ICMI GOLD MINE RECERTIFICATION AUDIT
- SUMMARY AUDIT REPORT

Harmony Central Gold Plant

Submitted to:
International Cyanide Management Institute,
1400 I Street, NW, Suite 550
Washington, DC 20005,
USA

Harmony Central Gold Plant
South Africa

Distribution:
1 Copy – Harmony Gold Mining (Pty) Ltd
1 Copy - ICMI
# Table of Contents

1.0 SUMMARY AUDIT REPORT FOR GOLD MINING OPERATIONS ................................................. 1  

SUMMARY AUDIT REPORT ........................................................................................................ 2  
  Auditors Findings .............................................................................................................. 2  
  Name of Other Auditors ................................................................................................. 2  
  Dates of Audit .................................................................................................................. 2  

PRINCIPLE 1 – PRODUCTION ................................................................................................. 3  

PRINCIPLE 2 – TRANSPORTATION ....................................................................................... 3  

PRINCIPLE 3 – HANDLING AND STORAGE ......................................................................... 6  

PRINCIPLE 4 – OPERATIONS .............................................................................................. 8  

PRINCIPLE 5 – DECOMMISSIONING ............................................................................... 17  

PRINCIPLE 6 – WORKER SAFETY .................................................................................... 18  

PRINCIPLE 7 – EMERGENCY RESPONSE ............................................................................ 22  

PRINCIPLE 8 – TRAINING ............................................................................................... 27  

PRINCIPLE 9 – DIALOGUE ............................................................................................... 30  

November 2017
1.0 SUMMARY AUDIT REPORT FOR GOLD MINING OPERATIONS

Name of Cyanide User Facility: Harmony Central Plant
Name of Cyanide User Facility Owner: Harmony Gold Mining Company Ltd
Name of Cyanide User Facility Operator: Harmony Gold Mining Company Ltd
Name of Responsible Manager: Teboho Tlhobo, Plant Manager
Address: PO Box 1, Glen, Harmony 9435
Country: South Africa
Telephone: +27 (0)57 804 6704
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2.0 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.
ICMI CYANIDE RE-CERTIFICATION AUDIT - SUMMARY REPORT

SUMMARY AUDIT REPORT
Auditors Findings

☒ in full compliance with

☐ in substantial compliance with

☐ not in compliance with

Harmony Central Gold Plant is:

The International Cyanide Management Code

Audit Company: ESC Afrika
Audit Team Leader: Ed Perry, Lead Auditor
Email: escafrka@gmail.com

This operation has experienced compliance problems during the previous three-year audit cycle which are discussed in this report under Standard of Practice 6.2 of the International Cyanide Management Code Verification Protocol for Gold Mine Operations.

Name of Other Auditors
Marie Schlechter, ICMI pre-certified Mine Technical Specialist

Dates of Audit
The Re-certification Audit was undertaken between 12 June 2017 and 15 June 2017.

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.

Harmony Central Gold Plant
Name of Facility

Signature of Lead Auditor
Date

25 November 2017
PRINCIPLE 1 – PRODUCTION

Encourage Responsible Cyanide Manufacturing by Purchasing from Manufacturers that 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.

☑ in full compliance with

☐ in substantial compliance with Standard of Practice 1.1

☐ not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 1.1 to 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's contract with the cyanide manufacturer (Sasol Polymers) requires that the cyanide be produced at a facility that has been certified as being in compliance with the Code.

Observed: Agreement for the Supply and Delivery of Sodium Cyanide entered into between Harmony Gold Mining Company Limited and Sasol Polymers a Division of Sasol Chemical Industries LTD, dated 31 March 2014 prior to this there was a similar agreement dated 18 January 2010.

SASOL Polymers is certified to be fully compliant with the ICMi Cyanide Code. SASOL Polymers recertification is dated 29 March 2016 with the prior recertification being dated 7 May 2013.

Cyanide is purchased directly from the manufacturer namely Sasol Polymers South Africa.
PRINCIPLE 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.

☑ in full compliance with

The operation is □ in substantial compliance with Standard of Practice 2.1

☐ not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 2.1 to establish clear lines of responsibility for safety, security release prevention, training and emergency response in written agreements with producers, distributors and transporters.

There is a written agreement, between the operation, the cyanide producer (Sasol), and transporter (Tanker Services).

Memorandum of Agreement for the Off-loading of Liquid Sodium Cyanide between Tanker Services Food and Chemicals Division and Harmony Gold Mining Company Limited.

Dated: 28 March 2017 (signed by Tanker Services and Harmony).

These agreements designate responsibilities for the following:

a) Packaging as required by the United Nations for international shipments and by the political jurisdiction(s) the shipment will pass through.

b) Labelling in languages necessary to identify the material in the political jurisdiction(s) the shipment will pass through, and as required by these jurisdiction(s) and by the United Nations (for international shipments).

c) Storage prior to shipment.

d) Evaluation and selection of routes, including community involvement.

e) Storage and security at ports of entry.

f) Interim loading, storage and unloading during shipment.

g) Transport to the operation.

h) Unloading at the operation.

i) Safety and maintenance of the means of transportation (e.g. aircraft, vessels, trains, etc.) throughout transport.

j) Task and safety training for transporters and handlers throughout transport.

k) Security throughout transport.

l) Emergency response throughout transport.

A similar agreement was in place prior to this dated 12 April 2013.

The agreement between Tanker Services and Harmony does not provide for any of the services to be subcontracted.
Standard of Practice 2.2: Require that cyanide transporters implement appropriate emergency response plans and capabilities and employ adequate measures for cyanide management.

☑ in full compliance with

☐ in substantial compliance with Standard of Practice 2.2
☐ not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 2.2 to require that cyanide transporters implement appropriate emergency response plans and capabilities and employ adequate measures for cyanide management.

The operation’s contract with the cyanide transporter requires that the transporter be certified under the Code. Section 6.3 of the contract between Tanker Services and Harmony states that as Harmony Gold is a signatory to the ICMI it is compulsory for Harmony Gold to make use of an ICMI accredited transporter. Tanker Services Specialised Products Division - recertified 17 July 2015 with the prior certification dated 13 December 2011.

Chain of Custody Records state that Tanker Services delivers liquid Sodium Cyanide from the Sasol manufacturing facility in Sasolburg, South Africa directly to Harmony Central Plant, Welkom, South Africa.
PRINCIPLE 3 – HANDLING AND STORAGE
Protect Workers and the Environment during 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.

- [ ] in full compliance with
- [ ] in substantial compliance with
- [ ] not in compliance with

Standard of Practice 3.1

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 3.1 to 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.

