

***INTERNATIONAL CYANIDE  
MANAGEMENT INSTITUTE***

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

***Recertification Summary Audit Report***

***AngloGold Ashanti  
Savuka Gold Plant  
South Africa***

***28<sup>th</sup> June – 2<sup>nd</sup> July 2010***



Name of Operation: AngloGold Ashanti Savuka Gold Plant

Name of Operation Owner: AngloGold Ashanti

Name of Operation Operator: AngloGold Ashanti

Name of Responsible Manager: Zeph Ndlovu, Acting Plant Manager

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**Location detail and description of operation:**

AngloGold Ashanti's Savuka Gold Plant is located in the Carletonville area, approximately 90 km South West of Johannesburg in the Gauteng Province, South Africa. It currently receives its feed sources from Savuka Waste Rock Dump and TauTona and Savuka Mines and has a maximum capacity to treat 250 000 tons of ore per month.

Underground ore is transported to the plant from Savuka Mine directly via conveyor belts. Ore is received from TauTona via railway and is processed through a screening plant for size distribution prior to crushing. The oversized material from the screens is crushed by conventional jaw, standard, short head and omnicone crushers before being conveyed to the milling plant.

The milling section is divided into 3 milling modules, viz. Carbon Leader, VCR (Ventersdorp Contact Reef) West and VCR East. Each module consists of two stage milling, with ball mills being the first stage and tube mills being the secondary stage milling, with the exception of VCR East which utilises pebble mills in the second stage. Cyclones are used for classification. In total, the milling circuit consists of 8 ball mills, 32 tube mills and 2 pebble mills.

The mill product is then gravitated to the thickener section, which consists of 21 thickeners. Lime is added to the thickener feed launder as slaked lime. Lime

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aids in the settlement of the milled ore and maintains a protective level of alkalinity in the leach section. Flocculent is added to assist in the settling of the milled ore. The thickened underflow slurry is pumped to the leach circuit and the thickener overflow water is used in the milling circuit.

The leach circuit consists of 2 process streams. Stream 1 consists of 32 pachucas, and Stream 2 consists of 6 pachucas. Sodium Cyanide (NaCN) is added to the circuit for the purposes of gold dissolution. The Pump-cell adsorption circuit consists of 8 mechanical agitated vessels. Granulated carbon is used as the adsorption medium. The carousel feed system is used on the pump-cell plant, with 1 vessel constantly off-line.

The low-grade slurry (residue) is then screened for fine carbon and transferred to the residue tanks, where it is either pumped to the slimes dam or to the backfill plant, which supplies backfill to both Savuka and TauTona Mines. The backfill reject is thickened and pumped to the residue tank for disposal. The thickener overflow is reused at the backfill plant.

The loaded carbon is screened from the pulp and transported to Mponeng Gold Plant by road. Gold recovery from the carbon is completed at Mponeng Gold Plant and the regenerated carbon is transported back to Savuka Gold Plant. The Tailings Storage Facilities vary in age, some being long established. The TSFs are raised using the paddock and day wall system. This is the typical method used by the plants in the area.



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***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: 30/12/2010

Dates of Audit: 28<sup>th</sup> June – 2<sup>nd</sup> July 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.

Savuka Gold Plant

Facility

  
Signature of Lead Auditor

Date

3/1/2011

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Savuka Gold Plant

  
Signature of Lead Auditor

24<sup>th</sup> December 2010

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*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 Savuka 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 with materials appropriate for use with cyanide and are located in concrete bunds away from people and surface waters. The cyanide storage tanks are placed on steel legs in the concreted bund area. It was concluded by an engineer that the civil and structural aspects of the cyanide facility at Savuka are in good condition with a few minor problem areas not constituting a risk to operations as per design for cyanide

offloading and storage. Cyanide areas are away from incompatible materials and within the access controlled plant security area which is securely fenced. The Cyanide offloading area is located on a concrete surface for containing any spilled solutions. Drainage flows to a spillage sump equipped with a pump, which delivers into the main bund area. The automatic interlock to the offloading air valve will activate if the level of the storage tank is 80%, stopping the offloading process. Level and capacity of tanks are determined before offloading. For offloading into a single tank, the level of the receiving tank may not exceed 53%, and for offloading into 2 tanks, the level must not exceed 75%. The procedure covering cyanide unloading was reviewed and found to be effective.

