

***INTERNATIONAL CYANIDE
MANAGEMENT INSTITUTE***

***Cyanide Code Compliance Audit
Gold Mining Operations***

Certification Summary Audit Report

***Ma'Aden Gold & Base Metals Company
Mahd Ad Dahab Mine
Saudi Arabia***

20th – 24th October 2019

***For the
International Cyanide Management Code***



Name of Operation : Mahd Ad Dahab Mine (Mahd Mine)
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Location detail and description of operation

Mahd Ad Dahab (Mahd) Mine is located approximately 140 kms south east of the capital city of Al Madinah, in Al Madinah Province in the Western region of Saudi Arabia.

Ore stock pile

The ore from the mine underground is classified into super high grade, high grade, medium grade and low grade; each grade classification is stockpiled separately on the Stockpile. The oversize rocks (ore) on the stockpile are broken into medium size using a rock breaker. Different grades of medium size ore are blended to get the optimal crusher feed. Mobile equipment used: Rock breaker, Front end loader

Crushing

Blended ore is fed into the jaw crusher (primary crusher) which crushes the material to 80% passing through 100mm size; the crusher has a capacity of crushing between 45 and 75 t/h, but the normal crushing rate is about 60 t/h. From the primary crusher the ore is screened and sent to the secondary crushing stage (cone crusher) to reduce the particle size to about 10mm. The final crushed product is carried through the conveyor belt to the Blender, of 2000 tons live capacity, for feeding into the ball mill.

Grinding

The grinding (wet grinding) takes place in the ball mill. From the fine ore bin (silo), the ore is transported to the ball mill via conveyor belt at the rate of 25t/h. The ball mill length and diameter (inside the shell) is 5.8m and 3.2 m respectively. The mill installed power is 560 kW and unit power consumption (mill input) of 27.78 kWh/t, the mill's percent critical speed is 76. The mill can accommodate up to 40% volume steel charge, the steel balls size is 60 mm. The ball mill product is sent into hydro cyclone for classification in which the cyclone underflow is recycled into the ball mill while the cyclone overflow goes to the flotation circuit for treatment. The targeted grind product size from the ball mill through the cyclone overflow is 75% of material passing through 75 microns.



Copper flotation

The cyclone overflow material at around 35% solids by weight is fed into six automated Outotec copper flotation tank cells with a portion of the stream bled into a flash flotation cell. Zinc sulphate is added to the mill discharge hopper for conditioning before other reagents (collector and frother) are added into the conditioning tank and which are then fed to the cell (6 cells in series of 4 roughers and 2 scavengers), the easily floatable minerals are recovered through the cell launder overflow and sent to the copper cleaning stage, and then to the copper concentrate thickener depending on the concentrate grade after the cleaning stage. The flash flotation underflow is sent to the copper conditioning tank with the concentrate (overflow) joining the feed to the cleaner cells. From the cleaner the copper mineral is forwarded via a thickener to a dewatering filter (Larox) for filtering; the filtered copper is now in the form of copper concentrate.

Gold Leaching

The leach circuit contains five leach tanks (CIL). From the copper flotation, the copper tails are pumped to the leach feed thickener to thicken the slurry to at least 50% solids before pumping it into the first leach tank for the cyanidation process (to dissolve the gold). At the CIL, the slurry flows from one tank to another in counter-current with carbon movement. The activated carbon is added in to the last CIL tank and periodically forwarded counter current to the flow of slurry; the loaded carbon is harvested in the first CIL tank, and is then forwarded to the gold stripping circuit.

Acid Wash and Elution

The loaded carbon is subjected for acid washing to remove the acid soluble accumulated in the carbon during the CIL process. The adsorbed copper in the loaded carbon is then stripped in a cold elution stage. After cold elution, the loaded carbon is now ready for stripping; hot caustic cyanide is then circulated to the column to recover a concentrated gold and silver solution.

Electrowinning and Smelting

Electrowinning Process

After the elution process (stripping of gold from activated carbon into pregnant solution) the recovered concentrated gold and silver solution (pregnant solution/eluate) is subjected for the electro winning process. The pregnant solution is pumped through the electrowinning cell(s) which contains two electrodes (anodes and stainless steel cathodes).

Direct current is passed between the electrodes; the electrolytic action causes the gold in solution to plate out on the cathodes. The electrowinning continues until the solution leaving the cell(s) is depleted of gold. The barren solution is pumped away (through a barren solution tank) into the leach circuit.

Smelting Process

The gold (impure) from the loaded cathodes is cleaned off into a sludge which is filtered and dried for smelting. The dried impure gold is then mixed with fluxes and smelted in a furnace. Smelting removes the impurities from the gold into the slag and allows Doré bars to be cast in moulds in which the slag captures the impurities and it floats on the molten gold. The slag is removed from the gold bars and each gold bar is assigned a number sequentially.



Gold Sampling and Storage

A gold sample is taken from each gold bar (by a drilling method) for gold assaying purposes. After sampling, the gold bars are stored in a safe inside the gold room until the shipment day. Before gold shipment, the bullion list (showing each gold bar's number, weight and corresponding assay) is prepared. Each gold bar is stored in a separate box ready for shipment.

Tailings

Tailings Filtration

The leach tails are pumped to the tailings thickener via a carbon safety screen to thicken the material, which is then pumped to the tailings stock tank. The tailings stock tank distributes the feed to the 3 drum filters which filter the slurry to cake and filtrate (Process water). The tailings is transported to the tailings storage area (bay) via a conveyor system which is hauled by trucks to the tailings storage facility (TSF). The filtrate is then pumped to the process water tank to be returned to the process.

Tailings Deposition

The cake (Tailings) from the drum filter which was conveyed to the tailings storage area (bay) is hauled to the tailings storage facility (TSF) by means of a front-end loader (FEL) and haulage trucks. The tailings are dumped on the TSF according to the tailings management plan (TMP) and levelled by a bull dozer where the material is dried after 2 to 3 days of dumping.



Auditor's Findings

This operation is

in full compliance

in substantial compliance

not in compliance

with the International Cyanide Management Code.

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: 7/02/2020

Dates of Audit: 20^h – 24th October 2019

I attest that I meet the criteria for knowledge, experience and conflict of interest for Code Verification Audit Team Leader, established by the International Cyanide Management Institute and that all members of the audit team meet the applicable criteria established by the International Cyanide Management Institute for Code Verification Auditors.

