

***INTERNATIONAL CYANIDE
MANAGEMENT INSTITUTE***

***Cyanide Code Recertification Audit
Gold Mining Operations***

Summary Audit Report

***Harmony Gold Mines Limited
Central Gold Plant
South Africa***

21st – 25th October 2013



Name of Operation: Central Gold Plant

Name of Operation Owner: Harmony Gold Mines Limited

Name of Operation Operator: Harmony Gold Mines Limited

Name of Responsible Manager: Teboho Tlhobo, Plant Manager

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Location detail and description of operation:

Central Plant is a Gold Plant located on the northern side of the town of Virginia in the Free State Province of South Africa. The plant was commissioned on the 21st October 1987. The plant process includes milling, thickening, leaching, adsorption, elution, carbon regeneration, and electrowinning. The plant is designed to mill and treat 180,000 tonnes per month and currently treats 160,000 tonnes per month. The plant currently treats 100% waste rock dump from Harmony 2 WRD, Harmony 4 WRD and Masimong 4 WRD.

The Plant uses two identical Polysius SAG mills. Two thickeners are on-line whilst the third thickener is on stand-by. Lime and flocculent are added in the thickener in a solid/liquid separation (clarification) process and lime is added to control the pH at the leaching circuit.

Thickened material from the thickeners is pumped to the leaching vessels for the leaching process to take place. Cyanide and oxygen are added for the dissolution process to take place whilst activated carbon is added, moving counter-current to the pulp, whilst extracting gold from the pulp materials. Six leach vessels are on-line with a capacity of 2,000,000ℓ and seven carbon-in-pulp vessels are also on-line with a capacity of 380,000ℓ. Cyanide consumption is kept at 210 grams/tonne.

Loaded carbon from the adsorption circuit is pumped to the Elution Plant for acid washing, using Hydrochloric acid and subsequently pumped to the Elution process where gold is recovered into a solution form whilst the eluted carbon is regenerated at approximately 650 - 750° C. The pregnant solution (gold rich solution) is then pumped to the electrowinning process where gold is recovered at the cathodes attached to steel

wool. Recovered gold is then dried in the oven at < 150° C. Cyanide is added in the Elution column at 150kg/elution. Dried gold sludge is then despatched to the Rand Refinery for further purification.



Auditor's Finding

This operation is

X in full compliance

- in substantial compliance
 not in compliance

with the International Cyanide Management Code.

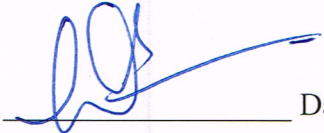
This operation has not experienced compliance problems during the previous three year audit cycle.

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: _____

Dates of Audit: 21st – 25th October 2013

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.

Central Gold Plant


Facility


Signature of Lead Auditor

Date

7/7/2014

Central Gold Plant


Signature of Lead Auditor

28th June 2014

Auditor's Findings

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

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

X in full compliance with

The operation is in substantial compliance with **Standard of Practice 1.1**

 not in compliance with

Basis for this Finding/Deficiencies Identified:

There is a Harmony Group-wide, cyanide supply contract, covering all Harmony Gold Plants, in place with Sasol Polymers, as the sole supplier of liquid Sodium Cyanide, delivered by bulk tanker. This supply contract includes Central Gold Plant. Sasol Polymers is a signatory to the Cyanide Code and was re-certified as a fully compliant Production Facility with the ICMI Cyanide Code on 2 March 2010 and again, on 7th May 2013.

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:

A Group-wide cyanide supply contract covering all Harmony Gold Plants (including Central) is in place with Sasol Polymers as the sole supplier of liquid Sodium Cyanide. Sasol Polymers is also responsible for the transport of cyanide solely using Tanker

Services, who started transporting Sasol Polymers-produced cyanide from July 2011. Tanker Services became a certified ICMI transporter on 13 December 2011. A Memorandum of Agreement (MOA) for the offloading of liquid sodium cyanide in terms of SANS 10231:2006 between Tanker Services Specialised Products Division and Harmony Gold Mining Company is in place. The supply contract and MOA cover the responsibilities and requirements for safety, security, unloading, emergency response (spills prevention and clean-up), route planning and risk assessments, community liaison, emergency response resource access and availability, training, and communication.

