

***INTERNATIONAL CYANIDE  
MANAGEMENT INSTITUTE***

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

***Recertification Summary Audit Report***

***AngloGold Ashanti  
Kopanang Gold Plant  
South Africa***

***10<sup>th</sup> – 14<sup>th</sup> May 2010***



Name of Operation: AngloGold Ashanti Kopanang 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

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**Location detail and description of operation:**

Kopanang Gold Plant is situated in the North West Province of South Africa, approximately 24 km South East of Klerksdorp.

The gold plant treats primary, underground gold ore, mined at the Tau Lekoa and Kopanang Shafts, in a twin stream configuration. The remaining mill capacity is filled up with the addition of payable grade waste rock.

The plant consists of conventional, Run-Of-Mine (ROM) milling, leaching, carbon in pulp (CIP) and electro-winning sections. In the first stage of comminution, the ore is milled in a set of 6 parallel ROM semi-autogenous (SAG) mills. The milled pulp reports to a set of four thickeners for solid-liquid separation. The screened mill product gravitates to the 60m diameter thickeners with lime and flocculent being added to assist with settling and pH adjustment. The reclaimed thickener overflow water is returned to the milling circuit.

After thickening, the pulp is pumped through a series of eight leach tanks per stream, where the gold is dissolved with Sodium Cyanide at a set pH of 10.5. The fourth stage is the CIP section where the dissolved gold is absorbed by

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activated carbon in the pulp. The carbon loaded with gold is sent through an elution column where the gold is stripped from the carbon by a warm caustic solution.

Three integral elution circuits exist. Loaded carbon is pumped out of the No. 1 adsorption vessel to the loaded carbon vibrating screens where the carbon is washed and then discharged into the loaded carbon measuring vessels. The slurry and water returns to the pulp stream.

The loaded carbon is accumulated in the loaded carbon vessels and this is then transferred into the elution column. A caustic solution containing 2.2 % Sodium Hydroxide (NaOH) at a temperature of 130° Celsius is pumped through the carbon in the elution column. The pregnant solution (eluate) is cooled down in the flash tanks and then passes through to the electro-winning cells, where the gold is recovered from the solution onto the stainless steel cathodes. The barren solution (eluant) then returns to the elution column for re-use. The caustic solution is re-circulated continuously for the entire duration of the elution process of 17 hours. Steam for heating the eluant is supplied by four electrode boilers.

The electro-winning section comprises of eighteen Mintek-type smelts. Each cell has six stainless steel cathodes and seven anodes. The dissolved gold in the eluate is electro-won onto the stainless steel in the cathode baskets. The spent electrolyte then flows through to the eluant tank to be re-circulated to the elution column. The cathode gold sludge is smelted for bullion bar production.

Carbon is de-watered using a vibrating screen and fed into the rotating kilns where the volatiles and organic contaminants are driven off and the carbon reactivated by bringing the carbon temperature up to 750° Celsius. The regenerated carbon is acid treated with a 5% hydrochloric acid (HCl) solution for removal of inorganic contaminants. After acid treating, the carbon is returned to the CIP section.

Residue from the plant is pumped to the Tailings Storage Facilities(TSF) situated at the Mispah slimes dam and No. 4 compartment West TSF.

The Gold Plant utilizes the conventional cyanide leach/carbon in pulp technology to extract gold. The final product is gold bullion bars, shipped to the refinery for refining and sale.



***Auditor's Finding***

**This operation is**

**X in full compliance**

in substantial compliance \*(see below)

not in compliance

with the International Cyanide Management Code.


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

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: 23/9/2010


Dates of Audit: 10<sup>th</sup> – 14<sup>th</sup> May 2010

I attest that I meet the criteria for knowledge, experience and conflict of interest for Code Verification Audit Team Leader, established by the International Cyanide Management Institute and that all members of the audit team meet the applicable criteria established by the International Cyanide Management Institute for Code Verification Auditors.

