INTERNATIONAL CYANIDE MANAGEMENT INSTITUTE

Cyanide Code Compliance Audit Gold Mining Operations

Recertification Summary Audit Report

Gold Fields South Deep Gold Mine South Africa

30th August – 3rd September 2021

Name of operation:	South Deep Gold Mine
Name of Operation Owner:	Gold Fields Limited
Name of Operation Operator:	South Deep is managed by Gold Fields
Name of Responsible Manager:	Mr Stephen Joseph, Metallurgical Manager
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Location detail and description of operation:
South Deep is situated in the Magisterial Districts of Westonaria and Vanderbijlpark (Gauteng Province), some 45km southwest of Johannesburg in the Republic of South Africa. Access internationally is via O.R. Tambo International Airport or by road from Johannesburg along the N12 Highway.
Geologically it is located in the West Rand Goldfield of the Witwatersrand Basin. South Deep is a deep to intermediate level underground mine exploiting gold-bearing, shallow dipping tabular and/or stacked reef orebodies. South Deep is situated next to the Sibanye Stillwater Kloof Gold Mine and below the Ezulwini Mine, which is also operated and owned by Sibanye Stillwater.

Mining Method
South Deep is an underground mechanised mine, using an owner mining workforce. Reserves are accessed through de-stress and shadow development cuts to manage rock stress and seismic activity. A number of selective mining methods, including drifts and benches, are employed, but long-hole stoping with paste fill is the primary bulk mining method. Significant focus is on frontline coaching to improve compliance to plan and productivity. Mining method and extraction sequence optimisation is ongoing. It is estimated that the current Mineral Reserves will be depleted in 2106 (86 years).
The workings are accessed from the surface through two shaft systems, the Twin Shaft complex (main and ventilation shafts), of which the main shaft comprises a single-drop to 110A level, a depth of 2,998m, the vent shaft to 110 level at a depth of 2,947m and the

South Shaft complex, which is a sub-vertical system (three operating shafts) to 95 level at a depth of 2,786m.

The mine is divided into three main areas:

1. Current Mine (CM), characterised by selective mining methods scattered over a large area originally exploited by means of conventional tabular mining. The CM is accessed from four active levels (90, 93, and 95) from both the South Shaft and Twin Shaft complexes.
2. The North of Wrench (NoW), directly south and down dip of CM, comprises six mining corridors separated by regional pillars that extend southwards to the Wrench fault. A bulk non-selective mining method is applied, resulting in a higher Resources to Reserves conversion ratio.
3. The South of Wrench (SoW) east and west areas, situated south and down dip of NoW, will be mined in the same manner as NoW.

Processing

The South Deep processing plant consists of a conventional semi-autogenous grinding (SAG)/Ball Milling circuit, a gravity gold recovery circuit, and a conventional leach/Carbon in Pulp (CIP) circuit. The final product from both the gravity and CIP circuits is smelted into bullion. The processing plant is classified as a cyanide facility (above 0.5 mg/l WAD cyanide.) The milling circuit shows WAD cyanide concentrations of consistently below 0.5 mg/l WAD cyanide.

For re-processing tailings, the South Deep plant also includes a tailings retreatment section that consists of a thickener followed by a dedicated CIL (Carbon in Leach) circuit. South Deep has one active TSF (Tailings Storage Facility), the Doornpoort TSF, and four dormant TSFs, known as TSF 1, 2, 3, and 4.

TSF 1 and 2 are undergoing remining using hydraulic mining methods (i.e., using a water cannon). TSFs 1 and 2 were commissioned in 1968 and operated as upstream raised paddock dams as is typical in South African gold mines. These TSFs cover a combined footprint of 69 ha (hectares) and have a maximum height of 47m.

TSFs 3 and 4 were commissioned in 1982 and are also upstream raised paddock dams. These TSFs cover a combined footprint of 100 ha and have a maximum height of 41m. Deposition on these TSFs ceased in 2011.