Sodium Cyanide Bulk Storage Facility Technical Inspection Reports are conducted annually by Sasol Base Chemicals Supply Chain (Cyanide Manufacturer).

The Cyanide unloading and storage areas are located inside the Central Gold Plant, which has security and access control. The Cyanide storage areas are locked.

Unloading and storage areas are located away from people and surface water. The cyanide storage tanks are located separately from incompatible materials such as acids, strong oxidizers and explosives. All of the cyanide storage tanks are fitted with ventilation pipes.

The liquid cyanide is unloaded on a concreted bunded surface. The bund is constructed to contain any spilled cyanide. Any spilled cyanide can flow back into the storage bund for the cyanide tanks.

Leach cyanide storage tanks: there is an automated pump which pumps the liquid to the Emergency Sump where the slurry is dosed with cyanide.

Elution cyanide storage tanks: there is an automated pump which pumps the liquid into the Cyanide-Caustic Make-up Tank.

Cyanide mixing and storage tanks are located on concrete plinths within concrete bunded areas that can prevent seepage to the subsurface.

A high level alarm is sounded in the Central Control Room when the cyanide tank level reaches 90%. An automatic control valve is inserted in the off-loading compressed air line that shuts off the offloading air if the tank volume in both tanks reaches 90%.
Standard of Practice 3.2: Operate unloading storage and mixing facilities using inspections, preventative maintenance and contingency plans to prevent or contain releases and control and respond to worker exposures.

☒ in full compliance with

☐ in substantial compliance with
☐ not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 3.2 to operate unloading storage and mixing facilities using inspections, preventative maintenance and contingency plans to prevent or contain releases and control and respond to worker exposures.

Liquid cyanide is delivered in bulk tankers and no containers are used. The pipe and valves are and are rinsed following offloading of liquid cyanide, which was observed by the auditors.

The operation has developed and implemented plans or procedures to prevent exposures and releases during cyanide unloading and mixing activities including the following:

CTP 42A Liquid Cyanide Off-Loading, Rev 01, November 2012.

The procedure provides instructions on the checking and operating of valves and couplings, in specific sequence, during the off-loading of liquid cyanide and clean-up of any spills.


The procedure prescribes the actions to be taken, PPE to be worn in the event of any cyanide spillage during off-loading activities. Describes the actions to be taken for: -normal spills under controlled conditions; and abnormal spills;

CTP 06 - The "Buddy" System, Rev 01, September 2012.
PRINCIPLE 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 including contingency planning and inspection and preventative maintenance procedures.

☒ in full compliance with

☐ in substantial compliance with Standard of Practice 4.1

☐ not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 4.1 to implement management and operating systems designed to protect human health and the environment including contingency planning and inspection and preventative maintenance procedures.

The site does not have heap leach facilities or processing ponds.

The plant has 78 procedures. In addition, there are the following:


There are 13 operating procedures for the TSF in addition to the following:


The operation has plans or procedures that identify the assumptions and parameters on which the facility design was based and any applicable regulatory requirements (e.g., freeboard required for safe pond and impoundment operation; the cyanide concentrations in tailings on which the facility’s wildlife protection measures were based) as necessary to prevent or control cyanide releases and exposures consistent with applicable requirements including the following.

Harmony Gold Mining Company Limited Central Plant, DMR Mine Code 0261N, Mandatory Code of Practice on Cyanide Management, Code of Practice Number 8, Rev 09, June 2017. "Discharge points of cyanide must enter the process stream at a point where the pH is maintenance above 9.8 and which is well ventilated at all times. Regular pH monitoring must be conducted to ensure the pH does not drop below 9.8." The pH level is measured at the Leach if the pH is too low then it is automatically adjusted with lime in the thickeners.

CTP 32 - High Cyanide Levels in Residue Slime, Rev 01, November 2012. WAD cyanide readings not to exceed 50 ppm in the residue slime at all times. An alarm is activated in the Central Control room when WAD cyanide levels reach 45ppm in the residue slime.
CTP 65 - When High Storage Alarm is Sounded, Rev 01, December 2012. A high level alarm is sounded in the Central Control Room when the cyanide tank level reaches 90%. An automatic control valve is inserted in the off-loading compressed air line that shuts off the offloading air if the tank volume in both tanks reaches 90%.

Harmony Code of Practice for Mine Residue Deposits for Mine Residue Deposits, MRD 001, Rev 11, 20 December 2016. The minimum legal freeboard must be equal to the water level rise that is caused by a 1:50 year 24 hr storm event plus an additional 800mm as specified by regulation GN 704 form the National Water Act, Act 36 of 1998.

The operation has plans or procedures that describe the standard practices necessary for the safe and environmentally sound operation of the facility including the specific measures needed for compliance with the Code, such as inspections and preventative maintenance activities including the following:

CTP 14 - Cyanide Facility Inspections, Rev 01, October 2012. The states the following inspections must be conducted: Pre-Use Inspections; Shift and Daily Inspection; Monthly Inspections; Quarterly Inspection.

CTP 37 - Inspection of level indicators and changing / replacing of instrument on Cyanide Storage Tanks, Rev 01, November 2012.

CTP 38 - Inspecting vertical spindle pump inside cyanide bund, Rev 01, November 2012.

CTP 39 - Inspection of a Peristaltic Cyanide Pump, Rev 01, November 2012.

Inspections are undertaken as part of the planned maintenance process. The auditors observed the inspection records.

The operation has a procedure to identify when changes in a site's processes or operating practices may increase the potential for the release of cyanide and to incorporate the necessary release prevention measures.

CTP 08 - Management of Change, Rev 01, September 2012.

The procedure describes the process to follow when any change, be it temporary or permanent, has been identified in the form of alteration, addition, demolition, decommissioning, new construction and or process parameter changes. The directive requires the initiator to identify and conduct the following: Area of change; current, proposed situation, purpose of change and expected outcome; Hazard Identification Risk Assessment; Hazard Operability Assessment; Failure Mode Effects Criticality Analysis; Task and Process Analysis; Management Plant; Risk Management; Sign off by Plant Engineer, Metallurgical Unit Leader, Full Time Health and Safety Steward, Plant Manager, Plant Safety Officer, Environmental Officer.

The operation has cyanide management contingency procedures for situations where there is an upset in a facility's water balance, when inspections and monitoring identify a deviation from design or standard operating procedures, and/or when a temporary closure or cessation of the operation may be necessary including the following:

CTP 01 - Stopping and starting Central Plant Harmony Central Plant, Rev 1, June 2017.

CTP 09 - Change pipes in Cyanide Area, Rev 01, September 2012.

CTP 07 - Change cyanide pump, Rev 01, September 2012.

