by means of an on-line cyanide analyser integrated into a control loop linked to the dry tonnage feed.

The loaded carbon from the CIP circuit is treated in the elution section for final recovery of gold in the electrowinning cells. The CIP residue material joins the final residue stream reporting to the Mispah TSF from where the recovered water is recycled back to the mills.



Auditor's Finding

This operation is

X in full compliance

in substantial compliance

not in compliance

with the International Cyanide Management Code.

This operation has not experienced compliance problems during the previous three year audit cycle.

Audit Company: Eagle Environmental

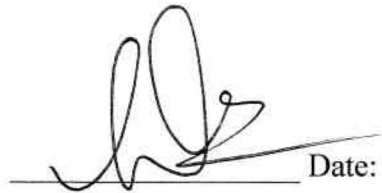
Audit Team Leader: Arend Hoogervorst

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Names and Signatures of Other Auditors:

Name : Dawid M. L Viljoen

Signature



Date: 3/01/2018

Dates of Audit: 6th – 9th June 2017

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 Mine Operations and using standard and accepted practices for health, safety and environmental audits.

Noligwa Gold Plant




8/01/2018

Facility

Signature of Lead Auditor

Date

Noligwa Gold Plant


Signature of Lead Auditor

3rd January 2018

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:

There is an AngloGold Ashanti (AGA) cyanide supply contract, covering all AngloGold Ashanti Gold Plants, including Noligwa Gold Plant, in place with Sasol Polymers, as the sole supplier of liquid sodium cyanide, delivered by bulk tanker. The contract requires that the producer or supplier of cyanide must be a signatory to the ICMI Code and the producer or supplier must be ICMI certified. Sasol Polymers is a signatory to the Cyanide Code and was re-certified as a fully compliant Production Facility with the ICMI Cyanide Code on 29 March 2016.

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:

The supply contract between Sasol Polymers and AngloGold Ashanti (which includes Noligwa Gold Plant) specifically covers the responsibilities and requirements for

transport, 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. Sasol Polymers' cyanide transporter, Tanker Services Specialised Products Division, was re-certified on 17 July 2015 as a fully ICMI Code compliant transporter.

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 AngloGold Ashanti supply contract (which includes Noligwa Gold Plant) requires that the producer/supplier of cyanide must be a signatory to the ICMI Code and the producer supplier and transporter must be ICMI certified. Tanker Services Specialised Products Division, Sasol Polymers' cyanide transporter, was re-certified on 17 July 2015 as a fully ICMI Code compliant transporter, thus meeting all the requirements for appropriate emergency response planning and cyanide management.

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 operation uses only liquid cyanide, delivered by bulk tanker, and no mixing or storage of solid cyanide takes place on site. As confirmed in previous certification audits, the offloading and storage facilities were designed and built, in accordance with sound and accepted engineering practices, with materials appropriate for use with cyanide and are located in concrete bunds away from people and surface waters. Cyanide storage

tanks are located on concrete plinths within a concrete lined, bunded area. The tanks are each equipped with a ventilation pipe to prevent HCN (Hydrogen Cyanide) gas build-up. Annual cyanide producer technical audits of the cyanide storage and offloading area have confirmed the acceptability of the facilities with scores of 100% and 96% for audits in 2015 and 2017 respectively. The cyanide offloading area for the liquid sodium cyanide is on concrete surfaced with bitumen (surface renewed currently in June 2017), equipped with humps and drains to contain any spills. The spillage sump in the cyanide offloading area is equipped with a pump that is manually started prior to off-loading. This is run during coupling and un-coupling of delivery pipes, delivering into the main bund area for the sodium cyanide storage tanks. Tank level indicators, display at the tank site and the SCADA (“Supervisory Control and Data Acquisition” system” –computerised control system) in the Control Room. High level alarms are set at 85% and interlocked with the loading air valve to stop off-loading at 85%. Cyanide deliveries are managed according to tank levels and production.

The procedure covering cyanide unloading was reviewed and found to be effective. The offloading and storage areas for the liquid sodium cyanide are contained, barricaded, closed off with restricted access, bund walls installed, and within the main plant security area, with no public areas close by. The cyanide is also stored away from incompatible materials.

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:

Liquid sodium cyanide is delivered in bulk tankers from Sasol Polymers to the Plant and offloaded into cyanide storage tanks. No solid cyanide is used on the plant therefore the only containers are the tankers themselves. The tanker couplings, connection pipe, and offloading couplings are washed before and after offloading. The outside of the tankers are also cleaned on their return to Sasol’s premises. The offloading procedure is detailed, spelling out PPE (Personal Protective Equipment) requirements, use of a “buddy” in the process, and opening and closing of valves and connection of couplings are clearly sequenced to prevent spillages and accidental releases during off-loading.

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:

The Noligwa Gold Plant has 15 Cyanide Process Procedures, 16 Cyanide Emergency Procedures, 4 Cyanide Alarm Procedures, 9 Cyanide Engineering Procedures, 8 Cyanide PPE Procedures, 24 General Procedures, and 19 General Cyanide Procedures., supported by 11 TSF (Tailings Storage Facility) contractor operating and management procedures, and a mandatory Code of Practice covering TSF operation. In addition, there is the South Africa Region Metallurgy (SARM) Cyanide Code Implementation Guidelines, July 2013. The Guideline includes: unloading, mixing and storage facilities, leach plants, tailings impoundments, and cyanide treatment, and disposal systems, PPE, and cyanide decontamination and demolition.

The Annual Vaal River Operations Tailings Facilities Audit Reports, by the AngloGold Ashanti Senior Manager: Geotechnical Engineering, were sighted with the conclusion, "...VRO (Vaal River Operations) TSF is generally in good condition and is well managed..." On-going issues were identified, prioritised and actioned in regular TSF meetings. The Geotechnical Engineer (AGA South Africa Region Surface Operations) concluded in a note for the record that, "... The TSF's are operated in accordance with the Code of Practice. I conclude that the Vaal River TSF's are stable and possess good factors of safety against major slope failure..." Design assumptions include procedure stipulating the WAD cyanide levels at 50 PPM in the plant residue material, and freeboard and design storm event (1.3 m and 1:50 year storm event respectively) are defined in the Code of Practice for the TSF's, and return water pond freeboard as specified in the ISO(International Standards organisation) Water Key Performance Indicator procedure.