The Doornpoort TSF was commissioned in April 2011, and a number of upstream wall raises have been constructed. The Doornpoort TSF incorporates a gravity decant system with drainage structures placed beneath the tailings itself. The Doornpoort TSF, once phase 2 is completed, will hold sufficient capacity for the LOM (Life of Mine) of South Deep as well as for the reclamation of TSF 1- 4.

Auditor's Finding

This operation is

X in full compliance

☐ in substantial compliance

☐ not in compliance

with the International Cyanide Management Code.

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

Audit Company: Eagle Environmental

Audit Team Leader: Arend Hoogervorst

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Names and Signatures of Other Auditors:

Name: Dawid M. L Viljoen Signature _____ Date: 24 JAN 2022

Dates of Audit: 30th August – 3rd September 2021

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

Facility	Signature of Lead Auditor	Date
South Deep Gold Plant		26/01/2022

Auditor's Findings

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

Standard of Practice1.1: 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 Gold Fields cyanide supply and transport contract between South Deep Gold Plant and Sasol South Africa (Sasol), as the supplier of liquid sodium cyanide. The contract requires, "…the Supplier currently must be certified with the ICMC (International Cyanide Management Code) and those engaged by the Supplier, for supply and transport, including the Nominated Sub-contractor under this Agreement, must be a signatory, certified and comply with the provisions of the ICMC for manufacture, transport and use of cyanide in the production of gold…" Sasol South Africa is a signatory to the Cyanide Code and was re-certified as a fully compliant Production Facility with the ICMI (International Cyanide Management Institute) Cyanide Code on January 23 2019. and was also certified during the preceding three years.

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:
The contract between Gold Fields South Deep and Sasol includes the supply and transportation of the liquid sodium cyanide. The contract states that "…the Supplier will supply and deliver sodium cyanide Solution to the company…". The contract also states that, "… the supplier shall in all respects be responsible (at its risk) for the safe and timely transportation of sodium cyanide to the company's operations and the supplier shall ensure transportation of sodium cyanide shall be undertaken in compliance with all relevant laws, statutes, codes, guidelines, and other legal and governmental requirements and authorizations…"
Regarding packaging, the contract states that the supplier shall package and transport the product in a tanker so as to ensure the safe, adequate and lawful transport, loading, off-loading, handling, and storage, all according to accepted international standards. The supplier shall ensure that the tanker shall be suitable for the methods of transport, delivery and off-loading to be used. Each tanker shall be marked in accordance with the National Road Traffic Act, No. 93 of 1996 and as required by the United Nations for international shipments.
The contract requires that labelling of the tanker must be in a language appropriate to identify the material in the governmental jurisdiction and as required by the recommendations for the Transportation of Dangerous Products published by the United Nations Economic and Social Council's Committee of experts on transport of dangerous goods.
As a certified producer within the ICMI, Sasol is committed to supplying all of its cyanide code signatory customers with sodium cyanide, including a red carmoisine dye, in compliance with ICMI requirements. In an email dated 17 May 2019 to the Process Plant Administrator at South Deep, Sasol stated that, "the first coloured cyanide delivery will be in June 2019. Please ensure to update and replace old MSDS (Material Safety Data Sheet) sheets and communicate the change to the Chemical Handlers/ER24 Paramedics. The revised MSDS containing reference to the red dye forms a part of the supply and transport contract."
Cyanide is transported directly from the Sasol cyanide production facilities to the South Deep Gold Plant; there are no ports of entry on the route of the liquid sodium cyanide from the producer to the mine; and there is no interim loading, storage or unloading during shipment.
The contract requires that the supplier will ensure that its nominated sub-contractor (Tanker Services Food and Chemicals/Imperial Logistics) produces a risk assessment document showing that the selected routes for transporting sodium cyanide are the lowest risk and include community involvement. The nominated sub-contractor is also responsible for security throughout transport. It also requires that safety and maintenance of the means of transportation throughout transport, is the responsibility of the nominated Sub-contractor, Tanker Services Food and Chemicals/Imperial Logistics (Tanker Services).
Consignee Duties and Responsibilities, in the contract, clearly spell out the roles of the driver of the transport and the Consignee's Qualified Person (CQP) in the off-loading process and implementation of the offloading procedures. All safety task and safety

training for transporters and handlers of the sodium cyanide is the responsibility of Tanker Services.
Emergency response throughout transport is included in the contract. The supplier and its nominated sub-contractor (Tanker Services) are responsible for the emergency response throughout the transportation period. The relevant clause does not absolve the supplier from its obligations in terms of the contract.