CTP 10 - Change suction and delivery valves in cyanide storage area, Rev 01, September 2012.

CTP 13 - Cyanide Dosing Amendments, Rev 01, October 2012.

Harmony Central Gold Plant
Name of Facility

Signature of Lead Auditor

25 November 2017
Date
ICMI CYANIDE RE-CERTIFICATION AUDIT - SUMMARY REPORT

CTP 56 - Respond to Abnormal and Emergency Conditions, Rev 01, December 2012. Residue Tank Overflowing, Residue Pipeline Burst.

The operation inspects cyanide facilities on an established frequency sufficient to assure and document that they are functioning within design parameters.

The operation undertakes inspections at the unloading, storage, mixing and process areas.

Inspections are documented, including the date of the inspection, the name of the inspector, and any observed deficiencies. Corrective actions are documented either directly or in the form of a work request number. The work request details the nature and date of the corrective action. Records are retained.

Preventative maintenance programs are implemented and activities documented to ensure that equipment and devices function as necessary for safe cyanide management. The planned maintenance system was computerised in 2012. This system includes scheduled maintenance for operational equipment. Job cards are automatically issued for the inspections, which are then planned in Monday meetings for the coming week. Job cards are also raised where ad hoc maintenance is required by the plant inspections or observations from foremen and control room.

The operation will prevent unintentional releases and exposures in the event its primary source of power is interrupted. The Plant has a back-up generator that powers the leach agitators, CIP agitators, emergency lights, thickener rakes and underflow pumps. In the event of a power failure, the cyanide pumps stop and the cyanide remains in the line. The Residue Tank is gravity fed from the CIP tanks. During a power failure, the residue tank will overflow into the bund and then pumped back once power is restored. The bund is sufficient to contain the overflow of the tank. The back-up generator is maintained as part of the planned maintenance programme and tested on a regular basis.

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

☑ in full compliance with

☐ in substantial compliance with

☐ not in compliance with

Standard of Practice 4.2

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 4.2; introducing management and operating systems to minimise cyanide use, thereby limiting concentrations of cyanide in mill tailings.

The operation conducts a program to determine appropriate cyanide addition rates in the mill and evaluate and adjust addition rates as necessary when ore types or processing practices change cyanide requirements.

pH control is automatic by addition of lime in the Thickener feed. If the pH falls below 9.5 at the Leach, the Thickeners are automatically put on circulation until the pH is corrected. Weekly bottle roll tests are conducted weekly on the material received and treated. Monthly bottle roll tests are undertaken on a composite sample. Diagnostic Leaching is done on the plant head grade (before pumped to leach) and residue. Where necessary based on this information the set point is altered.

Any adjustments of the set point are recorded in the logbook.

Harmony Central Gold Plant
Name of Facility

Signature of Lead Auditor

25 November 2017
Date
The operation has evaluated various control strategies for cyanide additions. A TAC 1000 has been in place since 2003. The TAC 1000, set point is 90ppm. Manual titrations are done every 2 hours in the Leach Tank no. 1, 6 and Residue Tank.

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

☑ in full compliance with

☐ in substantial compliance with Standard of Practice 4.3

☐ not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 4.3 to implement a comprehensive water management programme to protect against unintentional releases.

The operation has developed a comprehensive, probabilistic water balance. Central Plant was using an excel spreadsheet for the water balance until November 2016 when a comprehensive probabilistic water balance for the site was produced by Jones and Wagener, engineering consultants. The water balance is updated monthly with actual figures measured on the inputs such as ore received, water used, tailings sent to TSF etc., except for the evaporation which has been established for the area. The water balance has the capability to update the available freeboard on the TSF and, RWDs, in order to predict an overtopping in the event of an 1:50 year and 1:100 year storm event.

The water balance includes the following:

Output of tailings from the Plant to the TSFs on a monthly basis. Consideration of a 1:50 year and 1:100 year storm event and predict the overflow from the plant storm water dam. Daily precipitation in captured and the monthly figure is included in the water balance. Historical rainfall figures have been obtained. Runoff from paved areas with high run-off, non-paved areas, clean areas draining to the plant etc. have been calculated for the plant area. Runoff from steep outer side slopes, where significant runoff is expected is recorded for the TSFs. Effects of potential freezing and thawing conditions are not applicable. Historical evaporation data has been included in the model from 1906. The model calculates the seepage from the TSF. There are no discharges to a surface water body. The water balance includes the phreatic level.

The water balance modelled the various rainfall events and the total return water and evaporation pond capacity including the operating levels showing that these are sufficient to prevent overtopping in case of power failures during the rainfall events.

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. The TSF is inspected on a daily, monthly, quarterly and annual basis.

The ponds and impoundments are designed and operated with adequate freeboard above the maximum design storage capacity determined to be necessary from water balance calculations. The quarterly and annual reports observed confirmed that the TSF and RWDs are operated with more than the required legal freeboard to prevent an overtopping. The Water Balance Model confirmed that if operated at the required freeboard, the TSF and RWDs have adequate capacity to prevent overtopping during a rainfall event.

The operation measures precipitation, compares results to design assumptions and revises operating practices as necessary. Rainfall data is obtained from the Welkom airport database, as well as Plant daily

Harmony Central Gold Plant
Name of Facility

Signature of Lead Auditor

25 November 2017
Date
rainfall measurements. Rainfall is recorded on a daily basis and updated monthly on the water balance. The Water balance indicates that 113mm in 24 hrs constitute a 1:50 year rainfall event and 146mm in 24 hrs a 1:100year event based on the minimum freeboard stipulated in the Water Balance model. The monthly measured freeboard was observed for 2015 and 2016 and this was greater than the assumption in the model.

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

☒ in full compliance with

☐ in substantial compliance with ☐ not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 4.4 to implement measures to protect birds, other wildlife and livestock from adverse effects of cyanide process solutions.

There is no heap leach currently being operated.

There are no open waters where WAD cyanide exceeds 50 mg/L. WAD cyanide therefore the operation has not needed to implement measures to restrict access by wildlife and livestock.

There was one exceedance in 2014, three in 2015, three in 2016, and two in 2017 where WAD cyanide exceeded 50 mg/L WAD cyanide at the deposition point. When an exceedance at the deposition point occurs, it is formally investigated to ascertain, where possible, the cause. If necessary the set point is adjusted and recorded in the log book.

Maintaining a WAD cyanide concentration of 50 mg/L or less in open water is effective in preventing significant wildlife mortality as no wildlife mortalities have been recorded since the last recertification audit.

The TSF is inspected on a daily, basis, which includes records of wildlife mortalities.

No wildlife mortalities have been recorded in the period since the last recertification audit.