I attest that this Summary Audit Report accurately describes the findings of the verification audit. I further attest that the verification audit was conducted in a professional manner in accordance with the International Cyanide Management Code Verification Protocol for Gold Mine Operations and using standard and accepted practices for health, safety and environmental audits.

Mahd Mine



7/02/2020

Facility

Signature of Lead Auditor

Date

Mahd Mine

Signature of Lead Auditor

30th January 2020

Auditor's Findings

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

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

X in full compliance with

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

 not in compliance with

Basis for this Finding/Deficiencies Identified:

There is a Purchase Order Agreement in place between Ma'Aden Gold and Base Metals (MGBM) and Professional Chemicals & Ind. Equipment Co. Ltd. (Pro-Chemie) for the Supply, Delivery, Customs Clearance & Transport of Sodium Cyanide. MGBM obtains cyanide on behalf of all of its gold mines, including Mahd. Cyanide is purchased from cyanide producer, AGR/CSBP, which was certified as fully compliant with the ICMC (International Cyanide Management Code) on 3 August 2017.

The agreement confirms that Pro-Chemie and its appointed sub-Contractors, including the cyanide producer, shall be certified as being in compliance with the International Cyanide Management Code for the manufacture, transportation and storage of cyanide as to be ultimately used in the production of gold.

2. TRANSPORTATION: Protect communities and the environment during cyanide transport.

Standard of Practice 2.1: Establish clear lines of responsibility for safety, security, release prevention, training and emergency response in written agreements with producers, distributors and transporters.

X in full compliance with

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

 not in compliance with

Basis for this Finding/Deficiencies Identified:

There is a Purchase Order Agreement in place between Ma'Aden Gold and Base Metals (MGBM) and Professional Chemicals & Ind. Equipment Co. Ltd. (Pro-Chemie) for the Supply, Delivery, Customs Clearance & Transport of Sodium Cyanide. The Purchase Order Agreement specifically covers the responsibilities and requirements for transport to the operations, safety, security, unloading at operations, maintenance of means of transport, emergency response (spills prevention and clean-up), route planning and risk assessments, storage and security at ports of entry, interim loading, storage and unloading during shipment, community liaison, emergency response resource access and availability, training, and communication.

It was also confirmed that AGR, the cyanide producer, adds a carmoisine dye to the cyanide briquettes at the point of manufacture, before being transported to Mahd mine.

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

X in full compliance with

The operation is in substantial compliance with **Standard of Practice 2.2**

 not in compliance with

Basis for this Finding/Deficiencies Identified:

The Purchase Order Agreement confirms that Pro-Chemie and its appointed sub-contractors, including the cyanide producer and transporter, shall be certified as being in compliance with the International Cyanide Management Code for the manufacture, transportation and storage of cyanide.

AGR/CSBP cyanide road transport from production site to shipping port (Freemantle) is covered in the AGR Western Australian Supply Chain, and was ICMI-recertified on 16th November 2019. International Shipping from Freemantle, Australia, up to the King Abdullah Port (Saudi Arabia), and the handling of the containers from the vessel onto the wharf and into the designated storage area at the King Abdullah Port (Stevedore Company - National Container Company Limited which is part of the larger Group, International Port Management) is covered by the AGR Ocean Freight Supply Chain covering cyanide transport by ship from Freemantle using MSC and MAERSK Australia to various interstate or international ports. The Ocean Freight Supply Chain recertification was published on the ICMI website on 19th December 2017.

MGBM is a consignor signatory to the Cyanide Code covering the Saudi Arabia Supply Chain from the King Abdullah Port (Saudi Arabia) to the various MGBM mine sites, including Mahd Mine, in Saudi Arabia. The Saudi Arabia Supply Chain certification was published on the ICMI website on 8th December 2014. The Consignor re-certification

was recertified on 10 May 2018. The chain of custody records were checked and found to be in compliance with ICMI requirements.

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 cyanide mixing and storage plant was subjected to a Structural Integrity Assessment in September 2019 by a Civil Engineer and no issues were reported for the cyanide mixing and storage area in terms of fit-for-purpose. Tank mechanical fabrication drawings, including sample computation, dimensions, plate sizes, and stainless steel and welding specifications were sighted. Tables with quantities, unit costs and total cost estimates are included in the drawings. The drawings were prepared by the Mill Planner and checked by the Mill General Foreman. The tank was retrofitted to a previously existing mixing and storage facility, replacing the old tanks.

The cyanide mixing and storage tanks are placed on concrete tank foundations. Drawings reviewed confirmed that the reagent area has a solid impermeable concrete foundation. The cyanide mixing tank has an interlock with the automatic feed water valve which will close the valve at 75%. A hosing line is used to rinse the bags, with the take off before the automatic valve linked to the interlock. If this valve is left open, a risk of overflowing exists, and a high-level alarm has been fitted to warn of a high level should hosing be uncontrolled. An audible level alarm system sounds at 95% and functions as a high - high alarm. At the Dosing / Holding tank, the transfer pump to the holding tank is interlocked with the holding tank level system and shuts the pump down at a level of 90%.

The solid cyanide store is totally enclosed and equipped with ventilation louvers on all the sides. It was confirmed that the louvers were open at the time of the site inspection. The store is only used for solid cyanide storage. The floor is bunded and sloped to the middle with the side sheeting fitted to drain outside the floor bund. The roof is fitted with gutters to lead water away from the building sides. The Mine is situated in a very dry arid area with little rainfall.

Both the dry cyanide storage warehouse, the mixing tanks and the liquid cyanide storage tanks are placed inside a mine security area with access control as well as being fenced in

and the doors and gates are equipped with locks. Security and Operations staff must both unlock the cyanide warehouse gate and open the warehouse roll up door using a remote control (operated by security).

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:

Solid cyanide is delivered in briquette form, packed in a plastic bag inside a bulk bag. The bags are packed into 1 ton wooden boxes, and are transported from the manufacturer to the site in sea-tainers.

There are detailed, procedures and checklists covering cyanide mixing and transfer, and cyanide packaging disposal, which spell out PPE requirements, use of a buddy, and tasks are clearly sequenced to prevent spillages and accidental releases during mixing, packaging disposal, storage and transfer processes. There is a monthly consolidated inspection checklist which crosschecks box use with box disposal.

In terms of cyanide box offloading and storage, boxes are stored at a maximum height of 3 high, and only trained, competent and authorised personnel are allowed to operate the forklift truck.