*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 85 site specific cyanide procedures in place, supported by 9 TSF contractor operating and management procedures. A mandatory Code of Practice (COP) and

operating manual covering TSF operations in the West Wits area is also in place. The freeboard and design storm event (1.3m and 1:50 year 24 storm event) is defined in the COP. The annual TSF audit report for September 2009 concluded that there were no signs of instability in the TSFs, with adequate factors of safety existing against all failures, and freeboard was above target at all TSFs. Stability analyses are conducted and reported in annual and separate reports. Routine daily, weekly, monthly and quarterly inspection reports, legal inspections, and checklists for proactive and reactive management on the plant and TSF were sampled to check the effectiveness of systems. Piezometer levels and freeboard are surveyed monthly and quarterly surveillance meetings are used to report and evaluate freeboard, phreatic levels and drains. Surface water diversions are inspected monthly and all return water dams are inspected daily. There is a probabilistic water balance in place, and no scenario has been identified where the need has been highlighted to shut down the plant to prevent overtopping.

A CMMIS (Computerised Maintenance Management Information System) planned maintenance system and procedure, supported by a SIMM (Structural Integrity Management Monitoring) system is in place and functioning. The nature and date of corrective actions are documented using the IRMS (Integrated Risk Management System) system which also monitors and records progress and close out of corrective actions. Operational inspections conducted include: shiftly inspections; cyanide storage facility daily inspections; legal two weekly inspections; 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. Both the plant and the TSF contractor have change management procedures covering health, safety and environment in place and operational.

*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:*

The cyanide optimisation program from 2007 to date, including characterisation of the waste rock dump leach ability, concluded that feed can be leached at 180ppm. The ICMI WAD Cyanide report of 17 March 2008 showed cyanide addition rates could be lowered to 200 ppm in leach from 280ppm. Further bottle roll tests are planned on the two underground resources following indications from the diagnostic leach tests that ore characteristics may have changed. The corporate strategy is to evaluate feed mix, conduct laboratory diagnostic leach programs and make additional 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. WAD cyanide in the tails is measured using an on-line Cynoprobe analyser, and a TAC 1000 is in use at leach.

*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 TSF probabilistic water balance for the combined Mponeng and Savuka TSFs and a Savuka plant water balance is in place. The plant probabilistic Water Balance sighted included rainfall, water in ore, and water returned from TSF. Seepage assumptions were made as the plant area is small and evaporation is insignificant. The impact of rainfall including the catchment draining to the emergency dam was also modelled. Information is included in the water balances on rainfall, 1:50, 1:100 year, 24 hour storm events, evaporation, and solution deposition. Rainfall data is collected daily on the TSFs and the plant and combined with local rainfall measurements and data from the SA Weather Bureau. No run on occurs as all the TSFs are equipped with storm water cut off trenches to divert run off water away from the dams. The return water dams are on higher level than ground level. The plant has no run on as a clean / dirty water separation system is in place and storm water cut-off trenches are located around the plant. Rainfall scenarios in the water balance were used to determine return dam operating levels and emergency strategies to prevent overtopping. Power outages have been modelled and indicate that the antipollution dams will overflow in three cases to the nursery dam (which is a process water dam returning solution to the plant for use) and is the final spillage control dam. The emergency procedure is followed in the case of antipollution dam overflow. Thus no need for emergency power to the pumps exists. Phreatic levels are 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.*