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

☒ in full compliance with

☐ in substantial compliance with ☐ not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 4.5 to implement a comprehensive water management programme to protect against unintentional releases.

There are no direct or indirect discharges to surface water.

Harmony Central Gold Plant
Name of Facility

Signature of Lead Auditor

25 November 2017
Date
Surface water monitoring of the Swallows Stream, the closest water body to the RWDs, and the Sands River, the closest water body to the TSF were all below detection limit of 0.25 ppm.

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

☑ in full compliance with

☐ in substantial compliance with Standard of Practice 4.6

☐ not in compliance with

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

The operation is in full compliance with Standard of Practice 4.6 to implement measures designed to manage seepage from cyanide facilities to protect the beneficial uses of groundwater.

The operation implements specific water management or other measures to manage seepage to protect the beneficial uses(s) of groundwater beneath and/or immediately down-gradient of the operation.

The Central TSF Dam 23 has been equipped with under drains that drain into the solution trench. The solution trenches report to the RWD.

Water is decanted daily from the dam to minimise the amount of water available for seepage.

There is no numerical standard established by the applicable jurisdiction for WAD cyanide or any other species of cyanide in groundwater, therefore there are no compliance points below or down gradient of the gold plants or tailings facilities.

Weekly groundwater sampling is conducted at 6 boreholes upstream and downstream of the operations. There were occasional instances of WAD cyanide being greater than the 0.25 ppm detection limit.

The operation does not use mill tailings as underground backfill.

Seepage from the operation has not caused the cyanide concentration of the groundwater to exceed that necessary to protect its beneficial use. No remedial activity is needed to protect further degradation and restore beneficial use.

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

☑ in full compliance with

☐ in substantial compliance with Standard of Practice 4.7

☐ not in compliance with

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

The operation is in full compliance with Standard of Practice 4.7 to provide spill prevention or containment measures for process tanks and pipelines.

Spill prevention or containment measures are provided for all cyanide unloading, storage, mixing and process solution tanks. All the storage, mixing and solution tanks are built on concrete plinths.

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Harmony Central Gold Plant
Name of Facility

Signature of Lead Auditor

25 November 2017
Date

13
It was observed during the site assessment that all unloading, storage, mixing and process solution tanks are located in concrete bunds equipped with spillage sumps. All the bunds are in sound condition.

Both the cyanide off-loading areas (Treatment and Elution) are located on a concrete area, bunded. Any spilled material will drain to the storage bund spillage sumps.

Secondary containments for cyanide unloading, storage, mixing and process tanks are sized to hold a volume greater than that of the largest tank within the containment and any piping draining back to the tank, and with additional capacity for the design storm event.

Procedures are in place and are being implemented to prevent discharge to the environment or any cyanide solution of cyanide-contaminated water that is collected in the secondary containment area including the following:

CTP 33 - Hosing Spillage Containing Cyanide, Rev 01, November 2012.


Spillage from the Leach cyanide storage bund is pumped to the Emergency Sump to blend with the leach material. The spillage from the Elution cyanide storage bund is pumped to the Cyanide-Caustic Make-up tank. The CIL, CIP and Residue tank bund areas are equipped with spillage pumps that can pump any spillage back into their respective tanks.

There are no cyanide process tanks without secondary containment.

Spill prevention or containment measures are provided for all cyanide process solution pipelines to collect leaks and prevent releases to the environment. The cyanide dosing line has been placed in a launder in the area that it cross bare soil. The launder drains back to the Leach cyanide storage tank sump. The rest of the pipeline runs over concrete areas and bunds.

The Leach feed pipeline runs over cemented and bunded areas. Any spill of slurry from this pipeline could enter the stormwater system, which drains rainfall to the Return Water Dam via an unlined trench outside the Plant. In the event that the tailing pipeline fails or there is a spillage in the unlined trench the spillage will be cleaned up in accordance with CTP 69 - Cyanide-related Emergency Response Manual, Rev 01, December 2012.

There are no areas where the cyanide pipelines present a risk to surface water have been evaluated for special protection needs.

Cyanide tanks and pipelines are constructed of materials compatible with cyanide and high pH conditions. The tanks and pipelines are constructed from mild steel. The Tailings pipeline is manufactured from mild steel and lined with concrete.

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.

- in full compliance with

☐ in substantial compliance with Standard of Practice 4.8

☐ not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

Harmony Central Gold Plant
Name of Facility

Signature of Lead Auditor

25 November 2017
Date

14
The operation is in full compliance with Standard of Practice 4.8 to implement quality control/quality assurance procedures to confirm that cyanide facilities are constructed according to accepted engineering standards and specifications.

The initial certification audit found the following:

"No quality control/quality assurance records for the cyanide equipment were available."

Where there is no available quality control and quality assurance documentation or as-built certification for cyanide facility construction, an appropriately qualified person has inspected those elements of the facility involving cyanide and issued a report concluding that its continued operation within established parameters will protect against cyanide exposures and releases.

The previous audit observed the necessary inspections / report to confirm that the continued operation of the plant within established parameters will protect against cyanide exposures and releases, and these reports have been retained.

There have been no changes to the Plant since the previous recertification audit.

The following documents were observed for inspections to confirm that the continued operation of the plant within established parameters will protect against cyanide exposures and releases.

Virginia: Harmony Central Plant - Structural Safety Inspection of the Cyanide Bund area - Report, conducted by LMV Consulting Engineers, Town Planners and Environmental Specialists, 5 October 2016. Signed by J. H. Dykman Pr eng (ECSA registration Number 20140475)

“All structural elements which form part of this installation have been inspected by us. We confirm that all structural elements are in good condition and will only require the plant’s normal maintenance procedures.”

Harmony Structural Safety Audit Inspection Central Plant, Virginia, Report K2726 (Revised), October 2016, prepared by LMV Consulting Engineers (Pty) Ltd. No emergency repair required in the next 12 months.

Harmony Structural Safety Audit Inspection Central Plant, Virginia, Report K2726 (Revised), November 2015, prepared by LMV Consulting Engineers (Pty) Ltd. No emergency repair required in the next 12 months.

Harmony Structural Safety Audit Inspection Central Plant, Virginia, Report K2726 (Revised), October 2014, prepared by LMV Consulting Engineers (Pty) Ltd. No emergency repair required on any cyanide related infrastructure in the next 12 months.

Jones and Wagener Engineering & Environmental Consultants, Quarterly Tailings Dam Operations Meeting, 23 September 2016.

Jones and Wagener, Harmony Free State Tailing Dams Quarterly Report, 3 February 2017, Rev 0.