The bags are washed out once emptied in the splitter and are washed out three times to ensure no cyanide is left in the bag. Empty cyanide boxes must be temporarily stored in the cyanide mixing bund under lock and key, and burned as per procedure and cannot be used for any other purpose.

The cyanide producer adds a Carmoisine (red vegetable dye) dye to the cyanide briquettes at the cyanide manufacturing facility before being transported to the site at Mahd. An e-mail from the manufacturer's export manager, dated 12 April 2018, was sighted confirming the addition of the dye to solid cyanide briquettes at the cyanide manufacturing plant. It was observed during the site inspection that the bag breaker box at the cyanide mixing tank was stained red and that the liquid cyanide at the dosing point was coloured red.

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



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

X in full compliance with

The operation is in substantial compliance with **Standard of Practice 4.1**

not in compliance with

Basis for this Finding/Deficiencies Identified:

The site has 13 cyanide Standard Operating Procedures and a Tailings Storage Facility (TSF) procedure. The Mahd TSF is a lined area with the residue being filtered using Drum filters. The residue cake is loaded onto trucks and delivered to the TSF via a tarred road to minimise seepage to soil. The filter cake residue is tipped by truck. The tipped residue is evenly distributed over the surface of the TSF, after drying for around two days, using bulldozers.

The Gold Plant does not have any ponds and residue is filtered using drum filters to 20% cake moisture before being trucked to the TSF. No discharge to surface water takes place from the plant. Residue filtrate is collected in process water tanks in the plant. Thus, no open waters, or slurry tailings discharge, where birds could eat or drink, is present.

A monthly planned inspection system is in place and was sighted and drilled down. The reports included the following positions: Mill Superintendent, Process Engineer, EHS Engineer, Mill General Foreman, Maintenance General Foreman, Warehouse Supervisor, and Foreman Civil. The reports are signed off by the incumbents and faults are reported as appropriate to maintenance and job cards raised as necessary. A review of the integrated inspection system has deemed that the frequency of inspections is adequate. Maintenance records are kept and were sighted. The site is in the process of introducing the Oracle software as a formalised and detailed Planned Maintenance software system. This has not progressed to a point where it is auditable. Backup pumps are installed for all areas where failure in the pumps could result in cyanide releases. This was confirmed during site inspection. All reagent strength cyanide pipes, where crossing areas where leaks and releases may pose a risk, are installed in a pipe - in - pipe system, draining back to the cyanide storage bund. As the TSF is a dry TSF, there are no pipelines posing a risk to cyanide releases to the environment, requiring a PMS or back up pumps or secondary containment.

Operational inspections are done daily by the shift boss using the cyanide system checklist, including cyanide pumps, valves, suction, pipelines, empty boxes, leaks, and spills. Monthly management team inspections include the cyanide warehouse, cyanide mixing and storage area, cyanide pipe to dosing point, tanks, emergency cupboards, antidote fridges, acid spent solution, portable and fixed gas detectors, cyanide boxes /



bags burning area, tailings loading area, tailings hauling road, tailings dam, and are given risk ratings for all areas.

A Structural Integrity Assessment Report Mill Plant Mahd Mine prepared by a Civil Engineer, dated September 2019 was sighted. The conclusion from the report is that the plant is structurally sound to continue to operate, and the Engineer identified some minor repairs required to cracks in the civil foundations. The report includes reference to deterioration of some steel tanks, resulting in the requirement of repairs and support to CIL tanks and a process water tank. Evidence was sighted of completed repairs to the CIL tanks and that the proposed replacement of the process water tank and CIL feed thickener completion is expected by January 2020. The Engineer stated that the current tanks are still fit for purpose to use until replacement as planned.

A change management procedure is in place and is operational. Three change management exercises were reviewed: - installation of peristaltic pumps on the cyanide dosing installation; installation of the TAC 1000 cyanide control analyser in the cyanide dosing system; and the CIP (Carbon in Pulp) to CIL (Carbon in Leach) conversion.

The plant uses either full or partial process shutdowns to rectify faults and do major repairs. A pre-shutdown risk assessment is conducted as part of the shutdown planning. Plant shut down and start up practices are followed for shutdowns. There is no known case where an upset in the water balance will cause the plant to temporarily close as the plant is located in Saudi Arabia in a water scarce, desert area.

The plant is designed and equipped with bund walls, sump pumps and all spillages are returned to the process. There is no risk of unintentional releases on the plant as the plant is equipped with secondary containment which will contain all run back in case of power failure. The Plant is run using its own power generation system with 3 standby units available. The units are rented from a separate power company, which is responsible for power generator maintenance.

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:

Daily communication is held between the process plant and the Geologists to assist with planning the feed to the mill. Float and cyanide requirements vary with the blend received and are adjusted appropriately. The test report, "Cyanide optimisation CIL Circuit at Ma'aden Mahd Mining and Establishment of Factors Affecting CIL

Performance", by Kutika Athumani (metallurgist), dated August 2018 was reviewed. The objective of the report was, following the major change from CIP to CIL, to optimise reagents dosage, cyanide consumption, and gold recovery improvement. The report stresses the importance of the automation and effective control of the cyanide dosing to the CIL feed. It further highlights the importance of CIL feed density control. The report also covers gold particle size, refractory sulphides, ore mineralogy, sulphide minerals, leach kinetics, preg robbing materials and cyanicides. It links the concentration of polymetallic mineralisation to cyanide consumption, which is considered in the daily communication between the process staff and geology for planning cyanide parameter settings

Bottle roll tests are conducted on leach feed samples and Spreadsheets and graphs were sampled: including, "Cyanide Optimisation CIL Mahd", dated May 2019 showing cyanide addition rates of 1.3, 1.6, 1.8, 2.0, 2.2, 2.5, 2.8 kg/t. The test results indicated that the optimal recovery is achieved at around 2.0 to 2.5 kg/t cyanide addition.

The plant installed an on-line, free cyanide TAC 1000 analyser. The analyser is linked to a control system, automatically controlling the speed of a Verder peristaltic pump dosing cyanide to the no 1 CIL tank. Manual cyanide titrations are done every two hours and reported next to the TAC 1000 readings on the log sheet. The manual results are used to check the accuracy of the TAC 1000 and react in case of a malfunctioning unit.

