# *INTERNATIONAL CYANIDE MANAGEMENT INSTITUTE*

## *Cyanide Code Certification Audit Gold Mining Operations*

## *Summary Audit Report*

## *Harmony Gold Company Mponeng Gold Plant South Africa*

## *13th – 17th February 2023*

## *For the International Cyanide Management Code*

| | |
|---|---|
| Name of Operation: | Mponeng Operations - Mponeng Gold Plant |
| Name of Operation Owner: | Harmony Gold |
| Name of Operation Operator: | Harmony Gold |
| Name of Responsible Manager: | Mr Stanley Selamolela |
| Address: | Mponeng Gold Plant<br>Private Bag 8044<br>Western Levels<br>Carletonville<br>2500 |
| State/Province: | Gauteng |
| Country: | South Africa |
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**Location detail and description of operation**:

LOCATION

The Mponeng Gold Plant is located in the West Witwatersrand area, about 80km south west of Johannesburg. Mponeng Gold Plant, previously owned by AngloGold Ashanti (AGA), was bought by the Harmony Gold Mining Company Ltd (Harmony) and full ownership was transferred in October 2020.

PROCESS DESCRIPTION

The gold-bearing ore found in the West Wits area is mainly Ventersdorp Contact Reef (VCR). Carbon Leader ore is also present, but it is not mined at present at Mponeng mine. The ore is mainly comprised of a quartz conglomerate. The gold is mainly found on the interfaces of the different mineral phases, with some gold associated with sulphide minerals and traces of lead and uranium. The average particle size of the gold is <75µm, thus setting a benchmark for the milling process.

PROCESS FLOW

The plant processes ore from the Mponeng Reef, the Kusasalethu Reef and the Mponeng waste rock dump. The ore from the Mponeng shaft is transported by means of a conveyor belt into the plant reef silo, whilst the Kusasalethu shaft and Mponeng waste rock dump use trucks as the mode of transport into the plant and stockpiles on the pad.

The plant comprises the ore storage and transport (OST), milling, thickener, leach, carbon-in-pulp (CIP), AARL (Anglo American Research Laboratories) elution circuit, smelt house and the backfill and residue section. Ore from the mine is milled in three ROM (Run of Mine) SAG (Semi-Autogenous Grinding) mills operating in closed circuit with hydro cyclones. The cyclone overflow

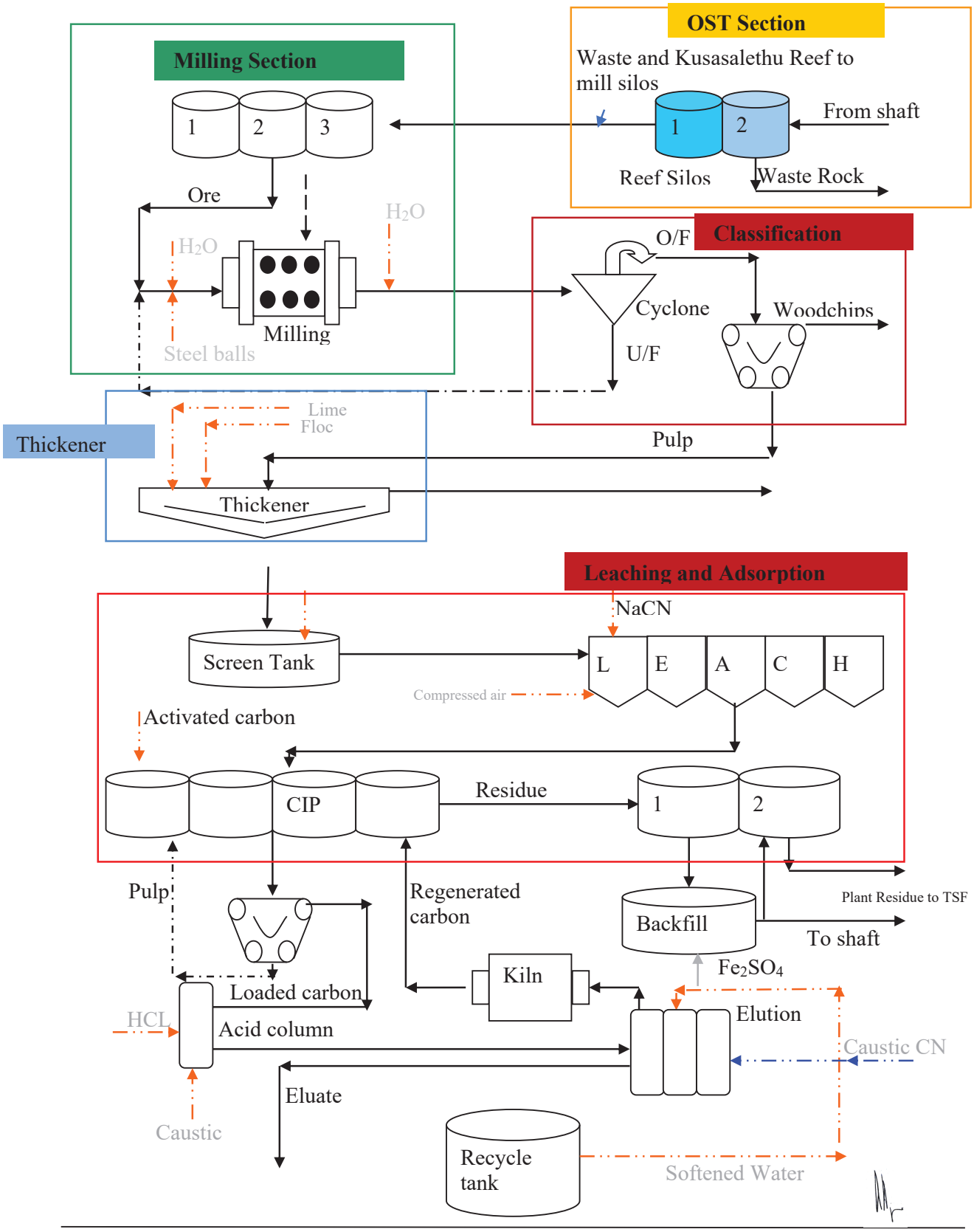
product reports to the thickeners for dewatering prior to leaching. The coarse cyclone underflow material is directed back to the mills for re-grinding.

Lime and flocculent are added to the slurry entering the thickeners to aid with settling. The thickener underflow is transferred to pre-leach, and the thickener overflow is re-used as mill dilution water. The pre-leach section is mainly to establish a buffer for a constant feed for leaching. A lime dosage point is also present at the pre-leach screen tank to adjust the pH to 10.25 required prior to introducing liquid sodium cyanide. The leaching section is comprised of 10 leaching tanks. Agitation is done by mechanical agitators and compressed air, which is introduced at the bottom of the pachucas. The residence time for leaching is ~40 hours.

Liquid sodium cyanide, delivered by bulk tanker from cyanide producer, Sasol South Africa Ltd, is used in the gold extraction process. Cyanide dosing control is applied by means of two on-line cyanide analysers; the Mintek (Mintek is South Africa's national mineral research organisation) Cynoprobe is utilized for dosing control, whereas the Process Analytical TAC1000 machine is utilized for concentration cross-check confirmation for effective control. The 2 hourly lead tank manual sample is titrated to verify the cyanide concentration from the 2 analysers. Cyanide addition is controlled according to the dry tonnage feed to the leach and concentration set point in the dosing tank. The leach slurry reports to the CIP (Carbon in Pulp) tanks, where activated granular carbon is used to adsorb the dissolved gold. The gold-loaded carbon is transferred from the lead CIP tank and reports to the elution circuit for de-sorption of the gold back into the solution phase. The CIP residue slurry reports to the backfill feed tank feeding the backfill section. The excess residue slurry not used for backfill, reports to the final residue tank, together with the fines removed from the backfill product. The final residue slurry is pumped to the tailings storage facility (TSF) for disposal.

The process water at milling and thickeners sections WAD (Weak Acid Dissociable) cyanide analysis is below the threshold of 0.5ppm. Therefore, these sections do not fall within the ICMI (International Cyanide Management Institute) audit certification.

Loaded carbon from the CIP section is washed before reporting to the acid wash column, where 3% hydrochloric acid is used. Following a sodium hydroxide (NaOH 300l/hr and soft water 20$m^3$/hr) neutralisation step, the gold-loaded carbon is pre-treated with 1%NaCN 2% NaOH hot solution, prior to being stripped with hot recycle eluate solution (Soft water). The gold solution (Eluate) from the elution circuit reports to the smelt house, where it is subjected to stainless steel wire mesh cathodes electrowinning cells. The plated cathodes are high-pressure washed to recover the sludge, which is filtered using a plate and frame filter press. The calcination of sludge is conducted in an oven at 750° C temperature, which is done overnight to provide sufficient time for complete oxidation.
The calcined sludge is smelted in an electric arc furnace at 1200°C. The charge is poured into cast iron moulds, and the gold sets into bars. The sides of the moulds are sloped inwards for easy removal of the solidified gold bars. Any slag remaining on the bars is removed with a needle de-scaler in the quenching bath located in the wash bay. Sampling of slag takes place during pouring, and gold samples are taken from the bar itself by a drilling method. The bars/bullions are labelled, and weights are recorded before being despatched to the Rand Refinery.


OST Section
Waste and Kusasalethu Reef to mill silos
1
2
From shaft
Reef Silos
Waste Rock
Milling Section
1
2
3
Ore
H2O
H2O
Milling
Steel balls
Classification
O/F
Cyclone
Woodchips
U/F
Thickener
Lime
Floc
Thickener
Pulp
Leaching and Adsorption
NaCN
Screen Tank
L
E
A
C
H
Compressed air
Activated carbon
CIP
Residue
1
2
Pulp
Regenerated carbon
Backfill
Plant Residue to TSF
To shaft
Fe2SO4
Kiln
Loaded carbon
HCL
Acid column
Elution
Caustic CN
Eluate
Caustic
Recycle tank
Softened Water

**Au Recovery**

Electrowinning
**Smelt house**

Final Product
**Gold Bullion (88% Purity)**

## *Auditor's Finding*

**This operation is**

**X in full compliance**

□ in substantial compliance *(see below)

□ not in compliance

with the International Cyanide Management Code.

**This operation has not experienced any compliance issues during the previous two-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: 6/10/2023

Dates of Audit: 13th – 17th February 2023

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 Mining Operations and using standard and accepted practices for health, safety and environmental audits.

| Facility | Signature of Lead Auditor | Date |
|---|---|---|
| Mponeng Gold Plant | | 6/10/2023 |

***Auditor's Findings***

***Principle 1. PRODUCTION AND PURCHASE:***
***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 certified 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 Gold Mining Company Ltd (Harmony) Group contract (which includes the Mponeng Plant) with Sasol South Africa (Pty) Limited (Sasol) in place for the purchase of liquid sodium cyanide. Harmony only purchases liquid sodium cyanide from Sasol. Sasol is an ICMI (International Cyanide Management Institute)-certified cyanide producer. The Sasol ICMI certification was confirmed as fully compliant when published on the ICMI website on 7th March 2022. As the cyanide production facility is fully certified, and Mponeng only purchases cyanide from Sasol, thus this Principle is compliant.