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 South Deep supply contract requires that the producer/supplier and transporter of the liquid sodium cyanide must be ICMI certified. Tanker Services Food and Chemicals/Imperial Logistics was recertified as fully compliant under the Cyanide Code as an ICMI transporter on 21 November 2018.
Chain of Custody documentation relates to the producer, Sasol, Sasol's bulk tanker transporter, Tanker Services, and delivery to the mine. There are no national border crossings or any other mode of transport. Chain of Custody documentation was sampled for one delivery in 2019 and one delivery in 2021. It should be noted that during 2021, there were cyanide supply problems at Sasol, and on occasions, Sasol could not deliver the amount of bulk liquid cyanide ordered. In such cases, South Deep would cancel the original Purchase Order and replace it with a new Purchase Order, based upon the quantity of cyanide actually delivered. This accounts for the difference in Purchase Order numbers between the original order and the purchase order number on the Sasol invoice.
Documents sampled in 2019 and 2021 during the Chain of Custody review process included: - Goldfields Purchase order, Sasol Tax invoice, Sasol Delivery Note and Dangerous Goods Declaration, Sasol Delivery Note, Sasol Certificate of Analysis, Tanker Services Delivery Note, and Goldfields Reconciliation.

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

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

X in full compliance with

The operation is □ in substantial compliance with **Standard of Practice 3.1**

□ not in compliance with

Basis for this Finding/Deficiencies Identified:
The operation uses only liquid cyanide, delivered by bulk tanker, and no mixing or storage of solid cyanide takes place on-site. Previous ICMC audit reports noted design information, handover certificates and vendor acceptance of installation certificates. The facility has not changed since the previous Recertification Audit.
Fit-for-Purpose Inspections are undertaken every 5 years on the Gold Plant (including cyanide storage), and every 3 years on the Backfill Plant and off-loading section, by a structural engineering consultant. In addition, Sasol undertakes technical audits of the cyanide off-loading and storage facilities annually (2018 – 100%, 2019 – 98% and 2020 – 100%).
The cyanide is stored away from people and surface waters and from incompatible materials. The cyanide storage area is equipped with fixed HCN (Hydrogen Cyanide) gas monitors with audible alarms and also alarming on the SCADA system (SCADA is a computer-based system for gathering and analysing real-time data to monitor and control equipment) in the control room to warn of any HCN gas presence. The cyanide offloading area is located on a concrete surface, sealed with a sealant to prevent spillage to subsurface. All the wash water and possible spillage from the tanker will drain from within the drive-over humps at both ends of the tanker off-loading pad into the cyanide bund, from where it can be pumped to the cyanide storage tank bund, and then to the leach.
To prevent overfilling, the reagent cyanide storage tank level is displayed at the offloading area and in the control room, and the offloading procedure checks that the cyanide tank level is less than 65%. The tank level interlocks with the offloading air valve and activates at 90% tank level. A high-level alarm will sound at 85%. Excess gas from each cyanide storage tank is vented through a scrubber. The cyanide dosing tank ("slave" tank) at the top of the Leach tank (TK2) can only be accessed via a cat ladder which is locked. The procedures covering cyanide unloading and transfer were reviewed and found to be effective. The daily PM instrumentation inspection includes checking level transmitters, associated cabling and control valves. This is part of the PMS system. Examples were sighted of completed Daily Instrumentation Inspection sheets.The Offloading Bulk Cyanide Checklist includes a specific requirement to check that there is sufficient space in the storage tanks to prevent the overtopping of cyanide.
The cyanide areas are within the access-controlled plant security area, which is securely fenced. The cyanide storage area is further locked to prevent any unauthorised plant personnel from entering.