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:

The mine is in a dry area in the Saudi Arabian desert. The TSF is constructed on a lined surface designed to contain the filtered tailings. There is no open water or ponds or slurry beach areas. The rainfall is measured using a weather station.

A report on a probabilistic water balance test at TSF no 5, Mahd mine, dated 13 May 2018, included infiltration tests on the TSF filtered cake sampled from the in-situ material indicating infiltration rates, "...The solid absorbs water up to 210 ml of the measuring cylinder over a period of 60 seconds..." This figure exceeds the maximum 24 hour rainfall events in the area which is a dry, arid, low rainfall area. Rainfall rarely exceeds 4 mm over a 24 hour period. The report continues: -

"...The beauty of the weather is that we will not probably have such heavy rainfall in such sort time as per historical rainfall data. The tests have been repeated a couple of times and recorded.

With the maximum monthly rainfall of 12 mm of rain during the rainy months of the year and the evaporation rate of 0.01m/day to 0.02m/day and infiltration rate of 50%, there is a



little chance of water going out of the dam even if the infiltration rate is insignificant (zero%), ...there no way of flooding the TSF No. 5 to such an extent that water will be released in the environment..."

The plant is equipped with bunds designed to take 110% of the largest tank volume and thus will contain the highest rainfall design event of 12mm per month. Thus, a probabilistic water balance is not applicable.

As the operation is situated in an arid water scarce area of Saudi Arabia, and no open water ponds or TSF open waters exist, no detailed probabilistic water balance is required. A basic supply demand water balance was reviewed.

The Mine area is equipped with storm water diversion concrete trenches to divert any storm water away from the process plant and the TSF. The consolidated monthly management inspection checklists were shown to include TSF water diversions.

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

X in full compliance with

The operation is in substantial compliance with **Standard of Practice 4.4**
 not in compliance with

Basis for this Finding/Deficiencies Identified:

The plant utilises drum filters to produce a filter cake at 20% moisture. The filtrate is collected in a process water tank and reused in the plant. There are no water ponds containing any cyanide solutions in the process plant.

The TSF is a filter cake (at less than 20% moisture) deposition site with no return water going back to the plant. The TSF is lined and the tailings are sun dried before being levelled by bulldozer. There is never a pool on the TSF and no return water or return water ponds exist. The whole mine is fenced to restrict access.

There have been no recorded bird or animal mortalities and long-standing employees cannot recall mortalities occurring. This was confirmed during a review of the consolidated monthly inspection checklists. There is no operating heap leach facility on the site. The heap leach was decommissioned in 2004.

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

X in full compliance with

The operation is in substantial compliance with **Standard of Practice 4.5**
 not in compliance with

Basis for this Finding/Deficiencies Identified:

No surface water or rivers are existing in the area. The mine is located in a desert area in Saudi Arabia. It is a water deficient plant with a closed water system due to the extreme water shortages and does not discharge any water.

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

X in full compliance with

The operation is in substantial compliance with **Standard of Practice 4.6**
 not in compliance with

Basis for this Finding/Deficiencies Identified

The plant is equipped with bunds and sump pumps to contain any cyanide solutions spillage. The TSF impoundment is lined to prevent any seepage into ground water. The asphalt road used to transport the filter cake is sprayed with water. The filter cake is filtered to 20% bound moisture.

Ground water is found at the Mine and is used for consumption by the mine. Sampled quarterly results: January and June 2019 borehole monitoring results reviewed were below limits of detection of 0.002 mg/l as total cyanide (The standard is below 0.001 mg/l total cyanide). The mine makes no use of backfill.

The mine has not caused the cyanide concentration of the ground water to exceed that necessary to protect its beneficial use and therefore there has been no remedial activity necessary.

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:

The reagent area concrete foundations plans confirm a solid concrete foundation for cyanide reagent tanks. The CIP and Leach tanks are installed on a ring beam filled with compacted soil and a 150mm welded wire reinforced concrete impermeable layer at the top, confirmed in tank drawings. Elution section solution tanks are placed on a solid concrete floor with welded wire mesh fabric reinforcement as an impermeable layer. All tanks are installed inside concreted bunds and inspections confirmed the bunds are

competent. All secondary containments are sized to be at least 110% of the largest tank with sizing ranging from 110% - 168%. All secondary containments are equipped with sumps and sump pumps equipped with level detectors which automatically start the pump, returning spillages back to the process.

The cyanide dosing lines are made of stainless steel inside a HDPE pipe (pipe-in-a-pipe system) which is compatible with high pH cyanide solutions. The new peristaltic Verder Flex dura 25 technical specifications were sighted, including the hose specifications, which is the only part directly in contact with the high pH cyanide solutions. Tank fabrication drawings specify materials compatible with cyanide and high pH conditions. Thus, the materials of construction are deemed compatible with cyanide and high pH solutions.

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:

There were no civil construction Quality Assurance/Quality Control documents for the plant but this was covered in a Structural Integrity Assessment report: Mill Plant Mahd Mine, prepared by a Registered Civil Engineer. The conclusion is that the plant is structurally sound to continue to operate, and the Engineer identified some minor repairs required to cracks in the civil foundations. The report includes reference to deterioration of some steel tanks, resulting in the requirement of repairs and support to CIL tanks and a process water tank. Evidence was sighted of completed repairs to the CIL tanks and that the proposed replacement of the process water tank and CIL feed thickener completion is expected by January 2020. The Engineer stated that the current tanks are still fit for purpose to use until replacement as planned.

The Certificate of Completion (3/3/2015) for the supply and installation of HDPE liner to the new tailings dam was signed by the Civil Foreman: Maintenance, and noted by the Superintendent: Maintenance. The Work Completion Certificate for the HDPE lining at new tailing dam pond Lining was signed by the Civil Foreman: Maintenance, and the Supervisor: Civil on 2/3/2015.

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

X in full compliance with



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

Basis for this Finding/Deficiencies Identified:

Monitoring work at Mahd mine has been undertaken by a Ma'aden group-wide service provider since July 2015. The service provider's Procedure for the sampling of groundwater, is based on Technical Standard, USEPA 40CFR part 264.97: General Groundwater monitoring requirements, ISO 5667-11 "Water quality part 6 section 6.11 guidance on sampling of groundwater, BS3930 Code of Practice for site investigations, in addition to regulatory guidance described in RCER2010 vol. 2. This was sighted and reviewed.

