INTERNATIONAL CYANIDE MANAGEMENT INSTITUTE

Cyanide Code Compliance Audit Gold Mining Operations

Summary Audit Report

Goldfields Ghana Tarkwa Gold Mine Ghana

14th – 18th January 2008

Name of Operation:	Tarkwa Mine
Name of Operation Owner:	Goldfields Ltd
Name of Operation Operator:	Goldfields Ghana Limited
Name of Responsible Manager:	Philip Engelbrecht, Metallurgy Manager
Address:	P. O. Box 26, TARKWA
Country:	Ghana
Telephone:	+233 0362 22400-9
Fax:	+233 362 20254
E-Mail:	philipE@goldfieldsghana.com

Location detail and description of operation:

Tarkwa Gold Mine, majority owned and operated by Goldfields Ghana Limited (71.1%), IAMGOLD (17.9%) and the Ghanaian Government (10%). It is situated in the Western Region of Ghana, approximately 350km by road from the capital, Accra. Site conditions are tropical with annual rainfall of approximately 2,000 mm and temperature ranging between 25ºC and 35ºC.

Mining activities around Tarkwa date back to the late 19th century. Activities expanded progressively until 1960 when all the workings in the area were abandoned and allowed to flood due to financial constraints. The assets were purchased by the state in 1963 and became known as Tarkwa Goldfields Limited. In June 1993 the Government of Ghana entered into an agreement with Gold Fields Ghana in terms of which the mine would be operated under a management contract by Gold Fields Ghana Limited (GFGL). Having reviewed the large, low grade deposit adjacent to the existing operations in 1996, Goldfields Ghana Limited was able to add 20 years of life to the mine by developing a heap leach surface mining operation.

The initial open pit/heap leach development, Tarkwa Phase 1, was completed in April 1998 processing 4.7Mtpa heap leach feed ore. An expansion, Phase 2, was completed in July 1999 increasing ore production to the heap leach to 7.2Mtpa. Process improvements and optimisations resulted in the throughput increasing to 9.4Mtpa. In August 2000, GFGL acquired the northern part of the Teberebie lease. These facilities increased ore production to the heap leach to 16Mtpa. The north heap leach has had a number of pad expansions, the latest Phase 5, to enable current production capacity to be sustained up to 2011.

The Tarkwa mine is located near the southern end of the Tarkwa Basin. The basin is N-NE trending, approximately 220 km long by 40 km wide within the West African Craton and is also referred to as the Tarkwa syncline or Ashanti Belt. The Tarkwaian is underlain by the Birimian System, which comprises primarily metavolcanics and metasediments. These lithologies form part of a greenstone belt noted for its shear hosted gold mineralisation. Within the Tarkwaian, gold is almost exclusively found in the conglomerates of the Banket Formation. These gold bearing conglomerates bear many similarities to those found in the Witwatersrand in South Africa. At Tarkwa Mine, gold occurs in a free state with other heavy minerals, predominantly haematite, in the matrix of the quartz pebble conglomerate. Apart from very small amounts of sulphide minerals observed near fault zones, there are no significant sulphides associated with the conglomerates.

Tarkwa Gold Mine is an Owner Miner utilising a mining fleet of Tamrock drills, Liebherr 984 and 994 excavators, Caterpillar 785 haul trucks and mostly Caterpillar ancillary equipment. Mining activities are based around a number of pits and the selective excavation of shallow dipping reefs that are blasted on a 6m bench height but excavated in two 3 meter flitches. The current overall mining rate is approximately 112Mtpa, containing some 16Mtpa of heap leach ore and 5 Mtpa CIL ore.

Heap leach operations are carried out at two main locations designated as the North and the South sections. At the South, ore is crushed down to a size of 9mm through four stages of crushing, while at the North, ore is crushed down to a size of 80% passing 12mm through 3 stages of crushing. Prior to placement on the heaps, the ore is agglomerated using cement and lime to minimize the migration of loose fines into the heap as well as subsequent blocking of drainage channels. Cyanide solution is added on the top of the heap through dripper tubes and percolates through the heap dissolving the gold particles. At the end of the percolation cycle, the pregnant solution is pumped to the Adsorption Desorption Recovery (ADR) plants (one each at South and North) where the soluble gold is adsorbed onto activated carbon. At the South, the gold is recovered by an elution and electrowinning process, while at the North, recovery is by elution and zinc precipitation. All gold sludge is smelted into dorê bars at the North smelt house facility. Barren solution exiting the adsorption plant is upgraded with cyanide and returned to the heap leach pads to recommence the leach cycle. Eluted carbon is thermally regenerated prior to return to the adsorption tanks. The heap leach cycle extends for up to 280 days before all the extractable gold has been recovered.