Standard of Practice 3.2: Operate unloading, storage and mixing facilities using inspections, preventive maintenance and contingency plans to

prevent or contain releases and control and respond to worker exposures.

X in full compliance with

The operation is □ in substantial compliance with **Standard of Practice 3.2**

□ not in compliance with

Basis for this Finding/Deficiencies Identified:
Only liquid cyanide is used and delivered via bulk tanker to storage tanks. No mixing or storage of solid cyanide takes place on-site. The cyanide offloading procedure is detailed, spelling out PPE (Personal Protective Equipment) requirements, the use of a buddy in the process, and is clearly sequenced to prevent spillages and accidental releases during off-loading. The cyanide off-loading procedure requires that the offloading pipes and valves and the outside of the tanker be washed with water after the off-loading has been completed.
As a certified producer within the ICMI, Sasol is committed to supplying all its Cyanide Code signatory customers with sodium cyanide, including a red carmoisine dye, in compliance with ICMI requirements. In an email dated 17 May 2019 to the South Deep Processing Plant Administrator, Sasol stated that, "…the first coloured cyanide delivery will be in June 2019. Please ensure to update and replace old MSDS (Material Safety Data Sheets) sheets and communicate the change to the Chemical Handlers/ER24 Paramedics. The revised MSDS containing reference to the red dye forms a part of the supply and transport contract…"

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 South Deep Gold Plant has a comprehensive list of procedures (numbers in brackets):

- Maintenance Inspection Guidelines (MIG) (41)

- Safe Work Procedures Gold Plant Process (55)
- Safe Work Procedures Backfill Process (40)
- Safe Work Procedures Tailings (5)
- Emergency Procedures (55)
- Mechanical Procedures (82)
- Electrical Procedures (55)
- Instrumentation Procedures (46).
- Technical (30)

These are supported by 45 TSF contractor operating and management procedures. A Mandatory Code of Practice for Mine Residue Deposits (Tailings Facilities Only), Doornpoort Tailings Storage Facility, is in place. The South Deep Gold Mine Doornpoort TSF SLR Project Geotechnical Investigation and Slope Stability Assessment, dated May 2019, included recommendations such as - operational conditions monitoring must be maintained, and the operator should ensure that a small pool is maintained, the rate of rise of the TSF is to be kept to below the design value of 1.6m/year, and the outer TSF side slope is maintained at a slope of 1V:4H.

The Detail design of the Doornpoort Tailings Dam Complex at South Deep Gold Mine Report indicated Tailings dams decant system capacity: 1:50 years flipped 140mm, Freeboard is the 1:50 year 24-hour storm event, plus 700mm, and no discharge to surface water exists. The South Deep Metallurgical Plant Mandatory Code of Practice for Cyanide Management states that the cyanide monitoring criteria is per the ICMI Code, i.e., less than 50 ppm cyanide WAD (Weak Acid Dissociable) in open bodies of water. The Hydrogen Peroxide and Dosing Procedure, section 3.6 - Auto Dosing Stream 1, requires that the pump should be at its maximum dosing rate should the WAD cyanide exceed 40 ppm.

