



REPORT

ICMI GOLD MINE RECERTIFICATION AUDIT - SUMMARY REPORT

Gold Fields South Deep Gold Mine

Submitted to:

International Cyanide Management Institute

1400 I Street, NW, Suite 550
Washington, DC 20005,
USA

Submitted by:

Golder Associates Africa (Pty) Ltd.

P.O. Box 6001 Halfway House, 1685 Building 1, Maxwell Office Park
Magwa Crescent West Waterfall City Midrand, 1685 South Africa

+27 11 254 4800

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1.0 SUMMARY AUDIT REPORT FOR GOLD MINING OPERATIONS

Name of Cyanide User Facility: South Deep Gold Plant

Name of Cyanide User Facility Owner: Gold Fields Limited

Name of Cyanide User Facility Operator: Gold Fields Limited

Name of Responsible Manager: Mr. Stephen Joseph
Head of Metallurgy

Address: South Deep Mine – Metallurgical Plant
Farm Modderfontein
Old Vereeniging Road
Westonaria
1779

State/Province: Gauteng

Country: South Africa

Telephone: +27 (0)11 411 1647 / 1858

E-Mail: stephen.joseph@goldfields.com

2.0 LOCATION DETAIL AND DESCRIPTION OF OPERATION

South Deep Gold Mine is an unincorporated joint venture between GFI Joint Venture Holdings Proprietary Limited and Gold Fields Operations Limited, both wholly-owned subsidiaries of Newshelf 899 Proprietary Limited a subsidiary of Gold Fields Limited. The Mine, situated in the Magisterial District of Westonaria 45 kilometres southwest of Johannesburg, is an intermediate to deep level gold mine comprising two shaft systems, the older South Shaft complex and the newer complex known as Twin Shafts. Ore is processed at a central metallurgical plant. The primary economic target is the Upper Elsburg Reef package with the Ventersdorp Contact Reef being a secondary economic target. The mining right area totals 4268,3939 hectares.

South Deep has been designated by Gold Fields as a developing mine, and a project to increase the ore mined per month to 330,000 tonnes has almost been completed. This project included the establishment of a new tailings storage facility in 2011 (Doornpoort TSF), the deepening and equipping of the ventilation shaft at the Twin Shaft complex to hoist waste and reef, as well as to establish the underground infrastructure to access the mineral reserves to the south of the current workings. In order to be able to process the increased tonnage, the metallurgical plant capacity was increased to treat an additional 110,000 tonnes per month. This included 4 new leach tanks and a new elution column. At the tail end of the process a full plant tailings plant has been built at the South Shaft.

The plant consists of an open plan stockpile feeding a Semi-Autogenous Grinding (SAG)-BALL milling circuit with between 10 – 15% of the plant feed reporting to a Gravity Recoverable Gold (GRG) Knelson Concentration Circuit. Mill circuit cyclone overflow at 80% -75 microns is directed to linear screens to remove tramp material before being thickened in preparation for cyanide leaching. The plant uses liquid sodium cyanide. Leached ore is then pumped to a carousel Carbon-in-Pulp unit for adsorption of gold in solution on to activated carbon. Loaded carbon is acid washed prior to elution in an AARL (Anglo American Research Laboratories) strip circuit. Pregnant eluate solution is electrowon in sludge reactors. The gold bearing sludge is filtered and dried before being smelted in an induction furnace to produce gold bars. Carbon is regenerated and screened prior to

recycling to the carbon-in-pulp (CIP) circuit. Barren slurry from the CIP circuit is transferred to a Backfill plant for cyclone classification of material prior to transfer to the tailings dam. The backfill can be either Cycloned Classified Tailings (CCT) or Full Plant Tailings (FPT).

The CCT / FPT is blended until a binder and sent underground to fill open slopes in the distress, development and long-hole section of the mine.

SUMMARY AUDIT REPORT

Auditors Findings

in full compliance with **The International Cyanide Management Code**

in substantial compliance with

not in compliance with

Gold Fields South Deep Gold Plant is:

Audit Company: Golder Associates Africa (Pty) Ltd

Audit Team Leader: Ed Clerk, Lead Auditor

Email: eclerk@golder.com

Gold Fields South Deep Gold Plant has not experienced any significant cyanide incidents or compliance problems during the previous three-year audit cycle.

Name of Other Auditors

Marié Schlechter, ICMI pre-certified Mine Technical Specialist

Dates of Audit

The Re-certification Audit was undertaken between 12 February 2018 and 14 February 2018.

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

PRINCIPLE 1 – PRODUCTION

Encourage Responsible Cyanide Manufacturing by Purchasing from Manufacturers that Operate in a Safe and Environmentally Protective Manner

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

in full compliance with

The operation is

in substantial compliance with

Standard of Practice 1.1

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in FULL COMPLIANCE with Standard of Practice 1.1 to purchase cyanide from manufacturers employing appropriate practices and procedures to limit exposure of their workforce to cyanide, and to prevent releases of cyanide to the environment.

The operation's contract with the cyanide manufacturer, Sasol South Africa (Pty) Ltd, requires that the cyanide be produced at a facility that has been certified as being in compliance with the Code.

The cyanide purchased by the gold mine is manufactured at a facility certified as being in compliance with the Code. South Deep purchases liquid cyanide from Sasol Polymers, Sasolburg, South Africa which is certified with the ICMI.

Cyanide is purchased directly from the manufacturer, Sasol Polymers, in South Africa.

PRINCIPLE 2 – TRANSPORTATION

Protect Communities and the Environment during Cyanide Transport

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

in full compliance with

The operation is

in substantial compliance with

Standard of Practice 2.1

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

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

The contract between Gold Fields and Sasol includes the transportation of the liquid cyanide. The contract states that *"the Supplier will supply and deliver Sodium Cyanide Solution to the Company"*.

Contract 4600001327, Amendment 00, Commencement Date: 1 July 2017, Effective Date or Rates: 1 July 2017, Expiry Date: 30 April 2022 between Gold Fields South Deep Joint Venture and Sasol South Africa (Pty) Ltd.

The contract designates responsibilities for the following:

- Packaging as required by the United Nations for international shipments and by the political jurisdiction the shipment will pass through;
- Labelling in languages necessary to identify the material in the political jurisdiction the shipment will pass through, and as required by the jurisdiction;
- Storage prior to shipment;
- Evaluation and selection of routes, including community involvement;
- Storage and security at ports of entry;
- Interim loading, storage and unloading during shipment;
- Transport to the operation;
- Unloading at the operation;
- Safety and maintenance of the means of transportation throughout transport;
- Task and safety training for transporters and handlers throughout transport;
- Security throughout transport;
- Emergency response throughout transport.

The issue of dye addition has been raised with the supplier but not yet initiated.