The weathering of the gold bearing conglomerates at Tarkwa is critical to the viability of the mine due to its effect on the gold extraction in the heap leach process. The closer to the surface, the more weathered the ore, the higher the porosity and the higher the gold recovery. Over the years, depletion of the more porous ores has taken place with a subsequent drop in recovery. The heap leach operations are experienced progressively lower recoveries due to having to treat lower porosity ores. The economics reached the point where a conventional milling plant was feasible to process the low porosity ores. This is particularly evident at the South section where recoveries have dropped to 64%.

The Tarkwa CIL plant was commissioned in October 2004 and utilises a single low aspect 27' x 42', 14MW dual pinion drive SAG mill, designed to mill 4.2mtpa (525tph). The plant was designed and constructed in a manner that would facilitate its expansion

to 8.4mtpa (1,050tph). Since the plant was commissioned in September 2004, the SAG mill has consistently exceeded its nameplate throughput by up to 25%. Through the installation of a 26' x 36' 14MW dual pinion drive Ball mill, along with additional upstream and downstream equipment, the plant will now be expanded to 12mtpa (1,500tph).

Tailings from the plant is deposited on the Tarkwa tailings storage facility (TSF), which is a paddock type impoundment located approximately 1.5 km north west of CIL plant site and immediately due south of the existing North leach pads. These facilities are also being upgraded to cope with the additional tonnage expected from current expansion project.

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

E-mail: arend@eagleenv.co.za

Names and Signatures of Other Auditors:

Name : Dawid M. L Viljoen Signature _____ Date: 22/5/2008

Dates of Audit: 14th – 18th January 2008

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.

Goldfields Tarkwa Gold Mine

Facility | Signature of Lead Auditor | Date 26/5/08

Certified/notarized:-

JUDD ROBERT REID
COMMISSIONER OF OATHS
PRACTISING ATTORNEY, RSA
28 OLD MAIN ROAD, HILLCREST
KWAZULU NATAL

Auditor's Findings

1. PRODUCTION: Encourage responsible cyanide manufacturing by purchasing from manufacturers who operate in a safe and environmentally protective manner.

Standard of Practice1.1: 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:
The plant's cyanide manufacturers and suppliers, Orica and Du Pont, are both ICMI Code Signatories and have achieved full compliance in audits against the ICMI Cyanide Code.

The combined supply and transport contracts for both manufacturers stipulate that they must be signatories to the ICMI and must be ICMI Code compliant.

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:
Both manufacturers of cyanide supplied to Tarkwa Mine (Orica and Du Pont) are contracted to transport the cyanide to site and are accordingly code compliant. Both companies sub-contract the transportation of the cyanide for the Ghana leg of the journey to Barbex, a Ghanaian transport company who are ICMI signatories and fully compliant as transporters and distributors. Both companies have undertaken due diligence investigations covering port and sea transport legs of the cyanide supply chain. ICMI Code-equivalent, non-certification audits were sighted for the US and Australian land legs of the cyanide transport chain.
Both contracts stipulate in detail, the responsibilities and requirements for packaging and labeling, safety, security, escort, emergency response (spills prevention and clean-up), route planning and risk assessments, community liaison, emergency response resource access and availability, training, and communication. They also stipulate that there will be appropriate liaison, joint drills and training.

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 supply and transport contracts for Orica and Du Pont stipulates that the transport sub-contractor must be a signatory to the ICMI and must be ICMI Code compliant. Emergency response planning arrangements were verified for both companies along the entire cyanide supply chain. With respect to Du Pont's cyanide transport chain, US transporter, Intermodal Cartage has been found Code complaint in a Code-equivalent, non-certification audit in 2007. The Canadian National Railway was found to be fully Code compliant after a Due Diligence audit in 2007. The Shipping company, MSC, was found to be fully Code compliant after a Due Diligence Audit in 2007. The Ghana transportation subcontractor, Barbex, a Code Signatory, is fully ICMI code compliant. Similarly, with respect to Orica's cyanide transport chain, the Ghanaian transportation subcontractor, Barbex, is fully ICMI code compliant.
Orica Australia's Cyanide Transportation Code Equivalent, Non-Certification Audit Summary Report (February 2007, Golder Associates) covers Cyanide Transportation by Toll Resources (Road) & QR National (Rail) from manufacturing site to Brisbane. (The Report covers all road and rail transportation in Northern Territory, Queensland & NSW.)
The Due Diligence investigation report (18 January 2008) on movement of containerised IBC from Brisbane to Takoradi/Tema, Ghana (The Shipping Company, MSC, is IMDG Code compliant).