A SAP PMS (Planned Maintenance System) has been in place since the previous re-certification audit and a shiftly operational inspection system is in place with any faults being reported and job requests are made out and submitted to the maintenance department for recording in the SAP (Proprietary name for software company) system and issuing of job cards. Bi-weekly legal inspections are conducted and the whole plant is covered every 90 days. The cyanide storage facility inspections are conducted and the inspection checklist covering cyanide storage facility, includes cyanide delivery pipes and valves, as well as low strength bund areas. The checklist includes checking for leaks, corrosion, mortalities, precipitation on pipes and flanges in the cyanide bund area and dosing points. At the TSFs, there are daily operational inspections and the SAP PMS system covers pipes, valves and pumps. The inspection frequencies for the TSF and plant

are deemed sufficient to assure and document that they are functioning within design parameters.

Pipeline patrols are undertaken for each shift (3 shifts per day) to spot any leaks and take appropriate action as detailed in the Pipeline Failure Procedure. In addition, Wonderware, (the TSF “SCADA”) shows in real time the operation of the pumps so that any issues can be seen immediately. All main flow slurry pumps have a standby pump to allow for planned maintenance without disrupting flows. TSF freeboard is surveyed on a monthly basis (Cyclone West Extension dam), and the other dams are surveyed on a quarterly basis.

There is a probabilistic water balance in place, and no scenario has been identified where the need has been highlighted to shut down plant to prevent overtopping. Proactive planning and management of containment dams, dam levels and normal and abnormal conditions contributes to reduction of risk and the unlikely need to temporarily cease plant operations under abnormal precipitation events. Thus, emergency power is not required to prevent unintentional releases in the event of a power failure. A series of procedures covering abnormal occurrences in the plant will be used to cover any other situations where a non-routine temporary closure may be necessary.

Cyanide pumps will automatically stop in the event of a power failure. In the event that Noligwa Gold Plant has a power failure but feed is still coming from the South Uranium Plant, a phone call will be made to the South Uranium Plant to stop pumping. An 8 hour surge capacity exists at the Noligwa Gold Plant to enable them to continue to receive feed from the South Uranium Plant until the pumping ceases. All tank overflows will be contained in bunds or trenched to the settling dams where the spillage will be contained. Temporary cessation of operations due to a power failure is detailed in the Procedure, "Cyanide Related Activities and power failures" i.e. in the event of a power failure, the man down alarm will not function and therefore the plant will be shutdown.

A change management procedure covering health, safety and environment is in place and the plant did not make any changes that could result in an increased risk of cyanide releases or cyanide exposure risks. Thus there was no need for a change management exercise to be implemented. The procedure requires sign-off by safety and environmental personnel.

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
- not subject to



Basis for this Finding/Deficiencies Identified:

A Cyanide Optimisation Programme for Surface Sources Noligwa Gold Plant was compiled and is being utilised. The programme includes: change management implementation; analysis, improvement and implementation; measurement of plant performance; cyanide consumption and forecasting of tonnages; budgeting of resources and people; reporting of analysis and improvement projects.

Initiatives include the following:

- Diagnostic leach and base recovery tests by an independent laboratory. This was conducted quarterly and more recently monthly. The aim of the test work and reports are to establish gold-mineral association within individual ore sources. In addition to WAD cyanide, free cyanide and speciation tests are undertaken to establish the optimum level of cyanide to use for a particular ore.
- The newly implemented Remote Operations Control (ROC) system (an advanced data collection system and monitoring station) monitors the instrumentation outputs, which are stored in a data collector. Control charts are compiled for performance parameters. Upper limits and lower limits for performance are set. Notification emails and SMSs are sent in an escalation sequence when the upper or lower limit is breached. The Upper Control Level is 25 ppm.
- Data included a degradation curve for the relationship between Free Cyanide and WAD (Weak Acid Dissociable) Cyanide from the first Leach Tank to Tank 8 CIP has been collected and analysed.

Additional optimisation work included oxygen demand tests in the neutralisation section, which affects cyanide consumption and leach efficiencies. As a result of the addition of pure oxygen in tank 2 being implemented, an improvement of cyanide consumption and recovery was noted. The cyanide consumption graph from 2015 to date indicated lower cyanide consumption from above 350g/t (grams per ton) to less than 350 g/t sodium cyanide. A Leach residue investigation dated 2015 resulted in the establishment of an optimum cyanide concentration of 300 g/t.

Cyanide consumption graphs were reviewed, indicating an increase in cyanide consumption. Test work to evaluate the impact of adding lead nitrate on cyanide consumption is being conducted. The plant is considering improvement in the manual free cyanide titrations in the last leach tank and a plant trial on oxygen addition is in the process of being evaluated.

The plant uses a TAC1000 on-line analyser to measure cyanide in the head leach tank and a manual titration for the monitoring of terminal cyanide in the Leach Residue. This is fed into the Remote Operating Centre (ROC) on-line system so that all managers can see the data. If the values are too high (above 40 mg/l (milligrams per litre) WAD cyanide) or too low, a cascading e-mail and SMS text system is used to inform managers of the situation, ultimately including the Regional Vice President.

The TAC 1000 measures free cyanide on stream from both streams at 6 minute intervals. A ratio control system is used. The ratio is measured and controlled for each leach train. The dosage rates are controlled via the PLC (Programmable Logic Controller) and automatic valves. The TAC 1000 on line free cyanide is measured and controls the ratio settings. TAC 1000 maintenance is done weekly. The focus on cyanide control is to

accommodate cyanide consumption variation in the surface material fed to the Mispah section.