The Key PRAGMA (proprietary name) Planned Maintenance System (PMS) was operational in the Plant from the previous recertification audit to the end of 2019, when it was replaced by the SAP (proprietary name) ECC6 Planned Maintenance System in 2020, with a brief, two-month systems overlap between the end of 2019 and the beginning of 2020. Both the PRAGMA and SAP PMS systems include inspection and planned maintenance activities which can be aimed at meeting compliance with Cyanide Code requirements. An electronic review of the SAP PM (Planned Maintenance) system was undertaken to check the listing of critical cyanide equipment. Records from the PRAGMA system were checked, and it was confirmed that critical maintenance data was carried over to the SAP system. Equipment histories have been reviewed, looking at both PM and breakdown events. Examples of completed job cards have been reviewed to check completeness of filling in, and that Code-required minimum data is included. Records have been sampled from 2019, 2020, and 2021. The Shift Management and Handover Book includes a section which asks, for the different areas, if bunds are clean, and are there any cracks in bunds? It also asks if there are any pipes leaking, and if all inspections have been completed, and further asks for any deviations found to be noted. Examples for the day shift on 30-08-2021 (B crew), the night shift on 30-08-2021 (C crew), and other examples from 2019, 2020, and 2021, were sighted.

TSF daily operational inspections: includes pipe trench, valves, pumps stations, and slimes dams, which are checked and comments are recorded. Daily inspections by SSMS

(Stefanutti Stocks Mining Solutions), the TSF sub-contracted operators are carried out. The checklist includes the return water dam level, wildlife and wildlife mortalities observed, and daily gas monitoring readings. February and October 2018, November 2020, and July 2021 were sampled. Monthly Stefanutti Stocks Hazard Management System (HMS) inspections and spreadsheet reports, which include the condition of the side slopes, benches, day walls, and freeboard were sampled for February and November 2018, January and February 2020, and February 2021. Quarterly Audits, including SLR (consulting engineers) representation, were carried out for 2018, 2019, 2020, and 2021 and were sampled.

Further inspection topics covered include: - Underdrains, TSF Pool, Temporary Penstocks and Catwalks, TSF Piezometers, TSF Freeboard, TSF Wall Raising- Hybrid Day Wall System, Tailings Density and Grading, Storm Water Solution Trench, Storm Water Channel into the Silt Trap, Scavenger Boreholes, Return Water Dam, Water Levels, Piezometers at the RWD (Return Water Dam), Storm Water Drain (Running Along the East and Downstream of the RWD), Action Lists, and ongoing actions to be undertaken at Doornpoort.

The operation inspects the cyanide facilities on an established frequency, which the auditors deem as sufficient to ensure that they function within design parameters. If deficiencies are detected during the inspections, a job card is raised for correction of the deficiency. If the corrective action is minor and can be fixed during the planned inspection, the repair will be undertaken, and the artisan will raise the job card retrospectively. Inspections are documented, including the inspection date, the inspector's name, any observed deficiencies, and corrective actions. The records of inspections are retained. The PMS schedules planned inspections by boilermakers, fitters, electricians, and instrument technicians on a daily, weekly, monthly, quarterly, six-monthly, or annual frequency, depending upon the equipment. Some operational inspections are scheduled, but activities are often followed through by operational staff, and that data is rarely included in the PMS records. During the switchover from PRAGMA to SAP, an Excel spreadsheet was developed of all assets and the spreadsheet listed asset numbers for both PRAGMA and SAP. Foremen checked assets in the field and confirmed presence and asset numbers during walkabouts.

The PMS inspections include tanks, pipes, pumps, valves, secondary containments, ponds and impoundments located in the plant and the TSFs (old and new) complex. During the electronic review of the two PMS systems, examples from the cyanide facilities were checked electronically, and hard copy job cards were reviewed. All tanks are thickness tested annually. The plant pollution control dam level and all TSF RWD levels are shown on the SCADA (Supervisory Control And Data Acquisition) system and used to manage the water usage, as per the Probabilistic Water Balance and the Water Management Plan. There is a GoldSim (proprietary name) computerised probabilistic water balance in place, and no scenario has been identified where the need has been highlighted to shut down the plant to prevent overtopping. The South Deep Gold Mine Standard Procedure for Stopping the Gold Plant Operations for extended periods, and the Backfill Plant South Deep Gold Mine Standard Procedure for Stopping the Backfill Plant Operations for extended periods, can be used for any extended shutdowns, including strike action and Covid 19 lockdowns. The procedures include cyanide management during stoppages for

extended periods.The plant is designed to contain any spillages in the plant pollution control dam, and thus no backup power is required in case of power failures.
A change management procedure covering health, safety and environment is in place and operational, and examples of major and minor change management exercises were sighted. These included the operation of a new Gekko ILR (InLine Leach Reactor), and new backfill final tailings tanks. All MOC (Management of Change) documentation is signed off by Safety, Health and Environmental Officials.

