



# ***INTERNATIONAL CYANIDE MANAGEMENT INSTITUTE***

## ***Gold Mining Operations***

### ***Summary Audit Report Form /***

***September 07, 2008***

***(1<sup>st</sup> draft at 14/03/2008)***

***AngloGold Ashanti - Queiroz Plant***

***For The  
International Cyanide Management Code***

**[www.cyanidecode.org](http://www.cyanidecode.org)**

## July 2005

The International Cyanide Management Code (hereinafter "the Code"), this document, and other documents or information sources referenced at [www.cyanidecode.org](http://www.cyanidecode.org) are believed to be reliable and where prepared in good faith from information reasonably available to the drafters. However, no guarantee is made as to the accuracy or completeness of any of these other documents or information sources. No guarantee is made in connection with the application of the Code, the additional documents available or the referenced materials to prevent hazards, accidents, incidents, or injury to employees and/or members of the public at any specific site where gold is extracted from ore by the cyanidation process. Compliance with this Code is not intended to and does not replace, contravene or otherwise alter the requirements of any specific national, state or local governmental statutes, laws, regulations, ordinances, or other requirements regarding the matters included herein. Compliance with this Code is entirely voluntary and is neither intended nor does it create, establish, or recognize any legally enforceable obligations or rights on the part of its signatories, supporters or any other parties.

## **SUMMARY AUDIT REPORT FOR GOLD MINING OPERATIONS**

### ***Instructions***

1. The basis for the finding and/or statement of deficiencies for each Standard of Practice should be summarized in this Summary Audit Report. This should be done in a few sentences or a paragraph.
2. The name of the mine operation, lead auditor signature and date of the audit must be inserted on the bottom of each page of this Summary Audit Report. The lead auditor's signature at the bottom of the attestation on page 3 must be certified by notarization or equivalent.
3. An operation that is in substantial compliance must submit a Corrective Action Plan with the Summary Audit Report.
4. The Summary Audit Report and Corrective Action Plan, if appropriate, with all required signatures must be submitted in hard copy to:

**International Cyanide Management Institute (ICMI)  
1200 G Street, NW, Suite 800  
Washington, DC 20005, USA**

5. The submittal must be accompanied with 1) a letter from the owner or authorized representative which grants the ICMI permission to post the Summary Audit Report on the Code Website, and 2) a completed Auditor Credentials Form. The letter and lead auditor's signature on the Auditor Credentials Form must be certified by notarization or equivalent.
6. Action will not be taken on certification based on the Summary Audit Report until the application form for a Code signatory and the required fees are received by ICMI from the applicable gold mining company.
7. The description of the operations should include sufficient information to describe the scope and complexity of the gold mining operation and gold recovery process.





## SUMMARY AUDIT REPORT

Name of Mine: AngloGold Ashanti Brasil Mineração Ltda.  
Name of Mine Owner: AngloGold Ashanti  
Name of Mine Operator: AngloGold Ashanti  
Name of Responsible Manager: José Roberto Vago  
Address: Fazenda Rapaunha s/n, bairro Galo, Nova Lima,  
State/Province: Minas Gerais, MG. Country: Brazil.  
Telephone: (55+31) 3589-2401 Fax: (55+31) 3589-2455  
E-Mail: [RMLeal@anglogoldashanti.com.br](mailto:RMLeal@anglogoldashanti.com.br)

### Location detail and description of operation:

#### Queiroz Plant:

The Industrial Complex of Queiroz was built with the purpose of treating the gold and silver from the mines of AngloGold Ashanti Brasil Mineração around the city of Nova Lima in the state of Minas Gerais in Brazil, as well as the production of sulfuric acid as a by-product.

The complex is located in the municipality of Nova Lima, 22km far from Belo Horizonte the capital of Minas Gerais state in the hydrographical basin of Velhas River and the sub-basin of Queiroz Stream (Velhas River affluent).

The Industrial Complex of Queiroz constitutes of two independent circuits for the treatment of the ore from the different mines.

In the circuit named Cuiaba with capacity of 60,000 ton/month the refractory ore from Cuiaba mine is treated physically and has no process involving cyanide.