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 Water Balance (a probabilistic water balance) was developed in 2010 and incorporates scenario planning to do water demand and water conservation strategy. Water balance input sheets were updated quarterly and fed into GoldSim. Other updates were done when major changes occur such as the recent influx of additional groundwater due to neighbouring shafts that stopped pumping.

Clean dirty separation studies (1:50 year storm event) data is fed into the GoldSim model in terms of dam sizes and overflows. The 50 year storm event model run on GoldSim includes every plant and TSF, dam and catchment areas reviewed post 2009.

A meteorological assessment was conducted by an independent consultant and the 1:50 year storm event was revised from 118mm to 130mm of precipitation in 24 hours. From there the plant specific conditions and requirements were assessed. This model was used until the end of 2014.

Changes since 2014 include the Mine Waste Solutions (MWS) remaining operation that is excluded from the scope of the audit. The GoldSim model was replaced at the end of 2014. A new probabilistic water balance model for the Vaal River Region is being subsequently used. The model (sighted February 2017 water balance update) includes evaporation, rainfall, seepage and interstitial water in the calculations. The TSF's are using the conventional paddock dams and thus no run on is appropriate. Storm water cut off trenches are in place to prevent any potential run on. The return water dams are run at maximum operating levels to cater for power failures (80% and 28% of total capacity). This was confirmed in graphs in the ISO procedure, Surface water management procedure for Vaal River and MWS for Environmental Department, Mine Waste Solutions, Vaal River Tailings Management. The return water dams are equipped with ultrasonic level detectors and use is made of telemetry to the central control room to record data. The pumps are controlled either manually or automatically. No emergency power is thus required to prevent overtopping of the return water dams. The model is updated monthly using actual rainfall, slurry feed rates and standard assumptions and actual measurements for interstitial water, seepage, evaporation. An updated version including the evaporation data was provided.

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 Plant uses an on-line Cynoprobe WAD-Free cyanide analyser and the samples are taken every 20 minutes at the tailings pumps and recorded in the system. The data is recorded 6 times per day in a spreadsheet. Electronic files were sighted and reviewed.

2015 - WAD cyanide daily data and graphs were reviewed. There were 3 exceedances of 54, 51 and 56 mg/l WAD cyanide. The incidents were reported and, taking into account the 30% degradation between the plant and the tipping point, the WAD cyanide was deemed to be below 50 mg/l.

2016 - WAD cyanide daily data and graphs were reviewed and there were no significant exceedances observed.

2017 - WAD cyanide daily data and graphs were reviewed and no significant exceedances were observed. However, a spike was observed in 2017, and the investigation indicated that the Cynoprobe sample filter bag was blocked resulting in an incorrect reading.

Back-up grab samples are taken at the tip points at Mispah. The samples are taken by the TSF staff weekly, using the sampling procedure. These samples are submitted to Mintek. (Mintek is South Africa's national mineral research organisation specialising in mineral processing, extractive metallurgy and related areas and has a specialist laboratory.) The results received from Mintek for 2015, 2016, 2017 showed no exceedance were observed. The evaluation of the on-line Cynoprobe data of the samples taken from the tailings pumps at the process plant (the compliance point) indicated that the WAD cyanide in the slurry leaving the plant is below 50 mg/l WAD cyanide. It was therefore concluded that the open waters at the relevant TSF fed by the Noligwa Gold Plant is below 50 mg/l WAD cyanide and thus do not need to restrict access by wildlife and livestock to the TSF and return dam open waters.

The TSF and process plant include monitoring for wildlife mortalities. No wildlife mortalities were reported since the last recertification audit and it can therefore be concluded that maintaining the WAD cyanide below 50 mg/l is effective in preventing 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 are no direct discharges to surface water from these cyanide facilities. Two legal discharge points exist that are allowed to discharge seepage water to the Vaal River. However, these discharges are not from any of the cyanide facilities and do not form part of the scope of the audit. Seepage from the tailings facilities are intercepted by a system of trenches and boreholes and this water is pumped to storage facilities before being used in the gold plants (including Noligwa Gold Plant) for the Vaal River area as process water. This includes water from the Eye Dam sump and the Boat Club sump. Monitoring is conducted upstream and downstream of the gold plants and associated infrastructure on the Vaal River and the Schoon Spruit (Schoon River).

The downstream values for the Vaal River are sampled monthly and results between 2014 and to date are below limits of detection of 0.02 mg/l WAD cyanide. The downstream values for the Schoon Spruit between 2014 and to date are also below limits of detection of 0.02 mg/l WAD cyanide.

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

Mining processing plants' process water is the only beneficial use of groundwater in the immediate area and all other water for domestic and livestock use is supplied in pipes by the Midvaal Water Company.

Various water management measures to manage seepage to protect the beneficial uses of ground water beneath and/or immediately down gradient of the operation are in place and they include:- lining of trenches for the transportation of process water; boreholes adjacent to the Vaal River to intercept seepage from TSF's; sub surface perforated pipelines that discharge into the Boat Club sump before being pumped to the plants; and various areas of woodland adjacent to TSF's planted to undertake phytoremediation of shallow groundwater.

There is no numerical standard established by the applicable jurisdiction for WAD cyanide or any other species of cyanide in groundwater, therefore there are no compliance points below or down gradient of the gold plants or tailings facilities. Groundwater monitoring is undertaken to establish whether the tailing facilities are having an impact on the surrounding groundwater. Groundwater monitoring is undertaken twice a year. No values above 0.02 mg/l free cyanide have been recorded since 1 January 2011.



The Plant's Backfill Quality Assurance stipulates the procedure to be followed to ensure that the backfill quality meets the required specification regarding its cyanide content. The procedure states that the permissible cyanide concentration in backfill product is 25 ppm (Free Cyanide) and 50 ppm (Sodium Cyanide, total). If free cyanide is above 25ppm the Production Metallurgist rejects the batch and it is pumped to residue. The procedure includes reference to the MINTEK Technical Information Report PWL AGA BF 100112, dated 12 January 2010, which is the technical guideline which established the permissible cyanide concentrations. The procedure refers to the South Africa Region Metallurgy (SARM) Cyanide Code Implementation Guidelines, July 2013 which provide further information and background on backfill management.