I attest that this Summary Audit Report accurately describes the findings of the verification audit. I further attest that the verification audit was conducted in a professional manner in accordance with the International Cyanide Management Code Verification Protocol for Gold Mine Operations and using standard and accepted practices for health, safety and environmental audits.

Kopanang Gold Plant

Facility

  
Signature of Lead Auditor

23/9/2010  
Date

Kopanang Gold Plant

Signature of Lead Auditor

23<sup>rd</sup> September 2010

*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 cyanide supply contract, covering all AngloGold Ashanti Gold Plants, including Kopanang 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 2 March 2010.

**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 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 Infrachem SiLog was re-certified on 13 January 2010 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 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. SASOL Infrachem SiLog was re-certified on 13 January 2010 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. 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. The cyanide is also stored away from incompatible materials. The Cyanide offloading area is located on a concrete surface equipped with humps, for containing any spilled solutions. Drainage flows to a spillage sump equipped with a

pump, which delivers into the main bund area. Currently, only one of the two tanks is used due to major maintenance. Cyanide deliveries are scheduled to bring 24 tons every second day to reduce the risk of overfilling. The Tanks' level indicators display at the tank site and on the control room SCADA. High level alarms are set at 85% and interlock with the delivery air valve to stop offloading at 85%. Cyanide orders are placed at 45% to 50 % tank capacities to take the load capacity of a 24 ton cyanide delivery truck. The procedure covering cyanide unloading was reviewed and found to be effective. Cyanide areas are within the access controlled plant security area which is securely fenced.

*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:*

Only liquid cyanide is used and is delivered via bulk tanker to storage tanks and no mixing or storage of solid cyanide takes place on site. The offloading procedure is detailed, spelling out PPE requirements, use of a buddy in the process, and 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 site has 52 cyanide process and engineering procedures in place, plus 26 general emergency procedures, supported by 30 TSF contractor operating and management procedures and a mandatory Code of Practice covering TSF operation. Operations and

maintenance manuals for Mispah 2 TSF (incorporating the extension to the TSF), the Vaal River East and West complex Mispah 1 and 2 paddock dams and the Cyclone operation at the conversion of the West extension were also reviewed and found to be effective. Routine daily, weekly, monthly and quarterly inspection reports, legal inspections, and checklists for proactive and reactive management were sampled to check the effectiveness of systems. Surface water diversions are inspected as part of the daily inspections and all return water dams are equipped with level indicators and transmitters displaying on the SCADA (computerised control and monitoring) system. 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. The plant is designed to contain any spillages in the anti-pollution ponds and thus no back up power is required in case of power failures.

A CMMIS (Computerised Maintenance Management Information System) planned maintenance system and procedure is in place and functioning. Operational inspections conducted include: Shiftly inspections; Cyanide storage facility daily inspections; Legal two weekly inspections; Weekly engineers inspections; Annual PCR (Physical Condition Rating) inspections; and Shift foreman's daily inspections. Tank thickness testing is done on a planned basis for all high and low strength cyanide tanks. Flood tests are conducted on cyanide reagent strength bunds triggered by the CMMIS system. TSF inspections are carried out shiftly, daily, monthly, quarterly and annually. A change management procedure covering health, safety and environment is in place and operational and examples of major and minor change management exercises indicated that the process is used effectively.

*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:*

In the plant, the use of automated cyanide titrating and control instruments (TAC 2000) optimises the control of cyanide addition. Ore feed mix to mill is constant and test work is conducted only when ore changes are planned. The last ore mix change was in 2005 when external laboratory tests were conducted. A cyanide leach test on Tau Lekoa ore and waste mix is done monthly. Diagnostic leach tests are done three monthly on a

composite sample. New ore arrangements are planned and test work programs are in place to characterise ores. A plant test program to reduce cyanide is in place, reducing cyanide from 200 ppm CN to 180 ppm CN.