In the other circuit named Raposos with capacity of 33,000 ton/month the non-refractory ore comes from smaller mines for testing or third parts. Raposos Circuit only performs a physical treatment in this ore (size reducing and blending). Therefore, there is no process with cyanide at Raposos circuit.

With the new conception of the Cuiaba ore treatment circuit (commissioned in 2007) milling, gravimetric concentration, flotation and filtering/de-watering is held close to the shaft in the plant of Cuiaba. The concentrate generated is then transported to Queiroz by an aerial ropeway (cableway). The concentrate is then re-pulped and transferred to the pyrometallurgical plant for roasting and Sulfuric Acid production.

The calcine material generated is pumped to the Hydrometallurgical plant where it is leached in aerated tanks where the specific reagents like cyanide are added for the dissolution of gold. The pulp containing soluble gold is sent to a set of two thickeners that operate counter-currently (named CCD – Counter Current Decantation) to separate the solution rich in gold from the gold-poor solids. The pulp extracted from the second thickener is pumped to a second leaching circuit from where it is pumped to a set of tanks where carbon will be added to absorb the residual gold that has been dissolved – CIP carbon in pulp. After the absorption of residual soluble gold, the pulp is pumped to the tailings dam.



The gold-rich (pregnant) solution is filtered and de-aerated before zinc is added in a process called Merrill Crowe precipitation. The precipitated is filtered and sent to the smelt house where it is refined to gold in bars.



## Auditor's Finding

This operation is

- in full compliance
- X** in substantial compliance \*(see below)
- not in compliance

with the International Cyanide Management Code.

- \* The Corrective Action Plan to bring an operation from substantial compliance to 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:** NCA - Nosa Certification Authority Ltda., Brasil

**Audit Team Leader:** Celso Sandt Pessoa

**E-mail:** [celsosandt@ncabrasil.com.br](mailto:celsosandt@ncabrasil.com.br) and [celsopessoa@nosa.com.br](mailto:celsopessoa@nosa.com.br)

**Names and Signatures of Other Auditors:**

Julio Monteiro (Acting as lead-Auditor on training – under care of Celso S. Pessoa)

Eberson Cassio de Andrade (Auditor)

Date(s) of Audit: 11 to 14 September, 2007 (on site), 03 to 07 December 2007 (on site) and 12 to 14 December, 2007 (off site).

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.

**OFÍCIO DE NOTAS E REGISTRO DE CONTRATOS MARÍTIMOS**  
Rua do Acre, 28 - Centro - RJ - Tel.: (21) 2253-3459 - Tabelião Aloir Meichuades de

Reconheço por SEMELHANÇA a firma de:

[2AM00974]-CELSON SANDT PESSOA

Rio de Janeiro, 23/01/2009

Serventia : 3,68  
Taxa TJ+ Fundos : 1,09  
Total : 4,77

CLAUDIA RODRIGUES MORAIS ANDRADE

OFÍCIO DE NOTAS E REGISTRO DE CONTRATOS MARÍTIMOS

CORREGEDORIA GERAL DA JUSTIÇA - RJ  
SEÇÃO DE FISCALIZAÇÃO  
RECONHECIMENTO  
FIRMA POR SEMELHANÇA  
NFE  
SBF67123



**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.*

The operation is **X** in full compliance with  
in substantial compliance with Standard of Practice 1.1  
not in compliance with

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

The company buys the cyanide from Cyplus GmbH Germany (ICMI certified) according to the contract # AGABM/081/07 (Cyanide purchase and sale contract). AGAM's policy is to buy cyanide from suppliers that are certified according to ICMI requirements for cyanide producers. AGAM buys, in a corporate way, the cyanide for all its operations in Brazil (Santa Bárbara plant, Serra Grande plant and Nova Lima plant), from Cyplus GmbH (Rodembacher Chausse, 4. 63457, Hanau-Wolfgang, Germany). It was evidenced the contract AGABM/081/07 (dated 29/08/2007), between the two companies, addressing all issues related to cyanide supply.