The procedure, Titration for Free Cyanide, is used in the certification of backfill batches. Backfill Quality Certificates for 2015, 2016, and 2017 were sampled and in all cases were found to be significantly lower than the maximum permissible concentrations.

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:

All tanks are placed in bunded areas or on concrete surfaces. The Mispah leach and carbon adsorption flat bottomed tanks are placed on solid concrete bases, with the conical leach tanks, residue tanks and neutralising tanks placed on plinths and steel legs. The eluate tanks are placed on solid concrete bases inside concrete bunds. All bunded areas are equipped with spillage pumps that can pump any spilled cyanide or slurry containing cyanide back into the process tanks/storage tanks. Large quantities of clean cyanide solution are returned to the storage tanks. If the liquid is from an unknown source, the pH and cyanide concentration are measured before it is pumped to the leach. Spillages of leach are pumped into the leach tanks, and spillages from CIL (Carbon in Leach) are pumped back into the CIL. Contaminated water that flows via lined trenches into the settlement ponds is used as process water.

All bunds are sized to hold a volume greater than that of the largest tank within the containment area and any piping draining back to the tank, with additional capacity for the design storm event. The residue bund is linked to the settling dams via concrete trenches. The plastic lined settling dams are operated at 60% level leaving 17,600m³ available as secondary containment for CIP and residue tank secondary containment. The backfill largest tank volume is 810m³ and the bund (designed for spillage control only) is linked to the settling dams.

Within the Gold Plant, reagent strength cyanide pipelines are located within secondary containment (launders) or above competent secondary containment and all flanges are covered with flange covers. Any spillage in the launders report back to the cyanide tank

bunds or other secondary containment. The slurry pipelines were replaced with HDPE(High Density Polyethylene)-lined steel pipelines as a spill prevention measure. All unlined slurry pipelines are part of the SAP PMS system (including thickness testing) and the Pipeline Patrol system. The PMS Engineering Planner reports that no leaks have been reported since the installation of the HDPE-lined steel pipelines.

One area where the slurry lines cross the 9 shaft bridge (Kopanang Vaal River bridge) was identified as a potential risk. Special protection measures include the lining of all lines, before and after, crossing the bridge and an associated containment paddock.

Cyanide tanks and pipelines are manufactured from materials compatible with cyanide and high pH conditions, as per Chapter 46 of the South Africa Region Metallurgy (SARM) Cyanide Code Implementation Guidelines document.

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:

There were no new additions or extensions to the process plant. Detailed Quality Control/Quality Assurance (QA/QC) documentation is available for the TSFs and for the plant and has been audited previously.

AGA has in place an on-going SIMM (Structural Integrity Management Monitoring) system report which is a corporate risk monitoring system for plant structures) for all mines which regularly reviews and re-prioritises all structures and recommends repairs and maintenance. This replaces the need to keep original QA/QC records and covers where records are not available.

Professional engineers conducted visual inspections as part of the AngloGold Ashanti (AGA) Structural Integrity Management and Monitoring (SIMM) reports for Noligwa plant. The June 2016 report stated, "...Noligwa Gold Plant can be described as worn and dilapidated and must be a maintenance priority to AGA if life of mine is expected to extend to 2030..." Detailed discussion and recommendations were included on prioritised maintenance work required to ensure the plant met life of mine expectations. (These, in the meantime, reduced with Noligwa reducing from 2030 to 2022 and Mispah reduced from 2030 to 2021.) Only six items had a priority, 2 of which needed work within one year of the date of the audit and the remaining four within three years. The Production Metallurgist reported that the two items (covering pillar repair and bund wall repair) have been completed. He referred to the Maintenance Budgets for 2017 and 2018 and indicated that prioritized repairs and maintenance would continue in those years. He further reported that maintenance funding would continue through the revised Life of Mine dates, based upon the priorities indicated in the SIMM report. A Working Cost

(maintenance) expenditure Statement for 2017-2018, and Capital Figures for 2016 and 2017, with “stay in business” Annual Estimates through to 2022 were sighted.

The Geotechnical Engineer (AGA South Africa Region Surface Operations) concluded that, “...The TSF's are operated in accordance with the Code of Practice. I conclude that the Vaal River TSF's are stable and possess good factors of safety against major slope failure...” The Senior Manager: Geotechnical Engineering, AngloGold Ashanti concluded, “...VRO (Vaal River Operations) TSFs are generally in good condition and are well managed...”

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:

Procedures for environmental monitoring (including sample preservation and chain of custody procedures and Code compliant sampling sheets) of surface water and borehole water, developed by A MINTEK cyanide specialist chemist originally. These were subsequently reviewed by the Vaal River TSF Production Metallurgist, Production Engineer and Full-time Safety Representative. Boreholes are placed and sampled upstream and downstream of the plant, The Vaal River and Schoon Spruit (Stream) are sampled up and downstream of the mine. Boreholes are sampled twice yearly, the Vaal River and Schoon Spruit are sampled monthly, wildlife is monitored daily, water dams are sampled monthly and plant boreholes are sampled quarterly. Wildlife mortalities are also checked daily by the pipeline patrols and recorded on the patrol check sheets. No cyanide-related wildlife or bird mortalities have been reported since the last recertification audit. The auditors deem the frequency with which the surface water and groundwater is monitored to be adequate to characterise the medium being monitored and identify any 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:

A closure and decommissioning procedure is in place which describes the process to be followed prior to and during decommissioning (decontamination of cyanide equipment prior to demolition) and includes an implementation schedule. Use would also be made of the South Africa Region Metallurgy (SARM), Cyanide Code Implementation Guidelines, which describe the process to be followed during decommissioning in Chapter 38: Basic Demolition Practices. The decommissioning procedure was reviewed in 2017 and is reviewed two yearly.

