



June 2014

## ICMI RE-CERTIFICATION SUMMARY REPORT

# AngloGold Ashanti West Gold Plant

**Submitted to:**

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REPORT



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## 1.0 SUMMARY AUDIT REPORT FOR GOLD MINING OPERATIONS

**Name of Cyanide User Facility:** West Gold Plant

**Name of Cyanide User Facility Owner:** AngloGold Ashanti (AGA)

**Name of Cyanide User Facility Operator:** AngloGold Ashanti (AGA)

**Name of Responsible Manager:** Mr L LaGrange Lombard

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## 2.0 LOCATION DETAIL AND DESCRIPTION OF OPERATION

AngloGold Ashanti Ltd. is a global gold mining company. It was formed in 2004 by the merger of AngloGold and the Ashanti Goldfields Corporation. AngloGold Ashanti (AGA) is now a global gold producer with 21 operations on four continents: Africa, North America, South America and Australia.

AngloGold Ashanti West Gold Plant is situated in the North West Province of South Africa, approximately 4 km west of Orkney. The plant treats reclaimed waste rock dump material from the No 1, 3 and 4 waste rock dumps to a milling capacity of 180,000 tons per month. Residue from the plant is pumped to the Tailings Storage Facilities situated at the West Extension slimes. West Gold plant is the newest of the Vaal River Operations Gold Plants of AGA SARM (AngloGold Ashanti South Africa Region Metallurgy).

The plant utilizes two semi-autogenous, ROM mills in the comminution circuit, which is then followed by a thickening section where lime is added to condition the slurry prior to cyanide dosing in the pre-leach section. The pre-leach section consists of four mechanically agitated, flat-bottomed leach vessels, into which oxygen is injected to achieve the required dissolved oxygen Concentration for gold dissolution. The leach pulp gravitates to the carbon in leach (CIL) vessels.

The CIL section of the plant consists of eight mechanically agitated, flat-bottomed vessels operated in a carousel mode, whereby the carbon is contained the same vessel. Pulp is fed to the first CIL vessel and gravitates through the circuit to the residue vessel. The plant residue is pumped to the West Extension Tailings Storage Facilities. Gold loaded carbon is removed daily from the CIL circuit.

The loaded carbon is washed with diluted hydrochloric acid to remove calcium and base metal impurities from the carbon. The spent hydrochloric acid is discarded into the residue stream. The acid treated, loaded carbon is then transferred to an elution column. The West Gold Plant has opted for the Zadra elution

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process. Barren eluent with diluted caustic heated to 130°C is used to elute the loaded gold from the carbon. Stripped gold cyanide eluate exiting the elution column as pregnant passes continuously through the electro-winning cells, where the gold is stripped from solution and deposits onto the cathode. The stripped barren solution is recycled back into the elution circuit.

The eluted carbon is regenerated through a regeneration kiln at 750 °C to remove volatile fouling on the carbon. The regenerated carbon is then returned to the CIL circuit. The cathode gold sludge is calcined and smelted to produce gold bullion bars which are refined at the Rand Refinery for sale.

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## SUMMARY AUDIT REPORT

### Auditors Findings

in full compliance with **The International Cyanide Management Code**  
**AngloGold Ashanti West Gold Plant** is:  in substantial compliance with  
 not in compliance with

**Audit Company:** Golder Associates  
**Audit Team Leader:** Ed Perry, Lead Auditor  
**Email:** [eperry@golder.com](mailto:eperry@golder.com)

West Gold Plant has not experienced any significant cyanide incidents or compliance problems during the previous three year audit cycle.

### Name of Other Auditors

Marie Schlechter, ICMI pre-certified Mine Technical Specialist

### Dates of Audit

The Re-certification Audit was undertaken between 4 October 2013 and 6 November 2013. The tailings facilities and other central services are shared between of the various gold plants within the Vaal River Operations, located near Orkney in the North West province. The audit therefore started when these first of these shared services was visited and completed when the plant visit was completed.

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 Cyanide Production and using standard and accepted practices for health, safety and environmental audits.

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**PRINCIPLE 1 – PRODUCTION**

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

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

in full compliance with

The operation is

in substantial compliance with

**Standard of Practice 1.1**

not in compliance with

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

The operation is in full compliance with Standard of Practice 1.1; to 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. AGA has a contract with Sasol Polymers (the only producer of liquid sodium cyanide in South Africa) for the supply of liquid sodium cyanide. An amendment of the contract states that the producer must be ICMI certified. Sasol Polymers cyanide production facility in South Africa was recertified on 7 May 2013.

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**PRINCIPLE 2 – TRANSPORTATION**

**Protect Communities and the Environment during Cyanide Transport**

**Standard of Practice 2.1:**

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

**in full compliance with**

**The operation is**

in substantial compliance with

**Standard of Practice 2.1**

not in compliance with

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

The operation is in full compliance with Standard of Practice 2.1; to establish clear lines of responsibility for safety, security release prevention, training and emergency response in written agreements with producers, distributors and transporters. An agreement exists between Sasol Polymers (cyanide producer), Tanker Services (cyanide transporter) and AGA dated 3 May 2012. The agreement states that Tanker Services must be ICMI certified. Tanker Services was certified on 13 December 2011. The Agreement includes the following: details of the tankers used; a requirement to comply with national legislation; duties and responsibilities of the transporter including; safety, maintenance, training, security, offloading and emergency response. The training matrix for Tanker Services was observed showing that the training for all drivers is up to date. No subcontractors are used and there are no stop overs for the tankers. A transport route risk assessment is undertaken by Sasol Polymers and this is reviewed every two year with the most recent version dated 24 January 2012

**Standard of Practice 2.2:**

**Require that cyanide transporters implement appropriate emergency response plans and capabilities and employ adequate measures for cyanide management.**

**in full compliance with**

**The operation is**

in substantial compliance with

**Standard of Practice 2.2**

not in compliance with

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

The operation is in full compliance with Standard of Practice 2.2; to require that cyanide transporters implement appropriate emergency response plans and capabilities and employ adequate measures for cyanide management. Group wide cyanide supply contract covering all AGA Gold Plants is in place with Sasol Polymers as the sole supplier of liquid sodium cyanide in South Africa. Sasol was responsible for the transport of cyanide to Kopanang Gold Plant until July 2011 when SiLog (Sasol's transport services) and its physical assets were sold to Tanker Services who started transporting liquid sodium cyanide from Sasol Polymers to the gold plants from July 2011. Amendment no 6 LSA12 (1) 1 Jul 2006 to contract JG043001 requires the producer, supplier of cyanide to be a signatory to the ICMI Code and the producer, supplier and transporter to be ICMI certified. Tanker Services became a certified ICMI transporter on 13 December 2011.

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The break in ICMI certification of the liquid sodium cyanide transportation is deemed acceptable by the auditors as the interim cyanide risk was minimal because: the new transporter took over all of the transporter resources of ICMI transport certified SiLog (dedicated bulk cyanide liquid tankers, trained and experienced owner-drivers and contract drivers, assessed route risk assessments, cyanide documentation and systems) and was, and still is, covered in terms of Sasol's Product Stewardship and Responsible Care policies by the Sasol cyanide emergency response system (24 hour emergency control room, network of cyanide trained, emergency response spill and medical response service providers), dedicated cyanide tanker storage area and cyanide tanker decontamination facilities. Delivery notes (chain of custody records) for the three year re-certification period were observed showing that the liquid cyanide was transported directly from the Sasol Polymer cyanide production facility to Kopanang Gold Plant with no stop overs.

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**PRINCIPLE 3 – HANDLING AND STORAGE**

**Protect Workers and the Environment during Handling and Storage**

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

in full compliance with

The operation is

in substantial compliance with

**Standard of Practice 3.1**

not in compliance with

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

The operation is in full compliance with Standard of Practice 3.1; to 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.