**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.*

The operation is **X** in full compliance with  
in substantial compliance with Standard of Practice 2.1  
not in compliance with

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

All responsibilities related to safety, security, release prevention, training and emergency response are addressed at Cyanide purchase and sale contract AGABM/081/07 signed between the company and Cyplus GmbH Germany. It is specified and used an UN approved packaging in a wooden box with a pallet base, containing 1000kgf (net) of solid cyanide, in a HDPE inner liner, hermetically sealed and packaged in a woven PP big-bag with lifting loops, stowed in a 20 cubic feet seaworthy closed, general purpose ocean container, with 20 metric tons (net), all in accordance with UN and IMDG regulations. All labeling is accordance with UN regulations, German and Brazilian legal requirements. Texts also available in English. All storage requirements are clearly addressed at the purchase contract between Cyplus and AGAM.

Standard of Practice 2.2: *Require that cyanide transporters implement appropriate emergency response plans and capabilities and employ adequate measures for cyanide management.*

The operation is **X** in full compliance with  
in substantial compliance with Standard of Practice 2.2  
not in compliance with

not in compliance with

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

The contract between AGAM and Cyplus requires that all transporters used shall be certified according to ICMI requirements for transporters or be audited by an independent third part of its transportation activities. The transportation documentation, from Cyplus to AGAM facilities (invoice, purchase order, inspections certificates, quality control certificates) are kept by AGAM.

The transporters used by Cyplus and AGAM have Code-equivalent, non-certification audits and due diligences conducted by Code-approved auditors and have programs and procedures implemented consistent with the ICMI Audit Protocol for Transport of Cyanide. Transportation was found in substantial compliance with this standard of practice because the auditor considered that the route map of the transporter Niquini needs to be better documented. It was clear to the auditor that the transporter Niquini has made a good faith effort to comply with Code requirements, that the deficiency can be corrected within one year and that there is no immediate or substantial risk to health, safety or environment, as the route map does exist and only needs a more formal presentation.

AGAM will submit an Action Plan to ICMI in order to demonstrate its commitment on certificating that the transporter Niquini will implement its Action Plan addressing entirely all Standards of Practice of Cyanide Transportation Verification Protocol.

**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.*

	<b>X</b> in full compliance with	
The operation is	in substantial compliance with	Standard of Practice 3.1
	not in compliance with	

*Summarize the basis for this Finding/Deficiencies Identified: (Due to the sensitivity of security issues regarding storage of cyanide, no descriptions of substantial or non-compliance with this aspect of the Standard of Practice should be provided).*

There is a brand new facility for reception, storage and mixing of cyanide, which was built according to accepted engineering procedures. This new area is located away of people and surface waters. There is a control method to go into this area, and only authorized people are allowed to go inside. This area is provided with a first aid facility, well and full equipped, that shall be used in the event of any incident involved during cyanide handling. The field audit evidenced that operations personnel were interviewed about the operational procedures. The cyanide solution tanks are provided with level indicator and also high-level alarm system. All cyanide solution handling and tank maneuvers are done by the operators at the control room, using computer systems to do so. Operators in the control room were interviewed and the SDCCD system was verified. All area for storage and preparation of cyanide, including walls, floors and all portions of the containment, including the areas immediately beneath cyanide mixing tanks, are made of concrete. Solid cyanide is stored in its original packaging, in a well ventilated area, under roof and the big-bags lay down on pallets. No other product is allowed to be stored in this area.





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.*

The operation is **X** in full compliance with  
in substantial compliance with Standard of Practice 3.2  
not in compliance with

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

The new facility is provided with all required controls. Wooden boxes are dismantled and stored at a specific warehouse for dangerous solid waste, which access is restricted. The final disposition is the thermal destruction provided by RESOTEC, which is qualified by FEAM (local EPA) to supply this kind of service. All cyanide plastic bags and big-bags are neutralized three times and after that thermally destroyed. The rinse water is re-used in the cyanidation process loop. There are in place inspection procedures applicable to the cyanide containers that will be sent back to the transporter. Adequate handling procedures are in place and evidenced during field audit. There is a procedure for limiting the height of stacking of cyanide containers. It was evidenced that the operation timely clean up of any spills of cyanide during mixing, which is done by two operators. There are operational procedures to prepare the cyanide solution with solid cyanide. Valves are protected. A JSA is done before the mixing operation starts. The mixing operation is done by two operators, where the second one stays in a remote area. Materials used to mitigate any spills are available at the mixing area. Both operators are equipped with all required PPEs (Tyvec overall, gloves, boots, oxygen tanks, masks, radio, HCN detectors) for this operation. Adequate handling procedures to prevent rupturing of cyanide containers are in place and evidenced during field audit. During the field audit, it was evidenced the procedure of stacking no more than 3 pallets of cyanide containers for each pile.