Thickness testing of tanks and pipelines are undertaken every 3 years. Central Plant Tank and Pipeline Thickness Testing, Ultrasonic Services and Consulting CC, 6 October 2016.

______________________________
Harmony Central Gold Plant
Name of Facility

______________________________
Signature of Lead Auditor

25 November 2017
Date
Standard of Practice 4.9: Implement monitoring programs to evaluate the effects of cyanide use on wildlife, surface and groundwater quality.

☑ in full compliance with

☐ in substantial compliance with  ☐ not in compliance with

Standard of Practice 4.9

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 4.9 to implement monitoring programs to evaluate the effects of cyanide use on wildlife, surface and groundwater quality.

The operation has developed written standard procedures for monitoring activities including the following, WADSP001 - Harmony Plants Cyanide WAD Sampling and Analysis, Rev 1, 28 August 2013.

Sampling and analytical protocols have been developed by appropriately qualified personnel.

The sampling procedure was compiled by the Harmony Analytical Lab personnel. The auditors observed the qualifications for Sharon Rampton - Mine Assayer's Certificate of Competency (12 November 1988) and Boniface Mahlomola - National Diploma Analytical Chemistry (2008).

The procedures specify how and where samples should be taken, sample preservation techniques, chain of custody procedures, shipping instructions, and cyanide species to be analysed.

Sampling conditions and procedures are documented in writing.

The operation monitors for cyanide in groundwater down-gradient of the site. There is no direct discharge to surface water. The auditors observed the sampling map. The map indicates the boreholes being sampled:

The Swallows Stream, the closest water body to the RWDs, and the Sands River, the closest water body to the TSF are monitored upstream and downstream.

The operation inspects for and records wildlife mortalities related to contact with and ingestion of cyanide solutions.

Monitoring is conducted at frequencies adequate to characterise the medium being monitored and to identify changes in a timely manner.

Harmony Central Gold Plant
Name of Facility

Signature of Lead Auditor

25 November 2017
Date

16
PRINCIPLE 5 – DECOMMISSIONING

Manage Cyanide Process Solutions and Waste Streams to Protect Human Health and the Environment

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

☒ in full compliance with

☐ in substantial compliance with ☐ not in compliance with

Emergency Response Practice 5.1

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 5.1 to plan and implement procedures for effective decommissioning of cyanide facilities to protect human health, wildlife and livestock.

The operation has developed written procedures to decommission cyanide facilities at the cessation of operations.

CTP 70 - Decommissioning Plan for Harmony Central Plant, Rev 03, September 2016.

The plan includes an implementation schedule for decommissioning activities. Section 8. Cost Estimation and Duration of Decommissioning (CTP 70) lists the actions and activities required in sequence when the decision is made to decommission the facility.

The operation reviews its decommissioning procedures for cyanide facilities every three years or after any significant additions to the cyanide equipment sections.

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

☒ in full compliance with

☐ in substantial compliance with ☐ not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 5.2 to establish an assurance mechanism capable of fully funding cyanide related decommissioning activities.

The operation has developed an estimate of the cost to fully fund third party implementation of the cyanide-related decommissioning measures as identified in its site decommissioning or closure plan.

The Liability Cost Assessment is reviewed annually by an external consultant.

The operation has established a financial mechanism approved by the applicable jurisdiction to cover the estimated costs for cyanide-related decommissioning activities as identified in its decommissioning and closure strategy. The trust fund is audited annually by PWC.
PRINCIPLE 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 and control them.

☑ in full compliance with
☐ in substantial compliance with
☐ not in compliance with

Standard of Practice 6.1

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 6.1 to identify potential cyanide exposure scenarios and take measures as necessary to eliminate, reduce and control them.

The operation has developed procedures describing how cyanide-related tasks such as unloading, mixing plant, operations, entry into confined spaces, and equipment decontamination prior to maintenance should be conducted to minimise worker exposure including the following.

CTP 02 - Control, Use and Issuing of Gas Mask Canisters, Rev 01, September 2012.

CTP 03 - Cyanide Decontamination, Rev 01, October 2013.

CTP 07 - Change Cyanide Pump, Rev 01, September 2012.

CTP 09 - Change Pipes in Cyanide Area, Rev 01, September 2012.

CTP 11A - Clearance Certificate for Hot Work, Rev 01, October 2012.

CTP 11B - Clearance Certificate for Vessel Entry, Rev 01, October 2012.

CTP 17 - Cyanide Sampling Procedures, Rev 01, October 2012.

CTP 20 - De-choke a Frozen Cyanide Pipeline, Rev 01, October 2012.

CTP 21 - Disconnect a motor on a cyanide pump. Rev 01, October 2012.

CTP 26 - Entering a confined space: Sumps or Tunnels, Rev 01, October 2012.

CTP 42A - Liquid Cyanide Off-loading, Rev 01, November 2012.

CTP 46A - Operating the PAC 7000, Rev 01, November 2012.

CTP 47 - Operating the WAD 1000 Cyanide Analyser, Rev 01, November 2012.

CTP 50 - Starting and Stopping a Cyanide Pump, Rev 01, December 2012.


CTP 68 - Working in Confined Space and Cyanide Storage Vessels, Rev 01, December 2012.

The procedures require, where necessary, the use of personal protective equipment and address pre-work inspections.
The operation implements procedures to review proposed process and operational changes and modifications for their potential impacts on worker health and safety, and incorporates the necessary worker protection measures.

CTP 08 - Management of Change, Rev 01, September 2012. The procedure describes the process to follow when any change, be it temporary or permanent, has been identified in the form of alteration, addition, demolition, decommissioning, new construction and or process parameter changes.

The operation solicits and actively considers worker input in developing and evaluating health and safety procedures. The Full Time Health and Safety Representative (Union Representative) is involved in the drafting and updating of all Cyanide related procedures. It is their responsibility to communicate worker issues and concerns to the procedure committee during the drafting and reviewing of procedures. It was observed that the representative is a signatory on all procedures.

**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.

☒ in full compliance with
☐ in substantial compliance with
☐ not in compliance with

The operation is in full compliance with Standard of Practice 6.2 to operate and monitor cyanide facilities to protect worker health and safety and periodically evaluate the effectiveness of health and safety measures.

The operation has determined the appropriate pH for limiting the evolution of HCN gas during mixing and production activities.

CTP 57 - Response to Low pH Level, Rev 01, December 2012.

Discharge points of cyanide must always enter the process stream at a point where the pH is maintained above 10.5 and which is well ventilated at all times. Regular pH monitoring must be conducted to ensure it does not drop below 9.8.