***Principle 2. TRANSPORTATION:***
***Require that cyanide is safely managed through the entire transportation and delivery process from the production facility to the mine by use of certified transport with clear lines of responsibility for safety, security, release prevention, training and emergency response.***

***Standard of Practice 2.1:*** *Require that cyanide is safely managed through the entire transportation and delivery process from the production facility to the mine by use of certified transport with clear lines of responsibility for safety, security, release prevention, training, and emergency response.*

**X in full compliance with**

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

□ not in compliance with

*Basis for this Finding/Deficiencies Identified:*
The chain of custody documents for the delivery of liquid cyanide from cyanide producer Sasol to Mponeng Plant consists of Sasol documentation, Mponeng Plant warehouse receipts, and Tanker Services Food and Chemicals/Imperial Logistics (Tanker Services) documentation. Three sample sets related to purchase orders are listed below: -

**2021**

• Harmony Purchase Order No 14245-MPO dated 29th July 2021
• Sasol Delivery Note-Dangerous Goods Declaration No 85021618, delivery Date 22nd October 2021
• Sasol Tax Invoice No 90935913 dated 12 July 2021

**2022**

• Harmony Purchase Order No 35261-MPO dated 30th June 2022
• Sasol Delivery Note-Dangerous Goods Declaration No 85210987/55215162, delivery date - 29th July 2022
• Sasol Delivery Note Document No 2060129, printed 30th July 2022
• Sasol Tax Invoice No 91091739 dated 30th July 2022
• Tanker Services Delivery Note No 1390563 dated 30th July 2022

**2023**

• Harmony Purchase Order No 46401-MPO dated 27th January 2023
• Sasol Delivery Note-Dangerous Goods Declaration No 85340293/55256449, delivery Date 1st February 2023
• Sasolburg Operations Site Services Laboratories Certificate of Analysis, Sample ID 10651228, dated 1st February 2023
• Sasol Delivery Note Document No 2092024
• Sasol Tax Invoice No 91165844 dated 2nd February 2023
• Tanker Services Delivery Note No 1431784 dated 2nd February 2023.

Mponeng Plant has only one transporter for liquid sodium cyanide, delivered in bulk directly from the cyanide producer, Sasol, to the Plant. The transporter is Tanker Services, certified as a Code compliant transporter on 1st April 2022.

***Principle 3. HANDLING AND STORAGE:***
***Protect workers and the environment during cyanide handling and storage.***

***Standard of Practice 3.1:*** *Design and construct unloading, storage and mixing facilities consistent with sound, accepted engineering practices, quality control//quality assurance procedures, spill prevention and spill containment measures.*

**X in full compliance with**

**The operation is**

□ in substantial compliance with **Standard of Practice 3.1**

□ not in compliance with

*Basis for this Finding/Deficiencies Identified:*
The operation uses only liquid cyanide, delivered by bulk tanker, and no mixing or storage of solid cyanide occurs on-site. Previous AGA (AngloGold Ashanti) ICMI (International Cyanide Management Institute) certification audits verified that the plant had been designed and built according to AngloGold Ashanti Corporate Engineering Specifications.
The Sasol cyanide offloading facility inspection report dated 6 December 2022, resulting in 98% compliance, was sighted. Any deviations are loaded onto PIVOT (performance management software) for follow-up and closure. No Sasol technical inspections were done during 2020 and 2021 due to the Covid-19 restrictions. An e-mail communication between Sasol and Mponeng Gold Plant discussing the Covid restrictions during 2020 and 2021 was sighted.
The Structural Engineer's Report, detailed under 4.8 below, includes the cyanide offloading and storage facilities.
The offloading and storage areas for the liquid sodium cyanide are contained, barricaded, closed off with restricted access, bund walls installed, and with no public access to the areas. There are no surface waters or drainage to surface waters in the cyanide storage area or the Gold Plant.
The offloading area for the liquid sodium cyanide is on concrete, surfaced with acid proofing, and equipped with humps, kerbs, walls and drains to contain and manage spills. The integrity of the concrete was confirmed, and there is ongoing maintenance of the acid-proofing.
The elution cyanide storage tank bund is connected to the unloading area with a pipe and valve. The valve is opened during unloading and closed afterwards. The inspection sheets were checked to confirm the opening and closing of the valve during offloading. The cyanide storage bund is deemed in good condition following the observations during the site inspection. The "CN: Cyanide Management Cyanide Storage and Delivery Plan Procedure" manages the storage and delivery process.
The following procedure was reviewed to show how the cyanide storage tanks are prevented from over filling: -
The "Cyanide Off-loading Procedure" states that off-loading may not occur when the receiving tank level is 50% or higher (section 3.2.6). At 80%, the air valve will close automatically. The air valve is interlocked with the level. Tank levels are displayed outside the offloading area and in the control room on the SCADA (**S**upervisory **C**ontrol **A**nd **D**ata **A**cquisition), alarming from 80%.
It was confirmed that level measuring instrument maintenance on the DMS (proprietary name) PMS (Planned Maintenance System) system on a 3-monthly frequency was in place, and this was further confirmed during the interview with the Instrumentation Technician.
It was observed during the site visit that the cyanide storage tanks are located on concrete plinths within a concrete bund. This was further confirmed when an adjoining spare concrete plinth with no tank installed was sighted.
During the site visit, it was observed that the cyanide storage tanks are located on concrete plinths within concrete bunded areas equipped with spillage pumps. Cyanide

storage tank bund wall flood tests are conducted. Results for 2021, 2022, and 2023 were sighted, reporting no leakage.
As only liquid sodium cyanide is used on the site, there are no storage facilities or precautions in place for the storage of solid cyanide. The liquid cyanide storage tanks are not close to any incompatible materials and are situated in their own bunded area to prevent the release of any liquid cyanide into an area where it could mix with any incompatible materials. This was confirmed during the site inspection.

***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:*
As only liquid sodium cyanide (delivered in bulk tankers) is delivered and used at Mponeng Plant, there are no procedures to manage, stack, clean or dispose of empty cyanide containers or cyanide drums.
With regard to cyanide tankers, the "Cyanide Off-loading Procedure" requires the cleaning of the tanker, pipes and connections and any spills that may have occurred during off-loading before the tanker leaves the site (Sections 4.33 and 4.34).
The operation and sequencing of valves and couplings are addressed in the Offloading procedure sections 4.8 to 4.12, 4.21, and 4.26 to 4.30 of the “Cyanide Off-loading Procedure". The Cyanide Champion’s daily inspection of the cyanide facilities includes checking valves and couplings, which are also inspected before offloading. Job cards are raised for any repairs or faults identified.
The "Cyanide Off-loading Procedure", Section 6.2, defines the role and responsibilities of the Buddy in off-loading, and the "Buddy System Procedure" also includes the definition of the Buddy and further includes full details of buddy roles, responsibilities and requirements.
The cyanide received from Sasol is coloured red as per the SDS (Safety Data Sheet). The latest Sasol SDS was checked at the certification and shown to include the colour of the sodium cyanide solution. Mponeng Plant does not add any dye to the sodium cyanide.

***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 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:*
Mponeng Gold Plant has 89 Cyanide Procedures currently in use. There is a Code of Practice (COP), "Mine residue deposits, Mponeng Gold Plant, Mponeng Gold Plant", in place. This Code of Practice was drawn up in accordance with the requirements of the South African Chief Inspector of Mines. The Intasol (TSF Contractor) Baseline risk assessment was sighted. In addition, the Intasol Standard Working Procedures (SWPs) were sighted, which included: -
* ITS-SWP-002 Operating valves,
* ITS-SWP-004 Moving, carrying and installation of Pipes,
* ITS-SWP-006 HMS (Hazard Management System) Control system,
* ITS-SWP-007Penstock operation,
* ITS-SWP-008 Depositioning slurry on TSF,
* ITS-SWP-009 Moving and rigging of cyclones,
* ITS-SWP-010 Taking of Density samples, and
* ITS-SWP-011 Cyclone Operation.

The Harmony West Wits Operations Mponeng Tailings Storage Facility (TSF), 2021 Annual Audit, was sighted, as were: - the Harmony West Wits Operations Mponeng Tailings Storage Facility, Third Quarterly Report For 2022, approved by Rynier Shields, Pr. Eng. , the Harmony West Wits Operations Mponeng Tailings Storage Facility, Fourth Quarterly Report For 2022, signed off by Rynier Shields, Pr. Eng., and the Harmony Gold Mining Company Limited, Harmony West Wits Operations Mponeng Tailings Storage Facility, First Quarterly Report For 2022.
Legal freeboard requirements
1:50 year 24-hour rainstorm, plus 800 mm additional freeboard Government Notice (GN) 704(6)3 National Water Act (NWA).
1:100 year 24-hour rainstorm, plus 500 mm additional freeboard. Government Notice (GN) R527(73)4, Mineral and Petroleum Resources Development Act (MPRDA). No 28 of 2002.
The Antipollution dams were designed to handle the 1 in 50-year storm event, as per the previous re-certification audit. In the "High Cyanide Levels are Measured in the Residue Slime (WAD-Weak Acid Dissociable) Procedure", it is required that a maximum level of 50 ppm WAD cyanide is specified in tailings slurry sent to TSF, to ensure that the TSF is operated at less than 50 ppm WAD cyanide. The procedure includes an action level of 40 ppm WAD cyanide. The "Backfill Quality Procedure" requires free cyanide to be kept at less than 26.5 ppm as NaCN (Sodium Cyanide).

Previous AGA (AngloGold Ashanti) re-certification audit evidence: Chapter 31 - Backfill Product Management of the AGA Cyanide Code Guidelines, states the levels of cyanide permissible in the Backfill: Free Cyanide 26.5 ppm, Sodium Cyanide (total) 50 ppm, and WAD Cyanide less than 50ppm. This is as per the MINTEK (Mintek is South Africa's national mineral research organisation) Technical Information Report. The "Backfill Quality Procedure" requires free cyanide to be kept at less than 26.5 ppm as NaCN.

An electronic review of the DMS (proprietary name) PMS (Planned Maintenance System) confirmed that the inspections and preventative maintenance activities are sufficient for the safe and environmentally sound operation of the facilities, including the specific measures needed for compliance with the Code.

With regard to the TSF, Intasol conducts daily inspections bound in monthly books (The inspections include monitoring for bird mortality and cyclone operating data). Monthly books sampled included December 2021, May 2022, and January 2023. Since the takeover from AGA by Harmony, quarterly inspections and reports by Jones and Wagener (Engineers of Record) have been conducted. (Detail on these quarterly inspections can be found under 4.8 below.) An annual TSF Audit is conducted: by Jones and Wagener. (Also see 4.8 below.) Daily pipeline inspections are conducted by Intasol. The TSF pipelines, pumps and valves form part of the DMS maintenance system.

Monthly Inspections are conducted. The TSF Weekly inspection file was sighted, and examples for 10/2/2023, 7/10/2022, and 1/4/2022, 2021 were sampled. Inspection files for 2022 and 2021 were sighted and sampled. The Checklist includes Solution trenches and bridges, Underdrains, Catchment paddocks, and the tailings delivery system. Specific examples for 31/12/2022, 31/5/2022, and 31/1/2022 were sampled.

The weekly Return Water Dam (RWD) inspections, including capacity/storage level RWD wall, pumps, pipes and valves, were sighted and examples for 7/1/2022, 11/2/22, 8/7/22, 10/2/23, 13/2/23, and 3/12/21 were sampled.

Electronic exception reporting is done on cell phones by the Pipe Patrol Supervisor to the WhatsApp group, which includes Harmony and Intasol Managers. Examples were sighted and reviewed on a cell phone.

The Gold Plant has the following 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, the "Change Management" procedure. In Section 2.8, Step 7, Authorising the Change Plan, any deviation from the Cyanide Guideline Chapter 8, requires the Approval of the General Manager and the Senior Safety, Health and Environmental (SHE) Manager. The responsible Head of Department approves the MOC (Management of Change) and the final, issue-based risk assessment will be approved by the SHE Manager. No changes were implemented which increased the risk of cyanide releases or exposure since the takeover from AGA.