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 Group-wide cyanide supply contract covering all Harmony Gold Plants (including Central) in place with Sasol Polymers as the sole supplier of liquid Sodium Cyanide requires cyanide to be supplied by road tankers and the seller as well as the transporter will be ICMI Compliant over and above national regulations. Offloading is covered by a Memorandum of Agreement (MOA) for the offloading of dangerous goods between Tanker Services Specialised Product Division and Harmony Gold Mines Central Gold Plant. The supply contract and MOA cover the responsibilities and requirements for safety, security, unloading, emergency response (spills prevention and clean-up), route planning and risk assessments, community liaison, emergency response resource access and availability, training, and communication.

Sasol Polymers was responsible for the transport of cyanide until July 2011 when Sasol SiLog and its physical assets were sold to Tanker Services who started transporting Sasol Polymers-produced cyanide from July 2011. Tanker Services became a certified ICMI transporter on 13 December 2011. There is a break in deliveries of cyanide to site by an ICMI certified cyanide transporter between July and December 2011. The auditors deem the break to be acceptable for Mine Code compliance purposes for the following reasons:-

- 1) The change of transporters was beyond the control of the mines,
- 2) There was only one ICMI certified transporter and one ICMI certified liquid cyanide supplier in South Africa and the mines were bound to the producer/transporter conditions,
- 3) Finding a replacement/alternate supplier/transporter in the short term was not feasible because the mines can only handle liquid cyanide on site and do not have the facilities to mix their own cyanide from briquettes,
- 4) the mines applied pressure upon the supplier to organise ICMI certification for the replacement transporter as soon as possible,



5) The interim cyanide risk was minimal because the new transporter took over all of the transporter resources of ICMI transport certified SiLog (dedicated bulk cyanide liquid tankers, trained and experienced owner-drivers and contract drivers, assessed route risk assessments, cyanide documentation and systems) and was, and still is, covered in terms of Sasol's Product Stewardship and Responsible Care policies by the Sasol cyanide emergency response system (24 hour emergency control room, network of cyanide trained, emergency response spill and medical response service providers, dedicated cyanide tanker storage area and cyanide tanker decontamination facilities.)

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 plant uses only liquid cyanide, delivered by bulk tanker, and no mixing takes place on site. It is equipped with two offloading and storage facilities, and a redundant, decommissioned and decontaminated flake cyanide storage and associated make-up facility. Design drawings for the cyanide off-loading and storage area were sighted, along with satisfactory inspection reports by the cyanide manufacturer's technical representative. The leach offloading and storage area and the elution cyanide storage area were designed and located on concrete and away from people and surface waters, away from incompatible materials, and built with materials appropriate for use with cyanide and high pH conditions. Leach cyanide storage unloading takes place on a concrete area, designed to contain seepage and drain to the cyanide storage. The elution cyanide storage is equipped with a concrete pad for offloading, draining to a sump, from which the solution is pumped to the reagent area bund. The concrete in the treatment offloading and elution offloading areas is competent. All cyanide storage tanks in both leach and elution areas are equipped with differential pressure level indicators. High level alarms (sounding at 85%) are installed, alarming at the offloading site and in the control room as well as being interlocked with the offloading air supply. The leach offloading cyanide tanks are placed inside a concrete bund and placed on solid concrete tank foundations and the elution cyanide storage tanks are placed on plinths and placed over a concrete bund area, lined with chemical resistant bricks. Both the Leach cyanide storage area and the elution

cyanide storage areas are fenced and locked. Both areas are within the plant security area with access control at the main gate.

Standard of Practice 3.2: Operate unloading, storage and mixing facilities using inspections, preventive maintenance and contingency plans to prevent or contain releases and control and respond to worker exposures.

X in full compliance with

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

Basis for this Finding/Deficiencies Identified:

Only liquid cyanide is used which is delivered via bulk tanker to the storage tanks. The offloading procedure covering both areas is detailed, spelling out PPE requirements, use of a buddy in the process, and clearly sequenced to prevent spillages and accidental releases during off-loading.