Where the potential exists for significant cyanide exposure, the operation uses personal monitoring devices to confirm that controls are adequate to limit worker exposure to HCN gas and sodium, calcium or potassium cyanide dust to 10 ppm on an instantaneous basis and 4.7 ppm continuously over an 8-hour period, as cyanide.

The operation has identified areas and activities where workers may be exposed to cyanide in excess of 10 ppm on an instantaneous basis and 4.7 ppm continuously over an 8-hour period, and require use of personal protective equipment in these areas or when performing these activities. If the alarm sounds the area will be vacated and subsequently tested before being declared safe for re-entry.

Hydrogen cyanide monitoring equipment is maintained, tested and calibrated as directed by the manufacturer, and records are retained for at least one year.

There have been periods longer than the 6 month calibration interval specified by the manufacturer. All equipment was calibrated at the time of the audit. The calibration of the monitors has been added to the DMS maintenance system to prevent reoccurrence of this situation.
Warning signs has been placed at areas where cyanide is used advising workers that cyanide is present, and that no smoking, open flames and eating and drinking are not allowed. This was observed during the site visit. PPE requirements are stipulated at all these areas.

Showers, low pressure eye wash stations and dry powder or non-acidic sodium bicarbonate fire extinguishers are located at strategic locations throughout the operation and are maintained, inspected and tested on a regular basis.

Unloading, storage, mixing and process tanks and piping containing cyanide are identified to alert workers of their contents, and the direction of cyanide flow in pipes is identified.

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

Procedures are in place and being implemented to investigate and evaluate cyanide exposure incidents to determine if the operation’s programs and procedures to protect worker health and safety, and to respond to cyanide exposures, are adequate or in need of revising.

HAR_MI_SAF_026 - Managerial Instruction Accident-Incident Reporting and Investigation Harmony Group, Rev. 0.22, 01/02/2000.

No cyanide exposure incidents recorded in the last 3 years.

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

☒ in full compliance with

☐ in substantial compliance with

☐ not in compliance with

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

The operation is in full compliance with Standard of Practice 6.3 to develop and implement emergency plans for cyanide exposure. The operation has water, oxygen, a resuscitator, antidote kits, radics, cell phone, and alarmed safety showers readily available for use at unloading, storage and mixing locations and elsewhere in the plant. There are first aid cabinets at strategic locations in the plant and the TSF containing appropriate PPE, oxygen and antidote for use in a cyanide emergency.

The operation inspects its first aid equipment regularly to ensure that it is available when needed, and materials such as cyanide antidote kits, which includes Tripac-Cyano and Sodium Thiosulphate solution are replaced to ensure that they will be effective when needed. All antidote kits were stored in fridges as per manufacturer requirements and are all within expiry dates.

The auditors observed that the antidotes are stored as per manufacturer requirements and are all within expiry dates.

The operation has developed specific written emergency response plans and procedures to respond to cyanide exposures including the following:


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*Harmony Central Gold Plant*
*Name of Facility*

*Signature of Lead Auditor*

25 November 2017
*Date*
ICMI CYANIDE RE-CERTIFICATION AUDIT - SUMMARY REPORT


Frazer Alexander Tailings - Site Emergency Procedure, Rev 1.0, Nov 2013 (prior to December 2016 when Intasol took over operation of the TSF).

The operation has its own on-site capability to provide first aid or medical assistance to workers exposed to cyanide.

All employees are trained on Cyanide First Aid as part of their induction training. Additional training is provided by mock drills.

The operation has developed procedures to transport workers exposed to cyanide to locally available qualified medical facilities. CTP 05 - Ambulance Entry in the Event of an Emergency, Rev 01, September 2012. The ambulance comes from the local hospital.

The operation has made formalised agreements with local hospitals, clinics, etc., so that these providers are aware of the potential to treat patients for cyanide exposure. The operation is confident that the medical facility has adequate, qualified staff, equipment and expertise to respond.

Agreement between Harmony Gold Mining Company Limited and St Helena Private Hospital (Pty) Ltd, signed December 2014.

Mock emergency drills are conducted periodically to test response procedures for various cyanide exposure scenarios, and lessons learnt from the drills are incorporated into response planning.
PRINCIPLE 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.

☐ in full compliance with
☐ in substantial compliance with
☐ not in compliance with

The operation is

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 7.1 to prepare detailed emergency response plans for potential cyanide releases.

The operation has developed an Emergency Response Plan to address potential releases of cyanide that may occur on site or may otherwise require response including the following:


Frazer Alexander Tailings - Site Emergency Procedure, Rev 1.0, Nov 2013 (prior to December 2016 when Intasol took over operation of the TSF).

The Plans consider the potential cyanide failure scenarios appropriate for its site-specific environmental and operating circumstances, including the following, as applicable:

- Catastrophic release of hydrogen cyanide from storage or process facilities;
- Transportation accidents;
- Releases during unloading and mixing;
- Releases during fires and explosions;
- Pipe, valve and tank ruptures;
- Overtopping of ponds and impoundments;
- Power outages and pump failures;
- Uncontrolled seepage;
- Failure of cyanide treatment, destruction or recovery systems (not applicable as no cyanide treatment undertaken); and
- Failure of tailings impoundments, heap leach facilities and other cyanide facilities.
Tanker Services are responsible for transportation related emergencies and are a fully ICMi certified transportation company.

The Plan describe specific response actions (as appropriate for the anticipated emergency situations) such as clearing site personnel and potentially affected communities from the area of exposure, use of cyanide antidotes and first aid measures for cyanide exposure, control of releases at their source, and containment, assessment, mitigation and future prevention of releases.

In the event of an emergency incident an investigation is undertaken to ensure the prevention of future releases.

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

☒ in full compliance with

☐ in substantial compliance with ☐ not in compliance with

**Standard of Practice 7.2**

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

The operation is in full compliance with Standard of Practice 7.2 to involving site personnel and stakeholders in the planning process.

The operation has involved its workforce and stakeholders, including potentially affected communities, in the cyanide emergency response planning.

During the community consultation, the emergency response with regard to cyanide management at the plant is discussed with the community and they are provided with the opportunity to contribute or raise any issues of concern.

Workforce are involved in mock drills and have the opportunity to make comments or provide feedback. Emergency responders can raise any issues for inclusion or change in the Emergency Response Plan.

The Emergency response plan is discussed with all employees during the refresher training.

The operation has made potentially affected communities aware of the nature of the risks associated with accidental cyanide releases, and consulted with them directly regarding appropriate communications and response.

The operation has involved local response agencies such as outside responders and medical facilities in the cyanide emergency planning and response process.

Full Chain emergency mock drills are conducted with the ambulance and St. Helena Hospital. The outside responders can provide input and comments during the drills with regard to emergency planning and response process.