The "Procedure to be followed when high cyanide levels are measured in the residue slime WAD levels High" details the process to be followed when the WAD cyanide in the residue starts increasing above 30 ppm. The shift foremen are to monitor the situation and notify the TSF Management if the concentration in the residue leaving the Plant exceeds 50 ppm. A temporary cessation of operations due to a power failure will be managed in accordance with the procedure "Cyanide Related Activities and Power Failures". This states that all cyanide-related work is to stop during power outages, due to

the unavailability of safety alarms. Section 3.6 states that in the event of situations such as work stoppages, lack of ore or other essential materials, economics, civil unrest, or legal or regulatory actions, cyanide areas and related work will be temporarily closed, or there will be a cessation of operations. The process plant will be stopped for routine planned shutdowns as per the routine procedures for stopping and starting.
Abnormal or emergency conditions relating to long-term shutdowns would be managed by the use of cyanide emergency procedures and appropriate issue-based risk assessments. Appropriate issue-based risk assessments would develop necessary process and procedural and systems amendments for the potential circumstances.
The boilermaker conducts yearly visual planned inspections on all tanks, looking for cracks, holes and leaks, signs of welding failure, corrosion, the condition of the tank foundation for cracks, and checking for broken and corroded foundation bolts. Sighted work order P0019642 dated 18-11-2022, yearly boilermaker inspection of Leach Cyanide Tank 2 with the conclusion that the tank was visually satisfactory. Sighted work order P0022251 dated 3-02-2023 yearly boilermaker inspection of Pachuca Tank 10 with no defects sighted during the visual inspection. Sighted work order P0019200 dated 7-11-2022 yearly boilermaker inspection of CIP tank 3, and the tank was reported as in good condition. All tanks undergo a three-yearly thickness test conducted by external specialists. Sighted a Wearcheck NDT (Non-Destructive Testing) Thickness Profiling Record for Sodium Cyanide Tank 8TK-008, Report No. 91348, dated 19 May 2021. Thickness results from all 32 test points were found to be acceptable.
Bunds and similar containments in high-strength and low-strength cyanide areas form part of the daily checklist-driven inspections conducted by the Cyanide Champion. Variances observed during these inspections are reported to the Foreman for further action. The Cyanide Champion's Daily Inspection Files for 2021, 2022 and 2023 were reviewed, and specific inspection reports for 8-1-2021, 24-8-2021,3-1-2022 and 10-5-2022 were sampled. The Cyanide Champion conducts 6 monthly, 24-hour flood tests on the bund integrity of the high strength Cyanide bund. Flood test reports were sampled for 2021, 2022 and 2023, with results showing no leakage. Sighted P0022310 dated 12-02-2023 - 6 monthly Process Flood Tests. The concrete condition of bunds is also included in the regular SIMM (Structural Integrity Management Monitoring) Reports conducted on the Plant. The latest SIMM Report was completed in November 2022, with the previous report having been undertaken in 2020. No findings in the 2022 Report relate directly to the scope of this Cyanide Code recertification audit.
There are no heap leach pads on site, and no design documents require leak detection or collection systems.
The TSF pipelines, pumps and valves form part of the DMS maintenance system. Daily Tailings pipeline inspections are conducted by the security department, shiftly, and pipeline leaks are reported by exception.
TSF contractors, Intasol, conduct daily inspections of all pipelines and valves on the TSF footprint. Sighted work order P0022271 dated 1-2-2023 monthly boilermaker pipeline inspection on 8CYDP03_Leach Cyanide pipeline. The Checklist includes conducting a mini-risk assessment, visually inspect flange bolts, gaskets, and covers for any leaks, inspect welding for visible cracks and leaks, inspect for excessive corrosion on the pipe,

visually inspect if the pipeline is in place and secure, no missing or loose U bolts, and pipe supports, and inspect the pipe for dents - visual inspection stated all in order.
Sighted work order P0022485 dated 9-9-2023 monthly boilermaker pipeline inspection SCASP03_Caustic Cyanide Pipeline at Elution Section - visual inspection stated all in order. Sighted work order P0022193 dated 01-02-2023 monthly boilermaker pipeline inspection 9CYDP01_Elution Cyanide Pipeline - no findings. Sighted work order P0022540 dated 7-2-2023 monthly boilermaker pipeline inspection 8CYDP04_Cyanide pipeline at Leach Area - no findings. Sighted work order P0013129 dated 13-5-2022 annual Fitter TSF piping inspection -WP1PF-SD_From Mponeng Plant Fence to Split TSF Pipeline. No findings. Sighted work order P0022604 dated13-2-2023 Shift foreman Tailing line inspection WP1PF-SD, from Mponeng Plant Fence to Split TSF Pipeline checking the following:- inspect for missing bolts and nuts on flanges, visually inspect valves for leaks, inspect for excessive corrosion on the pipe, visually inspect for leaks on the pipes, inspect for theft of any company materials, inspect for intruders on company property, check return water dams levels, pumps station, check the condition of the fence, check that the pumps are running, check that the pump station is locked, and complete shift checklist. Sighted work order PS0021131 dated 14-12-2TSF pipelines, pumps, and valves form part of the DMS maintenance system, Daily Tailings pipeline inspections are conducted by the security department shiftly, and pipeline leaks are reported by exception.
TSF contractors, Intasol, conduct daily inspections of all pipelines and valves on the TSF footprint. Sighted work order P0022271 dated 1-2-2023 monthly boilermaker pipeline inspection on 8CYDP03_Leach Cyanide pipeline. The checklist includes conducting a mini-risk assessment, visually inspect flange bolts, gasket and covers for any leaks, inspect welding for visible cracks and leaks, inspect for excessive corrosion on the pipe, visually inspect if the pipeline is in place and secure no missing or loose U bolts and pipe supports, and inspect the pipe for dents - visual inspection stated all in order. Sighted work order P0022485 dated 9-9-2023 monthly boilermaker pipeline inspection SCASP03_Caustic Cyanide Pipeline at Elution Section - visual inspection stated all in order. Sighted work order P0022193 dated 01-02-2023 monthly boilermaker pipeline inspection 9CYDP01_Elution Cyanide Pipeline - no findings. Sighted work order P0022540 dated 7-2-2023 monthly boilermaker pipeline inspection 8CYDP04_Cyanide pipeline at Leach Area - no findings. Sighted work order P0013129 dated 13-5-2022 annual Fitter TSF piping inspection -WP1PF-SD_From Mponeng Plant Fence to Split TSF Pipeline. No findings. Sighted work order P0022604 dated13-2-2023 Shift foreman Tailing line inspection WP1PF-SD_From Mponeng Plant Fence to Split TSF Pipeline checking the following:- inspect for missing bolts and nuts on flanges, visually inspect valves for leaks, inspect for excessive corrosion on the pipe, visually inspect for leaks on the pipes, inspect for theft of any company materials, inspect for intruders on company property, check return water dams levels, pumps station – check the condition of the fence, check that the pumps are running, check that the pump station is locked, and complete shift checklist. Sighted work order PS0021131 dated 14-12-2023 monthly Fitter Cyanide pump inspection with a 23-item checklist including: - examine pump for leaks and gland problems, visually inspect suction pipeline for leaks, inspect delivery valve housing and delivery pipeline for leaks and inspect suction valves for leaks - No findings.

Sighted work order P0016848 dated 09-09-2022 3 monthly Fitter residue pump inspection 6PM101_Residue to Slime Dam A Stream Pump 1A. No findings.
Valves are mostly on repair/replace on failure mode, except for the larger valves on the tailings lines, which may have the valve gate replaced if the damage is not too severe.
For on-line level indicators for ponds and impoundments displaying on the SCADA in the Control Room, the instrument technician carries out inspections on the measuring equipment. Sighted work order P0020238 dated 02-12-2022 3 monthly Instrumentation pressure transmitter inspection - no findings. Sighted work order P0018701 dated 19-10-2022 3 monthly instrumentation level transmitter inspection - no findings. Sighted work order P0022598 dated 12-02-2023 weekly instrumentation pH meter calibration - no findings.
Sighted Water Key Performance Indicator, Environmental Management Department, Metallurgy and Mine Waste Solutions ISO 14001/4.6/00/2014/1 section 3.10, Mponeng Gold Plant including under 3.10.5 Mponeng Gold Plant PCD, 3.11.2 Savuka Gold Plant and 3.11.5 Savuka Gold Plant PCD. The Dam is inspected daily by the Foreman.
Physical integrity of surface water diversions is covered in the Mponeng Gold plant Quarterly Environmental Assessment Reports. The Reports highlighted environmental issues, including any that may relate to surface water diversions, and any work required is done through job cards being raised. Sighted Quarterly Environmental Assessment Reports for Quarter 3 – January – March 2023 and Quarter 4 – April – June 2023.
The auditors deem that Inspections on the Plant are done on an established frequency sufficient to assure and document that they are functioning within design parameters.
Containment Dams 1 and 2 are inspected daily by the Cyanide Champion as a part of his daily Cyanide Storage Facility/ Cyanide Low Strength Areas inspection checklist. The criteria inspected include the dam wall condition (cracks and seepage) and the % dam level.
Inspections on the TSF are conducted as per COP (Code of Practice) requirements and Intasol procedures. Daily wildlife mortality inspections are conducted. Intasol inspections are done daily, monthly and quarterly. The inspections are deemed of an appropriate frequency sufficient to assure and document that they are functioning within design parameters.
Inspection checklists contain the date of the inspection and the name of the inspector. Faults are reported to the Plant Manager and Engineering Foreman, who send the report to the Planned Maintenance Foreman, who makes out a job card to the engineering department for the required repairs, which are recorded and entered in the DMS system.
In an interview with the Maintenance Planner, Mrs. Mmaphetha Golimpi, she reported the following: - Change of ownership of Mponeng Gold Mine from AGA to Harmony occurred during October 2020. The previous owner of the Mponeng Gold Mine, AngloGold Ashanti (AGA), was fully Cyanide Code compliant and operated an electronic Planned Maintenance System (PMS) supplied by SAP (proprietary name). Harmony uses an electronic PMS called the DMS (proprietary name). During the handover, the AGA SAP PMS system was switched off on 12 February 2021, and the Harmony DMS PMS went "live" on the 1st March 2021. In order to assist the transition, SAP handed over 5 years of historical PMS records dated prior to the switch, to Harmony. The DMS system includes all critical cyanide equipment in the Gold

Processing Plant and on the TSF. The system also generates work orders (job cards) and keeps a complete history of all breakdown and planned maintenance inspections. An electronic review was undertaken of the DMS PMS system, reviewing the planned inspections of the boilermen (monthly and yearly), Fitter (three monthly and yearly), the instrument technician (weekly, three monthly, and six monthly) and the electrician (monthly and three monthly). As ownership of Mponeng only reverted to Harmony in October 2020, a full history could not be reviewed. Examples cited above demonstrate that appropriate planned inspections are being carried out. Tools used in conjunction with the DMS system include FMECAs (Failure Mode Evaluation Critical Analyses) and a Defect Elimination Managerial Instruction.
All liquid sodium cyanide and sodium cyanide mixtures are contained in tanks and pipes. If the power fails, all liquids and mixtures will remain in their appropriate storage tanks and pipelines. No cyanide will be released into the environment due to the power failure. Any flow back will run into the Antipollution dam. It is concluded that the operation does not require emergency power to prevent unintentional releases.