4. OPERATIONS: Manage cyanide process solutions and waste streams to protect human health and the environment.

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

X in full compliance with

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

Basis for this Finding/Deficiencies Identified:

The site has 76 cyanide specific procedures in place. These are supported by the Harmony Gold Free State Operations Tailings Dams Mandatory Code of Practice (COP) for Mine Residue Deposits, and 12 procedures for TSF (Tailings Storage Facility) operations. Assumptions and operating parameters covering freeboard, and cyanide concentrations are clearly stated. Routine shiftly, daily, weekly, monthly, quarterly and annual inspection reports, legal inspections, and checklists in the plant and TSF were sampled to check the effectiveness of systems and ensure that proactive and reactive management takes place.



An Excel driven, spreadsheet-based, Planned Maintenance System (PMS) covering the reagent strength cyanide equipment and other cyanide equipment was used until December 2011, after which a new computerised PMS system, the DMS, was implemented in January 2012, replacing the excel spreadsheet system. Records from both systems were sampled and reviewed. Quarterly technical inspections with consultants of the TSF facilities are undertaken to ensure integrity and safety in addition to the monthly TSF inspections involving the site staff and TSF contractors. A change management procedure covering health, safety and environment is in place and operational.

There is a probabilistic water balance in place, and no scenario has been identified where the need has been highlighted to shut down the plant to prevent overtopping as the plant operates in a water deficit situation. The plant will be stopped temporality for maintenance when inspections identify that repairs are required. Standard stopping and starting procedures are used in conjunction with pre work inspections. There is no need for emergency power to prevent cyanide releases as all solutions and slurries require pumping and the process plant does not use gravity flow in the design. All spillages will be contained in bunded areas when power trips occur.

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

X in full compliance with

- The operation is**
- in substantial compliance **with Standard of Practice 4.2**
 - not in compliance with
 - not subject to

Basis for this Finding/Deficiencies Identified:

The plant treated 50% waste and rehabilitation material from demolished plants and old waste sites mixed with Reef from underground Mining till November 2010, when reef treatment was terminated. A change in feed sources occurred in 2010 when only waste and rehabilitation material was treated in conjunction with waste rock dumps. Currently, the plant is processing waste rock dumps only with plans in hand to treat old plant demolition material in the near future.

A range of ore and feed characterisation and test work was done on: Dredging dam sample diagnostic leach (Cyanide consumption test work on the dredging material samples indicate significant cyanide consumption), test work on the combined feed to the plant was done indicating high cyanide consumer presence, test work on the various clean-up sites were conducted indicating various cyanide consumption figures for each feed source type, and bottle roll results from samples on the various reclamation and clean-up sources from Aug 2011 to 8 October 2013. A pre-aeration test program was conducted, "Investigation of the effect of pre aeration on gold recovery by cyanidation process", concluding that the material requires pre aeration using oxygen. The plant has

been treating increasingly marginal, variable and difficult waste, reclamation and demolition sources making cyanide management complex and often reactive.

The strategy to control cyanide addition of the variable ore sources is to use automatic cyanide addition control to the leach feed. Use of on-line free cyanide measurement and control technology was tested and implemented. Ratio control with the dry tonnage outputs from the leach feed mass flow was tested, but found to be ineffective. The plant uses a TAC 1000 cyanide measurement and control system, coupled to flow control valves controlling addition rates at the thickener underflow box feeding the leach. A WAD 1000 analyser is installed on the residue tank - results are used to manually adjust cyanide control settings of the TAC 1000 if the WAD CN increases above parameters in tailings. An occurrence book is used to record cyanide parameter changes and reasons for the change.

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

X in full compliance with

The operation is in substantial compliance with **Standard of Practice 4.3**

 not in compliance with

Basis for this Finding/Deficiencies Identified:

A spreadsheet-based probabilistic water balance is in place which includes the return water dams, slimes dam and plant. Information is included on rainfall, storm events, and solution deposition. Rainfall is measured using rain gauges on the TSF and a weather station at the plant, and evaporation data used was provided by the South African Weather Service. Phreatic surfaces review and stability analyses are done annually, where TSF COP parameters, including pool levels, are reviewed. The TSF pool levels and freeboard are measured daily. The return water dam levels are monitored by the Harmony Environmental Department and reported to the plant. The plant then controls the pond levels following the weekly reports. The Plant inspects the return water dams weekly.