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 procures solid cyanide and mixing of solid cyanide is done on site. Original drawings and design documentation for unloading, mixing and storage were sighted for the CIL Plant and the North Heap Leach operations which clearly indicated that facilities were designed for effective cyanide management and control. (The South Heap Leach is an old operation and design documentation was incomplete but "Fit for Purpose" documentation, signed off by competent engineers, was sighted.) Drawings were signed off by appropriately qualified and competent engineers and quality control documentation was sighted. The unloading, mixing and storage areas are within security areas to minimise human exposure, located on concrete bunded areas to prevent seepage and contain any leakage, away from people and surface waters, and are clearly separated from incompatible materials. All storage tanks are equipped with level indicators and high level alarms with audible and visual alarms at the storage area. The level measuring and alarm systems are also included on the Preventative Maintenance System. High strength cyanide and process solution piping is located within bunded areas, or with secondary containment via "pipe-within-a-pipe" or above appropriate geo membrane liners.

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:
The site utilizes solid cyanide which is delivered in sea containers which are "destuffed" of their cyanide into secure storage areas. The off-loading and "destuffing" procedures are thorough and detailed. Mixing operations are covered by sequenced instructions. Cyanide packaging (wooden boxes, liners and bags) are stored securely and returned to the transporter/distributor (Barbex) for incineration under controlled conditions. Use is made of the "sentry" (Buddy) system to optimise safety and safe handling. All procedures include step by step task and hazard identification and appropriate actions for normal, abnormal and emergency occurrences. PPE requirements are included in procedures. Procedures are in place to cover spill responses. Inspection checklists were sighted and interviews conducted which confirmed cyanide awareness and competency. All reagent cyanide facilities are covered in the preventative maintenance system, with defined maintenance frequencies. Regular documented inspections are undertaken by shift staff and these are supported by regular legal inspections by safety officers and management.

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 68 cyanide-linked procedures classified under "General", covering all plants operating and engineering, CIL specific procedures, Heap leach general procedures, covering both North and South Heap Leaches, and North Heap leach and South heap leach specific procedures. Job specific engineering maintenance procedures for cyanide related equipment (including risk assessments) are in place, cross referencing the relevant procedure which integrate with health, safety, environment and emergency management activities and plans for the CIL plant and the two heap leach operations. The systems (linking to the site's OSHAS 18001 and ISO 14001 systems) were reviewed and tested and shown to be effective. TSF facilities are managed through the CIL Plant systems and these were also reviewed and checked and found to be effective. Quarterly technical inspections of the TSF facilities are undertaken to ensure integrity and safety and a TSF operating manual and supporting technical information is available. A change management procedure is in place and functioning but process application is still immature but there are plans to upgrade and improve response and sensitivity. The site

has cyanide destruction systems in place which are supported by appropriate inspections and preventative maintenance.
Water management (storm, process solutions, raw water and effluents) is well controlled through specific procedures, contingency plans and water balances prepared by external professionals.
Various types of inspections were in place and undertaken on a daily basis, in addition to legal inspections and management inspections. Preventative maintenance and inspection is controlled by an electronic system. The CIL PMS system is still in the transitional phase from MP2 to the RUSHTON system and records are still being transferred. Routine inspection reports and checklist were sampled and employees interviewed to check the effectiveness of systems.
In the case of the CIL plant, no emergency power is required as the plant is designed to drain centrally in the case of a power failure or plant closure. For the North and South Heap leach facilities, emergency power from generators is supplied to pregnant and barren pumps to balance solutions in case of emergencies.

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:
Initial test results were carried out in the design feasibility study. However, ore variation is insignificant, and thus cyanide optimisation is done based on daily residue monitoring, and changing addition rates. Test work is carried out by the Mineral Engineering Department of the University of Mines Technology of Tarkwa. Informal discussions take place between Metallurgy and the Mineral Resource Department on changes in mineralogy and metals impact. A TAC 2000 cyanide addition control and analyser is used currently, with investigations underway on the use of a TAC 1000 upgrade.