No material changes to engineering design or practices have been undertaken at the Plant in the last three years.

The following documents were observed showing the facilities had been designed and constructed in accordance with sound and acceptable engineering practices:

- “Structural Condition Report of the Cyanide Plant at AGA West Gold Plant” - September 2013 - conducted by Tenova Bateman - Prasada Rao Principle Engineer (Pr. Tech. Eng. No. 201070265).
- “Structural Investigations and recommendations conducted by BIE International Engineers” - 14/15 November 2011. Inspected by D. Todd and DW Fink (Level 2 Inspectors).
- “Sasol Bulk Storage Facility Technical Inspection Report” - 19 September 2011 - Conducted by Philip Viviers.
- “Sasol Bulk Storage Facility Technical Inspection Report” - 10 January 2013 - Conducted by Kobus de Wet.

The offloading area for the liquid sodium cyanide is closed off with restricted access, installed on a concrete surface, and equipped with humps and drains to contain any spills. The drainage for this area is to the bunded area for the cyanide storage tanks, which is located below the level of the offloading area. A spillage pump is located within the bund. Spilled water during cyanide offloading will be pumped to pre-leach once it has been established that the pH exceeds 10.5. Spilled concentrated cyanide will be pumped back to cyanide storage. Spillage from an unknown source not to be pumped to cyanide storage but rather to leach once pH has been established

There are no public areas close by. There are no surface waters or drainage to surface waters in the cyanide storage area or the Gold Plant as a whole.

Plant procedures state that liquid sodium cyanide may only be offloaded if the level in the storage tanks is less than 65%. Tank level indicators display at the tank site and SCADA in the Control Room. High level alarms are set at 85%, interlocked with air valve to stop offloading at 85%.

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Cyanide storage tanks are located within a metal framework above the bunded area and are equipped with ventilation pipes. The secondary containment areas for the liquid cyanide storage tanks, the leach tanks, and the CIP tanks are constructed of cement and appropriately lined. There are covered secondary containment launders on cyanide feed pipes. Pipes installed inside launder drain to the bund areas. The liquid cyanide offloading and storage area is placed away from incompatible materials explosives and apart from foods, animal feeds and tobacco.

**Standard of Practice 3.2:**

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

in full compliance with

**The operation is**

in substantial compliance with

**Standard of Practice 3.2**

not in compliance with

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

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

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 outside of which are washed during the offloading process and on their return to Sasol's premises.

Procedures were observed including "Procedure for Cyanide off-loading" WGP/CN-010 Rev 07 July 2013; "Procedure for buddy system" WGP/CN-047 Rev 07 May 2013; and "Procedure for Cyanide PPE Protection Levels" WGP/CN-035 Rev 07 May 2013.

The Offloading of Cyanide procedure states that; both the tanker driver and off-loader is present during the off-loading, both driver and off-loader must wear PPE (as defined in the Cyanide PPE Protection Levels), personal monitoring equipment, and details the role of the buddy.

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**PRINCIPLE 4 – OPERATIONS**

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

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

in full compliance with

**The operation is**

in substantial compliance with

**Standard of Practice 4.1**

not in compliance with

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

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

West Gold Plant has the following procedures: 50 Cyanide Safe Handling and Emergency Procedures, 24 Environmental Management and Protection Procedures, and 15 General Procedures.

In addition there are the following: "Mandatory Code of Practice Mine Residue Deposits Vaal River Tailings" Ref No. COP/SHE/t/002, May 2013 Rev. 2; and "South Africa Region Metallurgy (SARM) Cyanide Code Implementation Guidelines", July 2013, Rev 06. These procedures and code of practices include; unloading, mixing and storage facilities, leach plants, tailings impoundments, and cyanide treatment, and disposal systems.

The operation has the following plans and procedures that identify the assumptions and parameters on which the facility design was based and any applicable regulatory requirements; "Procedure to follow when high cyanide WAD levels are measured in the residue slime WAD levels high" WGP/CN-033 Rev 03 July 2013 This states that the maximum WAD cyanide allowed to exit the plant is 50 ppm if this is exceeded the TSF is informed in order for them to take appropriate actions; "Procedure for Abnormal Conditions at the Pre-Leach, CIL or Residue Tanks" WGP/CN-032 Rev 07 May 2013; "Procedure to follow for Cyanide Management when major upsets occur" WGP/CN-044 Rev 07 May 2013; "Procedure for Responding on low pH alarm" WGP/CN-024 Rev 07 May 2013; "Procedure to follow to avoid containment dam overflow" WGP/ENV-020 Rev07 May 2013.

Freeboard and design storm event (1.3 m and 1:50 year storm event respectively) is defined in the Code of Practice for the tailing facilities (TSFs).

Stability Analysis is conducted every two years by professional registered engineering consultants, "Vaal River and West Wits Operations Tailings Storage Facility Freeboard Assessments Report No. 01", SLR, February 2013. In addition an Annual Internal Audit is undertaken on all TSF facilities by Senior Geotechnical Engineer – "Vaal River Operations Tailings Facilities Audit Report" - August 2013.

Computerised Maintenance, Management Information System (CMMIS) maintenance documentation includes the equipment number and description as well maintenance frequency, inspection frequency, the task descriptions, the tools required, PPE requirements and relevant Risk Assessments. AGA moved from CMMIS to SAP in February 2013. All the historic data from CMMIS was moved over to SAP. Failure modes

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effects and criticality analysis (FMECA) are undertaken as part of the maintenance program for the plant as this determines the inspection frequency and details of the actions to be undertaken.

The daily inspections include cyanide storage facility, cyanide emergency cabin at storage area, ferrous sulphate storage, cyanide emergency cabin at the top of the leach, first aid station at the office, cyanide emergency trailer, containment dams, and wildlife deaths as detailed in the "Daily Inspections for Cyanide Storage, Dosing and First Aid Facilities Checklist" WGP/CN-021, Rev 07, May 2013 was observed.

The procedure on "Maintenance of Cyanide Equipment Procedure" WGP/CN-050, Rev 07, May 2013, was observed.

The Plant has the following change management procedure "Procedure for Change Management on Cyanide Installations" WGP/CN-046, Rev 07, May 2013. The change management process was undertaken to change the pH of the leach from 10.5 to 10.0. This included a risk assessment and subsequent occupational monitoring to confirm no increased risk.

The "Structural Condition Report of the Cyanide Plant at AGA West Gold Plant" dated September 2013 conducted by Tenova Bateman and "Structural Investigations and Recommendations" conducted by BIE International Engineers dated 14/15 November 2011 include structural integrity and signs of corrosion and leakage of cyanide storage, leach and CIP tanks. Other reports detailing inspections of the cyanide storage tanks include: "Sasol Bulk Storage Facility Technical Inspection Report" 19 September; and "Sasol Bulk Storage Facility Technical Inspection Report" 10 January 2013.

A high level alarm is installed on the pollution control dams. The alarm is connected to the SCADA. A pop-up will come up on SCADA when the level of Dam B reaches 20%, the high level alarm will be activated when the Dam B level reaches 65%.

Pipe patrols inspect pipelines, pumps and valves for deterioration and leakage. Pipe patrols are undertaken 3 times each day, one for each 8 hour shift. Observed "Pipe-Patrol Inspection Route and Meter Readings Log" for 2 November 2012.

The "Metallurgy Pipelines and Valves Standard for Tailings" states that bare steel pipes will be thickness tested every 12 months whereas HDPE lined pipes will be tested every 36 months. In addition, Wonderware (the SCADA) shows in real time the operation of the pumps so that any issues can be seen immediately.