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 plant changed from an ore treatment plant to treating various waste, reclamation, environmental clean-up and waste rock sources which forms part of the environmental clean-up strategy. The sources vary significantly in terms of treatment characteristics, including cyanide speciation and consumption. The WAD cyanide measured on-line at the CIP tank indicate occasional exceedances, mostly in the band between 50 and 70 mg/l WAD cyanide. These exceedances were traced to the variable ore source and feedstock mix fed to the plant. No wildlife mortalities were recorded during the 3 year period under review. The return water dam and supernatant pool samples indicate WAD cyanide values below 50 mg/l WAD cyanide. The plant has been treating waste rock (which is more manageable and predictable) since July 2013.

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

X in full compliance with

The operation is in substantial compliance with **Standard of Practice 4.5**

 not in compliance with

Basis for this Finding/Deficiencies Identified:

No direct discharge to surface water takes place. This was verified during site inspection. The closest stream (Swallows) is approximately 800m away and physical inspections do not show any indirect seepage into the stream. The stream was sampled quarterly in 2011 and 2012 and monthly since 2013. Downstream of the TSF, values for 2011 and 2012 showed all samples are below limits of detection of WAD cyanide (0.25mg/l). The analytical method was changed and values for 2013 were below 0.02 mg/l WAD cyanide indicating that no indirect cyanide discharges occurred to the stream.

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 TSF is equipped with under drains and toe drains and paddocks and cut off solution drains are also in place. The return water dams are protected by cut off trenches. Lanes of trees are planted around the TSF to assist with dewatering of the area around the TSF.

Boreholes are monitored as per the South African Department of Water Affairs requirements. No jurisdictional identified use or actual beneficial uses of ground water exist. The land surrounding the plant and TSF is mine property with no farming activities. Residents in the area use piped water supplied by the local municipality. However, the jurisdiction has set a general standard (DWA) of 0.5ppm free cyanide as the limit for groundwater levels. Boreholes are located down gradient of the TSF and are monitored and sampled monthly. Results since certification show all have been below the 0.5 mg/l free cyanide jurisdictional standard.

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

X in full compliance with

The operation is in substantial compliance with **Standard of Practice 4.7**

 not in compliance with

Basis for this Finding/Deficiencies Identified:

All tanks are placed inside or over concrete surfaces and bunds. The leach cyanide tanks are placed on ring beams with a solid concrete layer below the ring beams, serving as an impervious layer. The CIP tanks are placed over a bund, on concrete bases. Slurry tank bases are rubber lined for protection against erosion due to the draft tubes. The elution primary and secondary tanks are placed on solid concrete bases. All secondary containments are designed with sumps and pumps returning water and spillages back to the circuit and are sized to hold a volume greater than that of the largest tank and any piping draining back to the tank and the design storm event. Any spillage from the roads outside the bund areas is be routed to the return water dams at the TSF via drains, from where the solution is returned to the process. All TSF lines are steel pipes, lined with concrete as a special measure to prevent pipe failures and leaks. The pipe stations were changed, with the valves situated over the paddocks to contain any leakage. All pipes are routed over concrete and spillages are routed to either bunds or return water dams. The leach feed pipe is constructed from Nickel Chromium alloy and all other pipes are rubber lined as a measure to prevent pipe leaks. The cyanide line to the dosing point is equipped with secondary containment draining back to the cyanide storage bund. The PMS system includes cyanide pipeline inspections. Tanks are constructed of mild steel, cyanide pipelines are mild steel, welded flange types and slurry lines are mild steel flanged pipes, rubber lined, and concrete lined.

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:

Inspections by appropriately qualified persons were conducted on the tanks and structures in 2012. The report classified repairs into emergency, regular and maintenance categories. The cyanide facilities did not indicate any repairs that present an operational or safety risk, implying that the operations can be operated as fit for purpose and within established parameters consistent with the Code's Principles and Standards of Practice. Quarterly TSF inspections and reports with review from the geotechnical consultants, including a professional consulting civil engineer, were sighted and sampled. Annual TSF Audits for 2010, 2011 and 2012 were sighted and reviewed indicating no problems.