It is stipulated in the contract between South Deep and Sasol Polymers that the nominated sub-contractors (used for the transportation and off-loading of the products) must be a signatory, certified and comply with the provisions of the ICMI Code to the extent that those provisions are relevant to the supplier's manufacturing, handling, storing and transport of the products to the Company.

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

in full compliance with

The operation is

in substantial compliance with

Standard of Practice 2.2

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

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

It is required in the contract between South Deep and Sasol Polymers that the nominated sub-contractors (used for the transportation and off-loading of the products) must be a signatory, certified and comply with the provisions of the ICMI Code to the extent that those provisions are relevant to the suppliers manufacturing, handling, storing and transport of the products to the company.

The cyanide transporter, Tanker Services, is certified under the Code and has been used for the full recertification period.

Tanker Services Specialised Products Division was recertified on 17 July 2015 with the prior certification dated 13 December 2011.

The operation has chain of custody records identifying all elements of the supply chain, including producer and transporter, that handle the cyanide brought to its site.

Sodium Cyanide is delivered from Sasol Polymers by Tanker Services directly to Goldfields South Deep Plant. There are no interim storage facilities.

PRINCIPLE 3 – HANDLING AND STORAGE

Protect Workers and the Environment during Handling and Storage

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

in full compliance with

The operation is

in substantial compliance with

Standard of Practice 3.1

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in FULL COMPLIANCE with Standard of Practice 3.1 requiring operations design and construct unloading, storage facilities consistent with sound, accepted engineering practices, quality control/quality assurance (QC/QA) procedures, spill prevention and spill containment measures.

Facilities for unloading and storing have been designed and constructed in accordance with cyanide producers' guidelines, applicable jurisdictional rules and sound and accepted engineering practices.

Previous ICMC audit reports noted design information, handover certificates and vendor acceptance of installation certificates. The facility has not changed materially since the previous Recertification Audit.

Fit for Purpose Inspections are undertaken every 5 years on the Gold Plant (including cyanide storage) by a structural engineering consultant. In addition, Sasol structural inspections are undertaken annually. Reports for the 2015-2017 inspections were observed.

Unloading and storage areas cyanide located away from people and surface waters. The nearest surface water is located 1.25 km to the west of the unloading and storage areas.

A review of the site and documented risk assessments suggest there is no potential for release to surface water and the site has implemented controls to minimise the risk of human exposure.

The cyanide off-loading and storage areas are located within the security boundary of the plant.

Liquid cyanide is unloaded on a concrete or other surface that can minimise seepage to the subsurface. The cyanide off-loading area is concreted, sealed with a sealant and has bunds and drive-over bunds to prevent any spillage to the subsurface.

The cyanide unloading area is designed and constructed to contain, recover or allow remediation of any leakage from the tanker truck. All the wash water and possible spillage from the tanker will drain into the sump from where it can be pumped to the cyanide storage tank bund, and then to leach.

There is a method to prevent the overfilling of cyanide storage tanks, such as a level indicator and high-level alarm. The reagent storage tanks' levels are displayed at two places at the off-loading area. Procedural controls and alarms are in place. Instrumentation is maintained.

Cyanide storage tanks are located on a concrete surface that can prevent seepage to the subsurface. This is confirmed in design drawings.

Secondary containments for cyanide storage tanks are constructed of materials that provide a competent barrier to leakage.

Cyanide is stored:

- With adequate ventilation to prevent the build-up of HCN gas.
- Within a vented tank.
- In a secure area where public access is prohibited
- Separately from incompatible materials

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

in full compliance with

The operation is

in substantial compliance with

Standard of Practice 3.2

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

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

Liquid cyanide is delivered to the site in isotainers which are not removed from the transport vehicle. Once empty, the isotainers are removed from site for reuse by the cyanide manufacture. Procedures do require isotainer hoses and connection points to be rinsed after disconnection.

The operation has developed and implemented procedures to prevent exposures and releases during cyanide unloading activities. The cyanide off-loading procedure addresses the opening and closing of valves and valve covers. The procedure requires the off-loader, truck driver and buddy to wear personal protective equipment (PPE), including polyvinyl chloride (PVC) suits, elbow length PVC gloves, gumboots, face shields, hard hat, mask with canister, and mobile HCN gas monitor.

The procedures also require that the buddy should not be involved in any activities during the preparation and off-loading of cyanide. The standby foreman also stands outside the gate of the off-loading area as an additional buddy. The foreman is also equipped with the required PPE.

There is no storage or mixing of solid cyanide as only liquid sodium cyanide is used.

PRINCIPLE 4 – OPERATIONS

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

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

in full compliance with

The operation is

in substantial compliance with

Standard of Practice 4.1

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

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

Written management and operating plans or procedures have been developed for the cyanide facilities. South Deep has a comprehensive set of procedures which are stored in the IsoMetrix Document Control System and reviewed every three years.

The operation's plans and procedures identify assumptions and parameters on which the facility design was based. South Deep uses the PRAGMA system to schedule and implement inspections and preventative maintenance activities.

Water from the Return Water Dams, Pollution Control Dams and other storage dams is introduced into the process circuit. The operation's design, and management and operating procedures account for management of these areas as cyanide facilities. The cyanide solutions are re-introduced within secondarily contained areas that are subject to inspections and maintenance programs. Operating procedures for the specific areas refer to safe systems of work and appropriate PPE based on the risk determined.

The South Deep Metallurgical Plant Mandatory Code of Practice for Cyanide Management specifies the requirements for maintenance and procedures. The Cyanide Task Criticality Rating Index is a risk assessment of cyanide related tasks, which identifies the required inspections, maintenance and procedures.

Procedures and checklists addressing inspections and preventative maintenance have been developed for the operation.

The operation does have a procedure to identify when changes in a site's processes or operating practices may increase the potential for the release of cyanide and to incorporate the necessary release prevention measures. The Change Management Procedure identifies changes to the facility or its operating practices that may increase the potential for workers to be exposed to chemicals and/or other hazards or increase the potential for chemical releases before such changes are implemented so that they can be evaluated and addressed as necessary.

The operation has cyanide management contingency procedures that were developed through a risk assessment process. The Baseline Risk Assessment for the operation identified unwanted events and has been used to develop a comprehensive set of contingency procedures. Where the risk assessment process

identifies health, safety or environmental risks, the change management documentation is signed off by health, safety or environmental representatives.

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

The operation performs routine inspections of secondary containments for integrity, presence of fluids and available capacity to prevent accidental releases of the environment. The inspections are part of general area inspections as well as focussed preventative maintenance programs. Secondary containments were fitted with sumps and pumps rather than drainage pipes.

Where present, the operations conducted routine inspections of leak detection and collection systems at ponds as part of either general area inspections or focussed preventative maintenance programs.