**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.*

The operation is **X** in full compliance with  
in substantial compliance with Standard of Practice 4.1  
not in compliance with

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

Management and operational documented procedures were evidenced in place. Design, technical and legal requirements were identified and referenced in the operational procedures. Cyanide management contingencies are contained in the emergency response plan. The company did establish and implement an inspection and maintenance plan (preventive and predictive), covering all cyanide related equipments and piping, including the tailing dam. Risk analysis management is also another tool found established and implemented and used to evaluate the effect of the changes in the process that could cause cyanide spills. The





company has a SHE management system based on the NOSA model and is certified according to ISO 14001 and OHSAS 18001 by NQA-USA. Operational trainings on these procedures are provided for all operators and supervisors. Dynamic risk analysis is used by AGAM to evaluate the potential risks related to cyanide in its operations. Operational procedures were developed and operators and supervisors were trained and approved for their functions. Inspections, job safety analysis, planned job observations and preventive maintenance are usual tools at AGAM. In the event of water not in balance, all the water flow goes to the tailing dam. There is in place a tailing dam management procedure. Dam break simulations are also performed by AGAM. Inspections are a management tool used by AGAM. The documented procedure PD-A-VPOP 011 (2) addresses all the system related to inspection of installations. An inspection plan for 2007, encompassing the process plant (mixing area), tailing dam, precipitation, tank leaching and laboratory, was evidenced in place and being implemented accordingly. Planned inspections are performed each two months. Dam inspections are performed daily, weekly, monthly and annually, depending on the risk. There is an inspection plan in place covering the process plant (facilities and equipments) and the tailing dam. Inspections records were established addressing the date of inspection, the inspector name, non conformances and required corrective actions and dispositions. AGAM did establish and implement a preventive maintenance plan specific to cyanide related equipments and systems. The plan was last up-dated in March/ 2007. All required maintenance activities are documented at standard maintenance jobs. AGAM did establish an emergency power system, composed by three diesel generators (two of 450 KVA and one of 750 KVA). Maintenance and testing records (weekly basis) were evidenced.

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

	<b>X</b> in full compliance with	
The operation is	in substantial compliance with	Standard of Practice 4.2
	not in compliance with	
	not subject to	

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

The company has established objectives and targets related to cyanide consumption. Plans were established and found under implementation. Cyanide consumption (g/ton) has decreased more than 50% (mean value) in the last three years. AGAM cyanide consumption policy is addressed at documented instruction RT-O-DRME- 002(2). Since 2004, the cyanide consumption decreased from 457 g/ton to 200 g/ton (upper limit for 2007). Cyanide consumption is monitored each two hours. The decreasing of cyanide consumption is a result of some technical strategies, such as cyanidation tests, new piping system and manual addition of cyanide, that were implemented by AGAM. Automatic addition of cyanide didn't work well for AGAM processes.

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

	<b>X</b> in full compliance with	
The operation is	in substantial compliance with	Standard of Practice 4.3
	not in compliance with	



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

Evidences that the operation has developed a comprehensive, probabilistic water balance were available by reports, charts and procedures. Evidences were available by a report and Piezometric Monitoring – Risk Chart that the dams are pond and impoundments designate and operated with adequate freeboard above the maximum design storage. Evidences that the water balance considers the factors listed in the item 4.3.2 were found in reports, procedures and emergency plans. Evidences that the operating procedures incorporate inspection and monitoring activities to implement the water balance and prevent overtopping of ponds and impoundments and unplanned discharge of cyanide solutions to the environment were available in a procedure. Evidences that ponds and impoundments are designed and operated with adequate freeboard above the maximum design storage capacity determined to be necessary from water balance calculations were available in reports. Evidences that the operation measures precipitation, compare the results to design assumptions and revise operating practices as necessary were available in a report and a procedure.