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:
Water balances (including probabilistic water balances) were prepared for the TSF and subsequent expansion projects enhanced the water balances. Procedures and operating plans were developed, based upon the direction given in the design data and studies. Clear guidelines are given on minimum freeboards and operating capacities of ponds. These procedures, plans and initiatives were reviewed and found to be appropriate in managing to prevent overtopping and unintentional releases. Information is available on rainfall, storm events, solution deposition, and cyanide destruction capacities, should they be required.

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

X in full compliance with

The operation is in substantial compliance with **Standard of Practice 4.4**

not in compliance with

Basis for this Finding/Deficiencies Identified:
The operation commenced sampling and analysing for WAD cyanide on 29 July 2007 and since then, the TSF, ponds and water bodies on the site all have experienced WAD cyanide levels that are significantly below 50 ppm. All ponds and open waters associated with all three cyanide operating facilities were checked for WAD cyanide levels and found to be ranging between 1 and 5ppm WAD and between 20 and 30 ppm WAD. The site is in the process of completing fencing around the main ponds to prevent access by wildlife. No cyanide-related bird, or wildlife mortalities have been experienced since the signing of the ICMI Code. A Study by the Ghana Wild Life Society (carried out in August and December 2007), concluding that although birdlife exists on mine water bodies, they tend not to directly access the water but feed on insects on or above the water. Around 40% of the species observed were migrant species. Additional studies were suggested to identify if the behaviour of any of the migrant species might create risk under abnormal or emergency conditions, in view of the low WAD CN levels under normal conditions. The site has obtained netting which will be used in the event that ponding on the leach pad becomes an issue or WAD cyanide levels become problematic.

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:
The site has no direct discharge to surface water but there is some indirect discharge to surface water. Ghana Environmental Protection Agency cyanide levels guidelines are 0.2 ppm free CN and 0.6 ppm WAD CN. Sample results measured are at limits of detection at <0.01 ppm total CN.

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
The CIL plant equipment is installed within concrete bund areas and is equipped with an environmental pond to cater for emergencies. The floors of the leach pads and ponds as well as all trenches were lined with impermeable material to minimize seepage flow into groundwater. Monitoring bores are provided and monitored to establish early warning in the event of any seepage occurring. There are no direct discharges to surface water but the limited indirect discharges to surface water are monitored with management controls in place. Levels are managed and are below Ghana Environmental Protection Agency requirements. (Ghana Environmental Protection Agency cyanide levels guidelines are 0.2 ppm free CN and 0.6 ppm WAD CN.)

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:
Spill prevention is primarily managed through the use of procedures, preventative maintenance and training. The site's design includes bunding and containment for all cyanide tankage and piping and material specifications requiring compatibility with cyanide and high pH conditions. Solutions and liquids in secondary containment are pumped back into the circuit and all secondary containment areas are maintained empty. All reagent strength and process solution pipelines are within containment. Procedures were also sighted which manage cyanide spillages, leaks, decontamination and transferring spillage from cyanide sumps. Bunding capacity all meets the ICMI Code requirements and this was confirmed by site inspection and review of plans and drawings available. Procedures were sighted covering pond inspections, solution water management, and stormwater management. Pipelines are also regularly inspected by a "Pipe patrol" including after hours inspections by security patrols.

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:
Quality control and quality assurance records were sighted for the CIL plant project dossier. Quality control documentation for the cyanide facilities for the North heap leach were sighted and reviewed. The absence of the similar documentation for the older South Heap leach was replaced by "fit for purpose" documentation signed by competent engineers. The quarterly Engineering reports for the TSF were sighted and reflected appropriate engineering controls and checks.

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:
A monitoring program is in place to sample both surface and groundwater for cyanide. Monitoring and inspections (including checks for bird mortalities and bird species on the TSFs) are guided by appropriate procedures and guidelines. The site's water quality sampling regime was sighted which indicated sample sites, sample types to be taken, and frequency. The program covers streams, groundwater, heap sumps and deactivated heaps, potable water and community wells. Frequencies range from weekly to monthly to quarterly. Detail on sample points was reviewed and found adequate for sample point circumstances.

5. DECOMMISSIONING: Protect communities and the environment from cyanide through development and implementation of decommissioning plans for cyanide facilities

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

X in full compliance with

The operation is in substantial compliance with **Standard of Practice 5.1**

not in compliance with

Basis for this Finding/Deficiencies Identified:
The site is covered by a Closure Plan which is updated regularly and costs updated annually. The base work for this has been done by consultants but the site is taking over the function from 2008 to increase accuracy and appropriateness. Specific procedures are in place to ensure that planning and costing adequately covers cyanide decommissioning and closure. Specific costing details and scheduling cover the CIL Plant and North and South Heap leaches.