The operation conducts routine inspections of surface water diversions used to manage surface run-on from upgradient watersheds. These are largely conducted through general area inspections. During the audit, personnel were observed maintaining upgradient drainage systems.

Inspections are documented, including the date of the inspection, the name of the inspector, any observed deficiencies and corrective actions. The records of inspections are retained.

Preventative maintenance programs are implemented, and activities documented. Inspections are completed daily, weekly, and monthly in addition to 3rd party (legal inspections) inspections on the plant. Schedules are in PRAGMA.

The operation has capacity to receive electricity from two different Eskom substations. The Gold Plant has an emergency generator for emergency lights, the thickener and security cameras. All cyanide pumps and off-loading will stop automatically if there is an interruption in the power supply. There is no drain down with all materials sitting in their respective tanks in the event of a power failure.

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

in full compliance with

The operation is

in substantial compliance with

Standard of Practice 4.2

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in FULL COMPLIANCE with Standard of Practice 4.2 requiring operations introduce management and operating systems to minimise cyanide use, thereby limiting concentrations of cyanide in mill tailings.

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

Bottle roll tests are undertaken for all new material to determine the lime and cyanide requirements prior to introduction into the plant. Bottle roll tests were conducted for stockpile material, Old South Deep TSF catchment paddock material, and re-mining and underground ore. These tests are conducted on an ad hoc basis on composite samples and as required for new ore.

The Managerial Directive Optimization Plan Sodium Cyanide discusses ore changes. The South Deep Set Point Logbook records date, authorisation, level of set point (reduced or increased) and reason for change.

The operation has evaluated various control strategies for cyanide additions. The operation has also evaluated the use of cyanide addition points within the process to ensure optimal recover with reduction in cyanide use wherever possible. The operation has implemented a strategy to control its cyanide addition. Two stage cyanide dosing is undertaken. First dosing is in the head tank, the cyanide levels are analysed in tank 2 and 4 and additional dosing is undertaken in tank 4 if needed. A monitor measures cyanide levels in tank 3 and 5 to determine the effect of the additions.

Dosing is also undertaken for re-mining ore in tanks 9 or 10 and monitor is used to monitor the cyanide levels in the tank 10.

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

in full compliance with

The operation is

in substantial compliance with

Standard of Practice 4.3

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

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

The operation has developed a comprehensive, probabilistic water balance. A GoldSim Probabilistic Water Balance has been developed for the entire mining operation.

It was demonstrated to the auditors that the plant runs simulations as per current situations such as tonnage received from underground, status of re-mining activities, whether the Reverse Osmosis plant is operational, availability of return water, rainfall, etc.

The auditors observed scenarios ran for the period January 2018 to December 2018 taking into consideration the above parameters. Currently the model predicts the plant being water negative and therefore enables the management team to plan for introduction of additional water sources.

The water balance considers the following criteria in a reasonable manner and as appropriate for the facilities and the environment:

- The rates at which solutions are applied to leach pads and tailings that are deposited into tailings storage facilities.
- A design storm duration and storm return interval that provides a sufficient degree of probability that overtopping of the pond or impoundment can be prevented during the operational life of the facility.
- The quality of existing precipitation and evaporation data in representing actual site conditions.
- The amount of precipitation entering a pond or impoundment resulting from surface runoff from the up-gradient watershed, including adjustments as necessary to account for differences in elevation and for infiltration of the runoff into the ground.
- Effects of potential freezing and thawing conditions on the accumulation of precipitation within the facility and the up-gradient watershed.
- Solution losses in addition to evaporation, such as the capacity of the decant, drainage and recycling systems, allowable seepage to the subsurface, and allowable discharges to surface water.
- The effects of potential power outages or pump and other equipment failures on the drain down from a leach pad or the emergency removal of water from a facility.
- Where solution is discharged to surface waters, the capacity and on-line availability of necessary treatment, destruction or regeneration systems.
- Other aspects of facility design that can affect water balance, such as the assumed phreatic surface in a tailings storage facility.

The operating procedures incorporate inspection and monitoring activities to implement the water balance and prevent overtopping of ponds and impoundments and unplanned discharge of cyanide solutions to the environment.

The TSF operator, Stefanutti Stocks, inspects the TSFs and return water dams (RWDs) on a daily basis and records the levels on a daily log sheet.

The ponds and impoundments are designed and operated with adequate freeboard above the maximum design storage capacity determined to be necessary from water balance calculations including the following:

- The Doornpoort TSF is operated with a minimum freeboard of 1 meter;
- The Doornpoort and Old TSF RWDs are operated with at least 1 meter below the overflow point;

Precipitation is measured on site the Doornpoort TSF and the Old South TSF and is included in the Water Balance on a monthly basis.

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

in full compliance with

The operation is in substantial compliance with **Standard of Practice 4.4**

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

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

The open water bodies including the TSF is located in operational and fenced areas that prevents access by livestock. No wildlife deaths due to cyanide poisoning have been recorded.

The Weak Acid Dissociable (WAD) monitoring results observed for the open water bodies for 2015, 2016 and 2017 indicated no exceedances above 50 mg/l WAD except for six exceedances recorded at the Doornpoort TSF penstock in 2015 and 2016. These exceedances were investigated, and the sampled incident investigations contributed the higher WAD readings to analytical errors for the incidents that occurred in February 2015 and March 2016. The four exceedances recorded in May 2015 (2), September 2015 and May 2016 were due to the high plant solid residues that required a higher free cyanide set point. Appropriate corrective actions were implemented on the day of the exceedance to prevent exposure to the Backfill and TSF employees.

Since June 2016, both Stream 1 (to Backfill Plant) and Stream 2 (to Doornpoort TSF) can be dosed with Hydrogen Peroxide dependent on the inline WAD reading on these tanks. No WAD exceedances have been observed since.

Maintaining a WAD cyanide concentration of 50 mg/l or less in open water is effective in preventing significant wildlife mortality as no wildlife mortalities have been recorded in the last 3 years.

Daily and observations are conducted by the Tailings Foreman at the TSF. The inspections include checking for wildlife mortalities. The results of the inspections are recorded on the daily checklists. No mortalities were observed.

The Environmental Department conducts monthly Wildlife Surveys at all open waters (listed in 4.4.3) to inspect for wildlife mortalities. The observation notes include wildlife present as well as any mortalities observed. No wildlife mortalities observed.

The operation does not have a heap leach facility.

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

in full compliance with

The operation is

in substantial compliance with

Standard of Practice 4.5

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

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

The operation does not have a direct discharge to surface water during normal operating conditions.

On 18 March 2016, the Twin Shaft pollution control dam (PCD) over spilled into the Kariegaspruit for a day following heavy rainfall from 14 to 17 March 2016; 92 mm was measured over 4 days.