Emergency generators are in place to provide emergency power to the thickeners and CIL agitators to prevent the tanks and pipes ceasing up. The thickeners have to be manually started when they are tripped due to the interruption of power. At the same time the thickeners are switched to recirculation to prevent material being pumped to the leach tanks. All other material will remain in their tanks. The emergency generators are tested and inspected on a weekly basis by the Electrical Department, which is recorded on the inspection register (Diesel Emergency Generator IS/SHE/s/105) There is also a generator test during shut downs and a yearly SAP (Maintenance Flag for a full service.)

Cyanide pumps will automatically stop in event of a power failure.

All liquid sodium cyanide and mixtures containing sodium cyanide are contained in tanks and pipes. If the power fails all liquids and mixtures will remain in their appropriate storage tanks and pipelines. No cyanide will be released into the environment due to the power failure.

Cyclone Engineering Projects is contracted for emergency pumping using mobile generators.

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## ICMI CYANIDE RE-CERTIFICATION AUDIT - SUMMARY REPORT

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

in full compliance with

The operation is

in substantial compliance with

**Standard of Practice 4.2**

not in compliance with

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

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

AGA conducted a Workshop in Nov 2010 and Dec 2012 with Afritech on Cyanide Optimisation. A Cyanide Optimisation Programme for Surface Sources West Gold Plant was compiled.

The cyanide optimisation programme includes: change management implementation; analyse, improve and implementation; measurement of plant performance; cyanide consumption as well as forecast of tonnages; budgeting of resources and people; reporting of analyse and improvement projects.

Initiatives include the following: head samples are analysed at SGS - base recovery results aid in predicting and understanding how much gold is available for cyanide. Diagnostic leaching was started in 2013 on the residue indicating how much gold is still available for direct cyanidation. The optimal set point was determined to be 145 ppm sodium cyanide. In light of the optimisation programme the cyanide usage has decreased from 265 g/ton and 200 ppm setpoint in 2010 to 205 g/ton and 145 ppm setpoint in 2013.

The optimisation programme also lead to the reduction in pH from 10.5 to 10.0 as no change in gold extraction was observed.

The newly implemented Remote Operations Control (ROC) system (and advanced data collection system and monitoring station) monitors the instrumentation outputs, which is stored in a data collector. Control charts are compiled for performance parameters. Upper limits and lower limits for performance are set. Notification emails and sms are sent in an escalation sequence when the upper or lower limit is breached.

Future initiatives include: optimising the milling, CIL optimization to achieve better cyanide degradation, and elimination of NKM Screen choking at CIL in order to ensure residence time of slurry in CIL, which will also reduce free cyanide and WAD cyanide.

The plant uses a TAC1000 on line analyser to measure cyanide in the head leach tank and a Cynoprobe to monitor terminal cyanide in the Leach Residue. This is fed into the ROC on-line system so that all managers can see the data. If the values are too high (above 50 mg/l WAD cyanide) or too low a cascading e-mail and sms system is used to inform managers of the situation ultimately including the Regional Vice President.

If the pH in the leach is below 9.7 the addition of liquid cyanide is automatically cut off.

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

in full compliance with

The operation is

in substantial compliance with

**Standard of Practice 4.3**

not in compliance with

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

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

A probabilistic water balance for the TSFs and Plants in the Vaal River Region is run on GoldSim using a 1:50 year 24hr storm event for the design scenario. A meteorological assessment was conducted by an independent consultant and 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. West Gold Plant and the TSFs have sufficient storage capacity to cope with a 1 in 50 year storm.

Input into the GoldSim is updated at least once a quarter. The following are included; slurry tonnage deposition onto each dam is included in the sheet; daily recorded rain measurement taken at each TSF, precipitation levels for a 1 in 50 year storm event; and monthly S Pan evaporation values, gold plant specific hydrological assessment.

The model has the capability to run different scenarios such as electricity cuts (no facility to pump water back to the plants) and to determine if certain dams will overflow in certain rainfall events. Also where solutions will be discharged in a certain scenario such as a major storm water event, inflow of additional water source.

Cyclone Engineering Projects is contracted for emergency pumping using mobile generators in the event of a power failure. Letter VRO131/13 August 19, 2013 agreeing to provide pumps to AGA as required was observed. This is used on a periodic basis by AGA.

TSF Freeboard is surveyed monthly in accordance with Mandatory Code of Practice Mine Residue Deposits Vaal River Tailings Ref No. COP/SHE/t/002, May 2013 Rev. 2. The local legal requirement is a minimum of 0.8 m as detailed the Water Act. The AGA standard is a minimum of 1.3 m in order to reduce the risks of over topping.

Phreatic level measured and stability analyses conducted every two years, with recommendations made on freeboard and pool management.

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

in full compliance with

The operation is

in substantial compliance with

**Standard of Practice 4.4**

not in compliance with

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

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

The TSFs receive slurry containing less than 50 mg/l WAD cyanide except during abnormal situations. The open water in the return water dams have a WAD cyanide concentration of less than 50 mg/l and therefore do not require any special measures to restrict access by wildlife. If tailings are measured at the plant to have a WAD concentration of higher than 50 mg/l the TSF is informed and emergency procedures implemented to scare way any animals or birds. WAD levels in open water are then measured. No WAD levels have been recorded in open water above 50 mg/l.

The occasional wildlife mortalities were recorded but none have been linked to cyanide. Any wildlife mortalities found close to TSF ponds or Return Water Dams are sent away to the Veterinarian Institute for toxic analysis. One bird (flamingo) was found dead on 16 September 2013, the report is still awaited from the Veterinarian Institute but has verbally been confirmed that it is not due to cyanide. One dead cow death found on 6 September 2013 at Mispah TSF - Incident No: MET/06092013/H&S/M/069-13 VR Tailings, Mispah 2 TSF. The Report is still awaited from the Veterinarian Institute. It has verbally been communicated that this death was not due to cyanide but "sour stomach" from eating maize.

There are no leach heap operations.

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

in full compliance with

The operation is

in substantial compliance with

**Standard of Practice 4.5**

not in compliance with

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

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

There are no direct discharges to surface water from these cyanide facilities. Two legal discharge points exists that are allowed to discharge seepage water to the Vaal River. Legal discharge points are Eye dam sump and Boat Club sump. The water at these points although legally able to be discharged to the Vaal River are not discharged but recycled back to the operations for use as process water due to the lack of available process water. There is no established mixing zone. The only discharge in the last three years was from the Boat Club sump (March 2011) due to flooding of the Vaal River. At the time of the flood the monthly analysis shows the WAD levels to be <0.02 mg/l.

Seepage from tailings facilities are intercepted by a system of trenches and boreholes this water is pumped to storage facilities before being used in the gold plants for the Vaal River area as process water. Monitoring is conducted upstream and downstream of the gold plants and associated infrastructure on the Vaal River and the Schoon Spruit (Schoon River). The majority of the monitoring on both rivers show WAD cyanide levels to be between 0.02 mg/l and <0.02 mg/l. The downstream values for the Vaal River only exceeded this on one occasion when WAD cyanide was 0.03 mg/l upstream of the facilities and 0.06 mg/l downstream of the facilities. The downstream values for the Schoon Spruit exceeded 0.02 mg/l on two occasions. On both occasions the upstream concentration was <0.02 mg/l with the downstream concentration being recorded as

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0.74 mg/l on both occasions. With both incidents having an identical reading and no subsequent increases in concentration it is believed that these levels may be due to an analytical or recording error. Elevated concentrations have not been recorded since June 2011.

The instances when downstream concentrations of WAD cyanide have been recorded as being above 0.022 mg/l appear to have been isolated instances with no causal link established. Therefore no remedial action has been required to prevent further degradation.