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

X in full compliance with

The operation is in substantial compliance with **Standard of Practice 4.9**
 not in compliance with

Basis for this Finding/Deficiencies Identified:

Procedures for environmental monitoring (including sample preservation and chain of custody procedures and documenting of sampling conditions) of surface water and borehole water, developed by a competent person, were sighted and checked. There are no discharges to surface water but boreholes are in place up and down stream of the plant. Surface water sampling is done monthly and borehole sampling bi annually (by the Harmony Group environmental department). Wild life is monitored daily for any mortalities. Frequencies are deemed adequate to identify changes.

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

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

X in full compliance with

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

not in compliance with

Basis for this Finding/Deficiencies Identified:

A decommissioning procedure and schedules for a decommissioning plan for Harmony Central Plant are in place, including the sequence and the scheduling of decommissioning. The decommissioning procedure is reviewed annually.

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

X in full compliance with

The operation is

in substantial compliance with **Standard of Practice 5.2**

not in compliance with

Basis for this Finding/Deficiencies Identified:

The Closure cost assessment for Harmony Gold Mining Company Limited 2013, Harmony Operations, dated June 2013 (Virginia Operations), which includes Central Plant, indicates an allocation of R 1,800,282 for third party cyanide decommissioning. The Harmony Gold Mining Company summary status of the rehabilitation trusts as at 30 June 2013 totalled R516,881,586. The rehabilitation trusts are established by legal requirement in terms of the Minerals and Petroleum Resources Development Act and are updated annually.

6. WORKER SAFETY: Protect workers' health and safety from exposure to cyanide.

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

X in full compliance with

The operation is

in substantial compliance with **Standard of Practice 6.1**

not in compliance with

Basis for this Finding/Deficiencies Identified:

The site has 76 cyanide specific procedures in place. These are supported by the Harmony Gold Free State Operations Tailings Dams Mandatory Code of Practice (COP) for Mine Residue Deposits, and 12 procedures for TSF (Tailings Storage Facility) operations. Assumptions and operating parameters covering freeboard, and cyanide concentrations are clearly stated. The procedures indicates PPE requirements and appropriate pre-work inspections. Routine shiftly, daily, weekly, monthly, quarterly and

annual inspection reports, legal inspections, and checklists in the plant and TSF were sampled to check the effectiveness of systems and ensure that proactive and reactive management takes place.

An Excel driven, spreadsheet-based, Planned Maintenance System (PMS) covering the reagent strength cyanide equipment and other cyanide equipment was used until December 2011, after which a new computerised PMS system, the DMS, was implemented in January 2012, replacing the excel spreadsheet system. Records from both systems were sampled and reviewed. Quarterly technical inspections with consultants of the TSF facilities are undertaken to ensure integrity and safety in addition to the monthly TSF inspections involving the site staff and TSF contractors. A change management procedure covering health, safety and environment is in place and operational.

Worker input comes from risk assessment workshops which include all people involved in the specific job, as well as the safety representative. Planned Task Observations (PTO) allows for comments by the person observed. Inputs also come from monthly health and safety meetings and monthly safety representatives meetings.

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

X in full compliance with

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

Basis for this Finding/Deficiencies Identified:

Current pH settings are to control at 10.5. The pH is controlled by lime addition to the thickener distribution tower. Lime addition is controlled via pH measurement in the thickener overflow. The TAC 1000 at no 1 Leach tank also measures pH. Low pH (<10.5) alarms on the SCADA in the control room. Lime addition to increase the pH is done manually in the case of low level alarms. The plant uses 7 PAC7000 personal HCN gas monitors and one PAC7000 personal HCN gas monitor is issued to the TSF team Leader. Fixed monitors are used at the elution cyanide storage, leach cyanide storage, the cyanide dosing, and elution section. Appropriate calibration records for fixed and personal monitors were sighted. Hot spot surveys were conducted by the Harmony Occupational Hygienist in 2013, 2012, and 2011, all showing nil gas levels. Safety showers and eye washes with diffusers are located at appropriate places throughout the plant and inspected regularly. The use of dry powder fire extinguishers was confirmed during site inspections. Fire extinguishers are checked and maintained monthly by specialist contractors.

The plant uses colour coding and stickers with direction flow for reagent strength cyanide lines and other lines and labelling was observed. Warning signs, in the form of concrete signs warning of poisonous water at the TSF access points, have been erected. English (the working language on site) is used together with symbolic signage. Eating and

drinking is only allowed in designated areas. MSDSs, as well as cyanide first aid procedures are readily available on site in English. Accident and incident reporting and investigation procedures, based upon the site safety reporting requirements, were found to be in place and effective.