The service provider specifies how samples should be taken, sample preservation techniques, chain of custody procedures and cyanide species to be analysed. The Field Data Sheet includes reference to sampling conditions (i.e. weather, livestock, and wildlife activity, human) and a separate section for noting observations. There is no surface water in the area. Ground water samples are taken down stream of the TSF and no upstream samples are taken as the mountain is directly up stream of the plant and TSF. A map indicating borehole locations was sighted.

Boreholes are sampled quarterly and the frequency is deemed adequate considering the specific site and the arid/desert circumstances. The monthly consolidated management inspection reports for 2019 include cyanide-related wildlife mortalities, for which none were recorded and it was reported that no cyanide-related wildlife mortalities had been recorded for the past few years. There are no open waters present on the mine containing WAD cyanide.

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

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

X in full compliance with

The operation is in substantial compliance with **Standard of Practice 5.1**
 not in compliance with

Basis for this Finding/Deficiencies Identified:

The site has a Cyanide Decommissioning Plan which includes a decommissioning schedule under section 4, Implementation of cyanide decommissioning plan indicating

actions 12, 6 and 3 months before closure. The plan stated it will be routinely reviewed and revised during the life of the operation to address changes in facilities.

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

X in full compliance with

The operation is in substantial compliance with **Standard of Practice 5.2**
 not in compliance with

Basis for this Finding/Deficiencies Identified:

The document, “Gold Mine closure costs updates during Mine Closure and rehabilitation Plan and cost Estimation Training” prepared by Green Environment & SRK Danismanlik, dated November 2017, covering Mahd, Al Amar, Bulgah, Sukhaybarat and As Suq Mines. Mine Closure Costs Estimates SAR (Saudi Arabian Riyals) 26 131 611.00 for Mahd in the 2017 estimate. Page 7 under cost estimation, it states that costs will include disposal of cyanide reagents, decontaminating of equipment, rinsing of heaps and activities to prepare tailing storage facilities for closure, removal of water from pond surfaces, or reduction of the cyanide concentration to a level protective of human health and wild life. Costs described are for third party implementation, and the bases for the estimates, such as rates quoted by or applicable to an outside contractor.

Ma'aden Gold and Base Metals Company uses a self-guarantee as a financial assurance mechanism to cover its estimated costs for the cyanide-related decommissioning activities identified in its decommissioning and closure strategy. A Statement of Financial Strength from PWC dated 11 March 2018, signed by Auditor, Mufadda Ali (Licence No 447), confirming MGBM's ability to implement cyanide-related decommissioning activities for Mahd, Al Amar, As Suq, Sukhaybarat, Ad Duwayhi and Bulgah gold mines. This statement was prepared according to ICMI guidelines.

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 procedures and forms were reviewed:- Cyanide mixing and transfer Mahd Mine; Disposal and burning of empty boxes and bags Mahd Mine; Cyanide offloading and storage Mahd Mine; Cyanide withdrawal from warehouse to cyanide mixing area; Buddy Procedure: The cyanide system Mahd Mine, Sample Confined space entry permit sighted; Sample Clearance certificate sighted; and Decontamination before maintenance procedure sighted. All were found appropriate for working with cyanide in a manner that minimised risk to worker exposure and included, where appropriate, the use of Personal Protective Equipment (PPE) and appropriate pre-work inspections.

The TSF Standard Operating Procedure covering basic guidelines for the inspection of the TSF including level monitoring, embankment stability, monitoring, flood control monitoring, liner status, and emergency response was reviewed. The latest version of the procedure includes decontamination of contractors' equipment before going off site.

A Change Management procedure is in place and operational and three management change exercises (installation of peristaltic pumps on the cyanide dosing installation, installation of the TAC 1000 cyanide control analyser, and the CIP to CIL conversion.) were sighted and reviewed.

With respect to work inputs on health and safety, daily safety meetings (maintenance and operations on a shift basis, separately) are conducted and minutes kept. The meeting file was sampled, including attendance lists. Issues arising included PPE compliance, and confined space entry. It was confirmed during the interviews with the staff that the daily meetings are used to discuss and report health and safety issues.

Inputs also arise from monthly production and safety meetings. Sampled meeting minutes gave the following examples: - discussion on decontamination of cyanide equipment cyanide procedure and related work permit; risk assessment, and permit to work and confined space entry. The workforce is also directly involved in Risk Assessments.

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 controlled at 10.5 to prevent HCN gas formation. The cyanide mixing pH is adjusted to be more than 11 by adding liquid NaOH as per the mixing procedure.

There are 5 fixed HCN gas monitors in place: cyanide mixing (1), top of leach (2), stripping (1) and refinery (1). The Plant has 7 personal PAC 7000 HCN gas monitors available. The PAC 7000 personal gas monitors are set to alarm at 1.9 first alarm and 3.8

PPM second alarm. The staff will evacuate at 3.8 ppm HCN. The fixed gas monitors alarm at 4.7 and 10 ppm HCN gas. Six areas are designed as cyanide hot spots and equipped with fixed HCN monitors: cyanide mixing (1), top of leach (2), stripping (1) refinery (1). The plant replaced all its seven fixed monitors and these were calibrated to 24 September 2019 with the next calibration due on 24 March 2020. Calibration records for the personal monitors were sighted for 6 October 2019 and 13 March 2019.

A quarterly survey, including HCN gas, is conducted by the Chief Assayer. Records sighted for the 15 October 2019 indicated the highest level in the leach - 1.4 ppm mid-morning, and for 20 May 2019, the highest level was the leach at 1.4 ppm. The times of the survey varies to cover time-based activities and variations. The areas surveyed are: ball mill discharge, floatation circuit, hydrocyclones area, cyanide mixing area, dewatering, stripping area and leach area tanks.

Appropriate signage was confirmed at the cyanide warehouse, cyanide mixing area, and cyanide dosing points were labelled on the leach. During the site inspection, the condition of the signage was excellent and the signage displayed covered all the ICMI requirements.

The cyanide manufacturer, AGR, adds a Carmoisine (red vegetable dye) dye to the cyanide briquettes at the cyanide manufacturing facility in Kwinana, Australia, before being transported to the site at Mahd. An e-mail was sighted from the Export Manager: AGR, dated 12 April 2018, confirming the addition of the dye to solid cyanide briquettes at Kwinana cyanide manufacturing plant.