**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:*

WAD cyanide levels at TSF tip from Dec 2007 (North Dams) Oct 2007 (South) to date, show all values are below 50 ppm WAD CN at both of the TSFs. Return water dam results sighted from 2007 to date show all values were less than 0.2 ppm WAD cyanide. WAD cyanide is measured at the plant tailings tanks, using a Cynoprobe, and no values above 50 ppm WAD cyanide are allowed to be pumped to the TSFs. Thus, the TSFs and all return water dams contain less than 50 ppm WAD cyanide and do not therefore require any special measures to restrict access by wildlife. Wildlife mortality inspections are conducted daily and no cyanide-related mortalities have been reported for the whole Mponeng/Savuka TSF complex or at the Savuka 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 under normal conditions exist. Boreholes are drilled up and down stream of the TSFs and return water dams are sampled quarterly. Results from 2008 to date indicate that the highest value was 0.0025 mg/l WAD cyanide. There is no indirect discharge and boreholes around the plant monitor groundwater with all results from Feb 2008 to Jan 2010 all below 0.008 mg/l WAD cyanide. No established mixing zone has been identified by regulatory authorities.

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

**X in full compliance with**

**The operation is**  in substantial compliance with **Standard of Practice 4.6**  
 not in compliance with

*Basis for this Finding/Deficiencies Identified*

There are no specific identified jurisdictional beneficial uses of groundwater. The National Water Act limit is 0.5ppm cyanide, not specifying the species of cyanide. All TSFs are equipped with under drains and cut-off trenches. A successful phytoremediation project (Woodland project conducted to prevent seepage from contaminating ground

water.) is in place at the Savuka and Mponeng TSFs. Clean/dirty water separation systems are in place, and cut-off trenches are dug around the TSF impoundments. The TSFs are designed with under drains and trenches to collect seepage and prevent contamination.

The plant process area surface is covered with concrete, tarmac and storm water drains and the areas not covered fall outside the risk of cyanide solution flows from the process. Cut off trenches are in place around the plant to ensure clean / dirty water separation. Boreholes downstream and upstream of the plant are sampled and monitored for cyanide contents quarterly.

A MINTEK report on the risk aspects of backfill material cyanide content for the site recommends that maximum free cyanide to be 26.5 ppm as free CN, or 50 ppm as sodium cyanide. The plant procedure specifies backfill maximum permissible total cyanide at 20 ppm and free cyanide of less than 2.5 ppm. Backfill sample analyses sighted indicate values varying between 1 to 2 ppm free cyanide. The report concluded that the cyanide in the backfill does not pose any risk to groundwater at the recommended levels. Only traces of CN were detected in fissure water samples taken during the investigations.

*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:*

The plant is designed with bunds around cyanide tanks and CIP tanks, and spillage aprons for the Leach tanks and residue section. Leach Pachuca Tanks are placed on steel legs and plinths, with CIP pump cells residue tanks and backfill on solid concrete bases, Cyanide storage tanks are placed on steel legs and plinths inside a concrete bund. The low strength cyanide areas spill prevention and secondary containment system consists of channels, routes and tarred roads which lead spills to the anti pollution dam system. All pipelines inside and outside the plant are subject to the plant CMMIS (planned maintenance) system.

All pipelines feeding the TSF ring main systems were replaced within the last 3 years. Sensitive areas were identified where pipelines were placed inside trenches or paddocks. The ring main pipelines are placed inside the TSF paddocks. The area where the pipeline crosses the Elandsfontein Spruit (stream) is rubber lined and paddocked to prevent any leaks from entering the surface water. Cyanide tanks and pipelines are manufactured from materials compatible with cyanide and high pH conditions, as per the AngloGold Ashanti Cyanide Guidelines document.

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*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:*

No new cyanide facilities or major modifications or additions to the existing facilities were constructed or implemented since the first certification audit. A Visual structural audit conducted in March 2009 indicated areas needing attention, and priority ratings with action plans were put in place to return the structural and civil integrity of the equipment. No high risk items were identified in the cyanide facilities and it was confirmed that the plant could be operated as designed. The annual slimes dam deposition report for 2009, which included a stability analyses note for the record, concluded that the West Wits TSFs are stable and possess good factors of safety against major slope factors.