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

in full compliance with

The operation is

in substantial compliance with

**Standard of Practice 4.6**

not in compliance with

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

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

Mining processing plants process water is the only beneficial use of groundwater, all other water for domestic and livestock use in the immediate area is supplied from the local potable water supplier, Midvaal Water Company. Groundwater monitoring results associated with the TSFs since 1 Jan 2011 that were observed did not exceed 0.03 mg/l for Mispah TSF and 0.02 mg/l for West TSF. Therefore no remedial action is deemed to be necessary

Seepage from the TSFs is managed through a number of measures including the following: lining of trenches for the transportation of process water; boreholes adjacent to Vaal River to intercept seepage from TSFs; sub surface perforated pipeline that discharges into Boat Club sump before being pumped to the plants; and various areas of woodland adjacent to TSFs planted to undertake phytoremediation of shallow groundwater.

The operation does not use mill tailings as underground backfill.

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

in full compliance with

The operation is

in substantial compliance with

**Standard of Practice 4.7**

not in compliance with

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

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

The Cyanide Offloading area is concreted and the slope is towards the bund area for the cyanide storage tanks. Any spillage of cyanide during offloading will run directly into the cyanide storage bund area which is

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located below the level of the road. The liquid cyanide storage tanks are located within a steel framework above the concreted bund. Any spill is pumped into the process via a sump and pump in the bunded area.

“Cyanide Offloading” CN-GEN-07, Rev 09, June 2013 details the activities to be undertaken during the offloading of liquid sodium cyanide to prevent and contain any spills.

All other cyanide process tanks i.e. leach, CIP and residue are located on concrete plinths within concrete bunded areas, which have sumps and pumps. Spilled water during cyanide offloading will be pumped to pre-leach once it has been established that the pH exceeds 10.5. Spilled cyanide will be pumped back to cyanide storage. Spillage from unknown source not to be pumped to cyanide storage but rather to leach once pH has been established.

All tanks are located within concrete bunds, which in conjunction with the pollution control dams and the Queen Mary reservoir provide more than 110% of the largest tank during a heavy rainfall event.

All cyanide containing slurry and solution pipelines are installed over bunds, concreted surfaces with all spillages outside a bunded area are routed to the lined pollution control dams or back into the bunds. The CMMIS system includes thickness tests and pressure monitoring takes place to detect major pipe failures.

For pipes transferring tailings from the plant to the TSFs and the transfer of process water from the TSFs a pipeline maintenance strategy was observed which has been formulated for implementation from October 2012 in order to reduce pipeline failures with thickness measurements undertaken and where necessary pipes replaced. All slurry lines when replaced are replaced with HDPE lined pipes. Any spills from slurry pipe are cleaned up as soon as possible in accordance with “Pipeline Failure Procedure” (P/SHE/e/015) dated February 2012.

Tailings pipelines do not present a risk to surface water.

Pipelines are steel with possible linings of HDPE. These materials are compatible with cyanide and high pH conditions.

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

in full compliance with

The operation is

in substantial compliance with

**Standard of Practice 4.8**

not in compliance with

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

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

Original drawings and the quality assurance process for these designs were verified during the 2007 Certification Audit. No material changes to engineering design or practices have been undertaken at the Plant in the last three years.

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A number of inspections have been undertaken of the plant and the TSFs by an appropriately qualified person with subsequent reports concluding that their continued operation is within established parameters and therefore protect against cyanide exposures and releases. These include:

“Structural Condition Report of the Cyanide Plant at AGA West Gold Plant” - September 2013 - conducted by Tenova Bateman - Prasada Rao Principle Engineer (Pr. Tech. Eng. No. 201070265). General Findings: Cyanide Plant structures that are in operation are in a good condition and well maintained. Specific Issues: Corrosion of Piping at flange points, damage to concrete protection paint, corrosion protection of steel work. Will apply for Capital in 2015 to conduct major repairs.

“Structural Investigations and recommendations conducted by BIE International Engineers” - 14/15 November 2011. Inspected by D. Todd and DW Fink (Level 2 Inspectors). Report inclusive of Cyanide Storage Area, CIL, and Residue Area.

“Sasol Bulk Storage Facility Technical Inspection Report” - 19 September 2011 - Conducted by Philip Viviers - minor issues identified during inspection.

“Sasol Bulk Storage Facility Technical Inspection Report” - 10 January 2013 - Conducted by Kobus de Wet - minor issues identified and rectified.

The inspections of the TSF include the following: “Annual TSF Audit Report” for August 2013, “SLR Global Environmental Solutions Vaal River and West Wits Operations Tailings Storage Facility Freeboard Assessments”, and “Vaal River Operations Mispah Tailings Storage Facility - Review of Piezometers and Stability of Mispah TSF’s”.

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

in full compliance with

The operation is

in substantial compliance with

**Standard of Practice 4.9**

not in compliance with

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

The operation is in full compliance with Standard of Practice 4.9; to implement monitoring programs to evaluate the effects of cyanide use on wildlife, surface and groundwater quality.

Written procedures have been developed for monitoring including the following: “Water Management Procedure 2 - Groundwater Sampling” (SAR/EM/W/002); “Water Incident Sampling Procedure” (SAR/EM/W/005);

“Procedure for Sampling Containment Dam Feed and Overflow” WGP/ENV-003 Rev 07 May 2013 for samples taken by the Gold Plant, and “Sampling Procedure for Specialised Speciation and Environmental Samples” (VRTM-CN08) version dated May 2013 for samples taken by Vaal River TSFs.

These procedures include how and where samples should be taken, sample preservation techniques, chain of custody procedures and cyanide species to be analysed.

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MINTEK cyanide specialist chemist originally developed the "Sampling Procedure for Specialised Speciation and Environmental Samples" (VRTM-CN08) dated May 2013 for sampling of contaminated soils and solutions. MINTEK is South Africa's national mineral research organisation specialising in mineral processing, extractive metallurgy and related areas.

"Procedure for Environmental Sampling Spillage" WGP/ENV-004 Rev 07 May 2013 - includes sampling method, sampling preservation, chain of custody and cyanide species to be analysed for and records to be kept including conditions at the time of sampling.

Sample log sheets from TSF samples were observed showing that sampling conditions including weather, temperature, precipitation, animal activity and anthropogenic influences are recorded.

The operation monitors for cyanide in discharges to surface water from the Eye Dam sump and the Boat Club sump on a monthly basis. Cyanide monitoring is undertaken in the Vaal River and the Schoon Spruit upstream and downstream of the AGA Gold Plants and associated infrastructure in the Vaal River Region on a monthly basis. Groundwater is monitored up-gradient and down-gradient of the gold plants and the TSF on a 6 monthly basis. Monitoring of WAD cyanide in tailings leaving the Gold Plant is monitored on a continual basis.

The Gold Plant inspects for wildlife mortalities on a daily basis, none have been recorded in the last 3 years. Wildlife mortalities are inspected for on the TSFs where the results are recorded in the daily logs. Wildlife mortalities are also inspected by the pipeline patrols on the patrol check sheets. Two wildlife mortalities have been found in the last 3 years, neither of which has been associated with the ingestion of cyanide.

In the professional judgement of the auditors the frequency with which the surface water and groundwater monitoring is conducted is adequate to characterise the medium being monitored and identify any changes in a timely manner.

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**PRINCIPLE 5 – DECOMMISSIONING**

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

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

**in full compliance with**

**The operation is**  in substantial compliance with **Emergency Response Practice 5.1**  
 not in compliance with

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

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

The following procedures have been developed for the decommissioning of the facility.

"Decommissioning Procedure" WGP/CN-045 Rev 07 May 2013. describes the process to be followed prior to and during decommissioning (decontamination of cyanide equipment prior to demolition) this includes actions to be undertake 12, 6 and 3 months prior to decommissioning. All procedures including this procedure are reviewed every three years.