***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:*
Bottle roll tests are conducted on the feed sources to determine optimum leach parameters and reagent consumption. Bottle roll tests were sighted and sampled. The feed to the Mponeng plant has changed to include the Kusasalethu reef, previously treated at the Kusasalethu plant. Tests were conducted on the new feed source. The MINTEK gold deportment analysis study on Harmony Gold Samples for Mponeng and Kusasalethu underground sources was sighted and reviewed.
Diagnostic leach samples for both Kusasalethu and Mponeng shafts to characterise the feed sources were sighted, and the results indicate an increased milling requirement for the Kusasalethu source. Releach bottle roll test results showed sufficient cyanide should be added to maintain efficiency in the leach.
Cyanide is controlled from the online Cynoprobe analyser, supported by a TAC 1000 free cyanide analyser, and checked with manual titrations using Rhodanine as an indicator. The TAC 1000 and Cynoprobe control can be swapped in case of maintenance and breakdowns of the Cynoprobe. The on-line values are used to change the positions of the cyanide dosing flow control valve to the required set point determined by test work. The cyanide addition is automatically stopped when a “no flow” is detected from the thickeners and when the pH is below 10.

***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:*
Harmony took over the Mponeng and Savuka Mines in October 2020. The Probabilistic Water Balance (PWB) model was converted from the AGA systems to a new Model ETA Operations Process Toolbox (PTB). The model is updated and run every month. The model is probabilistic because it considers the uncertainty and variability inherent in the prediction of precipitation patterns by considering the frequency and distribution of precipitation events along with extremes and seasonal variations rather than just average conditions.
A detailed water supply/demand water balance for the whole West Wits Region, including Savuka Plant and TSF and Mponeng Plant and TSF, was sighted. The Model includes the Mponeng plant and the Mponeng TSF, holding dams and return water dams. The model includes the following: -
-Actual Tailings deposition rates
-Evaporation - assumption for the area
- Rainfall - obtained from site rain gauges
- Seepage - Assumption of 1% of the total volume
- Interstitial water - Theoretical formula
- Water in the tailings feed to the TSF - daily data from plant
- Volumes of the Holding dams (367 000 $m^3$) and the return water dam (36 200$m^3$)
The WAD cyanide in the feed to the return water dam (RWD) is analysed, and it contained less than the limits of detection of 0.020 mg/l WAD cyanide. Thus, the Return Water Dam is not a cyanide facility as per the ICMI definitions. The RWD feed samples were reviewed from 2019 to the audit date.
The design storm event used in the model is 1: 50-year (50mm) over 24 hours and 1:100-year 24-hour storm event of 75 mm, which provides a sufficient degree of assurance that overtopping of the pond or impoundment can be prevented during the operational life of the facility. There is no run-on to the TSF and holding dams. There are no potential freezing and thawing conditions in the mine area (located in the Tropics). Solution losses, in addition to evaporation, are considered in the model design. The holding dam is used for surge capacity during power outages and equipment failures for the design storm events. The model showed and demonstrated that there is sufficient capacity to accommodate these scenarios. Pumps do not form part of the water management system. There are no allowable discharges to surface waters.
The quarterly and annual reports review, the Intasol HMS (Hazard Management System) system data and the Piezometer readings are considered in the conclusions and

recommendations. Details are included in 4.8 below on reports reviewed during the audit. The Intasol daily inspections and HMS data system include inspections and monitoring to maintain the operational parameters. Dam level monitoring is incorporated into the model. The quarterly and annual reports review the HMS system data and consider freeboard. The Jones and Wagener quarterly and annual reports review the HMS system data and consider TSF operating parameters and make conclusions with recommendations to maintain TSF operations as per the design and current status of the operation. Dam level monitoring is incorporated into the model.
The "Antipollution dam operating procedure" states,
"…3.1 The anti-pollution dam levels should be kept as low as possible below 40% at all times to ensure sufficient free board capacity in the event of an emergency. NB Refer to Probabilistic water balance.…
3.2 Anti-pollution dam water can be pumped to three different areas as follows: -
3.2.1 To residue with pump 9PM 019
3,2,2 To plant water circuit via the thickener or
3.2.3 The mill circuit with pumps 9PM 017 & 9PM 018…
3.5 Level control of the anti-pollution dam is automated, although pumps can also be stopped and started in the field. The pumps start automatically at 24% and stop automatically at 20%..."

***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 antipollution dams in the plant only receive spillage from the backfill, mills and storm water. The backfill feed is sampled using the WAD cyanide Cynoprobe analyser, and the values are less than 50 mg/l WAD cyanide. The plant does not mill in cyanide, and thus no cyanide solution is contained in mill spillage. As per evidence from the AGA recertification audit, no changes have occurred since Harmony took ownership of Mponeng Mine.
As the plant controls and monitors WAD cyanide to be less than 50mg/l in the tailings tank, the values in the TSF tipping points will be less than 50 mg/l WAD cyanide. The tip at the TSF is deemed the compliance point, and no significant exceedances have been observed since Harmony took ownership of Mponeng Mine in October 2020. Thus, the operation does not need to implement measures to restrict access by wildlife and livestock to open waters.
The Gold Plant measures WAD cyanide on line using a Cynoprobe analyser, sampling the tailings from the TSF tailings transfer tank at a frequency of 15 minutes. The data sighted are based on the daily average of the 72 samples.

The WAD cyanide graphs were reviewed for:

- 1 November 2022 to 7 February 2023: Maximum WAD cyanide: 42 mg/l, Minimum WAD cyanide: 5 mg/l.
- 1 October 2021 to 1 October 2022: Maximum WAD cyanide: 48 mg/l, Minimum WAD cyanide: 5 mg/l.
- 1 October 2020 to 1 September 2021: Maximum WAD cyanide: 46 mg/l, Minimum WAD cyanide: 5 mg/l.

No exceedances of 50 mg/l WAD cyanide were measured since Harmony took ownership of Mponeng Mine in October 2020.
The Gold Plant has daily inspections (three shifts daily), with the results detailed in checklists, including wildlife mortalities. Daily inspection reports, which include wildlife mortalities, were sighted and sampled, and no mortalities were recorded. The Intasol daily TSF inspection checklist includes wildlife mortality observations. No mortalities were observed during the time since Harmony took ownership of the operations.
There is no heap leach at the operation. Thus, no ponding control measures or solution over-spray controls are necessary.

***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:*
There is no direct discharge from the Gold Plant to surface water. There is the possibility for an indirect discharge to surface water to occur through seepage from the TSFs via the groundwater. Groundwater samples indicate that the Free and WAD cyanide levels are below the limits of detection. Gooseneck samples from WWS35 show results since October 2020 to date, reporting below limits of detection of 0.020 mg/l WAD cyanide. Thus, there is no indication of indirect discharge.
No instances where the downstream river samples exceeded 0.02 mg/l WAD cyanide were observed since the previous certification. Therefore, no remedial action has been required to prevent further degradation.

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

**X in full compliance with**

**The operation is** □ in substantial compliance with **Standard of Practice 4.6**

□ not in compliance with

*Basis for this Finding/Deficiencies Identified*
There are no identified beneficial uses of groundwater immediately down-gradient of the TSF operations. The Remis (Reliability and Maintainability Information System) system is used to indicate monitoring points. The system graphs the data for each monitoring point.

- Sighted Borehole MB 35 October 2021 to date taken 6 monthly:
- Sighted Borehole MB 21 October 2021 to date taken 6 Monthly
- Sighted Borehole MB 32 October 2021 to date taken 6 Monthly

Samples are analysed for Free, and WAD cyanide, and cyanide limits of detection are 0.020 mg/l. No results in the above boreholes exceeded the limits of detection of 0.020 mg/l WAD cyanide.
Groundwater flow was modelled, considering the geology of the area. The report, "Mponeng TSF complex conceptual design at pre-feasibility level for seepage containment structures and spring diversion", was sighted and reviewed. The groundwater flow lines are shown in the report. The downstream boreholes above, are placed downstream of the TSF.
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. Groundwater monitoring is undertaken to establish whether the tailing facilities are having an impact on the surrounding groundwater. Groundwater monitoring is undertaken twice a year. Results from October 2021 to the audit date were sighted, and down-gradient monitoring records were sampled in the Remis System. The various downstream sampling borehole points are shown on Remis. The point sampling results can be opened by clicking on the Remis map, and the data and graphs will be displayed. Graphs can be viewed, as well, with historical data shown for each point.
Chapter 31 – "Backfill Product Management" of the AGA Cyanide Code Guidelines states the levels of cyanide permissible in the Backfill: - Free Cyanide: 26.5 ppm, Sodium Cyanide (total): 50 ppm, and WAD Cyanide: less than 50ppm. This is as per the Mintek (Mintek is South Africa's national mineral research organisation specialising in mineral processing, extractive metallurgy and related areas.) Technical Report. The "Backfill Quality" procedure states that the allowable free cyanide in backfill to the shaft is 26.5 ppm, and the Total cyanide is 50 ppm. If a batch is non-compliant, it must first be treated with ferrous sulphate or redirected to the residue stream. Monthly speciation samples are checked at Mintek.
In the Previous AGA re-certification audit, it was noted that mining processing plant process water is the only beneficial use of groundwater. All other water for domestic and livestock use in the immediate area is supplied from the reticulated local potable water system, which is supplied by Rand Water. Samples are analysed for Free, and WAD cyanide, and the limits of detection are 0.020 mg/l. No results in the above boreholes exceeded the limits of detection of 0.020 mg/l WAD. Therefore, no remedial action is deemed to be necessary. The TSF and Return Water Dams are not lined and were established before current legal lining requirements. There is no evidence of seepage in

groundwater monitoring results. However, an interception trench for the Mponeng TSF is in the planning phase and is to be budgeted for FY (Financial Year) 2025.

***Standard of 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 cyanide-containing tanks are placed inside bunded areas. The bunds are linked to finally flow into the lined pollution control dams 1 and 2 within the concrete bunds and concrete trenches. No tanks are placed on ring beam foundations but on solid concrete structures. There are no cyanide process tanks that are without secondary containment.
The liquid cyanide storage tanks, leach tanks and CIP tanks are adjacent to each other. It was confirmed in AAC (Anglo American Corporation) drawings that civil foundations were on solid concrete reinforced foundations. The drawing, "Pachuca bases No 1 to 10, drawing 034 0345 001 C01494, rev 0, dated 28/4/84, shows the reinforcing of the concrete bases.
During the site visit, it was confirmed that the cyanide storage tanks are placed on solid concrete foundations with a bitumen layer. A spare adjoining tank foundation, with the connecting pipe work being located above concrete bunded areas, was sighted.
Bund wall calculations were reviewed, as detailed below:

- Reagent strength cyanide tank 132 $m^3$, bund volume 171 $m^3$ (130%).
- Leach tank volume 1,200 $m^3$, bund volume 606 $m^3$.
- CIP Apron tank volume 292 $m^3$, bund volume 390 $m^3$.
- Residue tank volume 920 $m^3$, bund volume 6,568 $m^3$. The bunds for the leach and CIP are interconnected with the bund for the residue, which provides sufficient volume for all of the tank areas.
- The Backfill bund area is connected to a silt trap and then to the trench leading to the antipollution dams. The antipollution dam's available capacity is 3,101 $m^3$, and the largest backfill tank is 1,020 $m^3$.
- Cyanide Caustic, Eluate bund maximum tank volume is 66$m^3$, and bund is 76.3$m^3$.