*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 Elandsfontein Spruit (stream) is sampled up and downstream of the mine. Plant boreholes are sampled quarterly, wildlife is monitored daily, surface water is 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 formal decommissioning procedure 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 (West Acid Float Uranium) plant rehabilitation costs by an outside contractor and the cyanide producer as a basis for the cyanide decommissioning estimates. The cost update for Savuka of November 2009 was sighted and the estimate is reviewed annually. The AngloGold Environmental Rehabilitation Trust Fund (as required by SA law) includes provision for decontamination of the cyanide equipment at Savuka 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 85 site specific cyanide procedures in place, supported by 9 TSF contractor operating and management procedures. A mandatory Code of Practice (COP) and operating manual covering TSF operations in the West Wits area is also in place. The freeboard and design storm event (1.3m and 1:50 year 24 storm event) is defined in the COP. The annual TSF audit report for September 2009 concluded that there were no signs of instability in the TSFs, with adequate factors of safety existing against all failures, and freeboard was above target at all TSFs. Stability analyses are conducted and reported in annual and separate reports. Routine daily, weekly, monthly and quarterly inspection reports, legal inspections, and checklists for proactive and reactive management on the plant and TSF were sampled to check the effectiveness of systems. Piezometer levels and freeboard are surveyed monthly and quarterly surveillance meetings are used to report and evaluate freeboard, phreatic levels and drains. Surface water diversions are inspected monthly and all return water dams are inspected daily. Both the plant and the TSF contractor have change management procedures covering health, safety and environment in place and operational.

A corporate procedure for risk assessment, including continuous risk assessment (Mini risk assessment) is in place for pre-work risk evaluations and inspections. Every procedure is developed from a risk assessment where worker input includes the Health and Safety Representatives from the workforce, artisans and management. The TSF contractor has done risk assessments for each procedure which has involved management, supervisors and workers. Procedures are also discussed at plant Safety and Health meetings. Green area meetings are used as a primary worker input and feedback on procedures and cyanide drills.

*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 is set at 10.5 with an interlock to Cyanide pumps at pH 10.5, and alarms at pH 10.5. The instrumentation functional specification indicates an audible alarm at the cyanide offloading alarm board and a flashing alarm at the SCADA in the control room. pH probes are located at the leach tanks and the cyanide dosing point. A hotspot survey of 18 Dec 2009 indicated that the highest hydrogen cyanide gas values detected were 1.1 ppm at the decant discharge. Fixed gas monitoring Polytrons units are in the pulp pumps top floor and bottom floor sump, Cyanide storage, back fill sump primary pump, leach feed no 1, 3 Pachuca, leach 1 drain pump. There are 17 PAC 7000, and 3 X-am 500 personal gas monitors used, with instantaneous (STEL – Short Term Exposure Limit)

alarms set at 7.5 ppm and 10 ppm. The TWA (Time Weighted Average) is set by the occupational hygienist at 4.7ppm over an 8 hour period, with settings password protected. Plant calibration frequency is 3 monthly and the manufacturer's requirement is a minimum of 6 monthly. Calibration certificates for all equipment were reviewed. On-going inspections and checks are also used to monitor and check facilities and emergency response equipment functioning and checklists covering three years since certification were sampled. Safety equipment such as safety showers, low pressure eye wash stations, and fire extinguishers are numerous and adequately signposted.

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. The required signs are placed at the cyanide storage, cyanide/caustic make up and cyanide dosing point, leach, CIP and residue areas. All cyanide pipelines are colour coded, and labelled with flow direction. MSDS documentation and cyanide first aid information was located throughout the plant. 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:*

There is a cyanide first aid station at the cyanide offloading and storage area. Two way radio communication is used and 7 cyanide man down alarms are placed at strategic locations in the plant. A fully equipped cyanide emergency trailer is available and 9 medical oxygen packs are placed at strategic positions in the plant. Use is made of bag resuscitators and 4 antidote packs are placed in fridges at the 1st aid station (2) and at the cyanide first aid station at the cyanide offloading and storage area (2). Inspection lists for the antidotes, oxygen BA sets, safety showers, Oxygen cylinders, and first aid boxes were inspected and 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 Western Deep Levels hospital (AngloGold Health Services hospital on mine property) 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 Savuka Gold Plant Emergency Response Plan includes cyanide failure scenarios as per a HAZOP study of emergency scenarios assessment for the Savuka gold plant. The emergency response plan is linked to specific emergency situations and the appropriate procedures and responses within the site's systems. The Emergency Response Plan includes escalations of emergency levels from "level 1" to "level 2" or "level 3" defined in the plan and also includes managing such issues as plant and community 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. The update of risk assessments on emergency scenarios include Safety representatives and Union representatives. Green Area meetings and Safety and Health meetings are used to highlight and discuss cyanide issues, including the Cyanide Emergency Response Plan. Emergency drills are used to involve the workforce in the response planning process and drill reports sighted indicated evaluation and feedback. The community is not directly involved in the Plan but is informed on its contents during dialogue sessions. Drills are used to involve hospital, ambulance and paramedic staff in planning and review processes.