"Procedure for Decontamination and Removal of Cyanide Contaminated - or redundant equipment form Cyanide Area" WGP/CN-03 Rev 07 July 2013, describes the decontamination and disposal of cyanide equipment.

Chapter 38: Basic Demolition Practices of the "South Africa Region Metallurgy (SARM) Cyanide Code Implementation Guidelines", July 2013, Rev 06 describes the process to following during decommissioning.

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

**in full compliance with**

**The operation is**  in substantial compliance with **Standard of Practice 5.2**  
 not in compliance with

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

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

The premature closure liabilities for West Gold Plant for 2012 have been calculated. Costs include the demolition of cyanide storage tanks, leach tanks and off-loading facilities (in addition to all other aspects of

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the Gold Plant) as well as the decontamination and removal of cyanide. The costs have been obtained from third party contractors then escalated on an annual basis and reviewed by te accounts department.

AGA has established a Trust Fund and Bank guarantees to provide for the closure liability costs. Ernst and Young Accountants audited the financial calculations as well as the income of the trust fund on an annual basis.

Observed AGA Environmental Rehabilitation Trust Annual Report 2012 signed by Director of Ernst and Young 26 June 2013. The overall opinion stated in the report was that the information on the calculations and trust fund presented was fair for 31 Dec 2012 and in accordance with International Financial Reporting Standards.

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**PRINCIPLE 6 – WORKER SAFETY**

**Protect Workers’ Health and Safety from Exposure to Cyanide**

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

**in full compliance with**

**The operation is**

in substantial compliance with

**Standard of Practice 6.1**

not in compliance with

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

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

The operation has a large number of procedures describing how cyanide-related tasks such as unloading, mixing plant, operations, entry into confined spaces, and equipment decontamination prior to maintenance should be conducted to minimise worker exposure. These procedures include personal protective equipment and address pre-work inspections including the following:

"Procedure for Cyanide off-loading" WGP/CN-010 Rev 07 July 2013; "Procedure for Cyanide Delivery Scheduling and Tank Level Control" WGP/CN-08 Rev07 July 2013; "Procedure for Decontamination and Removal of Cyanide Contaminated - or redundant equipment form Cyanide Area" WGP/CN-03 Rev 07 July 2013; "Procedure for buddy system" WGP/CN-047 Rev 07 May 2013; "Procedure for Clearance Certificate Authorization" WGP/GEP-015 Rev06 May 2013; ""Confined Space Entry" P.SHE/o/001 Rev 2 August 2009.

The Gold Plant has the following procedure, "Procedure for Change Management on Cyanide Installations" Rev 07 May 2013 in order to review proposed process and operational changes and modifications for their potential impacts on worker health and safety, and incorporate the necessary worker protection measures.

Plant conducts Monthly Health and Safety Meetings, which are attended by the Plant Management, Section Safety Stewards and Full Time Safety Stewards who represent the workers. These meetings include discussions on any changes to health and safety procedures. In addition new procedures are emailed to Shift Foremen for discussion in One Team Meetings (per shift).

In addition risk assessments are conducted (often in the form of a FMECA) and reviewed prior to the compilation or revision of procedures.

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

in full compliance with

The operation is

in substantial compliance with

**Standard of Practice 6.2**

not in compliance with

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

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

The pH of the slurry is controlled automatically and monitored by the ROC. The pH level is interlocked with the cyanide pumps, when the pH dips to 9.7 the cyanide pumps will stop and will only restart at 10.0.

Quarterly surveys are conducted by Occupational Hygienist at the Gold Plants to determine areas of potential cyanide exposure. The Code of Practice for Occupational Hygiene, dated 10 October 2013 includes baseline monitoring of known pollutants within the Plants and the TSFs. A risk assessment for each pollutant for each area of the plant was then undertaken using this monitoring data. No areas were identified where levels of 4.7 ppm continuously over an 8 hour period were identified.

The West Gold Plant gas survey inclusive of hot spots for 07 May 2012 was observed where all measurements of HCN were 0.0 ppm.

PAC 7000 ambient personal monitoring devices are used on the TSF if the TSF is notified by the Plant that the concentration of WAD cyanide in the tailings exceeds 50 mg/l. Monitoring did not show elevated levels of HCN on the TSFs during these periods of high WAD cyanide in tailings from the Gold Plant. Workers are protected from dust by the use of appropriate PPE (dust masks) as detailed in the risk assessment undertaken as part of the Job Template Analysis

“The Code of Practice for Occupational Hygiene” dated 10 October 2013 includes baseline monitoring of known pollutants within the Plants and the TSFs. A risk assessment for each pollutant for each area of the plant was then undertaken using this monitoring data. In addition to this a HAZOP for each plant has been undertaken to identify gaseous hotspots at the plant.

All monitoring devices observed during site visit were observed to be calibrated. Monitoring equipment is calibrated by Drager on a quarterly basis although it is only required by the manufacturer to be calibrated on a six monthly basis. Calibration certificates were observed.

Signs were observed in areas where cyanide is used e.g. offloading point for liquid sodium cyanide storage tanks and dosing points for leach tanks. The signs are placed to warn that cyanide is present, that smoking is prohibited, no open flames or eating and drinking are allowed and what PPE must be worn. Signs are placed at TSF sides and at the penstock prohibiting the drinking of the water, instruct on what PPE must be worn, prohibits unauthorised entry.

All safety showers have an integrated eye wash. Safety showers were located at appropriate locations including adjacent to the offloading area and close to dosing point in the pre-leach tanks.

Safety showers are tested per shift as observed in daily checklists. The fire extinguishers on the Plant were all observed to be dry powder. Fire extinguishers are checked monthly and serviced annually.

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All reagent strength cyanide pipes are colour coded purple and indicates that it contains cyanide as well as flow direction. Cyanide storage tanks are colour coded purple with red band as per colour coding index. Other tanks and pipes containing cyanide mixtures are appropriately labelled including flow of direction. Pipes carrying tailings are labelled as toxic /poisonous water with a skull and cross bones and not potable water pictogram at culverted areas.

The Sodium Cyanide Solution MSDS in English (official language of AGA) is on the outside of the cyanide offloading area and in the First Aid Cabin next to the offloading area. It includes the first aid procedures, safe handling and storage, personal protection, etc.

No cyanide exposure incidents have been recorded in the last 3 years. Any incident is announced to all South Africa Metallurgy Business Unit. Any incident is investigated by a team including the Cyanide Champion. The timeline (including photographs) is reconstructed. Access the cause of the accident and then compile remedial actions. Actions are loaded into the Risk Management System (RMS) to track the actions taken.

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

in full compliance with

The operation is

in substantial compliance with

**Standard of Practice 6.3**

not in compliance with

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

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

It was observed that First Aid rooms at First Aid Station (opposite offices), Cyanide Storage First Aid Station, First Aid Station at the top of the CIL contain water, oxygen, and antidote kits, available for use. All foremen etc. have radios for communication. The fully equipped (except for antidote kit, which is kept in the fridges in the First Aid Rooms) emergency trailer is parked adjacent to the Plant's offices.

In the event of an emergency at the TSF the Shift Forman will be immediately informed who will then call ER24 (paramedic and ambulance service) and at the same time informs 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. This is detailed in "Procedure for Notification of Cyanide Exposures to Vaal River Tailings Employees" (VRTM-CN02) dated May 2013.

The daily checks include the inspection of first aid kits including cyanide antidote. Observed "SA Metallurgy Tripac-Cyano and Hypo Solution Expiry List", Sept 2013, kept by the Reagent and Risk Manager was observed. All antidote kits were observed to be kept in fridges and within the expiry dates.

"West Gold Plant Emergency Preparedness and Response Plan" EPP Rev 07 July 2013 stipulates the management roles and responsibilities, plan maintenance and change management, Incident levels, plan training and testing, emergency scenario response plan, communication structure, command centres.