The operation engages in consultation/communication with stakeholders to keep the Emergency Response Plan current.

The operation annually invites SAPS, EMS, Africa Health Care, Traffic Department, Buthelezi Ambulances, St Helena Department, Nettcare 911, Traffic Department, ER24 to inform them of the following: cyanide truck moving through the area, what emergency numbers to call, only call the St. Helena Hospital, UN number on
ICMI CYANIDE RE-CERTIFICATION AUDIT - SUMMARY REPORT

truck. Observed: invite to Meeting to Discuss the Management of Cyanide Emergencies in the Matjabeng Municipal Area held on 1 March 2017.

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

☒ in full compliance with

☐ in substantial compliance with ☐ not in compliance with

Standard of Practice 7.3

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 7.3 to designate appropriate personnel and The cyanide related elements of the Emergency Response Plan designate appropriate personnel and commit necessary equipment and resources including the following.

CTP 69 - Cyanide Related Emergency Response Manual, Rev 03, March 2017. Section 5. stipulates the Plant Operations Control Centre (Plant Control Room) responsibilities to respond to emergencies.

The manual references CTP 22 - Emergency Contact Procedure, Rev 01, October 2012. It states that the Unit Leader must notify the Plant Manager of an incident. The Plant Manager has explicit authority to use the resources of the Plant.

Section 9. stipulates that Emergency Response Teams will be formed, trained and equipped to respond to medical emergencies, spills and fires/explosions etc. Training in emergency response procedures will be undertaken annually. The Plant Manager and Unit Leader will designate those personnel who must receive such training.

CTP71 - Cyanide Training Matrix Harmony Central Plant, Rev 01, October 2013, stipulates the required Standard Task Procedures in which the Emergency Personnel must be trained.

The Emergency Response Plan file contains the call-out procedure and 24 hour contact information of the emergency response coordinators and response team members.

The manual references CTP 01- Conducting Cyanide Drills, Rev 01, September 2012. The procedure describes the responsibilities of the Emergency Response Teams with regard to first on scene and then subsequent actions.

Section 10 of the ERP stipulates the emergency response equipment including the location, quantity, description of item and the entity responsible (paramedics, fire master, plant manager, etc.). The operation also has procedures to inspect its emergency equipment on a regular basis to confirm it is available and suitable for its intended use.

Section 7. of the ERP stipulates the role of the External Service Providers / Emergency Response Practitioners.

The operation has 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.

Harmony Central Gold Plant
Name of Facility

Signature of Lead Auditor

25 November 2017
Date
Standard of Practice 7.4: Develop procedures for internal and external emergency notification and reporting.
√ in full compliance with

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

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 7.4 to develop procedures for internal and external emergency notification and reporting.

The Plans includes procedures and contact information for notifying management, regulatory agencies, outside response providers and medical facilities of the cyanide emergency including the following:

The Emergency Response Plan file contains the call-out procedure and 24 hour contact information of the emergency response coordinators and response team members, the SAPS, Fire Department, Netcare 911, St Helena Hospital.

The Plan includes procedures and contact information for notifying potentially affected communities of the cyanide-related incident and any necessary response measures and for communications with the media.

Section 7 of the ERP stipulates that the SAPS will evacuate possible affected communities.

Section 5 of the ERP stipulates that employees will not disclose any information to the press or public. Only the HR manager in consultation with Senior management may release information.

The name and telephone number of the Media Liaison person is included on the emergency telephone list in the emergency response plan file.

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.
√ in full compliance with

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

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 7.5 to incorporate in response plans and remediation measures monitoring elements that account for the additional hazards of using cyanide treatment chemicals.
The Plan describes specific remediation measures as appropriate for the likely cyanide release scenarios. This includes the following:

CTP 63 - Use of Ferrous Sulphate, Rev 01, December 2012. The procedure also stipulates that cyanide in slurry form must be contained before it is pumped back into the circuit. It must never be allowed to leave the plant boundaries.

CTP 43 - Liquid Cyanide Spillage, Rev 01, November 2012.

The Plan prohibits the use of chemicals such as sodium hypochlorite, ferrous sulphate and hydrogen peroxide to treat cyanide that has been released into surface water.

Section 11.2 of Environmental Monitoring of Surface water EPR 001, rev 03, April 2015 states

"Should any surface water sources be contaminated, neutralising agents such as sodium hypochlorite, ferrous sulphate, etc. should not be introduced to the sources, as this could have a detrimental effect on aquatic and human life."

The Plan addresses 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.

Environmental Monitoring of Surface water EPR 001, rev 03, April 2015 - states in section 11.0 Emergency Response, that the monitoring should be undertaken at the points listed in section 6.1 Surface Water Monitoring Points and Identification.

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

☑ in full compliance with

☐ in substantial compliance with

☐ not in compliance with Standard of Practice 7.6

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 7.6 to periodically evaluate response procedures and capabilities and revise them as needed.

The operation reviews and evaluates the cyanide-related elements of its Emergency Response Plan for adequacy on a regular basis. Provisions are also in place to evaluate and revise the Emergency Response Plan after any cyanide-related emergency requiring its implementation.

Section 9 of the ERP stipulates that the Emergency Response Manual should be evaluated after any cyanide related emergency. When a review or simulation has identified deficiencies, the Plan should be revised as soon as possible to ensure its proper functioning.

Mock emergency drills are conducted periodically to test response procedures for various cyanide exposure scenarios, and lessons learnt from the drills are incorporated into response planning.
PRINCIPLE 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.

☐ in full compliance with
☐ in substantial compliance with
☐ not in compliance with

Standard of Practice 8.1

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 8.1 to train workers to understand the hazards associated with cyanide use.

The operation trains all personnel, who may encounter cyanide, in cyanide hazard recognition.

The E-Learning System is used by all employees. It is a computer based system where the employee or contractor will work through the modules until completed. Must achieve a 100% pass rate.

All employees and contractors receive two cyanide related training modules, Handling Cyanide Safety in a Metallurgical Plant, Cyanide First Aid Training. This includes a cyanide induction video, which includes cyanide first aid.

Cyanide hazard recognition refresher training is conducted periodically.

Refresher Training is conducted annually for all employees and contractors. The E-Learning modules are done during each refresher training.

The Central Plant Training Matrix has the name of each person working on the plant per area as well as the names of all the Intasol employees.

The sheet indicates the person’s name, job title, the date of the last time induction training was done as well as the date the refresher is due. The matrix automatically turns the cell orange when the date is due within the next month and red when it is overdue.

Training records are retained for 41 years at the plant after which it is sent to the 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.