The incident was reported to the Department of Water and Sanitation as per South African Environmental Legal requirements. The WAD cyanide concentration was less than 0.05 mg/l.

A project was initiated after this incident that now allows for process water to be pumped from the Twin Shaft PCD via the Cascade Dam and the Old RWD to the Doornpoort TSF RWD. The project was completed on 8 December 2016.

Surface water monitoring is conducted weekly. The Free cyanide results observed for monitoring conducted in the Kariegaspruit and Leeuwspruit during 2015, 2016 and 2017 were all below 0.022 mg/l Free cyanide.

The operation does not have an indirect discharge to surface water

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

in full compliance with

The operation is

in substantial compliance with

Standard of Practice 4.6

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

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

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

The Old South Deep TSF is dormant but the RWD is still used to store process water. A seepage cut-off trench has been installed south of the Old South RWD. The water captured by the cut-off trench is pumped back to the RWD.

Toe drains and cut-off drains on Compartment 3 and 4 of the Old TSF assist with removal of process water to the RWD.

The Doornpoort RWD was constructed with a HDPE liner and leakage detection system. An additional pump has been installed at the S21 monitoring point downstream of Doornpoort RWD to pump seepage water back to the RWD. Five scavenger boreholes have been installed downstream of the TSF and RWD to manage groundwater level and the pollution plume. The scavenger boreholes were commissioned in January 2018. The water from the scavenger boreholes are pumped back to the RWD. One of the five boreholes have been installed in the blast curtain.

Toe drains and cut-off drains have been installed at the Doornpoort TSF to ensure removal of process water to the RWD. The solution trenches at the Doornpoort TSF have been cement lined to prevent seepage from the trenches.

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 plant or tailings facilities.

Groundwater monitoring is undertaken to establish whether the tailing facilities are having an impact on the surrounding groundwater. Groundwater monitoring is conducted quarterly and tested for Free cyanide to ensure compliance below 0.022 mg/L. Monitoring records observed for 2015, 2016 and 2017 all indicated Free cyanide levels below 0.022 mg/L. The mine uses tailings from the Plant as backfill.

An assessment conducted on the backfilling operation concluded if the present status quo be maintained, the backfilling operations would comply affirmatively with the code question relating to underground backfilling of tailings. Similarly, there are sufficient factors that will prevent any build-up of the gaseous phase of cyanide in the well-ventilated mine workings to unacceptable levels. While the mine is still in operation, the chances of groundwater pollution is very unlikely to occur, due to the pressure differential between the high-water pressure in the aquifer overlying the mine working and the low (about 1 atmosphere) pressure in the mine workings. It is unlikely that mine water would leave the mine in any other way than physically being pumped out of the mine.

The target for WAD cyanide levels in the tailings portion of the backfill sent underground is 50 parts per million (ppm). Every batch of Backfill is tested for WAD cyanide in the tank before it is sent down the mine. If WAD cyanide is not under 50 ppm, ferrous sulphate is added in tank and retested, as per the Batching Backfill Preparation Plant procedure. Seepage from the operation has not caused the cyanide concentration of the groundwater to exceed that necessary to protect its beneficial use.



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

in full compliance with

The operation is

in substantial compliance with

Standard of Practice 4.7

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in FULL COMPLIANCE with Standard of Practice 4.7 requiring operations provide spill prevention or containment measures for process tanks and pipelines.

Spill prevention or containment measures are provided for all cyanide unloading, storage and process solution tanks. The off-loading area for the liquid sodium cyanide is closed off with restricted access, installed on a concrete surface equipped with humps and drains to contain any spills and pump back to the process.

The cyanide feed pipes from off-loading to the cyanide reagent storage tanks are drained immediately after off-loading and inspected for any spillage.

Secondary containments for cyanide unloading, storage and process tanks are sized to hold a volume greater than that of the largest tank within the containment and any piping draining back to the tank, and with additional capacity for the design storm event. Leach tanks and CIP tanks are located in a concrete bunded area. The bunds overflow to the Gold Plant's Pollution Control Dam. Greater than 110% of a tanks volume is provided by the bund in conjunction with the Plant's Pollution Control Dam which is concrete.

The secondary containment for the cyanide reagent tank is sized to hold a volume greater than the two interlinked storage tanks.

Procedures are in place and being implemented to prevent discharge to the environment or any cyanide solution or cyanide-contaminated water that is collected in the secondary containment area. The Plant is designed so that any spillage of cyanide reagent or cyanide containing material is returned to the leach tanks. In the event of a catastrophic failure of a leach tank the material will collect in the bund and the Plant's Pollution Control Dam. If this were to overflow it would be collected in the Twin Shaft's Pollution Control Dam.

Spill prevention or containment measures are provided for all cyanide process solution pipelines to collect leaks and prevent releases to the environment.

Pipelines for cyanide reagent transfer from off-loading to storage tanks are drained directly following off-loading. The cyanide pipeline is checked daily for leaks during each shift. Solution pipework within the Plant is over concrete bunded areas. Pipeline inspections are undertaken on a daily basis and thickness testing of pipework on an annual basis.

Areas where cyanide pipelines present a risk to surface water have been evaluated for special protection needs. There is a risk to surface water where the tailings lines cross the Kariegaspruit stream flowing to the Leeuwspuit. The HDPE lined steel pipe is located on rock gabions either side of the stream to prevent erosion during periods of high flow. The pipe connections are either side of the Spruit with one span of pipe crossing the Spruit.

Cyanide tanks and pipelines are constructed of materials compatible with cyanide and high pH conditions. Material compatibility is also addressed through the change management process. The slurry pipe is steel,

lined with a thick HDPE liner. Pipes for the transfer of reagent strength cyanide solution within the Plant are constructed of steel. The materials are all compatible with cyanide and high pH conditions.

Standard of Practice 4.8: Implement quality control/quality assurance procedures to confirm that cyanide facilities are constructed according to accepted engineering standards and specifications.

in full compliance with

The operation is

in substantial compliance with

Standard of Practice 4.8

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in FULL COMPLIANCE with Standard of Practice 4.8 requiring operations implement quality control and quality assurance programs during construction of all new cyanide facilities and modifications to existing facilities, including cyanide unloading, storage facilities and other cyanide facilities.

Quality control and quality assurance programs have been implemented during construction of all new cyanide facilities and modifications to existing facilities, including cyanide unloading, storage facilities and other cyanide facilities.

Previous ICMC audit reports noted QC/QA information contained in design documentation, handover certificates and vendor acceptance of installation certificates. During this Recertification period, QC/QA is addressed for minor modifications to the facility through the Management of Change Process.