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 environmental liability estimates accounting 2016: Noligwa Gold Plant document to fully fund third party implementation of the cyanide-related decommissioning measures identified in its site decommissioning plan was reviewed. The estimates include line item estimates which are:- decontamination of storage and dosing system, decontamination of SASOL tanker, chemical cleaning of storages, and associated medicals, induction, screening training and travel. Closure liabilities are updated annually to take account of any changes at the facilities. The AngloGold Environmental Rehabilitation Trust Annual Financial Statements 2015 were sighted which were signed off by a Director of Nexia SAB & T (Auditors) on 30 March 2016. The financial assurance mechanism is sufficient to cover cyanide-related decommissioning activities.

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 Noligwa Gold Plant has 15 Cyanide Process Procedures, 16 Cyanide Emergency Procedures, 4 Cyanide Alarm Procedures, 9 Cyanide Engineering Procedures, 8 Cyanide PPE Procedures, 24 General Procedures, and 19 General Cyanide Procedures, supported by 11 TSF contractor operating and management procedures. These procedures were sampled and checked and confirmed to include required PPE and appropriate pre-work inspections. There is also a mandatory Code of Practice covering the TSF operation. In addition, there is the South Africa Region Metallurgy (SARM) Cyanide Code Implementation Guidelines, July 2013. The Guideline includes: unloading, mixing and storage facilities, leach plants, tailings impoundments, and cyanide treatment, and disposal systems, PPE, and cyanide decontamination and demolition.

The Annual Vaal River Operations Tailings Facilities Audit Reports, by the AngloGold Ashanti Senior Manager: Geotechnical Engineering, were sighted with the conclusion, "...VRO TSF is generally in good condition and is well managed..." On-going issues were identified, prioritised and actioned in regular TSF meetings. The Geotechnical Engineer (AGA South Africa Region Surface Operations) concluded in a note for the record that, "... The TSF's are operated in accordance with the Code of Practice. I conclude that the Vaal River TSF's are stable and possess good factors of safety against major slope failure..." Design assumptions include procedure stipulating the WAD cyanide levels at 50 PPM in the plant residue material, freeboard and design storm event (1.3 m and 1:50 year storm event respectively) is defined in the Code of Practice for the TSF's, and return water pond freeboard as specified in the ISO Water Key Performance Indicator procedure.

A SAP PMS (Planned Maintenance System) has been in place since the previous re-certification audit and a shiftly operational inspection system is in place with any faults being reported. Job requests are made out and submitted to the maintenance department for recording in the SAP system and issuing of job cards. Bi-weekly legal inspections are conducted and the whole plant is covered every 90 days. The Cyanide storage facility inspections are conducted and the inspection checklist covering the cyanide storage facility, includes cyanide delivery pipes and valves, as well as low strength bund areas. The checklist includes checking for leaks, corrosion, mortalities, precipitation on pipes and flanges in the cyanide bund area and dosing points. At the TSFs, there are daily operational inspections and the SAP PMS system covers pipes, valves and pumps.

Pipeline patrols are undertaken for each shift (3 shifts per day) to spot any leaks and take appropriate action as detailed in the Pipeline Failure Procedure. In addition, Wonderware (the SCADA) shows in real time the operation of the pumps so that any issues can be seen immediately. All main flow slurry pumps have a standby pump to allow for planned maintenance without disrupting flows. TSF freeboard is surveyed on a monthly basis (Cyclone West Extension dam), and the other dams are surveyed on a quarterly basis.

There is a probabilistic water balance in place, and no scenario has been identified where the need has been highlighted to shut down plant to prevent overtopping. Proactive planning and management of containment dams, dam levels and normal and abnormal conditions contributes to reduction of risk and the unlikely need to temporarily cease plant operations under abnormal precipitation events.



Cyanide pumps will automatically stop in the event of a power failure. In the event that Noligwa Gold Plant has a power failure but feed is still coming from the South Uranium Plant, a phone call will be made to the South Uranium Plant to stop pumping. An 8 hour surge capacity exists at the Noligwa Gold Plant to enable them to continue to receive feed from the South Uranium Plant until the pumping ceases. All tank overflows will be contained in bunds or trenched to the settling dams where the spillage will be contained. A change management procedure covering health, safety and environment is in place and the plant did not make any changes that could result in an increased risk of cyanide releases or cyanide exposure risks. Thus there was no need for a change management exercise to be implemented.

Worker input on health and safety and procedures comes through monthly Health & Safety meetings, including the Health and Safety Representatives. Further worker input comes via mock cyanide drills, Green Area Meetings, One Team Meetings (OTMs) and involvement in risk assessment teams.

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 pH of the slurry is controlled automatically and monitored by the Remote Operations Centre (ROC). The pH level is interlocked with the cyanide pumps and when the pH dips to 10, the cyanide pumps will stop and will only restart at 10.5. The six monthly Occupational Health monitoring results for 2015 were sighted and the highest HCN (Hydrogen Cyanide) gas value of 3.2 was measured at safety shower 25 in the January survey and the June survey highest value of 4 ppm was measured at the neutralising dosing point. The results for 2017 all recorded values of 0. This control confirms that running at a pH of 10 limits the evolution of HCN during production activities.

The plant uses 5 Fixed Polytron HCN gas monitors at offloading, float, Mispah leach, High grade leach, and Residue (2) and 21 PAC 7000 personal HCN monitors and 2 X-am 5000 personal HCN monitors.

The monitor alarm settings were confirmed during an interview with the Occupational Hygienist as being set to alarm at 4.7 parts per million continuously over an 8-hour period and first alarm at 7.5 ppm HCN and then at 10 ppm on an instantaneous basis. Evidence of on-going maintenance of the monitors was sighted. Calibration records were sighted for the past 12 months for all monitors. Quarterly calibration frequency exceeds manufacturer's requirements.