The strategy is to evaluate feed mix, conduct laboratory diagnostic leach programs and make addition changes based on results from laboratory tests. The control strategy is to use on-line instrumentation measuring throughput and on line instrumentation measuring cyanide levels in leach. These are integrated using set points to control reagent strength cyanide addition rates. A cynoprobe is used on the tailings to measure WAD and free cyanide and integrate with cyanide addition set points.

*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:*

A probabilistic water balance for the Vaal River TSF complex, including all the TSFs and the return water dams, and one for the Kopanang plant was sighted and reviewed. Information is included in the water balance on rainfall, 1:50, 1:100 year, 24 hour storm events, evaporation, and solution deposition. Rainfall data is collected daily on the TSF and combined with local rainfall measurements and data from the SA Weather Bureau. No run-on occurs as all the TSFs and return water dams are on higher level than ground level. Furthermore, storm water cut-off trenches around the plant are in place. Rainfall scenarios in the water balance were used to determine return dam operating levels and emergency strategies to prevent overtopping. The power outage scenario was specifically modelled and the water removal ability of the system evaluated for the 1:50 year storm. TSF phreatic levels are measured and stability analyses are conducted every two years, with reviews and recommendations regularly made on freeboard and pool management. Return water pond and containment dam levels are monitored ultrasonically and displayed on the SCADA system and are also subject to regular foreman inspections.

*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:*

Regular water samples are taken at TSF tip points, decant and return water dams. WAD Cyanide measured at plant tailings tanks using a Cynoprobe showed that no values above 50 ppm WAD Cyanide left the plant. There were minor exceedances but on review of investigation reports, these related to either equipment malfunctions or isolated process aberrations which were, in the opinion of the auditors, appropriated dealt with, in both the short and long terms. The Mispah TSF tip points are mostly less than 30ppm, and the return water dams below 37 ppm. Thus, the TSFs and all return water dams are containing less than 50 ppm WAD Cyanide and do not therefore require any special measures to restrict access by wildlife. Wild life mortality inspections are conducted daily and no cyanide-related mortalities have been reported for the whole TSF complex at Vaal River or at the Kopanang plant during the period since certification.

*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:*

No direct or indirect discharges to surface water from cyanide facilities exist. No established mixing zone has been identified by regulatory authorities but river samples are taken for monitoring and control purposes. Upstream WAD Cyanide values from the Vaal River are at less than 0.217ppm (other non-signatory gold mining operations are operating upstream of the Vaal River Operations). Samples from down stream in the Vaal River are less than 0.015 ppm WAD Cyanide. Boreholes around plant monitor groundwater with all results below 0.019mg/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 area and all other water for domestic and livestock use is supplied in pipes by the

Midvaal Water Company. No current jurisdictional standard exists for cyanide in groundwater, no beneficial use has been established, and no compliance points have been established.

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:- clean dirty water separation trench systems; and the Woodland project (trees absorbing water) at Mispah slimes dam complex to prevent seepage contaminating ground water. The Slimes dams are designed with under drains and trenches to collect seepage and prevent contamination. The Vaal River dewatering project includes the use of interception boreholes drilled on the bank of the Vaal River where seepage in the groundwater is pumped into a tank and recycled to the plants for operational use. Plant floor areas are covered with hard surface, equipped with stormwater impoundments and clean dirty water separation trenches outside plant area.

*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 within concreted bunds with sumps and pumps which return any spillages back to the process. All reagent strength pipelines are within secondary containment launders or inside the cyanide storage bund. Two linked, concrete-lined, anti-pollution dams with a total volume of 11 200m<sup>3</sup> are used to contain any overflows from plant bunds and dirty water resulting from rainfall events. All sumps are linked to the anti-pollution dams via concrete trenches and, in the case of the leach, tarred roads and culverts.