The site inspection confirmed the use of safety showers at strategic locations throughout the plant. Showers are inspected weekly by shift boss and are included in the consolidated monthly management inspection checklist. Showers are also inspected by the HSE department monthly and reported. The emergency response procedure safety shower / eye wash inspection checklist was sighted which included details of specific inspection items. Temperature is checked due to the very hot environment of the plant area. The emergency response status reports which includes findings from inspections and corrective action for faults and deviation identified and includes safety showers, fire extinguishers, cyanide cupboards, spill kits and cyanide antidotes.

Fire extinguishers are inspected by the ERT (Emergency Response Team) monthly and the inspection file was reviewed and sampled.

In Cyanide mixing and storage and dosing, high strength cyanide pipelines are colour coded purple. Flow direction stickers were noticed and markers were both in English and Arabic. For process plant low strength cyanide pipelines, staff are trained that work on equipment including slurry lines must include a permit to work (Procedure Maintenance on cyanide equipment) which includes a cold work permit. The work permit identifies the contents of the equipment subject to the permit. A pre-job risk assessment is also done. This practice ensures that people working with cyanide are alerted to its presence. The AGR MSDS is available in Arabic and English and was sighted.

An accident / incident reporting system is used to investigate any cyanide or other incidents or accidents. No cyanide incidents have occurred. The Mine also uses the computerised MGBM "Hemaya" system which covers accident and environmental incident reporting. An example of a completed injury report and investigation was

sighted covering an injury to a right middle finger following handling rocks underground on 12 August 2019. The incident was investigated and the SOP was subsequently rewritten to address safer handling of rocks on vehicles in the underground environment. A full root cause analyses was undertaken with conclusions and recommendations.

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:

Cell phones and radios are currently used to raise emergency alarms. Alarm (“Panic”) buttons, coupled to audible alarms, are installed at the cyanide mixing, no 1 CIL tank, tank 6 CIL area, and the carbon harvest screen. There are 4 Cyanide emergency cabins containing oxygen sets, “Ambubag” resuscitator (Bag Valve Mask Bags) and cyanide PPE. Medical oxygen is kept at the Clinic, in the Ambulances (1 each), and Emergency Response Station (3).

Cyanide antidote (Packs containing injectable Sodium Nitrate and Sodium Thiosulfate) is kept at the clinic (5 packs) and in the Emergency Response Station (1 pack) in fridges. The Mahad hospital holds 1 pack. Cyanide Antidote checklists for October and September 2019 were confirmed during the site inspection and the antidotes are stored in fridges as per the manufacturer’s instructions. Antidotes are replaced by MGBM Head Office and ordered in time for replacement, 3 months before expiry. All mine sites receive cyanide antidote from the same order which is coordinated by the MGBM Head Office Purchasing Department.

The Clinic is situated at the camp (3 km from main plant) and include a Doctor, Nurse and the ambulance. They are available during office hours and on call after hours. An ERT station (500m from plant) is available on site, manned by an ERT specialist, on call after hours. The ERT station is equipped with cyanide emergency equipment. Cyanide victims will be taken, after decontamination, by ambulance from the site to the clinic for treatment.

Off-site Cyanide emergencies are treated at the Mahd hospital, behind the mine, which is equipped with an intensive care unit. An official letter in Arabic (translated) dated 1 October 2019, from the Regional Mahd Office of Ministry of Health, was sighted, giving Mahd Mine permission to communicate with the Mahd hospital. The documentation included the request for permission from the Mahd General Manager. The letter was used to arrange a meeting with the hospital to plan for the cyanide training by the Mahd Doctor.

The Mahd General hospital staff received cyanide first aid and treatment training by the Mine Doctor, confirmed in attendance registers dated 23 Oct 2019. Presentations were

given in English and Arabic. Questions were asked about patient condition and stay over time at hospital and treatment. Close observation including checking for symptoms were highlighted. The Mahd hospital and civil defence are included in emergency drills annually.

The Mine Doctor confirmed that the Mahd Hospital was informed about the need to treat patients for cyanide exposure. It was agreed that cyanide antidote will be sent with the patient to the hospital. The Mahd Cyanide Emergency Response Guide (MCERG) document will also accompany the ambulance with the patient to the hospital. The document includes the medical protocol for cyanide treatment.

The transportation of patients forms part of the MCERG (section 9.7.2 Transportation protocol), and all ERT members are licensed to drive the ambulance.

The following cyanide drill records were reviewed:

- A Cyanide spill drill at the warehouse on 23 February 2018. The scenario was that whilst withdrawing cyanide from the warehouse and whilst a delivery was in progress, a forklift drove over a hump causing a cyanide box to fall off and spill some of the contents on the road. The report included no specific observations.

- A Cyanide evaluation drill 2 October 2019. It was observed that the alarm on top of the CIL did not function, both alarms in the mixing area were operational, the alarms were effectively heard in the admin block and employees of the plant evacuated to the assembly area.

- An indoor drill for the ERT 20 September 2019. The focus was emergency transfer, oxygen administration, and basic firefighting operations. Positive observations: proper oxygen administration was observed and both teams A and B was able to load the patient in the skid in less than 3 minutes. Learning points - no proper body mechanics during patient transfer, and too slow donning of SCBA. The ERT specialist is also the Trainer. The Nurse observed the oxygen administration.

There is an MGBM Emergency and Management Response Standard (EMRS) and an Emergency Response Team Manual (ERTM) in place and a site specific Mahd Emergency Response Plan (ERP) in place which cover formal response to cyanide exposures.

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:

There is an MGBM Emergency and Management Response Standard (EMRS) and an Emergency Response Team Manual (ERTM) in place and a site specific, Mahd Emergency Response Plan (ERP) in place to deal with cyanide accidents and incidents. The Plan, now in its third revised issue, combines existing documented responses and emergency provisions to deal with the various scenarios and includes and identifies the emergency response team and coordinators who are on all shifts. The tailings are stored in a lined impoundment and consist of filter cake, dried out and flattened following tipping. Rainfall is insignificant in terms of TSF stability risk. The TSF failure scenario was thus not identified as a potential emergency scenario. Transport cyanide scenarios are covered in the Ma'Aden Consignor Cyanide Transport Emergency Response Plan. The ERP includes the clearing of site personnel from the area of exposure but there are no potential affected local communities that need to be catered for. The use of cyanide antidotes and first aid measures for cyanide exposure are covered in the corporate procedure "Cyanide First Aid & Medical Treatment".