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

X in full compliance with

The operation is in substantial compliance with **Standard of Practice 6.3**
 not in compliance with

Basis for this Finding/Deficiencies Identified:

Emergencies are communicated by radio and telephone. Cyanide man down alarms are also in place. A fully equipped cyanide emergency trailer is available. Cyanide antidote is available in fridges at the cyanide main storage first aid room and elution storage, and the elution offloading area is equipped with emergency equipment in a container. Uninterrupted Power Supply (UPS) units are installed on alarms which sound if power is lost on a fridge to ensure antidote Tripacks are stored as per manufacturers' directions. The cyanide equipment is regularly checked and tested and mock drills are held regularly on site. The Training Officer records lessons learned from drills and revises training, as appropriate.

Plant employees working with cyanide receive the basic cyanide first aid training and the staff working closest to the incident react to the cyanide alarm. The emergency response team responds to cyanide emergencies as 1st, 2nd, 3rd and 4th responders. The Harmony Ernest Oppenheimer Mine Hospital was confirmed to be able to treat cyanide emergencies and Hospital staff are given cyanide awareness training by the Harmony No 1 Plant training department annually. Emergency exercises are conducted periodically from the plant to the hospital and additional cyanide drill training is done monthly and documented. Netcare 911 is the contracted ambulance service undertaking patient transport.

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 plant has developed site-specific emergency scenarios and responses for its cyanide emergency plan. The cyanide emergency plan combines existing procedural responses and emergency provisions to deal with the various scenarios and includes and identifies the emergency response team and coordinators who are on all shifts. These preparations are regularly reviewed in the light of changes, mock drill learning points and employee feedback.

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

X in full compliance with

The operation is

in substantial compliance with **Standard of Practice 7.2**

not in compliance with

Basis for this Finding/Deficiencies Identified:

The workforce is involved in the Cyanide Emergency Plan process through safety meetings, training and emergency drills. The community is not directly involved in the Plan but is informed on its contents during dialogue sessions. Drills are used to involve hospital and ambulance staff in planning processes. Two Meetings with Netcare 911 in 2012 and 2013, attended by all Harmony Plant Managers and Safety Officers, discussed cyanide issues such as cyanide emergencies and cyanide emergency equipment.

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 Cyanide Emergency Plan details clear duties, roles and responsibilities for the various emergency scenarios. The control room operator is the primary response coordinator, authorised to call ambulance, security, and plant management. The emergency equipment inventory was checked and site inspections confirmed availability and readiness. The Plan includes contact references (telephone, and cell phone) of internal and external resources for the various scenarios, particularly with detail where external resources and skills might be needed. Also identified are the Emergency

Response Team and their training requirements as per the training matrix. Periodic drills involving internal and external stakeholders ensure that roles and responsibilities are understood and clearly implemented.

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

X in full compliance with

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

Basis for this Finding/Deficiencies Identified:

The Cyanide Emergency Plan includes details for appropriate emergency notification and reporting (internal and external) and the call-out procedure and contact information lists which are updated regularly. Media communication is dealt with in the Plan.

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

X in full compliance with

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

Basis for this Finding/Deficiencies Identified:

The environmental monitoring of surface water, liquid cyanide spillage, and use of ferrous sulphate procedures cover clean-up and remediation relating to releases, pipeline failures and spills, and provision of drinking water, as appropriate to the site-specific identified scenarios. Use of neutralization processes and materials is clearly covered, as is disposal of contaminated materials and the use of treatment chemicals such as ferrous sulphate in surface water which is prohibited.

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

X in full compliance with

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



Basis for this Finding/Deficiencies Identified:

The Plan is required to be reviewed annually, following incidents and emergency drills or when new information regarding cyanide becomes available. The report of a drill which included a cyanide spill and cyanide related injury was sighted. Evidence was sighted of learning points emerging from the various cyanide man-down drills.

8. TRAINING: Train workers and emergency response personnel to manage cyanide in a safe and environmentally protective manner.