Slurry pipelines containing cyanide are placed above concreted and tarred surfaces, running down into the anti-pollution dams, from where it can be returned to the process. All unlined slurry pipelines are part of the CMMIS system. Pipelines are being lined with HDPE, urethane and rubber where previous leaks occurred. All new pipe lines will be lined. Pipelines where the risk of pollution exists, are placed in earth trenches to prevent spillage from entering the environment. Cyanide tanks and pipelines are manufactured from materials compatible with cyanide and high pH conditions, as per the AngloGold Ashanti Cyanide Guidelines document.

One area where the slurry lines cross the 9 shaft bridge was identified as a potential risk. Special protection measures include the lining of all lines before crossing, and after crossing, the bridge.



*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:*

Detailed Quality Control/Quality Assurance documentation is available for the TSFs and for the plant. The cyanide plant structural and civil investigations and a subsequent Audit of civil structures at the cyanide plant declared remedial work to the civil structures to have been completed satisfactorily and thus the professional engineer confirmed the plant, “fit for purpose”. A professional engineer also conducted further visual inspections as part of the newly implemented, AngloGold Ashanti Asset Integrity Management (AIM) reports and concluded that the plant is fit for purpose.

A sampled annual TSF audit report for 2009, signed by a professional engineer, concluding that the TSFs at Vaal River are generally in a good condition and no significant issues were noted. The annual report utilises monthly piezometer data, freeboard surveys, monitoring and management data from the hazard management system, deposition strategy and data from the Life of Mine deposition plan.

*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) of surface water and borehole water, developed by competent persons, were sighted and checked. Boreholes are placed and sampled upstream and downstream of the plant, The Vaal River is sampled up and downstream of mine. Boreholes are sampled monthly, the Vaal River is sampled monthly, wildlife is monitored daily, water dams are sampled monthly and plant boreholes are sampled quarterly.

**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 decommissioning procedure and associated HAZOP is in place. The procedure includes a formalised schedule for decommissioning. The decommissioning plan is reviewed annually.

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

**X in full compliance with**

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

*Basis for this Finding/Deficiencies Identified:*

The "AngloGold Ashanti Annual review and update of 2009 environmental rehabilitation and closure estimate" used the WAFU plant rehabilitation costs by an outside contractor and the cyanide producer as a basis for the cyanide decommissioning estimates. The Cost update for Kopanang of November 2009 was reviewed and is reviewed annually. The AngloGold Environmental Rehabilitation Trust fund (as required by SA Law) includes provision for decontamination of the cyanide equipment at Kopanang Gold Plant. Estimates include line items which are decontamination of storage and dosing system, flame cut old sodium cyanide tanks, chemical cleaning of storages, decontamination of SASOL tanker, and associated medicals, induction, screening training and travel. A signed audit report for the trust fund by accountants Ernst and Young, dated 7 April 2010 was sighted.

**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 site has 52 cyanide process and engineering procedures in place, plus 26 general emergency procedures, supported by 30 TSF contractor operating and management procedures and a mandatory Code of Practice covering TSF operation. All procedures include requirements for appropriate cyanide PPE and pre-work inspections. Operations and maintenance manuals for Mispah 2 TSF (incorporating the extension to the TSF), the Vaal River East and West complex Mispah 1 and 2 paddock dams and the Cyclone operation at the conversion of the West extension were also reviewed and found to be effective. Routine daily, weekly, monthly and quarterly inspection reports, legal inspections, and checklists for proactive and reactive management were sampled to check the effectiveness of systems. A change management procedure covering health, safety and environment is in place and operational and examples of major and minor change management exercises indicated that the process is used effectively.

Every procedure is developed from a risk assessment where worker input includes the Health and Safety Rep, artisans and management. Worker input is considered in Health and Safety meetings, mock cyanide drills, and Green Area Meetings.