The following procedure was observed, which prevents the discharge of any cyanide solution or cyanide-contaminated water that is collected in the secondary containment area to the environment: -
The "Emptying Cyanide Spillage Bund Areas" procedure states that spilled cyanide will be pumped back to the Leach Cyanide Storage Tank, and rainwater will be pumped into the Barren Tank. Both will be conducted as per the process stipulated in the procedure.
The Plant was designed with bund walls and sump pumps in all secondary containment

areas, returning the contents to the process. No solution containing cyanide is released into the environment.
The "Antipollution dam operating procedure" states, "…3.1 The anti-pollution dam levels should be kept as low as possible below 40% at all times to ensure sufficient free board capacity in the event of an emergency. NB Refer to Probabilistic water balance…."
All cyanide dosing lines in the plant are contained in launders with splash covers. The launder drains back to the Cyanide Storage Bund. All cyanide process pipelines run within the plant above concreted areas. Visual inspections are conducted daily. Cyanide tanks are constructed of mild steel, and the cyanide dosing and cyanide /caustic tank pipelines are made of 316 grade stainless steel. All welds are x-ray tested.
The TSF pipelines for Mponeng were replaced with HDPE (High-density polyethene)-lined steel pipelines as a spill-prevention measure. Pipe patrols are conducted daily to identify any leaks timeously. Signage includes emergency phone/contact numbers along the pipeline for reporting any leaks by the public. This was confirmed during the site visit along the tarred road section adjoining the TSF pipeline.
In the plant, no areas were identified where cyanide pipelines present a risk to surface water. The tailings pipeline crosses a stream at two places. Additional protection for TSF pipelines crossing the Leeuw spruit, which diverted any spillage into a paddock for containment and remediation.

***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:*
The previous AGA recertification evidence stated that the original certification audit in 2007 confirmed quality control and quality assurance programs for the cyanide facilities stating, "Verified original drawings: drawing 034-0345-001-M727 and P&ID (Piping and Instrumentation Drawing) 0506013-ww-01G-31-F002.1 sheet 1 as per Chapter 42 of PCR (Physical Condition Rating) standards, Engineer signed checklist verified, Peter Anderson 5/6/06, X-rays Nov 2002 and report by Ray Sonic verified. Prozecon clearance for service report after repairs 1337 15/11/03 verified. Annual thickness tests verified 5/6/2006, Sighted official letter of 5 May 2007, signed by Dr F Wagener, Pr. Eng. ECSA (Engineering Council of South Africa) reg. no 690332 declaring the remedial work done as per recommendation in the inspection report by Dr F Wagener, Civil Engineer, ECSA reg. No. 690332 of November 2006, Cyanide plant audits, structural and civil investigation and recommendations report no AMTS06-068 ref 0 includes structural report signed off by Ivan Basson B.Eng. (Hon) Pr. Eng. ECSA Reg. No.920150, and LP

Nutt Pr. Eng. (ECSA Reg. No. 691884), structural seismic specialist." No material engineering design or practices have been undertaken at the Plant in the last three years. That information is still accessible.
No additional cyanide facilities have been constructed since Harmony took over the Plant in October 2020. The Plant confirmed that it still has access to the design drawings for the plant dated 1984. This was confirmed by sampling Pachuca base civil drawings, cyanide tanks drawings, and Pachuca general layout. It was reported that no plant additions had been installed since the original construction.
The Harmony Gold Mining Company Mponeng Gold Plant SIMM (Structural Integrity Management Monitoring) Report 2022 by Croeser Structural Engineering, November 2022, was sighted. The inspection was performed on 19 October 2022 by Izak van der Wat & Morné van Staden, Structural Engineers for the whole processing plant, including high-strength cyanide facilities. A previous SIMM inspection was completed at the plant in 2020. Whilst the 2022 report contains an extensive list of high-priority concerns, none of these concerns affect areas or structures that fall within the immediate scope of the Cyanide certification audit.
The Harmony West Wits Operations Mponeng Tailings Storage Facility, 2021 Annual Audit, was sighted.
The report concluded: -
"…10.7 General
Both compartments were improving following the appointment and action plans by a new Contractor in September 2021. Action plans are included in records of quarterly meetings included in the annual report…."
The Action plans are included in the 4th Quarterly Meeting minutes dated 07 December 2021.
The Harmony Gold Mining Company Limited, Harmony Wes Wits Operations Mponeng Tailings Storage Facility, First Quarterly Report For 2022, March 2022, was sighted.
The Harmony Wes Wits Operations Mponeng Tailings Storage Facility, Third Quarterly Report For 2022, September 2022, approved by Rynier Shields, Pr. Eng., was sighted.
The Harmony Wes Wits Operations Mponeng Tailings Storage Facility, Fourth Quarterly Report For 2022, signed off by Rynier Shields, Pr. Eng. The report is based on the Hazard Management System (HMS) data supplied monthly by Intasol.
* Conclusions: Section 11 Conclusions and recommendations include various conclusions identifying issues as well as recommendations. Follow up will be done at the next quarterly meeting..."
The contents of the Quarterly Reports suggest that on-going activities are being monitored by a Professional Engineer (Pr.Eng.) using the reports from the TSF contractor, Intasol and their HMS data. As a TSF is a project in progress, it can be concluded that the TSF is fit for purpose.

***Standard of Practice 4.9:*** *Implement monitoring programs to evaluate the effects of cyanide use on wildlife, and 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:*
The Surface water sampling operational procedure ISO 14001: 2015/8/21/00/2023 is being used and done by the Environmental Department, and Groundwater sampling is done by a contractor, GCS (specialised Geotechnical Consultancy), as per the Harmony procedure, CN Management: Sampling Procedure for Specialised Speciation and Environmental Samples. The procedure was compiled by a Senior Environmental Officer with a BA Environmental Science qualification and 16 years of field experience in the mines.
The Procedure specifies: -

- How samples should be taken. Section 5, Sampling Procedure, describes how the samples should be taken;
- Where samples should be taken. The REMIS (Reliability and Maintainability Information System) system maps all sample points on Google Maps;
- Sample preservation techniques. Section 4.5, Sample Preservation (including WAD and Free cyanide), describes the preservation method, as well as the storing of samples in a cooler bag.
- The procedure includes the chain of custody procedures and shipping instructions and analyses required (cyanide species to be analysed). There is an example of a chain of custody document.
- Quality assurance and quality control requirements for cyanide analyses. The Midvaal Water Company SANAS (South African National Accreditation System) Certificate of accreditation, including analytical methods used, was sighted. Section 4. Method for Determination of Weak Acid Dissociable cyanide by distillation using Skalar Continuous Flow Analyser is included in the Midvaal Water Company Scientific Services Methods Manual. (Method No.CFA-1C, Ver. 002, Issue Date: 17/3/2017") This was confirmed during the previous AGA ICMI re-certification audit.

The electronic field sampling sheet, including weather, livestock/wildlife activity, and anthropogenic influences under comments on any abnormal conditions, was sighted.
The groundwater monitoring boreholes are monitored twice a year, the surface water monitoring is undertaken monthly and specific samples are quarterly and annually. Monitoring of WAD cyanide in tailings leaving the Gold Plant is monitored on a continual basis and shown on the SCADA and recorded. Wildlife monitoring is carried out during daily TSF Monitoring activities and if dead or injured wildlife is found, it is reported to the Environmental Department for investigation. The auditors deem the frequency with which the surface water and groundwater are monitored to be adequate to characterise the medium being monitored and identify any changes in a timely manner.

***Principle 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, livestock, and the environment.*

**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:*
Chapter 38: Basic Demolition Practices, of the South Africa Region Metallurgy (SARM) Cyanide Code Implementation Guidelines, dated July 2013, describes the process to follow during cyanide decontamination and decommissioning. The Guidelines follow ICMI Principles. The "Cyanide Plant Decommissioning Procedure" was sighted. The procedure describes the planning required to ensure the safe decommissioning and decontaminating of cyanide facilities within the metallurgical plant.
It was confirmed that the Sasol Technical Consultancy still operates through Mosala Mokoena, the Sasol Specialist: Product Life Cycle (the replacement of Kobus de Wet, the previous Technical Officer who retired). The Sasol Technical Consultancy can provide producer-based technical support and advice on cyanide issues and matters relating to cyanide facility decontamination and decommissioning.
The "Cyanide Plant Decommissioning Procedure" contains actions required 12 months, 6 months and 3 months prior to decommissioning. The "Cyanide Plant Decommissioning Procedure" is reviewed annually in terms of the document control system.

***Standard of Practice 5.2:*** *Establish a financial 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 Estimate by Digby Wells: "Mponeng Operations - Closure cost assessment closure cost report", GP30/5/1/2/2 (02) MR and GP 30/5/12/2 (248) MR, dated June 2022 was sighted and reviewed. The document refers in section 7.2.4 to Cyanide Decontamination, including a cost estimate of South African Rands (R)671,508, prepared by a reputable third-party cyanide cleaning specialist, included in the mine closure cost

estimate for the Mponeng Plant. These costs are updated annually to take account of any changes at the facilities.
Mponeng and Savuka operations ("West Wits Mining Operations") were part of the AngloGold Ashanti (AGA) Group and were Cyanide Code-compliant operations. From 1st October 2020, the Harmony Group took ownership of these assets. The environmental liability (including provision for cyanide decontamination and decommissioning) is partially funded by funds held in a section 37A Trust Fund known as the AGA Rehabilitation Trust Fund. Sighted 2023 accounts for AGA Rehabilitation Trust Fund. After the transfer, there was a shortfall in the 37A Trust Fund. The Harmony Group is therefore required to fund the shortfall. The Harmony-administered Bambanani, Joel, Matjhabeng, and Tshepong Rehabilitation Trust Fund has surplus funds in excess of the shortfall. Sighted a Resolution by the Trustees of the Bambanani, Joel, Matjhabeng and Tshepong Rehabilitation Trust Fund dated 5 October 2020 to transfer an amount of R3,686,048.90 to fund the shortfall in respect of the West Wits Mining Operations. An Income Statement for the AGA Environmental Rehabilitation Trust to the end of January 2023 was sighted, which indicated that owing to investment surpluses subsequent to the takeover of the West Wits Operations, the Trust was in surplus over its liabilities and the support from the Bambanani Joel Matjhabeng and Tshepong Rehabilitation Trust was no longer needed. The latest accounts for the Bambanani Joel Matjhabeng and Tsheppong Rehabilitation Trust for the year ending 2021, signed by the Trustees on 16 May 2022, were sighted. The latest accounts for the AGA Environmental Rehabilitation Trust were due to be published during the processing of the Mponeng and Savuka ICMI certification audit reports. The latest AGA Environmental Rehabilitation Trust Annual Financial Statements for the year ending 31 December 2021, signed by Trustees on 11 May 2023, were subsequently sighted.

***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 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 following sample of procedures has been developed describing how cyanide-related tasks at the Plant should be conducted: -

- "Cyanide Off-loading Procedure" describes the process to follow during cyanide off-loading.

- "Buddy System Procedure" includes a definition of the Buddy and a description of the roles and responsibilities.
- "Obtaining Production Engineers / Plant Manager's Permission to Conduct Maintenance on Cyanide Equipment, Mponeng Gold Plant".
- "Servicing of Cyanide Vertical Spindle Pump Procedure Mponeng Gold Plant", WM_CN_SM_081, rev. 10, dated October 2022.
- "Installation of Cyanide Pipes Procedure Mponeng Gold Plant" is an engineering procedure.
- "Detoxification Of Cyanide Contaminated & / Or Redundant Equipment and Disposal of Cyanide Contaminated Waste Mponeng Gold Plant" describes the procedure to be followed when detoxifying cyanide contaminated equipment or redundant cyanide equipment and the discarding of cyanide waste, e.g., used cyanide containers, and PPE required and pre-work inspections.
- "Ventilation of Confined Space Mponeng Gold Plant" covers the proper ventilation of confined spaces.
- "Issuing of Clearance Certificates for Cyanide Areas and Equipment" describes issuing clearance certificates. Also sighted was a completed clearance certificate No 0351 to change a caustic pump to illustrate the process.
- "Issuing Cyanide Related PPE Mponeng Gold Plant" states that only the cyanide custodian is authorised to issue cyanide-related PPE, only appointed persons to work in the cyanide storage area or on related cyanide equipment and will be issued with cyanide PPE, all issues shall be recorded in the cyanide PPE issue booklet, and date of issue and person receiving PPE shall be recorded.
- "Leach / CIP Cyanide Flushing Procedure Mponeng Gold Plant" describes the procedure to be followed when flushing the cyanide dosing line.