The QC/QC programs have addressed the suitability of materials and adequacy of soil compaction for earthworks such as tank foundations and earthen liners, the installation of synthetic membrane liners used in ponds and for construction of cyanide storage and process tanks.

Previous ICMC audit reports noted QC/QA information contained in design documentation, handover certificates and vendor acceptance of installation certificates. During this Recertification period, QC/QA is addressed for minor modifications to the facility through the Management of Change Process.

The review of changes by appropriately qualified people is undertaken as part of the Management of Change Process.

QC/QC documentation, as referenced in previous ICMC audit reports and Management of Change documentation is available. Fit for Purpose Inspections are undertaken every five years on the Gold Plant (including cyanide storage), and every three years on the Backfill Plant and off-loading section, by a structural engineering consultant.

The auditor observed the DRA Structural Inspection Report from November 2017, which noted deficiencies that required repair in the Gold Plant. An Action Plan to address the deficiencies was developed. Evidence was observed to confirm all ICMC related high risk items identified in the Action Plan had been completed.

Sasol structural inspections are undertaken annually.

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

in full compliance with

The operation is

in substantial compliance with

Standard of Practice 4.9

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

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

The operation has developed written standard procedures for monitoring activities.

A consultant conducts surface water sampling at South Deep Gold Mine. The following procedures are used:

- Procedure for Taking Cyanide Samples.
- Determination of Free Cyanide in Water.

Groundwater sampling is also conducted by a consultant and uses the sampling procedures as described in the Quarterly Report.

WAD sampling conducted by South Deep Gold Mine is done in accordance with the WAD Sampling procedure.

The sampling and analytical protocols have been developed by appropriately qualified personnel:

- Surface water sampling procedures have been developed by a consultant.
- The South Deep Gold Plan WAD Sampling procedure was developed by the Plant Metallurgist.
- The Water Monitoring Procedure was developed by Supervisor Environmental and reviewed by the Unit Manager Environmental.
- The groundwater sampling procedure was developed by a consulting hydrogeologist.

The procedures specify how the samples should be taken, sample preservation techniques, chain of custody procedures, and shipping instructions.

Sampling conditions and procedures are documented in writing.

There is no discharge of process water to surface water. However, the operation does undertake monitoring upstream and downstream of the operation.

Groundwater sampling is conducted upstream and downstream of the operations.

The operations inspect for and records wildlife mortalities related to contact with an ingestion of cyanide solutions.

Daily and observations are conducted by the Tailings Foreman at the TSF. The inspections include checking for wildlife mortalities. The results of the inspections are recorded on the daily checklists. No mortalities were observed.

The Environmental Department conducts monthly Wildlife Surveys at all open waters to inspect for wildlife mortalities. The observation notes include wildlife present as well as any mortalities observed. No wildlife mortalities observed.

Monitoring is conducted at frequencies adequate to characterise the medium being monitored and to identify changes in a timely manner. Wildlife mortality inspections are conducted daily, surface water is sampled weekly, groundwater is sampled quarterly, emergency samples are taken when an overflow incident occurs.

PRINCIPLE 5 – DECOMMISSIONING

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

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

in full compliance with

The operation is

in substantial compliance with

Standard of Practice 5.1

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

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

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

The Demolition of Cyanide Facilities procedure describes the steps to follow during demolition of the cyanide facilities. The procedure further states that SASOL will assist South Deep with the Risk Assessment to determine best practice at the time of demolition.

A preliminary closure plan has been compiled for the South Deep Gold Mine. The plan stipulates the measures to be taken during mine closure to decommission the Gold Plant, other cyanide related facilities (tanks, vessels, concrete and steel structures). It further stipulates the required Cyanide Management measures to be taken during mine operations to ensure that the finances are in place to ensure fully funded cyanide-related decommissioning activities are included in the mine's overall closure costing. It includes the requirement to formulate a decommissioning plan for cyanide facilities.

The plan includes an implementation schedule for decommissioning activities.

It is required in the Preliminary Mine Closure Plan that a final closure plan is compiled approximately two to three years before planned decommissioning, currently scheduled for 2084.

The operation reviews its decommissioning procedures for cyanide facilities during the life of the operations and revise them as needed:

- The Demolition of Cyanide Facilities procedure is revised every three years or when major changes occur, and it necessitates an update.
- The Preliminary Mine Closure Plan is revised every three to five years.

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

in full compliance with

The operation is

in substantial compliance with

Standard of Practice 5.2

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

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

The operation has developed an estimate of the cost to fully fund third party implementation of the cyanide-related decommissioning measures as identified in its site decommissioning or closure plan. This is detailed in the South Deep Scheduled and Unscheduled Closure Costs, February 2017, which was observed by the auditors.

The closure cost estimates are reviewed every year.

South Deep contributes to the Place Dome Western Areas Joint Venture Trust. The shortfall between the money in this Trust and that required for cyanide related decommissioning activities is funded by seven guarantees.

It was observed by the auditors that there was no shortfall between the amount in the closure cost estimates (31 December 2016) and that covered by the Trust and the seven guarantees.

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 measure as necessary to eliminate, reduce and control them.

in full compliance with

The operation is

in substantial compliance with

Standard of Practice 6.1

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in FULL COMPLIANCE with Standard of Practice 6.1 requiring operations developed procedures describing how cyanide-related tasks such as unloading, operations, entry into confined spaces, and equipment decontamination prior to maintenance should be conducted to minimise worker exposure.

The operation has a comprehensive set of procedures which describe how cyanide-related tasks such as unloading, operations, entry into confined spaces, and equipment decontamination prior to maintenance should be conducted to minimise worker exposure. The procedures are stored in the IsoMetrix Document Control System and reviewed every three years.

The Cyanide Task Criticality Rating Index (Index) is a risk assessment of all cyanide related tasks (for both process and engineering). The Index requires a procedure to be implemented for any tasks with an elevated risk rating. The Index also references the relevant procedures and details the required inspections and maintenance.

The procedures require, where necessary, the use of personal protective equipment (PPE) and address pre-work inspections. All procedures require PPE that is specific to the risk. Pre-work risk assessment are conducted, which identify additional PPE requirements.

The operation does implement procedures to review proposed process and operational changes and modifications for their potential impacts on worker health and safety and incorporate the necessary worker protection measures.

The Change Management Procedure identifies changes to the facility or its operating practices that may increase the potential for workers to be exposed to chemicals and/or other hazards or increase the potential for chemical releases before such changes are implemented so that they can be evaluated and addressed as necessary. The procedure requires that a risk assessment is performed and recorded on a Change Management Implementation and Control Form. Changes are discussed at the weekly HSE meeting.

The operation solicits and actively considers worker input in developing and evaluating health and safety procedures.