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

**X in full compliance with**

**The operation is**      in substantial compliance with **Standard of Practice 6.2**  
  
 not in compliance with

*Basis for this Finding/Deficiencies Identified:*

The pH control in the plant is set at 10.5 with an interlock to Cyanide pumps activated and alarms at pH 10.5. Regular hot spot surveys indicate no hot spots identified in the plant. Daily cyanide gas monitor inspection checklists were reviewed and Dräger calibration certificates for 6 PAC 7000 personal HCN gas monitors, 5 Polytron fixed HCN gas monitors, and 4 X-am 5000 personal HCN gas monitors were sighted. Plant

calibration frequency is 3 monthly and the manufacturers' requirement is 6 monthly. On-going inspections and checks are also used to monitor and check facilities and emergency response equipment functioning and checklists covering three years since certification were sampled. Safety equipment such as safety showers, low pressure eye wash stations, and fire extinguishers are numerous and adequately signposted. MSDS and first aid information is available in English.

Slurry pipelines are marked as poisonous water. Eating and drinking is only allowed in dedicated areas and this is indicated on signs and trained and reinforced during annual induction of contractors and plant staff. Cyanide pipelines are colour coded, and labelled with appropriate description and directional flow. 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 site 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:*

It was confirmed that two-way radios and telephones were used to communicate emergencies and the mandown alarm system showed the position of the alarm on the SCADA system. Water, medical oxygen resuscitator, and antidote kits kept in fridges, are available in the cyanide emergency room, leach cabin on top of leach, the adsorption section and an emergency cyanide trailer is also available. Inspection lists for the antidotes, oxygen BA sets, safety showers, Oxygen cylinders, and first aid boxes were inspected confirmed for the whole plant and sampled for the three years since certification. The Emergency Response Team consists of cyanide Appointees in place on dayshift with afternoon and nightshift staff trained to handle cyanide emergencies. The West Vaal hospital in Orkney is the captive Company hospital to treat cyanide cases with ambulance contractor, ER 24, available on site for patient transport and paramedical services. Cyanide equipment is regularly checked and tested and mock drills are held regularly on site.

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:*

The Kopanang Gold Plant Emergency Response Plan was developed using the AngloGold Ashanti procedure ISO 14001 / OHSAS 18001 Reference ERP Procedure and the Plan includes cyanide scenarios as per a HAZOP study of emergency scenarios assessment for the Kopanang gold plant. The emergency response plan is linked to specific emergency situations and the appropriate procedures and responses within the site's systems. Emergency Response Plan includes escalations of emergency levels from level 1 to level 2 or 3 defined in plan 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:*

HAZOP and risk assessments involve the work force and the update of risk assessment on emergency scenarios included the fulltime Health & Safety Steward. Green area meetings and Safety meetings are used to highlight and discuss cyanide issues. Emergency drills are used to involve the workforce in the response planning process and drill reports indicated evaluation and feedback. The Emergency Response Plan is discussed in safety and health meetings. 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 planning processes.



*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 for the various emergency scenarios. The emergency equipment inventory was checked and site inspections confirmed availability and readiness. The Plan includes contact references (telephone, cell phone, etc) of internal and external resources for the various scenarios, particularly with detail where external resources and skills might be needed. 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 for 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.

*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 the use of treatment chemicals such as ferrous sulphate in surface water is prohibited.

*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 Plan is required to be reviewed annually, following incidents and emergency drills or when new information regarding cyanide becomes available. The report of a drill which included a cyanide spill and cyanide related injury was 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 staff entering the plant gate receives 2 days induction refresher valid for 18 months, basic cyanide first aid valid for 12 months. Written tests are conducted with an 80% pass mark. All contractors working on the plant for longer than 2 days will receive the same induction as above, including any work involving the reagent strength cyanide facilities. All contractors or visitors working less than 2 days (working under direct supervision of a plant employee) will receive plant specific induction which includes cyanide overview. A Training matrix is in place for staff and permanent contractors. Induction refresher training is done 18 monthly, cyanide related training 12 monthly, and all long term contractors induction refresher is done annually. A training matrix with a flagging system

is used to ensure all staff is covered. Selected employees were checked in interviews on their understanding of cyanide hazards, first aid and emergency response and this was further verified through checking of their training records. Training records are kept indefinitely.