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

X in full compliance with

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

Basis for this Finding/Deficiencies Identified:

The EMRS involves the workforce in the evaluation, testing and updating of the plan using mock drills. Local communities are outside the zone of influence of the mine and evacuation is thus not an issue. The government hospital and mine ambulance are involved in mock drills. The government approved cyanide drill was done with Civil Defence, HCIS (Higher Commission on Industrial Security), Red Crescent and head office approval and participation. Local community leaders were also involved (Governor). The Mine Doctor has made the local hospital aware of the need for cyanide treatment and has given cyanide awareness and medical training to hospital staff.

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 ERP details roles and responsibilities of the emergency response team. The emergency equipment inventory was checked and site inspections confirmed availability and readiness. The Plan includes contact references (telephone, cell phone, etc.) of internal and external resources for the various scenarios, particularly with detail on where external resources and skills might be needed. Periodic drills involving stakeholders ensure that roles and responsibilities are understood and clearly implemented. Feedback sessions and documents from drills assist with continuous improvement. No outside responders other than government authorities are used during emergency situations. Communities do not take part in the emergency responses, but are given information on cyanide.

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 ERP includes details for appropriate emergency notification and reporting (internal and external) and the call-out procedure and contact information lists which are updated regularly. Internal and external communication is dealt with in the Plan and “Ma'aden Crisis Management” - a 34-page corporate booklet containing the guidelines, duty cards, and action checklists associated with a crisis command centre was sighted and reviewed.

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

X in full compliance with

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

Basis for this Finding/Deficiencies Identified:

The emergency response documentation covers clean-up, remediation and a neutralisation methodology and cross references to the appropriate site procedures. The use of neutralization processes and materials is clearly covered, as is the disposal of contaminated materials.



Specifically, the Mahd Emergency Response Guide includes the following: -

- Section 9.8 Decontamination of spill of solid or liquid cyanide into soil outside bunded plant areas;
- Section 10.1 Dry Sodium cyanide spill - inside warehouse / mixing facility;
- Section 10.2 Dry sodium cyanide spill - outside cyanide warehouse on route to mixing areas;
- Section 10.3 Handling high strength liquid sodium cyanide spill inside bunded areas;
- Section 10.4 Handling high strength liquid sodium cyanide spill outside bunded areas;
- Section 10.5 Spill in surface water or storm trench;
- Section 10.6 Response to a fire near the Mahd cyanide warehouse; and
- Section 9.9 Neutralisation

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

X in full compliance with

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

Basis for this Finding/Deficiencies Identified:

The Mahd ERP includes the requirement for review and revision annually or after an actual cyanide emergency or a mock drill which identified deficiencies. Mock drills are scheduled at least annually. Drills incorporate identification of problems, action and follow up on completion.

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

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

X in full compliance with

The operation is in substantial compliance with **Standard of Practice 8.1**
 not in compliance with



Basis for this Finding/Deficiencies Identified:

All mine staff that may come into contact with cyanide are trained in cyanide awareness. Training course material used is based upon the cyanide producer's English language training material and has been translated into Arabic. A Training matrix is in place which documents training records and identifies training modules required by various job types. Refresher training is done 6 monthly. Training records are maintained.

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:

A dedicated mill trainer is used by all Ma'aden Mines and he shares his time at the different Mine sites. Training is done per section starting with the Crushing, Ball Mill, float, and leach CIP. The Mill trainer uses updated site-specific SOP's. A training matrix was sighted which included Standard Operating Procedures for the operations, including cyanide mixing, and offloading. Currently, an external Company is used to assist with mine wide training including the plant training. The training records for the external trainers were reviewed. Planned Task Observations (PTOs) by the Shift Bosses are used to assess competencies of the operators.

The Ma'aden Head Office Trainer comes to site to train other operational tasks (He is an ex-Shift Boss, experienced with the operation of process plants and effective in English and Arabic with 27 years total experience.) The External trainer is a Certificated Trainer qualified to facilitate learning using a variety of given methodologies, he is a certified Training Moderator and qualified to conduct outcomes-based assessments.

The initial induction, including basic cyanide awareness training is done by the Safety Officer before any person is allowed on the Plant. No new Operator will work in the Plant unsupervised before he has been trained for at least 6 months. The Plant Superintendent and Metallurgist will then satisfy themselves that the person is competent to work with cyanide. The Saudi Mill Operators need 2 years' SMP graduate training, and 6 months training with the mill trainer. A new Operator must pass a written examination with the mill trainer before being allowed to operate the section. Hard copy training records in Arabic (pass mark 60 %) were sighted.

Refresher training is given to employees when re-assigned to different sections. If on the job observations (including PTO's) suggest an employee is not following the procedures, he may be counselled and / or given refresher training.

A new operator must pass a written examination under the mill trainer before being allowed to operate, unsupervised, in the section. For critical training, The Mill Trainer

does practical training and on the job observation followed by the Shift Boss, who does PTO's to ensure competency. PTO's are conducted using a special form based on the SOP (Ma'aden Gold Format) to confirm competency.

Electronic training records are maintained in the training matrix which was reviewed. Hard copy records of AGR cyanide training was sighted and the training records of the interviewees were checked and appropriate training confirmed in the training matrix.

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:

Only trained Emergency Response Team (ERT) members (13 Members) will respond to spills and releases. Other staff who are not part of the ERT will evacuate to the emergency assembly points. Personnel who may come into contact with cyanide receives cyanide hazard awareness training covering emergency response in case of cyanide incidents.

The ERT training is all done as practical drill training. An ERT Specialist has recently been appointed who will also be responsible for all ERT training. Regular Monthly drills are conducted as part of refresher training for the ERT, including cyanide spills and mandown scenarios.

A number of drill reports were reviewed. A Cyanide spill drill at the warehouse on 23 February 2018 was undertaken where the scenario was that whilst withdrawing cyanide from the warehouse and whilst a delivery was in progress, a forklift drove over a hump causing a cyanide box to fall off and spill some of the contents on the road. The report included no specific observations requiring improvement. A Cyanide evaluation drill on 2 October 2019 noted that the alarm on top of the CIL did not function, both alarms in the mixing area were operational, the alarms sounded effectively at the administration block and employees of the plant successfully evacuated to the assembly area. An indoor drill for the ERT on 20 September 2019 focused on emergency transfer oxygen administration and basic firefighting operations. The observations were positive and proper oxygen administration was observed and both teams A and B were able to load the patient in the skid in less than 3 minutes. The Learning points were that no proper body mechanics during patient transfer was used, and the donning of SCBA was too slow. The ERT specialist is also the Trainer. The Nurse observed the oxygen administration techniques.