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

	<b>X</b> in full compliance with	
The operation is	in substantial compliance with	Standard of Practice 4.4
	not in compliance with	

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

The strategy adopted by AGAM comprises to control the level of WAD cyanide in the effluent that goes to the Calcine Dam below the levels of 50 mg/l not to expose wildlife, birds and livestock and monitoring the levels at the pool to make sure no cyanide is above the limit. The effluent is monitored for the levels of WAD cyanide previously to pumping tailings to the dam. Ferrous sulfate is added to the stream proportionally to the content of WAD cyanide. The Calcine Dam operates in a closed circuit with the effluent treatment plant, where the pool water is re-circulated for arsenic removal, the treatment using ferrous sulfate and lime is also beneficial for the removal of residual cyanide in the water before it reaches the final dam that will direct water to the environment. The dams are all fenced and constantly watched by security agents that take rounds to guarantee no intruder (and therefore no cattle) will interfere with the electrical installations of the pumping systems. Daily inspections are performed in order to verify the effectiveness of these measures and controls. The tailings dam is fenced although AGAM does not discharge waste water with WAD cyanide > 50mg/l. Waste water is controlled by AGAM lab, and any discharge with WAD cyanide is previously authorized by the QC laboratory. Discharges with WAD cyanide > 50mg/l are not allowed.

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

	<b>X</b> in full compliance with	
The operation is	in substantial compliance with	Standard of Practice 4.5
	not in compliance with	

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

The tailing is treated, controlled and monitored (three monitoring points) before discharged to the tailings impoundment, with levels complying with the Brazilian legal requirements. The



total and free cyanide are controlled downstream the mixing zone. The in-stream values for these two parameters are in accordance with local EPA and ICMI, as verified in records. The concentration of free cyanide is 0.022 mg/l or lower downstream of any established mixing zone, as found in records.

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

	<b>X</b> in full compliance with	
The operation is	in substantial compliance with	Standard of Practice 4.6
	not in compliance with	

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

The "Calcine Dam" is not equipped with any kind of impermeabilization. To guarantee that no kind of underground water contamination is occurring, the AGAM Company conducts monthly monitoring of the quality of this water. According to the monitoring records it was shown that the parameters values are within the limits established by legislation and ICMI. Evidence was found that there is a ground water monitoring program, inside and below gradient of the facility, taking place where total and/or free cyanide are monitored and kept below numeric limits according to applicable jurisdiction. The backfill is generated from flotation tailings before cyanide has been added in the milling. No remedial activity needed to be engaged as no seepage from operation has caused ground water contamination or cyanide concentration to increase.

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

	<b>X</b> in full compliance with	
The operation is	in substantial compliance with	Standard of Practice 4.7
	not in compliance with	

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

Cyanide tanking areas are surrounded by containment wall, constructed according engineering specifications and according Brazilian safety and environmental laws. Cyanide piping is protected against spilling, in order to protect the employees and the environmental impacts. The principal pipelines were protected with resistant material (PVC). All the piping out of service are protected in case of emergency operation. According presentation of chemical resistance materials specification (Tanks and piping are made of carbon steel).

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.*

	<b>X</b> in full compliance with	
The operation is	in substantial compliance with	Standard of Practice 4.8
	not in compliance with	

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

Evidences were available of a quality control and quality assurance programs been implemented in the new process plant of cyanide; Evidences of Material Specifications

(Paints, PVC, Iron, carbon steel) and that inspections were conducted to compare whether the buildings were built according to the planned were available. Evidences were available that the documents are being kept for record and organized in an electronic structured system. Evidences were available of appropriately qualified personnel that reviewed cyanide facility construction.

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

	<b>X</b> in full compliance with	
The operation is	in substantial compliance with	Standard of Practice 4.9
	not in compliance with	

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

A very comprehensive monitoring plan was found established and implemented. A monitoring plan, according to local EPA and ICMI requirements was found established and implemented. The plan is linked to the documented procedure RO-O-DRME-131(1), which addresses the system for sampling collection, testing and preservation (environmental waste water control).