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:
In house optimisation on the leach feed for remining, and the shaft is an ongoing process. A 2020 presentation on sodium cyanide optimisation was reviewed, and bottle roll tests, including varying cyanide optimisation for TSF remining and Reef, were sighted. The residual WAD cyanide analyses are also done on the tests. Optimal cyanide levels were determined, and two-stage cyanide addition was tested. Two-stage addition of cyanide resulted in lower cyanide consumption and lower WAD cyanide levels in the final tank.
A Managerial Directive Optimization Plan - Sodium Cyanide, dated 29 March 2021, was reviewed. Test work on gravity gold recovery was conducted. Gravity Recoverable Gold can constitute a significant fraction of recoverable gold. A Gekko (proprietary name) Intensive Leach Reactor (ILR) was installed and is being commissioned and optimised. This addition may improve recoveries and further optimise reagent consumption.
The re-mining source was the subject of sampling and test work by the greater Gold Fields Group. The results were used in the design of the re-mining project, and this was confirmed during interviews with the Metallurgical Manager and Plant Metallurgists. A presentation of re-treatment of the old tailings dam, which includes test work results and operational results of bulk tests, was sighted. No extreme cyanide consumption requirements were identified, although cyanide consumption increased from the Reef parameters. The South Deep Set Point Logbook from 2008 to date was sighted, including the implementation of parameters for the two-stage leach addition of cyanide.
Test work on concrete from the mill discharge area was conducted on 5 December 2019, determining leach parameters and recoveries. An Extended leach: CIL circuit improvement project dated 27 July 2020 was done, including diagnostic leach on residue.
The TAC 1000 analyser is used for free cyanide online measurement on both streams, and this was confirmed during the site inspection. Primary control is by ratio controlling

pump speed based on mass flow readings. Cyanide control is built into the TAC 1000 analyser, driving a variable speed positive displacement pump. The equipment suppliers have life access to the TAC 1000 data remotely in case of issues. The system will automatically send an SMS (Short Message Service) to the Operator if the readings exceed set limits. TAC 1000 readings are live on the SCADA for control and monitoring purposes by the Operators. Two-stage cyanide addition is practised and controlled by the TAC 1000 system. Manual titrations are done and compared to the TAC 1000 readings.
New technologies are monitored continuously to evaluate potential control improvements.

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

X in full compliance with

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

□ not in compliance with

Basis for this Finding/Deficiencies Identified:
A GoldSim (proprietary name) Probabilistic Water Balance has been developed for the entire mining operation. The software in the GoldSim Probabilistic Water Balance accounts for the natural variability and uncertainty of precipitation and evaporation and the average precipitation and evaporation rates. The model was developed in 2011 and was updated in January to July 2021. The model was demonstrated to the auditors covering the different site-specific scenarios:

- Production data, e.g., milled tons, TSF tons, backfill produced and placed. This includes Doornpoort deposition rates. The two old TSF's will not be used for deposition, and only for minimal care and maintenance of freeboard.
- Dam levels;
- Rainfall data; 61 years of actual site data is used. The weather stations at the Old TSF and Doornpoort are used for input in the model.
- TSF Seepage Water Flows;
- RWB (Rand Water Board) Data
- Underground water.

The Model outputs are as follows: -:

- Overall Water Balance;
- Volume spills (if any);
- Volume entrained/seepage water (if applicable);
- Evaporation.