When sampling and reviewing the Cyanide Management procedures referred to above, it was confirmed that the use of specifically identified personal protective equipment was included. The Plant and the TSF use the Harmony Continuous Risk Assessment SLAM (Stop - Look - Assess and Manage) system before each job is conducted, and this is a Harmony Group requirement. All staff are trained in the SLAM system and have signed off on the training. During the review of Intasol procedures, it was confirmed that the detail of required PPE and pre-task planning are included in the procedures. SLAM examples for 1390 29/9/21, 191948 13/2/23, 25312 25/22/2022 were sighted.

It was confirmed during the interviews that daily safety meetings are held where employees can comment on issues, including health and safety items. Topics are scheduled for the meetings. A Meeting on a monthly topic covering Cyanide - Mine Waste Splashing incident was sighted and was included as a topic in the green area meeting and the Mancom Meeting. Sighted Task-based risk assessment (TBA): remove and replace palisade at cyanide storage. The risk assessment was attended by Engineering supervisors and helpers on 6/2/23. The "Review of The Emergency Procedure" procedure states,

"…2.4 Employees shall be briefed on revised procedures during Green Area Meetings or through established forums such as the plant health and safety meetings…." At the TSF, Daily Green Talk Safety meetings are held, which may include health and safety procedures, Attendance, Topic of the day, Discussion, Suggestions and tasks of the day.

Various toolbox talks including attendance registers were sighted and sampled: 13/12/2021 Cyanide drill procedure, 15/01/22 Lightning, 17/02/22 Snake Bites, 29/3/22 Slip and fall,22/6/22 Heat Stroke, 18/5/22 Dust, and 26/1/23 Deposit cyclone methods.

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

**X in full compliance with**

**The operation is**

- ☐ in substantial compliance with **Standard of Practice 6.2**
- ☐ not in compliance with

*Basis for this Finding/Deficiencies Identified:*
The Leach pH is set at 10.25, to limit the evolution of hydrogen cyanide gas during production activities.
The operation uses monitoring devices to confirm that controls are adequate to limit worker exposure. There are 15 x fixed Polytron HCN (Hydrogen Cyanide) gas monitors, 7 x PAC 7000 personal portable HCN gas monitors, and 8 x X-am 5000 portable multi-gas (including HCN gas) monitors used on site. Monitors first alarm at 4.7ppm and then second alarm at 10ppm. The first alarm requires appropriate PPE and investigation, and the second requires immediate evacuation. The operation has installed Polytron fixed cyanide monitors at the hot spot areas in the Plant, including the Smelthouse. Hot spot signage was sighted during the site inspection at cyanide dosing points and the cyanide offloading, and residue pit, requiring appropriate PPE. Hot spot surveys have been done quarterly since 2022, and no high HCN gas readings have been observed. A survey was sampled for 21/12/22, where the highest was 0.9 ppm, and the average was 0.8 ppm HCN gas. TSF Penstocks and deposition points are potential HCN gas hot spots, but only if abnormal conditions are experienced from the plant. There is an Abnormal conditions procedure in place, including communication between the Control Room and the TSF.
There is a Service Agreement in place with Dräger, the manufacturer of the HCN gas monitoring equipment, for maintenance and calibration for services valid for 1 February 2021 to 31 January 2024. Calibration records for 2021, 2022 and 2023 of fixed Polytron, PAC 7000, and X-am 5000 gas monitors were sighted and reviewed.
During the site inspection, it was confirmed that the use of warning, prohibition and PPE requirement signage was in place at all appropriate locations. At the TSF, warning and prohibitive signage was observed, including signs at TSF entry points referring to cyanide, appropriate PPE, and displaying emergency telephone numbers.
High-strength sodium cyanide solution is delivered by tanker to the Mine. Sasol, the producer, adds red dye to the solution before delivery. Red colouring is referred to in cyanide training. It was confirmed in the Sasol SDS (Safety Data Sheet) for liquid sodium cyanide during the site visit that the cyanide colour is a light to dark red-coloured liquid.

It was observed during the site visit that dry powder extinguishers were used in cyanide areas. The fire extinguishers inspection books were sampled, and January to December 2021 and January to December 2022 were sighted. The Fire extinguisher service company, CSA Fire and Safety, visit quarterly and service 30 to 40 units at a time. The service certificate is issued, including the date of service and the next due date of service.
The use of safety showers and integrated eye wash stations was observed during the site visit at strategic locations in the plant, including the cyanide offloading and storage area and leach cyanide dosing point. Safety shower inspection registers for January to December 2021 and January to December 2022 were sampled and reviewed. All safety showers have an integrated eye wash and are linked to alarms in the SCADA in the control room. SCADA screenshots showing the alarms tested at the emergency cabin were sighted. The Safety Shower Monthly Fitter Planned (PMS) Inspection checklist was also sighted and reviewed.
All reagent-strength cyanide pipes have flow direction labelled and are colour-coded purple indicating that they contain cyanide. Cyanide storage tanks are colour-coded purple with a red band, as per the plant colour-coding index. Tailings pipeline labels indicating the direction of flow, the presence of a toxic substance, and the emergency telephone numbers to contact in case of a pipe leak are in place. This was all confirmed during the site inspection.
It was observed during the site inspection that SDSs (Safety Data Sheets) for Cyanide and Ferrous Sulphate are displayed at the cyanide storage areas, and are in English, the working language of the operation. Cyanide SDSs are displayed in the First Aid room and on the gate of the Cyanide storage area (abbreviated version).
There have been no lost time injuries relating to cyanide since the Harmony takeover in October 2020 of the operation, and a medical dressing case is being used to demonstrate the incident, investigation and reporting system. An incident investigation report based on the Standard Harmony Investigation system no INC-2022-0604 dated 9/12/22 was sighted involving a hand injury on a re-liner, which included identified cause, contributing factors, results and findings from the investigation and comments by the investigation team. The Standard Harmony Investigation system would be used if there were a cyanide incident.

***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:*
Mponeng Gold Plant has first aid rooms and facilities at the following locations: Cyanide Emergency First Aid Room (Cyanide Off-loading), Leach First Aid Room, and the Emergency Trailer and First Aid Room. During the site inspection, it was confirmed that

the cyanide Antidotes are stored in the plant fridges. During the site visit, it was observed that water, oxygen, antidote kits, resuscitator, telephones and alarm systems are present where employees could potentially be exposed to cyanide.
A fully equipped cyanide emergency trailer is parked at the Cyanide Emergency Room. ER24 (ambulance and paramedic service provider) is called when there is an incident to provide paramedic response and transportation to Fountain Hospital, located approximately 10 km from the mine. ER 24 is on 24 Hour Emergency Response and has oxygen, resuscitators and qualified personnel available to assist with any cyanide exposure incident. Fountain Hospital has oxygen, antidote kits, and resuscitators and is available to accept patients exposed to cyanide.
At the TSF, communication is done via radio and cell phone with the plant control room.
The TSF LDV (Light Deliver Vehicle) carries a First aid kit. This kit does not contain any cyanide emergency equipment, as this is included in the Plant Emergency Response Team equipment. No cyanide emergency equipment exists at the tailings facilities. The staff use radios and cell phones to communicate and to receive instructions from the Plant in the case of high WAD cyanide in residues. The Plant control room is contacted in the event of an emergency, which will contact the Emergency Response Team from the closest Plant and ER24, as appropriate.
Cyanide first aid rooms are located at the offloading and storage area, on top of the leach, and in the smelt house. All cyanide antidote kits are kept in fridges on the plant.
Inspection registers were sighted, including: -

- Monthly inspections of the cyanide antidote kits from January - December 2022 and January to December 2021. This included expiry dates for amyl nitrate kits. Antidote delivery was delayed in 2022 due to Covid travel restrictions.
- Daily inspections of First aid kits from January - December 2022 and January to December 2021
- Daily inspections of SCBA (Self Contained Breathing Apparatus) equipment from January - December 2022, and January to December 2021
- Daily Medical Oxygen equipment - January - December 2022 and January to December 2021

The Cyanide Emergency trailer is equipped with cyanide emergency equipment and is stationed in the plant for use during cyanide emergencies. The daily inspection files and sample inspections from January to December (except for April) 2021 and January to December 2022 were sampled and reviewed. The TSF first aid kit is carried in the LDV (Light Delivery Vehicle) and in the container (sealed) at the TSF, is checked every month. If the seals are broken, the kits are then refurbished.
The Plant has an Emergency Preparedness and Response Plan (EPRP), which also covers the TSF. In addition, the TSF has an OP: Operational Procedure, Emergency Plan Tailings Storage Facilities, Mponeng Gold Plant. The Emergency Preparedness and Response Plan cross references to CN: Cyanide Management: Emergency Procedure for CN First Aid Management, which further includes reference treatments for the various cyanide exposure scenarios.
Cyanide Appointees, who make up the Emergency Response Team, having undertaken the relevant first aid training, make up the First Aid team trained to conduct cyanide-related first aid. ER24 is contracted to provide emergency assistance and transport

patients to Fountain Hospital. In the event of an emergency at the TSF, the Intasol Site Manager will call the plant control room, which will initiate the EPRP (Emergency Preparedness and Response Plan) responses. ER24 (contracted) and Fountain Hospital (contracted) provide emergency response and casualty assistance to the Savuka Gold Plant, Mponeng Gold Plant and West Wits Tailings. ER24 is stationed on-site at the Medical Hub and at the Fountain Hospital.
The EPRP details the control room responsibilities, including contacting ER24 for picking up the cyanide emergency patient. The "Ambulance arrival at gold plant Mponeng Gold Plant" procedure covers security entry and exit actions.
ER24 is contracted to provide paramedic and ambulance support to transport cyanide patients to the mine Medical Hub and to Fountain Hospital as required. An agreement between Harmony and Africa Healthcare t/a Fountain Private Hospital is in place. The agreement, signed on 22nd December 2022, confirms that the hospital will accept cyanide patients and manage them according to ICMC (International Cyanide Management Code) cyanide protocols. The agreement confirms that Harmony will provide cyanide management training to designated Fountains Hospital staff and subsequent annual refresher training. The hospital commits to having Personal Protective Equipment and cyanide antidotes on site to treat at least three cyanide emergencies simultaneously.
ER24 and Fountain Hospital participate in cyanide exposure drills. The hospital agreement indicates that the hospital will participate in up to two cyanide drills per annum, and the Plant will notify the Hospital Manager before the drills. The Hospital Manager will notify the drill organisers in case of mass casualties at the Fountains Hospital.