**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.*

	<b>X</b> in full compliance with	
The operation is	in substantial compliance with	Standard of Practice 5.1
	not in compliance with	

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

The company did establish and implemented specific plans for partial and final decommissioning activities. A "punch list" (dated 01/09/2007) was reviewed related to the decommissioning process for the old cyanide installations (preparation of cyanide solution) at Queiroz plant. The decommissioning process is in progress. The final decommissioning is scheduled to 2019, and the decommissioning plan was found at revision dated 30/08/2007. This plan is, at least, updated annually, by the environmental management process.

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

	<b>X</b> in full compliance with	
The operation is	in substantial compliance with	Standard of Practice 5.2
	not in compliance with	

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

The company has identified the required resources to implement the final decommissioning plan, according to the "reclamation cost report" dated 13/11/2006 (annually updated). The required funds were evidenced to be available according to a third part audit (Ernst & Young



report dated 26/01/2007). AGAM's Environmental department has established a closure plan (last up-dated 30/08/2007), considering the operation close-out for 2019. AGAM did identify the economic resources required to implement the decommissioning plan. This forecast is annually up-dated and the last actualization was done in July/2007.

**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.*

	<b>X</b> in full compliance with	
The operation is	in substantial compliance with	Standard of Practice 6.1
	not in compliance with	

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

Evidences that the operation has developed procedures describing how cyanide-related tasks should be conducted to minimize worker exposure were available, and the procedures require, where necessary, the use of personal protective equipment and address pre-work inspections. A change management procedure is in place and a procedure comprising safety specifications for new projects to review proposed process and operational changes and modifications for their potential impacts on worker health and safety, and incorporate the necessary worker protection measures. Evidences were available at a procedure and checklists used for changes evaluations, where a multi-disciplinary team is involved to review proposed changes. AGAM did establish a "suggestion program" where all employees are encouraged to suggest improvements in the process.

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.*

	<b>X</b> in full compliance with	
The operation is	in substantial compliance with	Standard of Practice 6.2
	not in compliance with	

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

A procedure establishes the limit the production of cyanide hydrogen gas, during the moisture and production activities; records evidence that the limits are correct. Fixed cyanide gas monitors are present at the areas identified as having the greater risks of exposure, plus the personal gas monitors available for the activities being developed in areas where cyanide containing solutions are present. Evidences were available of quantitative evaluations to identify Areas and Activities where the workers may be exposed. The company holds a periodic monitoring program to assess the concentrations of NaCN and HCN in the environment and in activities where there is the possibility of the risk factor being present. Hydrogen cyanide monitoring equipment is maintained, tested and calibrated as directed by the manufacturer, and records are records retained for at least one year, as confirmed in calibration plans. Warning signs related to presence of cyanide and that smoking, open flame and eating and drinking are not allowed, and that, if necessary, suitable personal protective equipment must be worn are implemented. Showers, extinguishers properly located and maintained were available and have inspections programmed and maintenance contract.





The identification is satisfactory for tanks and piping containing cyanide and the cyanide flow in pipes clearly showed.

Evidences where available that the MSDS, first aid procedures or other informational materials on cyanide safety in the Portuguese language of the workforce available in areas where cyanide is managed.

Procedures are in place and fully implemented to investigate and evaluate cyanide exposure incidents.

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

	<b>X</b> in full compliance with	
The operation is	in substantial compliance with	Standard of Practice 6.3
	not in compliance with	

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

Evidences were available of necessary resources available for emergency situation in several locations. Antidotes for cyanide are available and stored according to the suppliers' guidelines and renewed according to the expiry dates. Emergency Response Plan was developed to respond to cyanide exposures. Queiroz Plant is provided with the resources for first aid with accidents involving cyanide during 24 hours, medical care available in the plant between 07:30 to 17:10 and after then, whenever needed the victim must be driven to Nossa Senhora de Lourdes Municipal Hospital. The Company made formalized arrangements with local hospitals in the Nova Lima City. Also, the medical facility has adequate, qualified staff, equipment and expertise to respond to cyanide exposures situations. There are evidences that Emergency simulations were held through the official after-simulate reports. The possibilities for improvements in the emergency response go to an action plan including the revision of the applicable emergency response plan if necessary.