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*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 which 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, and 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 permanently.

*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. Records are kept permanently, centrally in an electronic matrix and also as hard copies. An electronic back up system is also in place.

*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. Only cyanide appointees may work with high strength cyanide and they are trained in the procedures to be followed in the event of a cyanide release and for decontamination and first aid, and “off loading of liquid Cyanide from a road tanker into a bulk storage facility”, and “handling liquid cyanide safely in a metallurgical plant”. The training matrix specifies training as per the Emergency Preparedness Plan (EPP). The shift foremen are trained in cyanide emergencies on afternoon and night shift and take responsibility as incident commander. Shift teams take 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 (Breathing Apparatus) set training. The Western Deep Levels Hospital and ER24 staff receives cyanide first aid intermediate training and are assessed for competency. They are also involved in drills for training purposes. 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. Farmers along Elandsfontein Spruit attended meetings in July 2008, 16 Feb 2009 and an annual meeting on 14 Jan 2010 (which included a discussion on cyanide). An emergency response workshop in 2007 included the Klerksdorp Fire and Rescue Department, Klerksdorp Traffic Department, Potchefstroom Fire Service, SASOL Emergency Service, Provincial Dept, Merafong Fire and Rescue Department, Potchefstroom Traffic Dept, the Randfontein Public Safety Dept, and the Randfontein and Weston Area Emergency Medical Services. A NUFCOR emergency response workshop was held in March 2010. Cyanide Management Brochures were issued to local workers, hostel and township dwellers which included cyanide information, emergency information, exposure, and uses of cyanide. Additional leaflets containing TSF warnings, electricity, vehicle safety, and TSF water safety were distributed on Arbor Day 2009. A Wedela township community presentation given jointly by AngloGold Ashanti and Harmony was also sighted.

*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. Farmers along Elandsfontein Spruit attended meetings in July 2008, 16 Feb 2009 and an annual meeting on 14 Jan 2010 (which included a discussion on cyanide). An emergency response workshop in 2007 included the Klerksdorp Fire and Rescue Department, Klerksdorp Traffic Department, Potchefstroom Fire Service, SASOL Emergency Service, Provincial Dept, Merafong Fire and Rescue Department, Potchefstroom Traffic Dept, the Randfontein Public Safety Dept, and the Randfontein and Weston Area Emergency Medical Services. A NUFCOR emergency response workshop was held in March 2010. Cyanide Management Brochures were issued to local workers, hostel and township dwellers which included cyanide information, emergency information, exposure, and uses of cyanide. Additional leaflets containing TSF warnings, electricity, vehicle safety, and TSF water safety were distributed on Arbor Day 2009. A Wedela township community presentation given jointly by AngloGold Ashanti and Harmony was also sighted.

*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 issued to local workers, hostel and township regarding cyanide information, emergency information, exposure, uses of cyanide. Verbal presentations were also given to Wedela township. Leaflets containing TSF drowning warnings, electricity warnings, and vehicle safety information were also distributed. 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 West Wits Operations (<http://www.anglogold.co.za/NR/rdonlyres/8E6B8C1D-05C4-43E0-B63E-8CD8ACD12391/0/vaal.pdf>). An incident was reported on leak on CIL cyanide delivery line 9 Feb 2007 in the AngloGold Ashanti Country Report 2007. No cyanide exposures, hospitalisation or fatalities occurred or were reported during the period since certification.