***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.*

| | **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 an Emergency Preparedness and Response Plan (EPRP), which also covers the TSF. In addition, the TSF has an OP: Operational Procedure, Emergency Plan Tailings Storage Facilities, Mponeng Gold Plant.
The EPRP is based upon the Mponeng Gold Plant Procedural HAZOP (Hazard and Operability) study - Emergency scenarios assessment for Mponeng Gold Plant. The scenarios considered include: - Catastrophic release of hydrogen cyanide from storage or

process facilities; Transportation accidents; Releases during unloading; Releases during fires and explosions; Pipe, valve and tank ruptures; Overtopping of ponds and impoundments; Power outages and pump failures; and Failure of tailings impoundments, and other cyanide facilities. There are no heap leach facilities on site. There is no uncontrolled seepage from the tailings facility. Any drainage into the surrounding trenches is pumped back into the dam. Uncontrolled seepage would be managed as an emergency.
Sasol and Tanker Services are responsible for all transportation-related emergencies off the site. The route risk assessment for cyanide delivery from Sasol to West Wits Mponeng Gold Plant, Fochville, effective from 12 January 2022 to 12 January 2024, was sighted.
The following procedures were observed, which describe specific response actions: -

- "Evacuation Procedure" describes the evacuation of plant employees in the event of an emergency.
- “Operational Procedure, Emergency Plan Tailings Storage Facilities, Mponeng Gold Plant” describes TSF-specific emergency responses.
- “Cyanide spillage procedure" details specific response actions to cyanide spillages, including control of releases at their source.
- "Procedure to follow when HCN is detected” details the process to follow in the event of HCN gas detection by either fixed personal monitoring equipment or portable personal monitoring equipment.
- "Emergency Procedure for Cyanide First Aid Treatment" is the formal First-Aid & Medical Treatment for Cyanide Exposures protocol, including the use of cyanide antidotes.
- Containment, assessment mitigation and future prevention of releases are dealt with in separate procedures.

A zone of impact for a dam failure has been identified and the Community will not be affected.

***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:*
Information regarding the EPRP, and EPRP updates, is communicated through One Team Meetings, Health & Safety meetings, and SLAM (Stop, Look, Assess, Manage) risk assessments. References were sighted in meeting minutes and related documents. Further evidence appears in 9.1 and 9.2 below.
The evidence discussed during the audit meetings specifically related to TSF issues with the Wedela community leaders. Covid-19 prevented regular meetings with the

communities and affected parties since the Harmony takeover of Mponeng Mine in October 2020.
Medical facilities (ER24 and Fountains Hospital) are included in the emergency drills and are part of the feedback and post-mortem sessions where relevant updates would also be communicated. The Mine Surface Fire and Emergency Team Captain liaises with the Municipal Fire Department regularly.

***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 Plant Manager is the EPRP sponsor who provides his support role to the Emergency Response Process, thus lending support at the highest level. Emergency Response Team (ERT) members are Cyanide Appointees and are identified on all major notice boards and in first aid rooms. This was confirmed during the site inspection. All emergency training is done according to the Harmony training matrix. The call-out process is that the ERT will be called out in terms of the "Plant Emergency Response Team Call-Out Procedure". The Plan includes the duties and responsibilities of the coordinators and team members and a list of emergency response equipment, including personal protective equipment.
The Cyanide Champion, as the EPRP Coordinator, is responsible for the maintenance, updating, training and implementation of the EPRP (Appointment letter sighted). Inspection of emergency equipment is covered by various procedures and checklists: -

- "Cyanide Emergency Equipment Inspection procedure",
- "Checking of Cyanide First Aid Kits" procedure,
- "Inspection of Medical and Cyanide Antidote Kits" procedure, WM_CN_SM_068, rev. 10, dated October. 2022.

Emergency response equipment is checked using equipment registers, and the inspector is formally appointed for each register: -

- "Monthly inspections Cyanide antidote Register", sampled January - December 2022 and January - December 2021, including expiry dates for amyl nitrate kits. Antidote delivery was delayed in 2022 due to Covid travel restrictions.
- "Daily inspections First aid kits Register", sampled January - December 2022 and January to December 2021.
- "Daily SCBA (Self Contained Breathing Apparatus) Equipment Register" sampled January - December 2022 and January - December 2021.
- Daily Medical Oxygen inspection January - December 2022, January to December 2021.

The Cyanide Emergency trailer is equipped with cyanide emergency equipment and is stationed in the plant for use during cyanide emergencies. The daily inspection files and

inspections from January to December (except for April) 2021 and January to December 2022 were sighted and sampled.
ER24 is contracted to provide paramedic and ambulance support to transport cyanide patients to the Medical Hub and to Fountain Hospital as required. An agreement between Harmony and the Fountain Hospital is in place. ER24 and Fountain Hospital take part in cyanide exposure drills. The Mine has its own Fire Fighting facilities and would not make use of external responders. Intasol at the TSF will contact the Plant control room in case of cyanide emergencies.
ER24 is contracted to provide paramedic and ambulance support to transport cyanide patients to the mine Medical Hub and to Fountain Hospital as required. An agreement between Harmony and Africa Healthcare t/a Fountain Private Hospital is in place. The agreement, signed on 22nd December 2022, confirms that the hospital will accept cyanide patients and manage them according to ICMC (International Cyanide Management Code) cyanide. protocols. The agreement confirms that Harmony will provide cyanide management training to designated Fountains Hospital staff and subsequent annual refresher training. The hospital commits to having Personal Protective Equipment and cyanide antidotes on site to treat at least three cyanide emergencies simultaneously.
ER24 and Fountain Hospital participate in cyanide exposure drills, and the hospital agreement indicates that the hospital will participate in up to two cyanide drills per annum, and the Plant will notify the Hospital manager before the drills. The Hospital Manager will notify the drill organisers in case of mass casualties at the Fountains Hospital.

***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 EPRP contains detailed contact information for external stakeholders. Contact information can also be found on notice boards and in the control room. This was confirmed during the site inspection.
The “Procedure Public Consultation and Disclosure / Emergency Communications” details how communications about an emergency are undertaken. It states, "…Only the existing Corporate procedure for the communication for cyanide related incidents and accidents to Government Departments, the Media, and the general public is used…."
The Harmony Corporate Internal Crisis Communication Management Process for loss of life incidents/accidents involving highly regulated hazardous chemicals (including cyanide), referred to above, was sighted. The process indicates a flow chart for developing and approving information releases to external stakeholders, including

management, regulatory agencies, the Media, external response providers and medical facilities. These procedures also apply to the TSF, where appropriate.
The "Procedure to Notify ICMI of any Significant Cyanide Incident" was sighted. The purpose of this procedure is to describe the process to follow in notifying ICMI when any significant cyanide incident occurs. It includes the significant cyanide incidents, as defined in the ICMI Definitions and Acronyms document, Page 7 of 10, JUNE 2021. It was confirmed that no incidents requiring reporting, as per the ICMI definitions and acronyms, have occurred since June 2021, when the ICMI Cyanide Code was revised.

***Standard of Practice 7.5:*** *Incorporate remediation measures and monitoring elements into response plans and 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 following Plant procedures that were observed include specific remediation measures: -

- "Handling and Detoxification of Cyanide Spillage" requires spillages to be neutralised with Ferrous Sulphate. Neutralisation chemicals are stored at the chemical store or backfill section. The neutralised materials and media will ultimately be disposed of on the TSF.
- "Using Ferrous Sulphate" procedure when using ferrous sulphate to neutralize solutions and solids. Ferrous sulphate is stored at the chemical store or backfill section. The procedure states: -
  "...
  3.5 Approximately 25kg of ferrous sulphate is required for every 50 litres of 33% strength liquid cyanide released. Ferrous Sulphate is stored at the main chemical store.
  3.8 Spilled cyanide should be dammed up with soil or sand-bags and ferrous sulphate added to the dammed cyanide solution in order to neutralize the cyanide.
  3.10 Cyanide contaminated soil / sand and ferrous sulphate must be disposed of into the metallurgical circuit as per the Sampling Procedure For Specialised Speciation- And Environmental Samples – WM_CN_SM_029.
  3.11 Industrial grade ferrous sulphate is green in colour. The blue colour and its shades of blue can be used as a rough indicator of the continuing presence of cyanide…"
- "Sampling Procedure for Specialised Speciation and Environmental Samples", cyanide-specific sampling procedures.
- Surface sampling operational procedure ISO 14001: 2015/8/21/00/2023 AG5 MPO (027) dated 15/3/23 rev 00-2023.

All drinking water is provided by municipal water providers that would not be affected by any incident to surface or groundwater. Therefore, the provision of an alternative supply is not required.
The "Antipollution dam operation" prohibits the use of chemicals such as sodium hypochlorite, ferrous sulphate and hydrogen peroxide near the rivers and streams in section 2.10. The "Cyanide spillage procedure", section 3.14, prohibits the use of chemicals such as sodium hypochlorite, ferrous sulphate and hydrogen peroxide to treat cyanide that has been released into surface water or that has the potential to reach surface water.
The following Plant procedures that were observed include specific environmental monitoring measures: -

- "Sampling Procedure for Specialised Speciation and Environmental Samples"
- Surface sampling operational procedure
- Sampling of antipollution dam overflows, Section 3.2 says samples shall be taken every 30 Minutes and tested for cyanide.
- Emergency Sampling procedure in the Environmental Management System Emergency Preparedness and response manual in Table 3.4 (a) structural failures within TSF (situation a situation) Post incident activities; section 3 sampling of water and soil quality, to commence during incident and after clean-up spillage.

***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:*
In the "Emergency Preparedness and Response Plan", under Section 5.8, Plan Maintenance, it states that (the Plan) will be updated every 3 years, or whenever there is a major change to the document, or when the following changes occur: -

- regulatory changes,
- new risks identified,
- resources or organizational structure changes,
- after drills exercises,
- after the EPRP is used for an actual event
- funding or budget level changes,
- technology changes, or
- any other major changes at the request of the Harmony Risk Management Department.

In the procedure "Review of The Emergency Procedure", it states: -
"…2.1 Plant emergency procedure shall be reviewed at least on an annual basis. It is the

responsibility of the SHE (Safety, Health Environment) Officer and Cyanide custodian to review the procedures.
2.2 Procedures shall also be reviewed when shortcomings are highlighted during drills conducted.
2.3 When short comings are highlighted during drills conducted, it will be briefed to all employees during Green Area Meetings or through established forums such as the plant health and safety meetings.
2.4 Employees shall be briefed on revised procedures during Green Area Meetings or through established forums such as the plant health and safety meetings.
2.5 Additions to the old procedure will be highlighted in the new procedure on the last page.
2.6 The procedure will be reviewed whenever the Manager, Engineer, SHE Officer and the Custodian changes…."
Mock cyanide emergency drills are conducted periodically, and a full cycle Mandown drill report dated 15 December 2022 was sighted. The scenario was during the tightening of bolts on the offloading flange, the Offloader was splashed in the face. Learning points - Cyanide emergency alarm was not audible enough in the plant; the patient walking away; while showering the patient, no oxygen was administered; the rescue team forgot their X-am 500 gas monitors, the charcoal antidote was available but not prepared, and no shift appointees participated during the drill. Drill recommendations were added to the PIVOT action tracker, and corrective actions were completed by 28 January 2023.
A Mandown at the offloading 18 May 2022 scenario employee splashed by cyanide while opening the drill was held at the cyanide dosing valve at the leach Pachucas. Recommendations: cyanide alarm to be audible, designated assembly point signage outside the office building; one person to be appointed to take roll call outside the office building; and contractors to be part of the drill. The date of the PIVOT action tracker closure was sighted. The procedure CN: Cyanide Management Conducting Cyanide Drills, requires that cyanide drills must be conducted 6 monthly. Subsection 2.6 states that a report of the findings whilst conducting the man down drill shall be documented and filed, and sub-section 2.7 states that any deficiencies shall be actioned and recorded on PIVOT.
In the "Review of The Emergency Procedure", it states: -
"…2.2 Procedures shall also be reviewed when shortcomings are highlighted during drills conducted.
2.3 When shortcomings are highlighted during drills conducted, it will be briefed to all employees during Green Area Meetings or through established forums such as the plant health and safety meetings..."
There were no actual cyanide-related incidents requiring implementation of the emergency response procedures occurred during this ICMC (International Cyanide Management Code) recertification period and therefore no evaluations have been conducted since Harmony took over Mponeng Gold Plant from AGA.