**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.*

	<b>X</b> in full compliance with	
The operation is	in substantial compliance with	Standard of Practice 7.1
	not in compliance with	

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

Evidences were available of an Emergency Response Plan to address potential accidental releases of Cyanide, which considers the potential cyanide failure scenarios appropriate for its site-specific environmental and operating circumstances. It was evidenced in the Emergency Response Plan that the planning for response to transportation-related emergencies has considered transportation route(s), physical and chemical form of the cyanide, method of transport, the condition of the road or railway, and the design of the transport vehicle.

*Handwritten signature*

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

The operation is **X** in full compliance with  
in substantial compliance with Standard of Practice 7.2  
not in compliance with

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

Evidences were available that is involved in the operation the workforce and stakeholders, including potentially affected communities in the Emergency Response Plan. The operation has made potentially affected communities aware of the nature of their risks associated with accidental cyanide releases, and consulted with them directly or through community representatives regarding appropriate communications and response actions, as confirmed in the Emergency Response Plan, Meeting and Integrated Simulation, State Coordination for Civil Defense report and Cyanide Simulations. The operation has involved local response agencies such as outside responders and medical facilities in the cyanide emergency planning and response process. The operation engages in consultation or communication with stakeholders to keep the Emergency Response Plan current, through the updating of the project and requirements for operation permit at the emergency response State Department – Fire Department every two years. The company is open to visitors from the community and the union representing workers where an induction course is conducted about the risks present in the area, what the control strategies are, as well as the emergency procedures.

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

The operation is **X** in full compliance with  
in substantial compliance with Standard of Practice 7.3  
not in compliance with

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

Evidences were found available that the cyanide-related elements of the Emergency Response Plan:

- a) Designate primary and alternate emergency response coordinators who have explicit authority to commit the resources necessary to implement the Plan;
- b) Identify Emergency Response Teams;
- c) Require appropriate training for emergency responders;
- d) Include call-out procedures and 24-hour contact information for the coordinators and response team members;
- e) Specify the duties and responsibilities of the coordinators and team members;
- f) List emergency response equipment, including personal protection gear, available along transportation routes and/or on-site;
- g) Include procedures to inspect emergency response equipment to ensure its availability;
- h) Describe the role of outside responders, medical facilities and communities in the emergency response procedures.

Evidences were available on Emergency Response Plan in the item – 16 Simulated Exercises, that the operation confirmed that outside entities included in the Emergency Response Plan are aware of their involvement and are included as necessary in mock drills or implementation exercises. The external emergency response entities were invited to participate in a meeting for evaluation of the Emergency Response Plan and the simulation.



There is a participant list with the signature of the representing members of each entity in the meeting for discussion of the Emergency Response Plan and simulation planning involving each entity, and also a list of participants of these entities in the simulation.

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

The operation is **X** in full compliance with  
in substantial compliance with Standard of Practice 7.4  
not in compliance with

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

Evidences were available on Emergency Response Plan that the Plan includes procedures and contact information for notifying management, regulatory agencies, outside response providers and medical facilities of the cyanide emergency and notifying potentially affected communities of the cyanide related incident and any necessary response measures, and for communication with the media.

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.*

The operation is **X** in full compliance with  
in substantial compliance with Standard of Practice 7.5  
not in compliance with

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

Evidences are available at the Emergency Response Plan that the Plan does describe specific, remediation measures as appropriate for the likely cyanide release scenarios, such as recovery or neutralization of solutions or solids, decontamination of soils or other contaminated media, management and/or disposal of spill clean-up debris, provision of an alternate drinking water supply. Evidences are available at the Emergency Response Plan that the Plan prohibit the use of chemicals such as sodium hypochlorite, ferrous sulfate and hydrogen peroxide to treat cyanide that has been released into surface water and also that the Plan address the potential need for environmental monitoring to identify the extent and effects of a cyanide release, and include sampling methodologies, parameters and, where practical, possible sampling locations.