The use of safety showers and low pressure eye wash stations at the identified strategic positions where cyanide is used was confirmed during site inspections. Safety showers

are tested per shift as observed in the Daily Cyanide Checklist. Safety showers form part of the SAP PMS system for 6 monthly mechanical inspections. These were checked in the electronic review of the SAP PMS system. The placement of powder fire extinguishers at strategic areas in the plant was also confirmed. The fire extinguishers on the Plant were all observed to be dry powder. Fire extinguishers are checked monthly and records were reviewed. On-going inspections and checks are also used to monitor and check facilities and emergency response equipment functioning and checklists covering three years since the last certification were sampled. MSDSs (Material Safety Data Sheets) and first aid information is available in English.

The use of warning signs throughout the operation was confirmed during the site inspection. The signage included advising workers that cyanide is present, and that smoking, open flames and eating and drinking are not allowed, and that, if necessary, suitable personal protective equipment must be worn at the cyanide offloading and cyanide dosing areas. Signage was observed on slurry lines at the bridge crossing and other road crossings where the public are passing, advising that poisonous water is present. Pipes carrying tailings are labelled as toxic /poisonous water with a skull and cross bones and have a flow direction arrow. A “not potable” water pictogram is used at appropriate areas. In addition, a new GIS database shows pipes and can be used in the field to track and identify pipes.

Confirmed during the site inspection that unloading storage and mixing, as well as process tanks are labelled and colour coded as per the plant standards. Cyanide tanks are red with purple bands and cyanide pipes are painted purple with directional flow indicated. 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, based upon the AGA safety reporting requirements, 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:

There are detailed, written emergency preparedness plans in place for the Noligwa Gold plant and the Vaal River Tailings facilities, covering various cyanide release and exposure scenarios. First Aid rooms at the Cyanide Storage Area, at the top of Leach tanks, bottom of the leach tanks and at the offloading area contain water, oxygen, and antidote kits, available for use. All the process and engineering foreman and the control room operators have radios for communication. ER24 (ambulance and paramedics service providers) are part of the emergency response for AngloGold Ashanti. ER 24, 24

hour Emergency Response have oxygen, resuscitator, radio and qualified personnel available to assist with any cyanide exposure incident.

The nearby West Vaal Hospital (AGA-dedicated hospital) has water (outside shower), oxygen, antidote kits, and resuscitator available to accept patients exposed to cyanide at Noligwa plant. This was verified during the hospital site visit.

The Daily Cyanide Checklist includes the inspection of first aid kits including cyanide antidote. Checklists reviewed were January to December 2016, January to December 2015 and January to June 2017. The SA Metallurgy – TriPac antidote and Hypo Solution Expiry List, February 2018, covering all West Wits and Vaal River sites, kept by the Reagent and Risk Manager was sighted. All packs now have the same expiry date (confirmed during site inspection: TriPacs - Feb 2018 and Thiosulphates - Aug 2018). All antidote kits were observed to be kept in fridges and within the expiry dates.

Cyanide Appointees, having undertaken the relevant first aid training, make up the cyanide Emergency Response Team (ERT), trained to conduct cyanide related first aid. First Aid Rooms were observed during the site visit. ER24 are contracted to provide emergency assistance and transport patients to West Vaal Hospital, which is operated by AGA.

Vaal River Tailings does not have cyanide emergency equipment or a cyanide emergency response team. In the event of an emergency at the TSF, the Shift Forman will be immediately informed who will then call ER24 and, at the same time, inform the Tailings Production Metallurgist who then informs the nearest Plant Production Metallurgist who will send their Emergency Response Team. The Shift Foreman/ Tailings Production Metallurgist will also inform the Occupational Health Doctor and Occupational Health Sister. A Procedure for Notification of Cyanide Exposures to Vaal River Tailings Employees details that the ER24 emergency ambulance service will be called, in the event of a cyanide exposure, and the patient will be taken to the West Vaal hospital for treatment.

Man down drills are used to assure that the medical facility is competent and equipped to handle emergencies. Hospital staff are specifically trained to handle cyanide emergencies.

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 a Noligwa Gold Plant : Emergency Preparedness and Response Plan which contains the following: Statement of Strategic Intent; Management Roles and Responsibilities; Plan Maintenance and Change Management; Escalation Points and Incident Levels; Plant Training and Testing; Schedule for Full Hospital Response Chain (cyanide emergency drill schedule for Vaal River Operations); Emergency Scenario Response Plan; Plant Process Description; Crisis Management Plan; and Command Centres.

Noligwa Gold Plant has 16 Cyanide Emergency Procedures and an Issue Based Risk Assessment - Emergency Scenarios for Noligwa Gold Plant was conducted in May 2017. Emergency response scenarios are based upon the risk assessment. The Mandatory Code of Practice on Emergency Preparedness and Response Plan includes the Vaal River Tailings Emergency Preparedness Plan. The TSF Plan includes escalations of emergency levels from level 1 to level 2 or 3 and includes managing such issues as evacuation and community impacts. 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:

SHE (Safety, Health & Environment) meetings and OTM meetings involve the work force and the update of risk assessment on emergency scenarios. Full-time Health & Safety Representatives Meetings are also a forum to discuss issues relating to the Emergency Preparedness and Response Plan.

Emergency drills are used to involve the workforce in the response planning process and drill reports indicated evaluation and feedback. The community is not directly involved in the Plan but is informed on its contents during dialogue sessions. Drills are used to involve hospital and ambulance staff in emergency response planning processes.

A Cyanide Management Brochure for Processing Plants explaining:- what Cyanide is, its effects on people and the environment, reasons for use and ICMI certification has been produced. This brochure is distributed electronically or in paper format on request. Brochures were distributed during community meetings and at taxi rank visitations in 2016.