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:
Plans and funding of decommissioning activities are a requirement of the Mining licence and these plans and the latest third party decommissioning cost estimates and details of financial provisions were sighted. A reclamation bond, including a Bank guarantee support the closure funding and the documentation relating to this 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:
There is a full and detailed set of procedures in place and functional which covers the minimising of worker exposure to cyanide during all cyanide-related tasks. The format of the procedures includes the listing of the task, the risks associated with those tasks and the actions and activities and their format, in order to minimize cyanide risk. Appropriate PPE and pre-work inspections are specified in procedures for all cyanide-related tasks. Procedures were developed from risk assessments and reflect responses to normal and abnormal conditions. There is a link should there be escalation from abnormal to emergency conditions. Site procedures were extensively checked through examination and interview and records relating to risk assessments checked for worker input and involvement. Checks and balances are in place through worker involvement in risk assessments, through consultations in Health & Safety Committee meetings and during shift meetings. The organization has a strong risk assessment culture in place which is supported by a change management procedure. The latter is in the process of being strengthened.

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:
Specification pH control is set at greater than 10.5. Caustic is added in the process to maintain high pH levels. Personal monitoring devices (Micro IV gas detectors) are used to check cyanide exposure levels and are prescribed by procedure in many routine and non-routine activities. "Hot spots" have been identified and clearly demarcated and procedures indicate PPE required, personal monitoring that needs to be carried out and precautions that must be observed. On-going inspections and checks are also used to monitor and check facilities and emergency response equipment functioning. Safety equipment such as safety showers, eye washes, and fire extinguishers are numerous and adequately signposted. A site wide pipe colour coding system is in operation which includes cyanide pipe colour coding and directional flow. Appropriate warning signs and MSDS information in English (the site operational language) were evident on site. 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 more than adequate. Accident and incident reporting and investigation procedures were found to be in place and effective although the absence of cyanide incidents made verification of this for cyanide incidents, difficult.

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:
Cyanide emergency procedures form part of the site-wide emergency preparedness plan which covers the whole site and includes the cyanide facilities, i.e. the CIL plant, TSF facilities and the two Heap Leach operations. The plan includes responses to scenarios identified on site via a emergency scenarios risk assessment. The scope of the plan includes site-based responses and includes provision for evacuation of patients by ambulance to an on site hospital equipped and trained to handle cyanide emergencies. Emergency first aid equipment, antidotes, medical oxygen and BA sets are accessible and this is supported by a formal cyanide first aid procedure. The Cyanide Alarm is raised using two way radios which are extensively available on site. Due to the size of the site and poor reception, cell phones are only used as a back up. Fully equipped emergency trailers, which include cyanide equipment, are on permanent standby on site at two locations. Equipment is regularly checked and tested and mock drills are held on site and in conjunction with the hospital. Interviews confirmed employee knowledge of cyanide hazards, and emergency response.

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 site has used a risk assessment to develop site-specific emergency scenarios and responses. The emergency preparedness plan combines procedural responses and emergency provisions to deal with the various scenarios and includes identified emergency response teams and coordinators who are on all shifts. The Plan also links to procedures and resources in other systems (e.g. ISO 14001 and OSHAS 18001), should they be required. These preparations are regularly reviewed in the light of changes, mock drill learning points and employee feedback. Key community members in identified communities have been trained to liaise between mine and community should cyanide events require actions on the part of the community on matters such as water usage or evacuation.

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:
Representatives of the workforce were involved in the risk assessment to develop the emergency scenarios and response in the emergency response plan and procedures. Health and Safety Committee and Shift meetings are used to communicate developments and changes in all cyanide activities, including emergency response. There is a complex structure of planned meetings with community leaders and individual villages which has been used to initially communicate with communities on cyanide, cyanide emergencies and raise awareness and answer questions and concerns. Due to high illiteracy, much of the communication is done verbally and is also done jointly with the cyanide transporter,

Barbex, as a part of total ICMI commitment. Presentation materials and documentation on the communications was sighted. Full cycle drills are used to involve hospital 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 Preparedness Plan details clear duties, roles and responsibilities for the various emergency scenarios. Coordinators and alternate coordinators (Emergency Controllers and Site Controllers) are supervisors and shift supervisors who have access to resources and management structures for additional resources. The Plan cross references appropriate procedures which guide availability and use of resources and appropriate response. Emergency equipment lists were checked and site inspections confirmed availability and readiness. The Plan includes extensive 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. Emergency Team members were checked and training records and assessments showed the individuals to be well prepared and well equipped for cyanide emergencies. Periodic full scale 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 and the call-out procedure and contact information lists which are updated regularly. Media and community communication is done via a formal procedure. Contact details for community representatives were sighted.