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

The operation is **X** in full compliance with  
in substantial compliance with Standard of Practice 7.6  
not in compliance with

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

The operation reviews and evaluates the cyanide related elements of its Emergency Response Plan for adequacy on a regular basis, as evidenced on the Emergency Response Plan and through formal post simulates reports. The possibilities of improvements in the ERP go to an action plan including the revision of the plan if necessary. Mock cyanide emergency



drills are conducted periodically as part of the Emergency Response Plan evaluation process, as evidenced on the Emergency Response Plan. Provisions are in place to evaluate and revise the Emergency Response Plan after any cyanide related emergency requiring its implementation and mandatory reviews have been conducted each 3 years, as evidenced on the Emergency Response Plan.

**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.*

	<b>X</b> in full compliance with	
The operation is	in substantial compliance with	Standard of Practice 8.1
	not in compliance with	

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

It was evidenced that the company established an introductory training system for new employees, which address the hazards associated to the cyanide (first aid and handling), that annually there is a refreshment training session for all employees and that training records are kept by AGAM according to its SHE records management procedure, while the employee is an active worker.

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.*

	<b>X</b> in full compliance with	
The operation is	in substantial compliance with	Standard of Practice 8.2
	not in compliance with	

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

All operators are qualified according a qualification plan for each function. The company established documented safe work procedures. These training sessions are annually refreshed. Training material was established in conjunction by AGAM and Cyplus, where the main aspect is the cyanide. All training sessions are provided by qualified personnel to do so (AGAM supervisors, Health representatives (doctors and nurses), Safety representatives (safety engineer and technician), and Cyplus instructors). Planned job observations are performed systematically by AGAM to verify the training effectiveness. Records are retained throughout an individual's employment documenting the training they receive and have the name of the trainee, the instructor name, the date, the subject covered and the instructor perception about the trainee performance and understanding.

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

	<b>X</b> in full compliance with	
The operation is	in substantial compliance with	Standard of Practice 8.3
	not in compliance with	

*mmw*

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

Maintenance workers receive the same trainings (introductory, on the job and refreshing) as the operation workers. Decontamination procedures and first aids are included in the trainings programs. Simulation tests are performed systematically by AGAM involving their works. Simulation tests are performed systematically by AGAM emergency brigade. External stakeholders are involved in the emergency training sessions, such as the state fire brigade and public/ private hospitals. Simulated cyanide emergency drills addressing both worker exposures and environmental releases are performed periodically in order to verify the effectiveness of the emergency response procedure and also to verify the skills of the involved people. Records are retained documenting the cyanide training, including the names of the employee and the trainer, the date of training, the topics covered, and how the employee demonstrated an understanding of the training materials.

**9. DIALOGUE: Engage in public consultation and disclosure.**

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

	<b>X</b> in full compliance with	
The operation is	in substantial compliance with	Standard of Practice 9.1
	not in compliance with	

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

AGAM did establish a communication system with the stakeholders through a toll free number (0800-7271500), through the program "good neighborhood", newspaper, specific planned meetings with civil and military authorities, and specific planned meetings (quarterly) with the neighbors to communicate issues of concern regarding the management of cyanide.

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

	<b>X</b> in full compliance with	
The operation is	in substantial compliance with	Standard of Practice 9.2
	not in compliance with	

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

Cyanide related procedures are available for the stakeholders. AGAM established a program entitled "open doors" where planned visits are performed for the local stakeholders such as schools, universities and the population. The company has an Environmental Education Center, which is used by the community and also two specific newspapers that are forwarded monthly and annually (respectively) for the stakeholders. Annually, AGAM publishes its SHE performance on a Social/ Environmental report, which is distributed for around 6500 persons.

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

	<b>X</b> in full compliance with	
The operation is	in substantial compliance with	Standard of Practice 9.3

*mmw*



not in compliance with

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

The company established a specific procedure to handle incidents related to cyanide (PD-A-VPOP-072(2)). The company informs the stakeholders the results of environmental monitoring testing (water and air).

Any incident involving cyanide is included in the Environmental Performance Report addressing the parameters related to air and water quality for the population, released by AGAM each six months.