West Gold Plant has 50 Cyanide Safe Handling and Emergency Procedures, 24 Environmental Management and Protection Procedures, 15 General Procedures and General Emergency Procedures.

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"Procedure for Notification of Cyanide Exposures to Vaal River Tailings Employees" (VRTM-CN02) dated May 2013 details the emergency response in the event of a cyanide exposure at any of the Vaal River Tailings facilities. Contractors on site e.g. FAT also comply with this procedure. Both ER24 and West Vaal Hospital use Chapter 42 of the "South Africa Region Metallurgy (SARM) Cyanide Code Implementation Guidelines", July 2013, Rev 06.

Cyanide Appointees having undertaken the relevant first aid training make up the First Aid team trained to conduct cyanide related first aid. ER24 contracted by AGA is part of the emergency response for AngloGold Ashanti. The ER24 headquarters for the Vaal River area is located at Kopanang Mine. ER 24 - 24 hour Emergency Response have oxygen, resuscitator, radio and qualified personnel available to assist with any cyanide exposure incident.

ER24 are contracted to provide emergency assistance and transport patients to West Vaal Hospital, which is owned and operated by AGA.

"Procedure for Access of Ambulance in the event of a medical emergency" WGP/CN - 002 Rev 07 July 2013 states that the main gates to the plant are opened for the ambulance to ensure unobstructed entrance, all other traffic at the gates will be diverted away.

"Procedure for Notification of Cyanide Exposures to Vaal River Tailings Employees" (VRTM-CN02), dated May 2013, details the actions to be taken at the TSFs.

Full chain drills (i.e. from man down all the way through to treatment at the hospital) are conducted every six months rotated between the plants. West Gold Plant conducted its last full chain drill on 7 March 2011. This was well documented including photographs. Drills on the Plant are undertaken monthly for cyanide exposure or release. Cyanide drills are undertaken on VSF at 6 monthly intervals. Drill reports detail lessons learned and where necessary lessons are incorporated into response planning.

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PRINCIPLE 7 – EMERGENCY RESPONSE

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

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

[X] in full compliance with

The operation is

[ ] in substantial compliance with

Standard of Practice 7.1

[ ] not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

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

"West Gold Plant Emergency Preparedness and Response Plan" (EPP) Rev 07 July 2013 stipulates the management roles and responsibilities, plan maintenance and change management, Incident levels, plan training and testing, emergency scenario response plan, communication structure, command centres.

West Gold Plant has 50 Cyanide Safe Handling and Emergency Procedures, 24 Environmental Management and Protection Procedures, 15 General Procedures and General Emergency Procedures.

The procedures stipulate specific actions to be undertaken including as clearing site personnel and any affected communities from the area of exposure, use of cyanide antidotes and first aid measures for cyanide exposure, control of releases at their source, and containment, assessment, mitigation and future prevention of releases. These procedures actions to be undertaken in the event of catastrophic releases of hydrogen cyanide from storage or process facilities; releases during unloading and mixing; releases during fires and explosions; pipe, valve and tank ruptures; overtopping of ponds and impoundments; power outages and pump failures; failure of cyanide treatment systems; and failure of cyanide facilities.

The "Procedural Hazop Study for West Gold Plant - Emergency Scenarios Assessment for West Gold Plant dated 21 March 2010 considers various cyanide and related scenarios.

Transport accidents are considered in Sasol Polymer procedure for "The procedure for the handling of dangerous goods transportation incidents involving Sasol and Sasol service provider vehicles" - SSP-S-009 Rev 2 Date 14 December 2012.

"Sasol Transport Route Risk Assessment (Road) Assessment number SA0048 - Sasol Polymers Sasolburg to AngloGold Ashanti Vaal River West Gold Plant Orkney" dated 24 January 2012 considers the transportation route, the chemical form of the cyanide (liquid sodium cyanide) the method of transport (tanker) the condition of the road and the design of the transport vehicles

Overtopping of ponds and impoundments and failure of tailings impoundments, are considered in the following plans: "Vaal River Tailings Emergency Preparedness Plan - No.2 Tailings Plant Manager".

"Procedural Hazop Study for VR Tailings" VRT EP 071206 Rev 6 Aug 2013 assessed and listed the potential cyanide emergencies relevant to Vaal River TSF.

Emergency Plans are reviewed every 3 years.

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

in full compliance with

**The operation is**

in substantial compliance with

**Standard of Practice 7.2**

not in compliance with

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

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

Plant conducts Monthly Health and Safety Meetings, which are attended by the Plant Management, Section Safety Stewards and Full Time Safety Stewards who represent the workers. These meetings include discussions on any changes to cyanide emergency response planning.

The Chief Fire Officer, Business Services (the only permanent member of the AGA fire crew) liaises with local authority emergency response teams who provide feedback on cyanide emergency response planning on behalf of potentially affected communities. The Chief Fire Officer has been asked to be the Chair of the regional municipal Disaster Management Committee. Monthly meetings between the Chief Fire Officer and the Assistant Director of Fire and Safety are due to resume after a 2 year gap as there has been a new appointee to this position.

Sasol Polymers undertake a cyanide road show along the cyanide tanker transportation routes in association with the Gold Plants. The latest road show was 15 July 2012 in Midvaal. The Reagent and Risk Manager attended on behalf of AGA. These road shows allow communities to provide feedback on the emergency planning process.

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 can be distributed electronically or in paper format on request. Boards showing this information have been put up inside the Gold Plant and at the TSFs. The public being able to see the latter.

ER24 (contracted by AGA) and West Vaal Hospital (owned and operated by AGA) are involved in the emergency planning process and with the emergency drills.

The Emergency Preparedness Plans are reviewed every three years and as part of this review internal stakeholder are communicated with. "West Gold Plant Emergency Preparedness and Response Plan" Rev 07 was last reviewed in July 2013. "Vaal River TSF Emergency Response Plan" was last reviewed in July 2013. Where necessary consultation is undertaken with stakeholders more often than this, to keep the Plan up to date.

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

in full compliance with

**The operation is**

in substantial compliance with

**Standard of Practice 7.3**

not in compliance with

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

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

"West Gold Plant Emergency Preparedness and Response Plan" EPP Rev 07 July 2013 stipulates the management roles and responsibilities, plan maintenance and change management, incident levels, plan training and testing, emergency scenario response plan, communication structure, command centres. In addition it contains the following: Section 2 of EPP July 2013 Rev 07 includes the roles and responsibilities of EPP Sponsor, EPP Coordinator and EPP Committee, etc.; list of Emergency Chemical Response Team Members who are all Cyanide Appointees with appropriate training; Emergency Contact Numbers dated 09 September 2013; "Quantities of Cyanide Equipment"; Section 4 stipulates the Escalation Points and Incident Levels (1-3), Figure 7.1 illustrates the General Emergencies Decision Tree and Figure 7.2 Emergency Communication Structure.

"South Africa Region Metallurgy (SARM) Cyanide Code Implementation Guidelines", July 2013, Rev 06. Chapter 42 First-Aid & Medical Treatment of Cyanide Exposure states the West Vaal Hospital and ER24 requirements - Dr James Steel (West Vaal Hospital Manger) signed on 18/7/2013 to confirm commitment. Chapter 12 stipulates Training Requirements for Cyanide Appointees.

24 hour emergency telephone numbers are placed at every external telephone on the plant.