*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:*

A formal training matrix covers all process and engineering staff and National Unit Standards are used as a basis for the training. Competency is tested by on the job competency assessments. No refresher training is done on National Unit Standards, but task assessments are done to ensure continued competency. Retraining is done in the case of deviations or substandard activity. On the job training is done using unit standards followed by assessment. Regular Task Assessments are done to measure continued competency. Control is based on the issuing of access cards only following induction training and completion of the relevant unit standards before taking over shift. Records are kept indefinitely, centrally in an electronic matrix and also as hard copies. An electronic back up system is also in place. All trainers are qualified training assessors.

*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:*

The Cyanide Emergency Response Team is in place on dayshift and only cyanide appointees form part of the cyanide teams. The training matrix specifies training as per the Emergency Preparedness Plan (EPP). All cyanide response team members including appointees receives 12 monthly refresher training. The shift foremen are trained in cyanide emergencies on afternoon and night shift and take responsibility as incident commander. Shift teams takes part in after hour drills as part of emergency training. The EPP is trained through the emergency drills, and no classroom training on the use of the actual plan and documentation is currently taking place. All Cyanide Appointees receive

advanced training, including BA set training. 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. Training records are kept indefinitely centrally in an electronic matrix as well as on hard copies. The plant training officer is present at all drills and evaluates training effectiveness and reports to the AngloGold Ashanti central training unit where any changes to training procedures are made and implemented.

**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. Discussions were held with the Farmers Forum, Polsec (Police security liaison meeting), traffic department, and the Kanana community forum. Cyanide was also discussed at an Emergency Response workshop involving the neighbouring Klerksdorp Fire and Rescue, and Traffic Departments, Potchefstroom fire service, SASOL Emergency Services, the Provincial Safety and Security Dept, Merafong Fire and Rescue, Potchefstroom traffic department, Randfontein Public Safety Department, and Randfontein and Weston Area Emergency Services. Cyanide was also discussed at an NUFOR emergency response workshop. School presentations on cyanide were given at the Vaal Reefs primary school, and Technical high school, accompanied by warnings about cyanide contents of slimes dams.

*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. Discussions were held with the

Farmers Forum, Polsec (Police security liaison meeting), traffic department, and the Kanana community forum. Cyanide was also discussed at an Emergency Response workshop involving the neighbouring Klerksdorp Fire and Rescue, and Traffic Departments, Potchefstroom fire service, SASOL Emergency Services, the Provincial Safety and Security Dept, Merafong Fire and Rescue, Potchefstroom traffic department, Randfontein Public Safety Department, and Randfontein and Weston Area Emergency Services. Cyanide was also discussed at an NUFOR emergency response workshop. School presentations on cyanide were given at the Vaal Reefs primary school, and Technical high school, accompanied by warnings about cyanide contents of slimes dams.

*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:*

Cyanide Management Brochures were issued to local workers, hostel dwellers and township people. The brochure includes cyanide information, emergency information, cyanide exposure, and uses of cyanide. Leaflets containing TSF drowning warnings, electricity warnings, and vehicle safety were also distributed. The Vaal Reefs area has relatively high literacy levels in English but at meetings a senior company HR Officer translated in Zulu / Xhosa where required.

Any cyanide exposure is 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. Cyanide incidents are reported in the AngloGold Ashanti Country Report South Africa Vaal River Operations. An incident was reported on leak on CIL cyanide delivery line 9 Feb 2007 in AngloGold Ashanti Country Report 2007 report. (<http://www.anglogold.co.za/NR/rdonlyres/8E6B8C1D-05C4-43E0-B63E-8CD8ACD12391/0/vaal.pdf>, Page 49) No cyanide exposures, hospitalisation or fatalities occurred or were reported during the period since certification.