The Mahd hospital and civil defence are included in the Government required emergency drills annually. The Mahd General hospital staff receive cyanide first aid and treatment training by the Mine Doctor who gives presentations in English and Arabic. Questions raised included concerns about patient condition and stay over time at the hospital and

treatment. Close observation including checking for symptoms were highlighted in the training. During an interview, the Doctor confirmed that the Mahd Hospital was informed about the need to treat patients for cyanide exposure. Cyanide antidote will be sent with the patient to the hospital. The Mahd Cyanide Emergency Response Guide document will also accompany the ambulance with the patient to the hospital. The document includes the medical protocol for cyanide treatment.

No cyanide emergencies will involve the Civil Defence, if they occur inside the boundaries of the Mine. Trained Emergency Response Teams from other MGBM mines could be asked to assist when necessary.

Electronic training records are recorded in the ERT training matrix. Training records include the name of the trainer, the date of training, the topics covered, and how the employee demonstrated an understanding of the training materials.

9. DIALOGUE: Engage in public consultation and disclosure.

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

X in full compliance with

- The operation is**
- in substantial compliance with **Standard of Practice 9.1**
 - not in compliance with

Basis for this Finding/Deficiencies Identified:

Dialogue meetings are two-way dialogue sessions involving both dissemination of information and the answering of questions on cyanide.

The Ma'aden Social Performance Policy commits the mine to 1. Engage with all stakeholders internally and externally in a fair transparent and inclusive manner and 4. undertake routine reporting to both external and internal stakeholders on the performance of community engagement and social performance activities. Photos were sighted of the Mahd mine display for the Civil defence national day held on 01 March 2019 at the Mahd civic centre, where opportunities exist for handing out various brochures and answering questions from the communities.

It was further reported that the most effective means of creating stakeholder dialogue on cyanide was through the Government-required, annual Cyanide drills. Internal Dialogue was also promoted through internal drills. The official Government Approved Drill dated 7 March 2018 covered a cyanide spill between the warehouse and the cyanide mixing area. The drill report covered positive points including quick response by Civil Defence and the Plant Emergency Response Team (ERT), Police, Mine Security, ambulance, and hospital which were effective on high alert. There was fast evacuation of the employees, and good communication between Mine Management and Government Departments. Recommendation includes installing cameras in critical areas, use of Arabic instead of



English on radios and that Government staff should be able to speak English. A full cycle, Government approved cyanide drill from the mine to the Government Mahd Hospital was applied for and will be done in December 2019 once approved.

Internal drills carried out included a Cyanide spill drill at the warehouse (23 February 2018). Whilst withdrawing cyanide from the warehouse and whilst a delivery was in progress, a forklift drove over a hump causing a cyanide box to fall off and spill some of the contents on the road. The report included no specific observations. The cyanide evaluation drill of 2 October 2019 revealed that the observations alarm on top of the CIL did not function, both alarms in the mixing area were operational, the alarms sounded effectively at the administration block and employees of the plant evacuated to the assembly area.

An official letter in Arabic (translated) dated 1 October 2019, from the Regional Mahd Office of Ministry of Health, was sighted, giving Mahd Mine permission to communicate with the Mahd hospital. The documentation included the request for permission from the Mahd General Manager. The letter was used to arrange a meeting with the hospital to plan for the cyanide training by the Mahd Doctor of hospital staff.

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

X in full compliance with

The operation is in substantial compliance with **Standard of Practice 9.2**
 not in compliance with

Basis for this Finding/Deficiencies Identified:

Dialogue meetings are two-way dialogue sessions involving both dissemination of information and the answering of questions on cyanide.

The Ma'aden Social Performance Policy commits the mine to 1. Engage with all stakeholders internally and externally in a fair transparent and inclusive manner and 4. undertake routine reporting to both external and internal stakeholders on the performance of community engagement and social performance activities. Photos were sighted of the Mahd mine display for the Civil defence national day held on 01 March 2019 at the Mahd civic centre, where opportunities exist for handing out various brochures and answering questions from the communities.

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Recommendation includes installing cameras in critical areas, use of Arabic instead of English on radios and that Government staff should be able to speak English. A full cycle, Government approved cyanide drill from the mine to the Government Mahd Hospital was applied for and will be done in December 2019 once approved.

Internal drills carried out included a Cyanide spill drill at the warehouse (23 February 2018). Whilst withdrawing cyanide from the warehouse and whilst a delivery was in progress, a forklift drove over a hump causing a cyanide box to fall off and spill some of the contents on the road. The report included no specific observations. The cyanide evaluation drill of 2 October 2019 revealed that from observations, the alarm on top of the CIL did not function, both alarms in the mixing area were operational, the alarms sounded effectively at the administration block and employees of the plant evacuated to the assembly area.

An official letter in Arabic (translated) dated 1 October 2019, from the Regional Mahd Office of Ministry of Health, was sighted, giving Mahd Mine permission to communicate with the Mahd hospital. The documentation included the request for permission from the Mahd General Manager. The letter was used to arrange a meeting with the hospital to plan for the cyanide training by the Mahd Doctor of hospital staff.

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

X in full compliance with

The operation is in substantial compliance with **Standard of Practice 9.3**
 not in compliance with

Basis for this Finding/Deficiencies Identified:

It is reported that most of the local population can read and write, mostly in Arabic. The AGR cyanide awareness presentations are given in English and Arabic.

No cyanide incidents requiring reporting under legal requirements occurred and thus none was reported on in the current annual reports. The Ma'Aden Gold Annual Report Ma'aden 2018, <https://www.maaden.com.sa/download/2018-Annual-Report-En.pdf> includes Section 04 Sustainability stating, "Our sites and the headquarters continue to secure and renew different ISO certifications such as the ISO 14001-2015 for Environmental Management System, ISO 50001 for Energy Management System and the International Cyanide Management Code for gold operations."

The mine is obliged to report accidents to the Ma'aden Gold Corporate Office in Riyadh. They will decide on further reporting to Government as per the Higher Commission of Industrial Security requirements and the Government Social Insurance System and/or Presidency of Meteorology and Environmental Protection. All incidents are additionally reported via "Hemaya" which is a Ma'aden software program to report and manage incidents and accidents.