The procedures to inspect emergency response equipment and ensure its availability include the following: "Procedure for Checking Cyanide Antidote Kits" WGP/CN-09 Rev 07 July; "Procedure for checking Emergency Safety Showers and Eye wash basin with the plant" WGP/CN-014 Rev 07 July 2013; "Procedure for Daily Inspection of Cyanide Storage, Dosing and First Aid Facilities" WGP/CN-020 Rev07 May 2013; "Daily Inspection for Cyanide Storage, Dosing and First Aid Facilities Checklist" WGP/CN-021 Rev 07 May 2013; "Procedure to Test "Man-down" alarm" WGP/CN-025 Rev 07 May 2013; and "Procedure for Emergency Trailer Checklist" WGP/CN-037 Rev 07 May

Representatives of ER24 (paramedics and ambulance response) and West Vaal Hospital (AGA hospital) confirmed that they are aware of their involvement and that they are included in the drills.

The "Mass Incident Plan (External Disaster Plan)" ref AGAH/VR/EP/SOP/010, dated July 2012 compiled by Dr. J Pretorius (CMO Anaesthesia) details how West Vaal Hospital will respond to a cyanide incident.

The AGA, Chief Fire Officer, Business Services is informed of Man Down drills, however the fire crew is not directly involved as they do not have cyanide training. The Emergency Response Team for the Plant responds to cyanide emergencies.

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

in full compliance with

The operation is

in substantial compliance with

**Standard of Practice 7.4**

not in compliance with

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

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

Section 4 of the "West Gold Plant Emergency Preparedness and Response Plan" EPP Rev 07 July 2013 stipulates the Escalation Points and Incident Levels (1 to 3), Figure 7.1 illustrates the General Emergencies Decision Tree and Figure 7.2 Emergency Communication Structure.

Observed Emergency Contact Numbers dated 09 September 2013 and Cyanide Champion Contact List dated 18 September 2013. 24 hour emergency telephone numbers are placed at every Telkom Telephone on the plant. These lists include the number of ER 24, West Vaal Hospital and Chris Lovick (Chief Fire Officer).

South African Region Metallurgy Cyanide / Chemical Emergency Contact Numbers dated 10 October 2013. All numbers inclusive of SA Metallurgical Management, Plant Management, Emergency Response, West Vaal Hospital etc.

The "Emergency Response Plan for Vaal River TSF" includes contact information for management, regulatory agencies, outside response providers and medical facilities. Procedure Public Consultation and Disclosure / Emergency Communications (VRTM-CN07) Dated May 2013 details how communications about an emergency are undertaken.

"Procedure for communication with interested and affected parties" WGP/CN-006 Rev 07 May 2013 states that only the General Manager is allowed to make any statements to the media or any person regarding cyanide incidents.

"Procedure Public Consultation and Disclosure / Emergency Communications" VRTM-CN07 dated May 2013 details how communications about an emergency are undertaken. This procedure states that "No employee, contractor or manager is permitted to communicate directly or indirectly with the press or general public". The process for external communication is detailed in "SHE Communication, Consultation and Participation" (SP/SHE/s/008) dated October 2012. Issues that could result in public exposure are referred to the General Manager SA Region Metallurgy and Environmental Manager Environmental Management Department.

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6 June 2014.  
Date



# ICMI CYANIDE RE-CERTIFICATION AUDIT - SUMMARY REPORT

**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.**

in full compliance with

**The operation is**

in substantial compliance with

**Standard of Practice 7.5**

not in compliance with

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

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

"Procedure for Response Cyanide Spillage, Release of HCN and Communication" WGP/CN-012 Rev 07 July 2013 addresses the neutralisation of solutions or solids, decontamination of soils or other contaminated media, and management and disposal of spill clean-up material.

Only visibly spilled slurry is cleaned up after a pipeline failure when conditions are suitable it is disposed of at a TSF as per Pipeline Failure Procedure PSHEe015 Rev 0 February 2012.

Large quantities of concentrated cyanide spilled will be cleaned up by the Sasol Hazchem Team. Drinking water is supplied from Midvaal Water Company therefore alternative supplies are not required.

"Handling and Detoxification of Hazardous Chemical Spillage Ref No. VRTM-CN017 Rev 06 May 2013 and South Africa Region Metallurgy (SARM) Cyanide Code Implementation Guidelines, July 2013, Rev 06. Section 6 Chapter 41 point 4.16 and the "Procedure for using ferrous-sulphate" WGP/CN-048 Rev 07 May 2013 procedure prohibits the use ferrous sulphate, sodium hypochlorite, ferrous sulphide and hydrogen peroxide to neutralize cyanide spilled into surface water.

"Procedure for Environmental Sampling Spillage" WGP/ENV-004 Rev 07 May 2013 includes sampling methods for both slurry, solution and soil samples. Also addresses records to be kept and analysis parameters.

"Procedure for sampling containment dam feed and overflow" WGP/ENV-003 Rev 07 May 2013 stipulates parameters to be measured for at the overflow weir from the pollution control dams to the Queen Mary Reservoir.

"Pipeline Failure Procedure" PSHEe015 Rev 0. February 2012 states that samples need to be taken at the point of impact, at the point where spill meets sensitive ecosystems and downstream of impact as well as dams that may have been affected (where spill is not contained).

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

in full compliance with

**The operation is**

in substantial compliance with

**Standard of Practice 7.6**

not in compliance with

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

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

"West Gold Plant Emergency Preparedness and Response Plan" Rev 07 July 2013 states that it will be updated every 3 years or whenever there is major change to the document or when the following changes occur, regulatory changes, new risks identified, resources or organizational structure changes, after drills exercises, after the EPP is used for an actual event or for major changes. The EPP states that on the completion of mock drills, any required changes to procedures will be communicated for implementation and change of procedures. No changes have been instigated as a result of the mock drills.

Full chain drill (i.e. from man down all the way through to treatment at the hospital) is conducted every six months rotated between the plants. The full chain drill schedule for 2013 was observed. West Gold Plant was scheduled to undertake a full chain drill in October 2013, however due to the hospital being placed on alert due to the lowering of pH project at West Gold Plant the drill was postponed to November 2013. This drill was undertaken as planned. The last full chain drill was undertaken on 19 August 2011, both ER 24 and West Vaal Hospital were involved.

Cyanide drills are undertaken on VSF at 6 monthly intervals. Drill schedule for 2013 was observed.

No requirement to update the Emergency Response Plan has been identified after any cyanide related emergency, due to the fact that Vaal River TSF and Gold Plant have not had a cyanide related emergency in the last 3 years.

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## **PRINCIPLE 8 – TRAINING**

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

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

**in full compliance with**

**The operation is**

in substantial compliance with

**Standard of Practice 8.1**

not in compliance with

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

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

All AngloGold Ashanti staff entering the Plant 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 observed. Written tests are conducted for the induction and refreshers with a pass mark of 80%.

Contractors that will spend more than 3 days on the plant or if the contractor will be on the plant for less but will perform high risk work, will receive the same Induction Training as the employees. Contractors that will 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 received (green) where the training is due to expire within 3 months (yellow) and where the training is out of date (red).

The training for the plants within the Vaal River and West Wits areas are managed from a central training department. A plant training officer is present at each plant to undertake the plant specific training. Central training is responsible for induction training, maintaining the training matrix and as a moderator for plant specific training. Specialised training is done by outside training institutes.

All Cyanide Appointees and Off-loaders have a competency card showing that they are competent to work in cyanide areas (Cyanide Appointees and Off-loaders are certified to work in areas with risk of possible cyanide exposure) and the expiring date of their training. Training to be a Cyanide Appointee includes; Self Contained Breathing Apparatus (SCBA), St John's First Aid, PAC 7000, Cyanide Plant First Aid, Cyanide Offloading, Preparation for Maintenance, Induction Refresher and Emergency Response. Off-loaders in addition have training in cyanide offloading.

Refresher training of the Induction is undertaken every 18 monthly. Refresher training for Cyanide First Aid is undertaken every 12 months. Long term contractors induction is refreshed annually. Other training refreshed 3 yearly or as detailed in specific individual training records.