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:

The Emergency Response Plan details clear duties, roles and responsibilities and training for the various emergency scenarios. The emergency equipment inventory was checked and site inspections confirmed availability and readiness. Inspection checklists were sampled in the 2015, 2016 and 2017 records. 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. Periodic drills involving internal and external stakeholders 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 details of incident classification and escalation guidelines, appropriate emergency notification and reporting (internal and external) and the call-out procedure and contact information lists which are updated regularly. Internal and external communication (including the Media) is dealt with in the Plan covering plant and TSF emergencies.

The Plan also refers to a note from the Vaal River RTT (Rail Transport & Tailings) section to the respective plant managers on the use of ER24 and Vaal River Noligwa, Kopanang or West Gold Plants providing assistance as appropriate in cases of cyanide emergencies on the TSF. The note makes the point that Vaal river tailings does not have cyanide emergency equipment or a cyanide emergency response team.

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 Response Plan cross-references to detailed and specialised procedures which cover clean-up and remediation relating to releases, pipeline failures and spills, as appropriate to the site-specific identified scenarios. Use of neutralization processes and materials is clearly covered, as is disposal of contaminated materials and debris. The use of treatment chemicals, such as ferrous sulphate, in surface water is prohibited and cross referenced to a specific ferrous sulphate handling procedure.

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 Noligwa Plan and the Vaal River Tailings Plan are both required to be reviewed every three years, following incidents and emergency drills or when new information regarding cyanide becomes available. Drill reports including gassing and splashing were sighted. Evidence was sighted of learning points emerging from the various cyanide man-down 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 AngloGold Ashanti staff entering the plant gate receive a 2 day Induction. A refresher is undertaken no longer than 18 months after the previous course. This includes cyanide hazard recognition and basic cyanide first aid, which is refreshed every 12 months. The presentation used to undertake the Induction was viewed. The Basic Cyanide First aid and medical treatment for cyanide exposures course includes:- cyanide chemistry,

interacting with oxygen, toxicity, symptoms, gas generation, how cyanide is transported, SHE issues in the event of cyanide poisoning, first aid equipment for cyanide, First Aid training, emergency response chain, warning alarm systems, emergency response by control room, buddy system requirements, cyanide PPE requirements and use, cyanide PPE for hospitals, gas detection instruments, cyanide first aid and antidote kit (regulation 24.8.2), contents of medical aid kit details, cyanide exposure and symptoms, consequence of cyanide poisoning, generation of HCN gas, first aid procedure for cyanide poisoning, cyanide patient to be transported to the hospital directly, and emergency response in case of an incident including taking the TriPac antidote and Chapter 42 Medical Treatment Procedure (South Africa Region Metallurgy (SARM) Cyanide Code Implementation Guidelines, July 2013), in the ambulance transport to the hospital. Written tests are conducted for the induction and refreshers courses with a pass mark of 80%.

Contractors that spend more than 3 days on the plant or if the contractor is on the plant for less time but will perform high risk work, will receive the same Induction Training as the employees. Contractors that work less than 3 days on the plant (under direct supervision of a plant employee) will receive plant specific induction.

A training matrix is in place for all employees per plant/area showing the individuals and the various training modules including job specific training. The training matrix highlights the training employees have completed (green), where the training is due to expire within 3 months (yellow), and where the training is out of date (red). The permanent contractors, Fraser Alexander Tailings and Cyclone Projects, who work on the Vaal River TSF keep their own training matrix. Inductions for various groups of people were sampled and reviewed. Training is done at the Training Centre by qualified trainers. Confirmed that records of all training are retained electronically for at least the life of the plant (EduCos). Hard copy records per person per plant and per contractor are also kept for at least the life of the plant and archived in a container at the Central Training Centre.

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:

Workers are trained to perform their normal production tasks, including unloading, mixing, production and maintenance with minimum risk to worker health and safety and in a manner that prevents unplanned cyanide releases. The training matrix was observed that defines what training each worker is to receive based on their position and the tasks required of that position. The cyanide matrix covers all disciplines including Engineering (Maintenance), and Metallurgy (Plant Operations).



Sighted minimum generic standards for positions and sampled signed off standards for Boilermaker, Plant Attendant, Cleaners, Cyanide Off-loader, and Emergency teams. All positions and tasks where high cyanide risk exists, must, in addition, receive training as a cyanide appointee and be found competent in the training.

The Cyanide off-loader training was sampled and includes:- First Aid, Basic cyanide first aid, Metallurgy induction, preparation for maintenance, PAC 7000 or Xam 5000 HCN gas monitors, SCBA, Cyanide Appointee Unit standard, and Cyanide Off-loader Unit Standard.

Once trained Cyanide Appointees and Off-loaders receive an identification card with an expiry date of training so that it can be confirmed that training is up to date before any permit to carry out work in an area where cyanide may be released is issued. The routing form covers all the necessary sign offs before an access card is issued. That includes all the necessary sign offs by the training department. Transferred employees are covered by the internal transfer system and will receive section induction at the new plant.

The Noligwa Gold Plant trainer, Mr. Charles Harford, is a Registered Assessor, and has undertaken courses in Best Practice in Training, Presenting with confidence and professional train the trainer.

Competency assessments are done to initially determine competency in performing tasks by trained assessors. The Mine Conducts Planned Task Observations (PTOs) and conducts refresher training if identified by the PTO. Deviations on PTO's are recorded in the Risk Management System (RMS) and corrective actions will follow as appropriate which includes retraining, coaching or disciplinary measures. On the TSF, refresher training in terms of task training is conducted continuously. Refresher training is monitored using the matrix.

It was confirmed that records of all training are retained electronically for at least the life of the plant (EduCos). Hard copy records per person per plant and per contractor are also kept for at least the life of the plant. Electronic printouts of training records from EduCos was observed and the EduCos system was electronically demonstrated at the metallurgy Central Training Centre. All hardcopy training records are archived at the Metallurgy Central Training Centre in containers where the hardcopies are being scanned using ScanCo system from 2017. The training records of interviewees were reviewed to sample record keeping of training and this was found to be accurate and complete.