Supervisors are required to complete five Planned Task Observations (PTO) per week. PTOs include a prompt to amend procedures, if necessary. Revised procedures go to the Standard Review Committee for review, and are distributed to relevant department Supervisors for sign off. Personnel are advised of changes at morning meetings and PTOs.

Safety Rep Meetings are held monthly and are attended by daily and shift Safety Reps.

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

in full compliance with

The operation is

in substantial compliance with

Standard of Practice 6.2

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in FULL COMPLIANCE with Standard of Practice 6.2 requiring operations operate and monitor cyanide facilities to protect worker health and safety and periodically evaluate the effectiveness of health and safety measures

The operation has determined the appropriate pH for limiting the evolution of HCN gas during production activities. The Managerial Directive Optimization Plan Sodium Cyanide, states that pH must be kept above 10.5.

The operation uses ambient and personal monitoring devices to confirm that controls are adequate to limit worker exposure to HCN gas and dust.

Operational areas within and outside the plant use personal HCN monitors. Cyanide hotspot surveys were completed and informed what fixed HCN monitors were placed. Fixed HCN monitors are located at the Leach Tanks (three), CIP (three), tailings penstock (one), cyanide storage facility (one), elution column (one), off-loading area (one), and at the backfill areas (three). The alarm level on the HCN monitors is set at 4.7 ppm instantaneous thereby ensuring the 4.7 ppm level continuously over an 8-hour period is not exceeded. In the event that HCN gas levels trigger the 4.7 ppm instantaneous alarm level, either from a fixed monitor or a personal monitor, the area is evacuated, process controls are checked, and re-entry is only allowed once the levels has dropped to below 4.7 ppm.

The operation has identified areas and activities where workers may be exposed to cyanide and require the use of personal protective equipment in these areas or when performing these activities.

The hydrogen cyanide monitoring equipment is maintained, tested and calibrated every three months, in accordance with the manufacturer's directions.

Warning signs have been placed where cyanide is used advising workers that cyanide is present, and that smoking, open flames and eating and drinking are not allowed, and that, if necessary, suitable PPE must be worn.

Signs were observed in areas where cyanide is used e.g. off-loading point for liquid sodium cyanide, liquid sodium cyanide storage tanks and dosing points for leach tanks.

High strength cyanide solution is not yet dyed by the manufacturer prior to arriving at site for clear identification. The issue of dye addition has been raised with the supplier but not yet initiated.

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

Fire extinguishers are checked monthly and serviced annually. Annual servicing was observed to be up to date on all extinguishers. Safety showers and man-down Inspections are conducted weekly and have planned

maintenance. First aid rooms, antidote kits and oxygen packs, and respirator canisters are all inspected monthly.

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

All reagent strength cyanide pipes are colour coded purple and indicates that it contains cyanide as well as flow direction. Cyanide storage tanks are colour coded red with purple band as per colour coding index. Pipes carrying tailings are labelled as process cyanide with direction of flow.

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

The official language of Gold Fields is English with all documentation being in English including the induction, which must be passed before employees can work. All procedures are in English and training on procedures as well as task assessments are undertaken in English.

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

No cyanide exposure incidents have been recorded in the past three years.

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

in full compliance with

The operation is in substantial compliance with **Standard of Practice 6.3**

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in FULL COMPLIANCE with Standard of Practice 6.3 requiring operations develop and implement emergency response plans and procedures to respond to worker exposure to cyanide.

The operation has water, oxygen, a resuscitator, antidote kits, a radio, and an alarm system readily available for use at cyanide unloading, storage areas.

The operation inspects its first aid equipment regularly to ensure that it is available when needed, and materials are stored as directed by their manufacturer and replaced on a schedule to ensure that they will be effective when needed.

First aid rooms are inspected monthly.

All antidote kits were observed to be kept in fridges and within the expiry dates.

The operation has developed specific written emergency response plans or procedures to respond to cyanide exposures.

The operation has on-site capability to provide first aid or medical assistance to workers exposed to cyanide. There are trained first responders for each shift.

ER24 (ambulance and paramedics) is part of the emergency response for Gold Fields. ER24 are 24 hr Emergency Response and have oxygen, resuscitator, radio and qualified personnel available to assist with any cyanide exposure incident. The Plant Control Room will notify the ER24 Control Room (on the mine) to dispatch an ambulance in an emergency. The ER24 ambulance is located at the Mine.

The operation has developed procedures to transport workers exposed to cyanide to locally available qualified off-site medical facilities such as the ER24 Call-out Procedure for Cyanide Poisoning. An agreement is in place with Lenmed Hospital, stating that the Hospital is willing to accept and treat cyanide related emergencies.

Mock emergency drills are conducted annually and involve ER24, First Responders, off-loaders, Security and the Lenmed Hospital. The mock emergency drills test response procedures for various cyanide exposure scenarios, and lessons learned from the drills are incorporated into response planning. The mock drills are evaluated, and feedback is provided afterwards to provide learning points and points for improvement.

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.

The operation is in full compliance with **Standard of Practice 7.1**
 in substantial compliance with
 not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in FULL COMPLIANCE with Standard of Practice 7.1 requiring operations prepare detailed emergency response plans for potential cyanide releases.

The operation has developed detailed emergency response plans to address potential accidental releases of cyanide.

The Procedure for CN Emergency Preparedness and Response outlines the cyanide potential emergency situation and potential accidents that could have an impact on the environment and how the mine will respond to them in order to minimise impact to the environment.

The Baseline Risk Assessment and Cyanide Task Criticality Rating Index was utilised to identify scenarios and risks.

The operation has an agreement with Servtex Industrial Solutions to clean up spilt material, dated the 1 December 2017.

The Procedure for CN Emergency Preparedness and Response includes:

- Potential cyanide failure scenarios appropriate for its site-specific environmental and operating circumstances
- Descriptions of transportation incidents
- Specific response actions as appropriate (e.g. evacuate all personnel up wind of the accident, cordon off the area and place guards in strategic points to ensure no unauthorised persons gain access, put on the appropriate PPE, contain the spill, actions for neutralisation and decontamination of the area)
- Generic response and scenario specific procedures

First aid is covered in the Rescue and Cyanide First Aid Treatment Procedure and is displayed on large notice boards located at the TSF and the Plant.

The prevention of future releases is undertaken through the incident investigation process.

Standard of Practice 7.2: Involve site personnel and stakeholders in the planning process. in full compliance with**The operation is** in substantial compliance with**Standard of Practice 7.2** not in compliance with**Summarise the basis for this Finding/Deficiencies Identified:**

The operation is in FULL COMPLIANCE with Standard of Practice 7.2 requiring operations Involve site personnel and stakeholders in the planning process.

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

The workforce has been involved through the Health and Safety Representatives. Safety Representative Meetings are held monthly and are attended by daily and shift Safety Representatives.