Included in the inputs to the model are: - the 1:50 year 24-hour storm event; phreatic levels in the TSFs; the amount of precipitation entering a pond or impoundment resulting from surface run-on from the up-gradient watershed, including adjustments as necessary to account for differences in elevation and for infiltration of the runoff into the ground; and inclusion of evaporation, seepage, rain, and spills in the dam module. The TSF

module includes evaporation, direct rain, penstock outflow, seepage in the body of tailings, body of tailings seepage out of the bottom, under drains, and seepage captured in under drains wet beach entrainment. All water storages are equipped with level indicators and are displayed on the SCADA in the control room. A comprehensive set of water flow measurement systems is in place to assist with using the water model to balance water consumption. A Spill Prevention Control Procedure is also in place.
The model is used for planning, water management of the operation, including the transfer of water between the Return Water Dams of the Old TSF and Doornpoort TSF, and scenario planning and predictions.
It was demonstrated to the auditors that the plant runs simulations as per current situations such as tonnage received from underground, the status of re-mining activities, whether the Reverse Osmosis plant is operational, availability of return water, and rainfall. Currently, the model predicts the plant being water negative and enables the management team to plan to introduce additional water sources.
The old TSF Return water dams levels were simulated for the 72-hour power outage scenario: no overflow was predicted, and thus no emergency power is required. The mine is provided with two separate sources of power from Eskom, the national power utility. It was concluded that no emergency power is required in case of power failure.
The GoldSim model is run monthly, and operating practice is revised, as appropriate. GoldSim will update automatically, every time it receives new data, and when its iterations are run.

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 compliance measurement point is the Doornpoort TSF WAD cyanide readings at the online WAD analyser at the final residue tank.
GP (Gold Plant) stream 2 WAD cyanide results as daily averages were sighted for:
2018
5 x exceedances with a maximum of 57.1 mg/l.

- The individual investigations were sighted. The leading cause for the exceedances was identified as low backfill ratio, which depends on backfill demand by the shafts. Process optimisation work is undertaken, resulting in better management of WAD cyanide in stream 2.

2019
4 x exceedances with a maximum of 62.4 mg/l.

- The individual investigations were sighted. The leading cause for the exceedances was identified as erratic densities in the CIL, which was caused by slower cyanide

control caused by the density variations resulting from the commissioning of the new CIL circuit.

2020

2 x exceedances with a maximum of 58 mg/l

- The individual investigations were sighted. The main cause for the exceedances was identified as low backfill ratio, which depends on backfill demand by the shafts, and an increase in re-mining tonnage.

2021

11 x exceedances within a period during the commissioning of the Gekko Intensive Leach Reactor (ILR), totalling 17 x exceedances. The maximum exceedance was 87 mg/l. All ILR-related exceedances were investigated

- The individual investigations were sighted. The main cause for the exceedances was identified as low backfill ratio, which depends on backfill demand by the shafts (which is very low during January), and an increase in re-mining tonnage to the CIL.
- The commissioning of the Gekko ILR from April to mid-July, resulted in cyanide addition control issues. The rate of adding the ILR spent solution pumped to the Leach was reduced, resulting in improved WAD cyanide control. The long-term solution is being designed and includes the use of a surge tank and controlled addition of the spent ILR solution to the leach, resulting in effective cyanide control. The project is being added to Tracker (Action tracking software) to check the effectiveness of the intervention to manage the exceedances.

The WAD cyanide values for the Gold Plant PCD (Pollution Control Dam), Twin shafts PCD, Cascade Dam, Old return water dam, Doornpoort return water dam for 3 years, since the last certification audit were sighted. All values were less than the limits of detection of 0.5 mg/l WAD cyanide. These open water bodies are thus not classified as cyanide facilities.

No cyanide-related bird or wildlife mortalities have been reported since the last recertification. As a result of the above results, additional measures are thus not deemed required to prevent access of wildlife and livestock to the areas, and it is further deemed that maintaining the WAD cyanide levels at less than 50 mg/l is effective.