Standard of Practice 7.5: Incorporate into response plans and remediation measures monitoring elements that account for the additional hazards of using cyanide treatment chemicals.

X in full compliance with

The operation is in substantial compliance with **Standard of Practice 7.5**

not in compliance with

Basis for this Finding/Deficiencies Identified:
The Emergency Preparedness Plan 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 well covered, as is disposal of contaminated materials. Emergency sampling and monitoring procedures cover remediation issues and assessing risk. Prohibited chemicals are specifically named and three villages that could require alternative water supplies in the event of emergencies are identified. There are also cross references to the centralized environmental procedures which form part of the Environmental Management System.

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 current Emergency Preparedness Plan was sighted, along with the previous Plan which it replaced and the changes made as a result of cyanide awareness. Evidence was sighted of learning points emerging from cyanide man down drills (particularly relating to external drills including the hospital). The Plan includes the requirement for at least annual review, plus additional circumstances such as after a cyanide incident, or if mock drills suggest the need for change.

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:
Training programs were reviewed and training records checked to assess training undertaken and assessment results and records. Fifteen randomly selected employees were checked in interviews on their understanding of cyanide hazards, first aid and emergency response and this was verified through checking of their personal records. The Cyanide Training Matrix for all cyanide tasks was reviewed and found to be thorough and up to date. Competency is tested using written assessments, oral questioning, and on-the-job observation.

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:
Cyanide Training (task, awareness, first aid and emergency) is undertaken using a centralized Cyanide Training Matrix which links jobs to the cyanide training and refresher frequency and the necessary training elements required for that job. The Metallurgy Department has a dedicated Cyanide Training Department which is responsible for all cyanide training. Trainers assess employees after training and also carry out on the job observations and Planned Task Observations (PTOs) to test training effectiveness and application. All workers are trained before being allowed to work with cyanide in an unsupervised manner.

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

X in full compliance with

The operation is in substantial compliance with Standard of Practice 8.3

not in compliance with

Basis for this Finding/Deficiencies Identified:
All employees receive cyanide training which includes man down response, spill response, protecting themselves, cyanide first aid (employees are only trained to recognise symptoms and administer oxygen. Only medical staff may administer antidotes.) and use of appropriate PPE. Periodic mock drills are undertaken and training personnel attend these drills and formally evaluate response and performance. Training records were checked to confirm attendance and successful completion.

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:
There is a complex structure of planned meetings with community leaders and individual villages which has been used to initially communicate with communities on cyanide, cyanide emergencies and raise awareness and answer questions and concerns. Due to high illiteracy, much of the communication is done verbally and is also done jointly with the cyanide transporter, Barbex, as a part of total ICMI commitment. Evidence of meetings held with the local communities where cyanide was discussed specifically, was sighted. The communities were given the opportunity to raise issues and ask questions. Employee consultation is via Health & Safety meetings and union representatives and through feedback sessions after mock drills.

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:
Quarterly consultative meetings are held with local communities including chiefs, and government officials, public affairs officials, and district assembly persons (councillors), discussing projects, general cyanide awareness, cyanide incidents and emergencies. Direct response was obtained during the discussions, arising from questions and issues regarding cyanide. Regular monthly meetings with stakeholder communities are held and cyanide issues recorded when raised and cyanide awareness also discussed. Video and notes were reviewed on the Cyanide forum at Abekoase community, attended by 200 people. A video presentation on cyanide was given, including dangers of cyanide, transportation, showing people an example of what cyanide looks like. Questions about boreholes were asked. Focus is placed upon verbal communication and interaction because of high illiteracy levels.

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:
Owing to literacy problems, most of the cyanide information is supplied through verbal briefings of community leaders who then take the information back to villages. There is a Procedure in place for notifying potentially affected communities and the media of incidents and/or response measures. Monitoring data is provided to government officials according to legal reporting requirements. Reference is made to Goldfields Academy briefing information on cyanide.