Potentially affected communities have been involved through forums that are held.

ER24 have been involved in the Procedure for CN Emergency Preparedness and Response. Sasol was also informed of the procedure and their role in a transportation incident outside the plant.

Mock emergency drills are undertaken annually and involve ER24, Security and the Lenmed Hospital.

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

A TSF failure is the only scenario that has the potential to affect local communities.

A zone of influence for South Deep was determined and the Environmental Department did a land use survey to identify the potentially affected communities and have subsequently been made aware of the risk through community forums.

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

The operation engages in consultation or communication with stakeholders to keep the Procedure for CN Emergency Preparedness and Response current.

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

in full compliance with

The operation is

in substantial compliance with

Standard of Practice 7.3

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in FULL COMPLIANCE with Standard of Practice 7.3 requiring operations designate appropriate personnel and commit necessary equipment and resources for emergency response.

The emergency response teams are the primary responders with the names and 24-hour contact information is posted on notice boards located around the plant, backfill and off-loading including ER24, Fire Brigade and Sasol Polymers Hazmat Response details.

The operation does require training of First Responders, Emergency Response Co-ordinators and members of the Emergency Response Team in cyanide emergency scenarios, including the use of necessary response equipment. This is specified within the site training matrix which is aligned to the Emergency Response Plan.

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

ER24, emergency response paramedics, participate in the mock drills organised by South Deep.

The Matrix identifies which employees, including First Responders, Emergency Response Co-ordinators and members of the Emergency Response Team, require specific training.

The Procedure for CN Emergency Preparedness and Response details the Roles and Responsibilities. An Emergency Management Team is formed to manage response, logistics and communication during any emergency.

The duties and responsibilities of the Emergency Management Team are detailed in the Procedure for CN Emergency Preparedness and Response.

The emergency response equipment is listed on the first aid room checklists and in Monthly First Aid Room / Equipment Inspections Procedure.

The roles of outside responders are detailed in specific response plans. The operation has confirmed that outside entities included in the Procedure for CN Emergency Preparedness and Response are aware of their involvement and are included as necessary in mock drills or implementation exercises.

An agreement is in place with Lenmed Hospital, dated 30 October 2017, stating that the Hospital is willing to accept and treat cyanide related emergencies. Lenmed Hospital are also included in mock drills.

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

in full compliance with

The operation is

in substantial compliance with

Standard of Practice 7.4

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in FULL COMPLIANCE with Standard of Practice 7.4 requiring operations develop procedures for internal and external emergency notification and reporting.

The Procedure for CN Emergency Preparedness and Response includes procedures and contact information for notifying management, regulatory agencies, outside response providers and medical facilities of the cyanide emergency.

The Procedure details the internal and external communication process. The emergency response teams are the primary responders with the names and 24-hour contact information is posted on notice boards located around the plant, backfill and off-loading including ER24, Fire Brigade and Sasol Polymers Hazmat Response details.

The Cyanide Emergency Response Guidelines and Contact Numbers includes the relevant contact details, including Sasol and West Rand District Epidemic Response (fire, police and ambulance).

The Environmental Emergency Response Team Call Out Procedure for the mine includes details for a cyanide related emergency with the contact details of the Met Plant Manager and Environmental Department Manager.

The contact details for the TSF staff (Stefanutti Stocks Mining Services) are included in procedures.

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

Communications with the media is undertaken in accordance with the Gold Fields Crisis, Communications Policy, Guidelines and Procedures.

The operation also maintains a Stakeholder Database.

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

in full compliance with

The operation is

in substantial compliance with

Standard of Practice 7.5

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in FULL COMPLIANCE with Standard of Practice 7.5 requiring operations incorporate into response plans and remediation measures monitoring elements that account for the additional hazards of using cyanide treatment chemicals.

The Procedure for CN Emergency Preparedness and Response does describe specific remediation measures as appropriate for the likely cyanide release scenarios, including recovery and decontamination of solutions or solids, and management and disposal of spill clean-up debris. This procedure prohibits the use of chemicals such as sodium hypochlorite, ferrous sulphate and hydrogen peroxide to treat cyanide that has been released into surface water. It also prohibits the use hypochlorite, hydrogen peroxide and ferrous sulphate to treat cyanide spillage into streams or natural ponds.

The Water Monitoring Procedure addresses the potential need for environmental monitoring to identify the extent and effects of a cyanide release, and includes sampling methodologies, parameters and sampling locations. This procedure includes sampling techniques, parameters to be analysed for, and sample preservation, etc.

The procedure for Clean-up of Process Strength Cyanide Spillage directly refers to the Water Monitoring Procedure for sampling locations and requirements.

The Procedure for CN Emergency Preparedness and Response states that alternative drinking water will be supplied in the event that water sources have been polluted.

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

in full compliance with

The operation is

in substantial compliance with

Standard of Practice 7.6

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in FULL COMPLIANCE with Standard of Practice 7.6 requiring operations periodically evaluate response procedures and capabilities and revise them as needed. operation does review and evaluate the cyanide-related elements of its Procedure for CN Emergency Preparedness and Response for adequacy on a regular basis.

The Procedure for CN Emergency Preparedness and Response is reviewed annually or when an emergency / accident occurs that is sufficient to revise the procedure. The current version of the procedure is dated 16 August 2017.

Mock cyanide drills are conducted periodically as part of the Procedure for CN Emergency Preparedness and Response evaluation process.

Mock emergency drills are undertaken annually and involve ER24 and the Lenmed Hospital. The mock drills are evaluated and feedback is provided afterwards to provide learning points and points for improvement, including potential updates to the Procedure for CN Emergency Preparedness and Response.

Provisions are in place to evaluate and revise the Procedure for CN Emergency Preparedness and Response after any cyanide-related emergency requiring its implementation.

The Procedure for CN Emergency Preparedness and Response is reviewed annually or when an emergency / accident occurs that is sufficient to revise the procedure.

No cyanide related incidents have occurred that necessitated the revision of the procedure.

PRINCIPLE 8 – TRAINING

Train Workers and Emergency Response Personnel to Manage Cyanide in a Safe and Environmentally Protective Manner

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

in full compliance with

The operation is

in substantial compliance with

Standard of Practice 8.1

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in FULL COMPLIANCE with Standard of Practice 8.1; train workers to understand the hazards associated with cyanide use.

The operation trains all personnel who may encounter cyanide in cyanide hazard recognition, which includes the following.