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## ICMI CYANIDE RE-CERTIFICATION AUDIT - SUMMARY REPORT

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

in full compliance with

The operation is

in substantial compliance with

**Standard of Practice 8.2**

not in compliance with

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

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

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 defines what training each worker receives based on their position and the tasks required of that position. The training matrix indicates when the validity of an assessment will expire by turning the green block yellow 90 days prior to expiry.

All employees and permanent contractors are trained during the induction training prior to commencement of work related to cyanide. All employees receive Basic Cyanide First Aid Training during induction. Cyanide Off-loaders and Appointees are trained before working in areas where there is a potential for cyanide release. A Planned Task Observation (PTO) is undertaken the first time they are required to work in an area where there is a risk of cyanide release. All contractors who are due to work more than 3 days at the plant or who will be working in areas that have the risk of cyanide release undergo the 2 day induction including Basic Cyanide First Aid Training. Workers who will be working on site for less than 3 days are accompanied by an appropriately trained permanent employee. Once trained Cyanide Appointees and Off-loaders receive identification card with 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 training material for Cyanide Off-loading includes a wide range of modules including: Self Contained Breathing Apparatus (SCBA), St John's First Aid, PAC 7000, Cyanide Plant First Aid, Cyanide Offloading, Preparation for Maintenance, Induction Refresher and Emergency Response, and Cyanide off-loading. It covers normal off-loading as well as abnormal / emergency conditions that could occur during off-loading. The training matrix records which off-loaders received the off-loading training. After completion of the training, the off-loader is assessed at the plant by an assessor.

The competency assessment document used to assess compliance with the training for Intermediate Cyanide First Aid Treatment (MET-G 136) as part of the Cyanide Appointees and Off-loaders training was observed. It covers PPE requirements, identification of hazards and risks, symptoms of poisoning and first aid treatment. The details of the elements required per job as detailed in the training matrix include PTO.

Refresher Basic Cyanide First Aid is conducted every 12 months. 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 SCBA) is refreshed every 3 years. Fire Incident Command is refreshed every 3 years. Cyanide Appointee and Off-loading training is refreshed every year.

All trainers are qualified e.g. Vaal River TSF trainer - Mr Matube - Workplace Assessor - (ETDP SETA Accredited Service Provider), also completed various other courses on training management; West Gold

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## ICMI CYANIDE RE-CERTIFICATION AUDIT - SUMMARY REPORT

Plant trainer - Mr Molokele - Workplace Assessor - (ETDP SETA Accredited Service Provider) ; and Trainer Development Diploma for T.C. van Gent, Senior Training and Development Officer Metallurgy, dated 18 November 2002.

Records of training undertaken for all employees and all contractors are kept for at least the life of the plant on the electronic EduCos system detailing; the employees name, the date of the training, and the topics covered. Hard copies of training for all employees and contractors are kept for at least the life of the plant. The hard copies in addition to the information kept on EduCos also show the trainer and how the employee demonstrated an understanding of the training material.

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

in full compliance with

The operation is

in substantial compliance with

**Standard of Practice 8.3**

not in compliance with

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

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

All employees and contractors receive Basic Cyanide First Aid training during the induction training. Induction training presentation was observed.

The Emergency Response Team consists of Cyanide Appointees. Cyanide Appointees have all obtained a certificate in Self Contained Breathing Apparatus and Confined Space Rescue (SCBA) training.

The Medical Response Team (ER 24, Casualty Department Nurses) receive Intermediate Cyanide First Aid training. Casualty department nurses also receive Cyanide Poisoning Training at the hospital.

Refresher Basic Cyanide First Aid is conducted every 12 months. 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 SCBA) is refreshed every 3 years. Fire Incident Command is refreshed every 3 years. Cyanide Appointee and Off-loading training is refreshed every year.

The Emergency Drills are conducted at plant level. The plant training officer is present at all drills and evaluates training effectiveness. The review of the drill to assess that all personnel have the necessary skills and knowledge to ensure an effective response. Training procedures will be revised if deficiencies are identified. Plant training officer reports to AGA central training where any changes to training procedures are made and implemented. Record of Full Chain Drill 7 March 2011, show that G. Molokele – Training Development Officer West Gold Plant was present. G. Molokele stated that it had not been found necessary to change procedures in light of the drills (there are also monthly Plant cyanide drills) but training for individuals has been refreshed, on the job, in response to drills.

Records of training undertaken for all employees and all contractors are kept for at least the life of the plant on the electronic EduCos system detailing; the employees name, the date of the training, and the topics covered. Hard copies of training for all employees and contractors are kept for at least the life of the plant. The hard copies in addition to the information kept on EduCos also show the trainer and how the employee demonstrated an understanding of the training material.

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# ICMI CYANIDE RE-CERTIFICATION AUDIT - SUMMARY REPORT

**West Gold Plant**  
Name of Facility

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Signature of Lead Auditor

6 June 2014.  
Date



**PRINCIPLE 9 – DIALOGUE**

**Engage in Public Consultation and Disclosure**

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

in full compliance with

**The operation is**

in substantial compliance with

**Standard of Practice 9.1**

not in compliance with

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

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

A person wanting to complain on an issue related to West Gold Plant can come to the plant security at the plant entrance. Security will escalate the complaint to Plant Management and Security will record the complaint in OB book (Occurrence Book) with all details of complainant and complaint

In addition a school awareness campaign was run in October 2011 regarding the TSF facilities and the dangers they pose.

A visit was undertaken to site on the 19 July 2012 by grade 8 learners from Vaal Technical High School, Matlosana; Mayoral representative; and National Union of Mineworkers representatives.

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

in full compliance with

**The operation is**

in substantial compliance with

**Standard of Practice 9.2**

not in compliance with

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

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

AGA provides information to its stakeholders regarding cyanide management through the following:

Annual Sustainability Reports that are available on the AGA website;

AuRa Newsletter that is distributed electronically and sent to stakeholders on request;

Visit to site on 19 July 201 by grade 8 learners from Vaal Technical High School, Matlosana; Mayoral representatives; and National Union of Mineworkers representatives;

Awareness campaign at primary and secondary schools in the Vaal River area 17 - 20 October 2011; and

Flyers distributed to communities in neighbouring areas regarding dangers of TSF.

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# ICMI CYANIDE RE-CERTIFICATION AUDIT - SUMMARY REPORT

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

in full compliance with

**The operation is**

in substantial compliance with

**Standard of Practice 9.3**

not in compliance with

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

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

Observed Cyanide Management Brochure for Processing Plants explaining what cyanide and ICMI are, the possible effects on the environment, and reasons for its use. This brochure is available for distribution by the Plant either electronically or in paper. This is displayed as a poster inside the plant. Observed Cyanide Management Brochure displayed as a poster on boards adjacent to TSFs where public have access. In addition the 2012 Country Fact Sheet – South Africa details the quantity of cyanide used and this is on the AGA website

The majority of the community in the vicinity of the AGA Gold Plants in the Vaal River Region are literate.

The number of reportable environmental incidents in South Africa (10) is reported in the 2012 Country Fact Sheet – South Africa, which is on the AGA website. The environmental incidents include Pipe and pump failures leading to slurry spills between West Gold Plant and the TSF. These incidents are reported to the regulator (Department Water Affairs and Forestry Free State) putting it in the public domain.

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Signature of Lead Auditor

6 June 2014.  
Date





## Report Signature Page

**GOLDER ASSOCIATES AFRICA (PTY) LTD.**

Handwritten signature of Ed Perry in black ink.

Ed Perry  
Lead Auditor

Handwritten signature of Marie Schlechter in black ink.

Marie Schlechter  
Reviewer

Date: 23 December 2013

MS/EP/ms

Reg. No. 2002/007104/07

Directors: SAP Brown, L Greyling, RGM Heath

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