☐ in full compliance with
☐ in substantial compliance with
☐ not in compliance with

Standard of Practice 8.2

Summarise the basis for this Finding/Deficiencies Identified:

A training matrix is used showing all the employees with the dates on when the initial and refresher training was undertaken.

Harmony Central Gold Plant
Name of Facility

Signature of Lead Auditor

25 November 2017
Date
The E-Learning System is used by all employees. It is a computer based system where the employee or contractor will work through the modules until completed. Must achieve a 100% pass rate. This includes a cyanide induction video, which includes cyanide first aid, and is presented to all employees and contractors.

All employees and contractors undertake the two cyanide related training modules, Handling Cyanide Safety in a Metallurgical Plant, Cyanide First Aid Training.

Refresher Cyanide Induction Training is conducted annually after employees return from annual leave 100% pass rate is required.

In addition, all employees are tested on the PTO that they use in the course of their work.

Each of the plant procedures has been written in a planned task observation format, that the elements necessary for each job have been identified and stipulated and can be assessed during training and observation.

Training is conducted by the Training Assessor, who is appropriately qualified.

The various section foremen are competent to conduct PTO assessments due to their experience.

Training records are retained for 41 years documenting the training they receive. The records include the names of the employee and the trainer, the date of training, the topics covered, and if the employee demonstrated and understanding of the training materials.

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

- in full compliance with
- in substantial compliance with
- not in compliance with

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

The operation is in full compliance with Standard of Practice 8.3 to train appropriate workers and personnel to respond to worker exposures and environmental releases of cyanide.

All cyanide unloading, mixing, production and maintenance personnel are trained in the procedures to be followed if cyanide is to be released.

The induction informs all employees on what is required in the event of a cyanide emergency.

Mock drills performed are also used to train emergency responders.

The modules on Cyanide Safe Handling and First Aid provide all employees with the information on the procedures to follow if cyanide is released.

Site cyanide response personnel, including unloading, mixing, production and maintenance workers, are trained in decontamination and first aid procedures. They also take part in routine drills to test and improve their response skills.

Emergency Response Co-ordinators and members of the Emergency Response Team are trained in the procedures included in the Emergency Response Plan regarding cyanide, including the use of necessary response equipment.

__________________________  
Signature of Lead Auditor
The emergency response team receives the E-Learning Cyanide modules, and is trained further during the mock drills. The operation has made off-site Emergency Responders, such as community members, local responders and medical providers, familiar with those elements of the Emergency Response Plan related to cyanide.

The auditors observed Agreement between Harmony Gold Mining Limited and St Helena Private Hospital (Pty) Ltd, signed December 2014. St. Helena is equipped to accept serious cyanide patients and the management thereof in accordance with cyanide protocol. Training is undertaken of hospital staff and ambulance staff.

Refresher training for response to cyanide exposures and releases are regularly conducted through the annual refresher, through PTOs and through mock drills.

Simulated cyanide emergency drills are periodically conducted for training purposes covering both worker exposures and environmental releases.

Cyanide emergency drills are evaluated from a training perspective to determine if personnel have the knowledge and skills required for effective response. It was observed that recommendation for refresher training is made in areas where responders were found to be lacking.

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.
PRINCIPLE 9 – DIALOGUE
Engage in Public Consultation and Disclosure

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

☑ in full compliance with

☐ in substantial compliance with Standard of Practice 9.1
☐ not in compliance with

Summarise the basis for this finding/deficiencies identified:

The operation is in full compliance with Standard of Practice 9.1 to provide stakeholders with the opportunity to communicate issues of concern.

The operation provides the opportunity for stakeholders to communicate issues of concern regarding the management of cyanide, the following was observed as an example: Central Plant Community Complaint Report, Re: Glen Harmony Resident Complaint - Slime Dam 23, 05 February 2014.

The operation annually invites SAPS, EMS, Africa Health Care, Traffic Department, Buthelezi Ambulances, St Helena Department, Netcare 911, Traffic Department, ER24 to inform them of the following: cyanide truck moving through the area, what emergency numbers to call, only call the St. Helena Hospital, UN number on truck. Observed: Invite to Meeting to Discuss the Management of Cyanide Emergencies in the Matjabeng Municipal Area held on 1 March 2017.

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

☑ in full compliance with

☐ in substantial compliance with Standard of Practice 9.2
☐ not in compliance with

Summarise the basis for this finding/deficiencies identified:

The operation is in full compliance with Standard of Practice 9.2 to initiate dialogue describing cyanide management procedures and responsively address identified concerns.

There are opportunities for the operation to interact with stakeholders and provide them with information regarding cyanide management practices and procedures

Presentation was done at Harmony Primary School on 17 November 2016. Observed presentation called "Central Plant Slime Dam and Return Water Dam Safety Awareness". Harmony Public Communication Flyers - Cyanide Management at Harmony was provided to the Harmony Primary School during the visit for the children to take home to their families.

An information sheet has been created 'Information Central Plant Slimes Dam 23', 27 February 2014.

The information has been drawn up for the people who stay next to the Central Plant Slimes Dam 23 together with their livestock e.g. cattle and sheep.

[Signature]

Harmony Central Gold Plant
Name of Facility

Signature of Lead Auditor

25 November 2017
Date
Standard of Practice 9.3: Make appropriate operational and environmental information regarding cyanide available to stakeholders.

☑ in full compliance with

☐ in substantial compliance with

☐ not in compliance with

Standard of Practice 9.3

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in full compliance with Standard of Practice 9.3 to make appropriate operational and environmental information regarding cyanide available to stakeholders.

The operation has developed written descriptions of how their activities are conducted and how cyanide is managed. These descriptions are available to communities and other stakeholders.

Harmony Public Communication Flyers - Cyanide Management at Harmony. The flyer was provided to the Harmony Primary School during the visit on 17 November 2016 for the children to take home to their families.

A public communication flyer is also observed available, regarding cyanide, how it is used, why it is dangerous and what the mine is doing to reduce the risk. This flyer is provided to the community at the public meetings.

Presentations/discussions are given in Sotho, Xhosa and English to enable illiterate individuals to have access to the information regarding cyanide.

There have been no incidents of cyanide exposure in the last 3 years.

There have been no cyanide releases off the mine site in the past 3 years.

Section 5 of the ERP stipulates that employees will not disclose any information to the press or public. Only the HR manager in consultation with Senior management may release information.

Newsflashes are distributed within the Company via e-mail. Incidents are reported to the Department of Mineral Resources (DMR) by mine management. The DMR reports selectively on repeated or critical incidents. Information on significant cyanide exposures are made available, after appropriate investigations in the Integrated Annual Report.
Date: November 2017