TSF contractor, Fraser Alexander Tailings (FAT), have an issue-based risk index and a task inventory with 10 procedures which list all tasks required to perform the TSF operations. These Safe Work procedures are used as on-the-job training materials. Training is scheduled monthly and training schedules for 2015 to 2017 were reviewed. Copies of training records were sighted.

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 employees and contractors receive Basic Cyanide First Aid training during the induction training. Cyanide Appointees form the Emergency Response Team in each plant. The Cyanide Appointee training unit standard on cyanide releases covers basic first aid treatment for cyanide exposure, entering in confined spaces, cyanide neutralisation and spillage disposal. The training matrix also specifies training as per the Emergency Preparedness Plan (EPP).

Intermediate Cyanide First Aid is assessed every 12 months as part of the training for Cyanide Appointee and Off-loaders. Advanced Cyanide First Aid (including Self-Contained Breathing Apparatus - SCBA) is refreshed every 2 years. Fire Incident Command is refreshed every 2 years. Cyanide Appointee and Off-loading training is refreshed every year. In addition, Cyanide Emergency drills are undertaken monthly.

It was confirmed that training and refresher training are up to date in the training matrix and records are accurate and complete. The West Vaal Hospital and ER24 staff receive cyanide first aid intermediate training and are assessed for competency. They are also involved in drills for training purposes. It was confirmed that records of all training are retained electronically for at least the life of the plant (EduCos). Hard copy records per person per plant and per contractor are also kept for at least the life of the plant. Drills are also attended by the Training Officer who reviews drill reports and training procedures and revises training when deficiencies are identified.

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 meetings are two-way dialogue sessions involving both dissemination of information and the answering of questions on cyanide. A walk-about at the Taxi Rank and Spa shops at Wedela Township on 22 Aug 2016 involved members of the pipe patrol, the cyanide champion, and the Production Metallurgist Tailings, to inform community members about the mine's activities and raise cyanide awareness.

Members of the Community can raise any mine-related concerns (including cyanide) at the Vaal River and West Wits environmental Forums. Attendance lists sighted showed attendance by Community members, local businessman, Government Officials, and Councillors.



The minutes of the West Wits Operations Forum meeting held on 9 March 2017 in the municipal boardroom, Carletonville and the Vaal River Operation meeting held on 18 May 2017 at the Peacock Guesthouse, Stilfontein were also sighted. Minutes of a 15 July 2015 KOSH (Klerksdorp, Orkney, Stilfontein, Hartebeestfontein) meeting included the mention of presence of toxic chemicals on the TSF which was of interest to cattle owners. The meeting was held at the offices of Department of Mineral Resources (DMR), Klerksdorp.

A presentation to Umsizi (running the AGA Livestock Management Plan-LMP) dated May 2017 was sighted. The presentation detailed the LMP which was developed as a result of problems with free ranging livestock (e.g. accidents and drinking of contaminated water and destruction of veld). The initiative is aimed at the owners of livestock which might affect, or be affected by, the mining operations.

The AGA West Wits Fire Captain liaises with the Municipal Fire Department on a regular basis on all fire matters related to the mines (including, where appropriate, cyanide.) The AGA West Wits Fire Department is also a member of the Fire Protection Association (FPA) where relevant topics are discussed. The Fire Captain also discusses emergency planning with neighbouring land owners to ensure there is a co-ordinated response. This includes the neighbouring game farm. Chemical HAZMAT, including cyanide truck accidents, are also discussed with the municipal fire department.

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 meetings are two-way dialogue sessions involving both dissemination of information and the answering of questions on cyanide. A walk-about at the Taxi Rank and Spa shops at Wedela Township on 22 Aug 2016 involved members of the pipe patrol, the cyanide champion, and the Production Metallurgist Tailings, to inform community members about the mine's activities and raise cyanide awareness.

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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:

The Cyanide Management Brochure for Processing Plants explaining what cyanide and ICMI are, the possible effects on the environment, and reasons for its use was sighted. This brochure is available for distribution by the Plant either electronically or in paper form. This is displayed as a poster inside the plant. The majority of the community in the vicinity of the AGA Gold Plants in the Vaal River Region and West Wits Region are literate. The presentation to the taxi rank was done in the local languages (Xhosa and Sotho). The brochure is made available publically and is posted at the Vaal Reefs Supermarket and Take-Aways, the Orkney Library and has been made available at the Vaal Reefs Technical High School.

No cyanide exposure, hospitalisation or fatalities occurred or were reported in the last three years at either the TSF's or the Gold Plant. Any cyanide exposure is reported to the Department of Minerals within 14 days, when confirmed to be inhalation of poisonous gas. Fatalities are reported immediately.

An AGA Group-wide Workforce Management Reporting System (WMRS) is used as an electronic reporting platform for all safety and environmental incidents, inspections and deviations. Accidents are classified as Minor, Moderate, High, Major and Extreme and are reported to the national Department of Mineral Resources and the Department of Water Affairs and Exposure reports are available on the AngloGold Ashanti public web site.

The following were observed on the AGA website:



AGA Sustainability Report published 2016 - page 42 - reporting on ICMI certification for AngloGold Ashanti - report on incident Cocoruto in Brazil, p 46. Cyanide usage is reported on in the report. (<http://www.aga-reports.com/16/sdr>). The AGA Sustainability Report for 2014 - p 25 reporting on cyanide usage. 20 AGA cyanide plants are certified under the ICMI Cyanide Code. (<http://www.aga-reports.com/14/sdr/>). The AGA Sustainability Report for 2015 - p 38 mentioning 4 sites were recertified, p 39 reporting on 2 Obuasi incidents, and one Vaal River 2015 incident when the slurry pipeline failed at Kopanang resulting in a spillage to the storm water trench. (The incident was not deemed a “significant cyanide incident” from a Cyanide Code perspective.) Cyanide Code and cyanide consumption were covered (<http://www.aga-reports.com/15/sdr/home>). No cyanide exposures, hospitalisation or fatalities occurred or were reported during the period since the last recertification.