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

X in full compliance with

The operation is in substantial compliance with **Standard of Practice 8.1**

 not in compliance with

Basis for this Finding/Deficiencies Identified:

All plant personnel inside the plant fence (including security) are trained in basic cyanide awareness. The training matrix includes a flagging system to timeously indicate need for training and refreshers. This was confirmed during interviews with staff. Refresher training is done annually, based on schedules using a training shift system (which is also used for routine update training). Selected employees were checked in interviews on their understanding of cyanide hazards, first aid and emergency response and this was further verified through checking of their training records. Records are retained for 40 years on the Plant, after which the records are sent to the central Harmony archive.

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:

Task refresher training and corrective action is only undertaken should observation show that the incumbent is not complying with the Standard Task Procedures.
The Plan is required to be reviewed annually, following incidents and emergency drills or when new information regarding cyanide becomes available. The report of a drill which

included a cyanide spill and cyanide related injury was sighted. Evidence was sighted of learning points emerging from the various cyanide man-down drills.

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 plant personnel are trained in cyanide first aid. The dayshift cyanide / fire emergency team is trained in cyanide first aid and basic firefighting and the team leader in advanced firefighting. Trained cyanide emergency team members are in place on every shift with 1st, 2nd, 3rd, 4th responders roles defined in the procedure. Routine full cycle drills, as well as plant drills (using spare shift), are conducted. The Emergency responders are involved in mock drills, and training is given to the Ernest Oppenheimer Hospital and Netcare 911 ambulance and Paramedic staff. There are no community members in the area of the Mine and thus are not involved in the Cyanide Emergency Plan. Periodic mock drills are undertaken and training personnel attend these drills and formally evaluate response and performance. Refresher training is done annually. Records are retained for 40 years on plant, after which the records are sent to a central archive.

9. DIALOGUE: Engage in public consultation and disclosure.

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

X in full compliance with

The operation is in substantial compliance with **Standard of Practice 9.1**

 not in compliance with

Basis for this Finding/Deficiencies Identified:

Dialogue meetings are two-way dialogue sessions involving both dissemination of information and the answering of questions on cyanide. A Regional cyanide presentation by Harmony Regional Services and Management was given, covering Matjabeng Municipality, SASOL, Emergency services, and Government, in March 2012. A Cyanide Awareness presentation to Harmony Secondary School was also given in March 2012. A presentation on cyanide awareness was given in February 2012 at the Harmony Country Club to community members, Department of Health officials and medical responders and

a cyanide presentation was given to Medical Doctors at the Oppenheimer Hospital in May 2012.

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

X in full compliance with

The operation is in substantial compliance with **Standard of Practice 9.2**

 not in compliance with

Basis for this Finding/Deficiencies Identified:

Dialogue meetings are two-way dialogue sessions involving both dissemination of information and the answering of questions on cyanide. A Regional cyanide presentation by Harmony Regional Services and Management was given, covering Matjabeng Municipality, SASOL, Emergency services, and Government, in March 2012. A Cyanide Awareness presentation to Harmony Secondary School was also given in March 2012. A presentation on cyanide awareness was given in February 2012 at the Harmony Country Club to community members, Department of Health officials and medical responders and a cyanide presentation was given to Medical Doctors at the Oppenheimer Hospital in May 2012.

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:

Posters are used to communicate cyanide issues and fliers have also been developed which explain cyanide and its uses. Owing to literacy problems, most of the cyanide presentations have to be given verbally in the predominant local languages of Sotho and Xhosa. Copies of presentations were made available to stakeholders who requested them. Reporting on incidents has not been done because there have been no incidents. Injuries must be reported to the Department of Minerals Resources who do not necessarily make the information publically available. Similarly, spills and releases must be reported to the Department of Water Affairs and Environment. Transport related incidents are reported by Sasol Polymers and the transporter, Tanker Services, through their own reporting mechanisms.

The Harmony Group communication policy is followed. Cyanide incident response would need to be prepared by the Corporate Communications Department. The Harmony

website contains an item, "Harmony and the Cyanide Code". The Cyanide Code is mentioned in the Sustainable Development Report, p124 (2012). Information on significant cyanide exposures and releases would be made available, after appropriate investigations, on the company website (www.harmony.co.za) and via the annual Sustainable Development Report.