The operation trains all personnel who may encounter cyanide in cyanide hazard recognition, which includes the following:

- A Cyanide Awareness module is presented during the annual Mine Induction Programme and is presented to all new employees, ex-leave and permanent contractors. The training routing form stipulates that this module must be completed before the person is allowed to work on site. A written test is completed afterwards.
- Cyanide Awareness Training is presented by Sasol Base Chemicals to all Gold Plant and Stefanutti Stocks employees. The course covers the following topics:
 - Product identification, -risks, -safe handling
 - Product off-loading documentation
 - The effective use of PPE
 - The basics of preparing to handle emergencies
 - Key steps in handling product spillages
 - Key steps in rescuing an effected person
 - Key principles of administering medical oxygen.
- On-site Cyanide First Aid Training is conducted at South Deep Plant. Attendees are assessed to be able to assist in an Emergency Situation, may it be a Cyanide Contaminated patient (conscious or unconscious) or Cyanide Spillage. Cyanide First Aid Training is conducted every three years and for new employees.
- Cyanide First Aid Training is presented by a consultant to all TSF contractors (valid for three years).

Training records are retained for 50 years.

Standard of Practice 8.2: Train appropriate personnel to operate the facility according to systems and procedures that protect human health, the community and the environment.

in full compliance with

The operation is

in substantial compliance with

Standard of Practice 8.2

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in FULL COMPLIANCE with Standard of Practice 8.2 to train appropriate personnel to operate the facility according to systems and procedures that protect human health, the community and the environment.

The operation trains all personnel who may encounter cyanide in cyanide hazard recognition, which includes the following:

- A Cyanide Awareness module is presented during the annual Mine Induction Programme and is presented to all Gold Plant new employees, ex-leave and permanent contractors.
- Cyanide Awareness Training is presented by Sasol Base Chemicals to all Gold Plant and contractors.
- On-site Cyanide First Aid Training

All new employees and ex-leave employees receive a "Route Form" that requires them to receive very specific training before they are allowed work on the plant.

The training included: Full Body Harness, Stop Fix & Continue, E-Learning which includes the Cyanide Awareness Module, First Aid, Fatigue Management, Skills and Qualification Audit.

The operation evaluates the effectiveness of cyanide training by testing and observation in the form of Planned Task Observations.

Planned Task Observations (PTOs) are undertaken. The PTOs have been incorporated into job specific training procedures. PTOs are conducted by the Supervisors.

It was observed that the training material (Safe Work Procedure) contains the training elements in steps for each job. The employee is then assessed on each step during the PTO process.

A training matrix have been developed for both South Deep and contractors. The training matrix identifies all operational personal as well as the Work Procedures that must be trained on, required Safety, Health and Environmental (SHE) Training and Mock Drills required (including Cyanide Mock Drill). The Matrix identifies which employees require which training and indicates the date of last training received.

The South Deep Training Needs Analysis stipulates the training required for each job category as identified in the matrix.

Appropriately qualified personnel provide task training related to cyanide management activities.

Refresher training on cyanide management is provided to ensure that employees continue to perform their jobs in a safe and environmentally protective manner.

All employees receive refresher training on an annual basis after they return from annual leave. The route form is provided to ex-leave employees to receive training as required.

PTOs of the Cyanide Procedures are conducted by the Supervisors on the Cyanide Off-loaders annually.

Cyanide First Aid Training (First Responders and Off-loaders) are conducted annually by an external consultant.

Sasol Cyanide Procedure Training (All Employees) are conducted annually.

Training records are retained for 50 years. The records include the name(s) of the employee(s) and the trainer, the date of training, the topics covered, and if the employee demonstrated an understanding of the training material.

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

in full compliance with

The operation is

in substantial compliance with

Standard of Practice 8.3

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

The operation is in FULL COMPLIANCE with Standard of Practice 8.3 to train appropriate workers and personnel to respond to worker exposure and environmental release of cyanide.

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

Mock drills are used to train and evaluate the personnel on emergency procedures. Feedback is provided after the mock drill on deviations observed.

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

An agreement is in place with Lenmed Hospital, dated 30 October 2017, stating that the Hospital is willing to accept and treat cyanide related emergencies.

Mock emergency drills are undertaken annually and involve ER24 and the Lenmed Hospital.

Simulated cyanide emergency drills are periodically conducted for training purposes covering both worker exposures and environmental releases and feedback is provided afterwards to provide learning points and points for improvement.

PRINCIPLE 9 – DIALOGUE

Engage in Public Consultation and Disclosure

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

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

Summarise the basis for this Finding/Deficiencies Identified:

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

South Deep provide opportunity for stakeholders to communicate issues at the following meetings:

- Internal Monthly Meetings - facilitated by the South Deep Internal Sustainable Development Department and the Environmental Department. Non-governmental organisations (NGO's) are invited to the meetings.
- Communities visit conducted once a year, except for Bekkersdal and Thusanang which are visited twice a year due to political instability. The main focus / issues discussed at the meetings are:
 - Closure and future land use
 - Environmental Issues
 - Social and Labour Plan
 - Procurement
 - Local Economic Development
 - Feedback on Previous Meeting
 - Grievance Mechanism
 - Report on Alliance Partners / Community Projects
 - Relation Assessment
 - Survey / Questionnaire.

Although the meetings are not specifically about Cyanide, these meetings provide stakeholders with the opportunity to communicate issues of concern regarding the management of Cyanide.

Community members are given the opportunity to raise questions about Cyanide during these meetings. The community is also informed that South Deep Gold Mine has a Grievance Mechanism whereby a formal complaint can be lodged in relation to grievances and concerns. The process was explained.

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

in full compliance with

The operation is

in substantial compliance with

Standard of Practice 9.2

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

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

There are opportunities for the operation to interact with stakeholders and provide them with information regarding cyanide management practices and procedures as stated in 9.1.

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

in full compliance with

The operation is

in substantial compliance with

Standard of Practice 9.3

not in compliance with

Summarise the basis for this Finding/Deficiencies Identified:

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

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

The operation has developed a pamphlet on Cyanide off-loading and usage created for employees and stakeholders. The pamphlet explains the identification of the truck transporting the cyanide, the use of cyanide in the process, the operation of the TSF. It provides an Emergency Number for the Hazmat team and South Deep Control room in case of emergency such as a tanker incident, etc.

A picture pamphlet (comic strip) in Sotho has been prepared to illustrate and explain the use of Cyanide at South Deep Mine. The pamphlet is distributed during the annual community meetings.

Approximately 10 South Deep employee's forms part of the team that attend the meetings and assist with verbal explanation of the pamphlets to illiterate community members.

The operation makes information publicly available on confirmed cyanide release or exposure incidents. There have been no incidents of Cyanide exposure or release on or off the mine site in the past three years.

In the event of a Cyanide exposure or release of the mine site incident, the incident and associated details will be reported via several platforms.

Signature Page

Golder Associates Africa (Pty) Ltd.



Ed Clerk
ICMC Lead Auditor



Marié Schlechter
ICMC Gold Mine Technical Auditor

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APPENDIX A

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