***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.*

**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:*
The cyanide hazard awareness training is given at e-learning induction and refresher courses. The training is provided to Plant employees, including in-house security, Intasol TSF contractors (included in the Intasol training matrix), and Medical Hub staff. Fountain Hospital and ER 24 staff are given presentations by the various Harmony Mine Training Officers (confirmed in the plant training matrix). A separate Contractors Matrix confirmed e-learning. Entry to the plant is by using a clock card, which only allows access after the completion of induction training or refresher training.
It was confirmed that Basic Cyanide First aid and medical treatment for cyanide exposures, UN No 3414, includes: -

- Cyanide chemistry, interacting with oxygen, toxicity, symptoms, decontamination, gas generation.
- How cyanide is transported, SHE issues in the event of cyanide poisoning, first aid equipment for cyanide, First Aid training, emergency response chain, warning alarm systems, emergency response by the control room, and buddy system requirements.
- Cyanide PPE requirements and use, cyanide PPE for hospitals, Gas detection instruments
- Cyanide first aid and antidote kit, Mine Health and Safety Act Regulation 24.8.2 (Cyanide antidote storage requirement), contents of medical aid kit details,
- Cyanide exposure and symptoms, consequences of cyanide poisoning, generation of HCN gas.
- First aid procedure for cyanide poisoning
- Cyanide patients are to be transported to the hospital directly
- Emergency response in case of an incident, including TriPac and Chapter 42 Medical Treatment Procedure (AGA Guidelines), in the ambulance transport to the hospital.

The training matrix covering Savuka and Mponeng confirmed induction e-learning was sighted. It was confirmed that there are 178 employees in the training matrix. It was confirmed that refresher training in e-learning is undertaken every 18 months. Long-term contractors' induction is refreshed annually.
During the electronic demonstration of the training matrix, it was confirmed that the records are kept electronically, as well as the hard copies at the Vaal Reefs depot, in a

storage container. The electronic database was sighted where each employee's full training record, including courses and refresher training, is available and can be extracted and printed, as required.

***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:*
Workers are trained to perform their normal production tasks, including unloading, production and maintenance, with minimum risk to worker health and safety and in a manner that prevents unplanned cyanide releases. The training matrix was observed that defines what training each worker is to receive, based on their position and the tasks required of that position. The Training Matrix includes detailed training requirements for all positions, which was confirmed during the demonstration of the Training Matrix. All holders of positions and tasks where high cyanide risk exists must, in addition, receive training as a Cyanide Appointee and be found competent in the training. The Cyanide Offloader receives additional training in cyanide offloading, as well as the cyanide appointee training, which was also confirmed in the electronic demonstration of the matrix.
It was confirmed in the training matrix that the required elements are included in the training matrix for each person. The Standard Operating Procedures (SOPs) are used as modules for the task training as per the matrix.
The Intasol TSF Training Matrix, including all Safe Work Procedures (SWPs) and indicating the expiry dates and date of Planned Task Observations (PTOs), was sighted. The SWP for each set of tasks is used as the base training material. The Matrix is updated as training is completed. The matrices for 2022 and 2023 to date were sighted.
The Plant Trainer, Welcome Diso, has received Train the Trainer training, presenting with confidence training, best practices in Training level 3 and level 4 training, Professional train the trainer training, is a qualified work place assessor, a registered assessor, a qualified 18001:2007 Lead Auditor, has received Management for supervisors training, and hazard identification training. Teresa Cierenberg is an ILS (Intermediate Life Support) Paramedic (23 years of experience) who trains cyanide medical service providers. Her Qualification as a Paramedic allows her, through the HPCSA (Health Profession Council of South Africa), to give various levels of First Aid Training (including cyanide). She works through JT Services, which is the Registered Service Provider for the Certificates, and which is registered as a Training Provider by the South African Labour Department.

Moses Melk is responsible for the training of Intasol TSF staff, and he has completed Facilitation training, conducted an outcomes-based assessment (15 Credits Level 5 SAQA (South African Qualifications Authority) no 115753) Assessor training, and Conduct Moderation of outcomes-based assessment SAQA ID 115729 (learner number 115759) training. The Trainer's experience totals 26 years on TSFs with various TSF Contractors.

All employees and permanent contractors are trained during the induction training prior to the commencement of work related to cyanide. All employees receive section induction e-learning and are assessed by their Foreman. Employees can only work with cyanide once they are competent. On the TSF, all new employees are given a site-specific cyanide awareness induction by Harmony. Intasol training is based on on-the-job task training using Safe Work Procedures (SWPs) and Planned Task Observations (PTOs).

The Mine Conducts Planned Task Observations and conducts refresher training if identified by the PTO. Deviations in PTOs are identified and recorded by the Supervisor.

Currently, the requirement is one PTO per supervisor per month, but this is currently under review with other management strategies.

Plant PTOs Sampled: -

- PTO-10-02-2021 -Servicing Cyanide Tac Machine – Being observed – Henry Makamadze, Observer – Zenzele Magwanyane. – Finding – Satisfactory
- PTO- 16-02-2021 – Leach Pachucas clean-up – the Apron – Being observed – Sello Kometsi, Observer – Caiphus Sobayeni = Finding – Satisfactory
- PTO – 25-10-2022 – Cyanide Titration – being observed – D Khobile, observer – B Lesame – Finding – Satisfactory.
- PTO – 12-04-2022 – Analysing Cyanide – being observed – Zenzele Magwanyane, observer – B Lesame
- PTO – 22-06-2022 – Clean Spillage of Cyanide inside Bund Wall – being observed – Monde Mdaka, Observer – Billy Lesame. Finding – Satisfactory
- PTO – 02-02-2023 – Cleaning Pachuca Tank – being observed – Daniel Ntsasa, observer – John Schloho – Finding – Satisfactory

TSF PTOs sampled: -

- Depositing slurry on TSF. 5/1/22 by PJT Pretorius on G Moleku.
- Operating and closing of valves on TSF. 6/12/21 by PJT Pretorius on A Bandezi.
- Operating a penstock on TSF. 13/2/23 by Tebogo Tshane on Stephanus.

During the electronic demonstration of the training matrix, it was confirmed that employees are evaluated using assessments and PTOs before being declared competent to perform their job. Competency levels are shown for each person on the training matrix. Intasol uses PTOs and, additionally, uses informal safe behaviour observation methods to confirm competency. Targets are set by Management periodically.

During the electronic demonstration of the training matrix, it was confirmed that the records are kept electronically, as well as the hard copies at the Vaal Reefs depot, in a storage container. The electronic database was sighted where each employee's full training record, including courses and refresher training, is available and can be extracted and printed, as required. The TSF Training records are kept at the Site in hard copy format for at least 5 years.

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

**X in full compliance with**

**The operation is**  in substantial compliance with Standard of Practice 8.3

 not in compliance with

*Basis for this Finding/Deficiencies Identified:*
All employees at the Process plant and the TSF were trained in Cyanide Hazard Awareness training, which is given at e-learning induction and refresher courses. This training includes all unloading, production, maintenance and contracting personnel and also covers cyanide releases, decontamination, and first aid.
The Cyanide Appointees are included in the training matrix, and it was confirmed that there are 24 appointees and 4 Offloaders. The Cyanide Appointees form the Emergency Team on the plant, and at least 4 appointees are present on each shift. The Cyanide Appointees lists were sighted on the notice boards and at the cyanide emergency stations. The training requirements for Cyanide Appointees were sighted electronically and on hard copies. This includes: - SCBA training, Harmony First Aid, PAC 7000 personal gas monitor, and proof of e-learning induction.
There are no external providers involved in the EPRP, except for ER24 and Fountain Hospital medical service providers. The contracted Medical Response Team (ER 24) and the Fountain Hospital receive verbal training and are trained by the Training Officers of Kusasalethu or Savuka, or Mponeng. ER24 and Fountain Hospital participate in cyanide exposure drills which is a part of training. The attendance register dated 13 December 2022 covering cyanide first aid training for Fountains hospital was sighted. All relevant personnel receive refresher e-learning every 18 months - confirmed in the training matrix. Expiry dates are yellow flagged in the Matrix 3 months before expiry.
It was confirmed during the electronic demonstration of the training matrix that the records are kept electronically, as well as the hard copies at the Vaal Reefs depot, in a storage container. The electronic database is where each employee's full training record, including courses and refresher training, is available and can be extracted and printed as required. The attendance register dated 13 December 2022 covering cyanide first aid training for Fountains Hospital was sighted.

***Principle 9. DIALOGUE AND DISCLOSURE: 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:*
Harmony took ownership of Mponeng Mine in October 2020. Many of the AGA strategies are in the process of being reviewed, revised, and rebranded for Harmony. The dialogue with stakeholders and communities was restricted during the Covid 19 regulations and additional constraints from 2020 to the beginning of 2022.
A poster describing the West Wits metallurgical operations prepared by AngloGold Ashanti is available in the plant and was used for internal stakeholders. With regard to Stakeholder engagement, the Wedela Ward Councillors' feedback meeting on a dust grievance dated 30 Sept 2022 was sighted. Also sighted was a presentation on the dust suppression strategy developed to inform the community on what is being done in the short, medium, and long term to deal with the issue. The process used would also be used if there were cyanide grievances from the community or if there were cyanide-related issues that need to be communicated.
In the next three years, a number of engagement strategies will be developed, which will include cyanide.

***Standard of Practice 9.2****: 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 9.2**

□ not in compliance with

*Basis for this Finding/Deficiencies Identified:*
Harmony took ownership of Mponeng Mine in October 2020. Many of the AGA (AngloGold Ashanti) strategies are in the process of being reviewed and rebranded for Harmony. A poster describing the Savuka metallurgical operations is available on request and was sighted.
The majority of the community in the vicinity of the West Wits Region (now called Mponeng Operations) is literate. Discussions can be held in Xhosa and Sotho languages, where required. The majority of the Mines employees were previously employed by AGA, and there is an element of carryover. (Mponeng was previously fully ICMI certified under AngloGold Ashanti.) The estimated percentage of the workforce living in the local communities within 20 km is 70%.
Fatalities or mass incidents are handled via the Harmony Corporate Communications Department. Newsflashes are distributed within the Company via e-mail. Incidents are reported to the Department of Mineral Resources and Energy (DMRE) by mine

management. The DMRE reports selectively on repeated or critical incidents, not necessarily publicly or widely. It does not make all information available to the public.
Information on significant cyanide exposures is available after appropriate investigations on the company ESG website (http://www.harmony.co.za/sustainability/sustainability-reporting/2022/), page 163, mentions the cyanide code and cyanide incidents table). The information will identify on which sites the cyanide incidents occurred. No Cyanide incidents have occurred since Harmony took over the operations in October 2020 from AGA.
Mine releases are reported to the Department of Water Affairs and Sanitation (DWAS) and the Department of Forestry, Fisheries and Environment (DFFE) following an investigation by the Mine Environmental Department. Sasol and Tanker Services are responsible for releases due to tanker incidents en route to the mine. Information on significant cyanide releases is available, after appropriate investigations, on the company ESG (Environmental, social, and corporate governance) website (as above).