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

X in full compliance with

The operation is

- ☐ in substantial compliance with **Standard of Practice 4.5**
- ☐ not in compliance with

Basis for this Finding/Deficiencies Identified:

There is no licensed discharge of plant water to surface water. As a precaution, downstream cyanide values are monitored. Downstream from old TSF dams 1 to 4, water

samples from sample points S6 and S10 for Free cyanide were monitored, and all values have been at less than the limits of detection of 0.022 mg/l Free cyanide for the three years since the previous certification audit. Water samples from sample point S20 downstream of Doornpoort were checked for Free cyanide. All values were at less than the limits of detection of 0.022 mg/l Free cyanide for the three years since the previous certification audit.
The values show that there is no indirect discharge to the surface water of the Kariegaspruit and Leeuwspruit downstream of the TSFs. Surface water analyses are done by DD Sciences Laboratories. Their limit of detection is 0.022 mg/l Free cyanide and 0.5 mg/l for WAD cyanide.

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 Doornpoort TSF is equipped with underdrains draining seepage to the return water dams. Scavenging wells were installed during 2018, 2019, and 2020, with water returned to the return dam. A presentation was sighted of graphs showing water levels and volume pumped to return water dams. The wells are used to control groundwater levels and for return dam liner protection. Water quality is monitored. The return dams are HDPE (high-density polyethylene) plastic-lined and equipped with leakage detection systems and boreholes monitoring for WAD cyanide.
The plant is equipped with concrete bunds collecting any spillages. The surface of the plant is covered by concrete slabs and tarred roads, draining into stormwater drains and collected in the plant pollution control dam (PCD), which is kept empty.
Groundwater beneficial use is deemed for mining purposes only. 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 downgradient of the gold plant or tailings facilities. The Mine is using a cyanide water quality standard of 0.5 mg/l WAD cyanide. Groundwater monitoring is undertaken to establish whether the tailing facilities are having an impact on the surrounding groundwater. Monitoring records observed from 2018 to 2021 are all below levels of detection 0.01 mg/l WAD cyanide.
Groundwater monitoring Doornpoort TSF
Downstream borehole results for the following points: - SD 39, SD40, SD36, and SD45 were sighted. All results were less than the limits of detection of 0.01 mg/l WAD cyanide.
Groundwater monitoring Plant and old TSFs:

Upstream (SD12, SD16) and downstream borehole results for the following points SD 9, SD 11, and SD 12 were sighted. All results were less than the limits of detection of 0.01 mg/l WAD cyanide.
The groundwater analyses are done at Element Material Technology South Africa (Pty) Ltd, who are South African National Accreditation Standards (SANAS) accredited. Their limits of detection are 0.01 mg/l cyanide.
A WAD analyser is installed on the backfill to the underground line. A high pH binder is added to each batch. Sampling is also done underground. The mine process water is sampled and analysed for WAD cyanide. Values were reviewed, and they were all less than 0.01 ppm WAD cyanide.
A MINTEK (South Africa's national mineral research organisation) health study was initially conducted in 2008 (sighted final report MINTEK REP GF S-Deep BF080817: final, dated 17 Aug 2008) concluding that, based on available results, very little risk of HCN gas was present. A peer review of the report by AED (proprietary name), dated 19 Oct 2011, concluded that they fully supported the conclusions in the original MINTEK report. The Mine uses 50 mg/l WAD cyanide as a cut-off value for backfill batch certification, before release to underground sections. This was confirmed in previous certification audits. The Cyclone Classified Tailings to underground from 2019 to date were below 50 mg/l WAD cyanide with some values at 30 mg/l, but still below the 50mg/l WAD cyanide standard for both streams.

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:
Leach tanks are placed on ring beams with a 100mm impervious concrete layer, and this was confirmed in a review of drawings and sighting of photographs. Cyanide reagent solution strength tanks are situated on concrete bases inside the bund area, and no cracks were observed. It was confirmed that civil design drawings were sighted. Leach, CIP, elution, and tailings tanks are all placed inside concrete bunds. The leach extension was carried out by TWP (contractors), and civil drawings of the tank foundations, including a 10mPa concrete infill mass, were sighted. These tanks were placed inside a concreted bund (TK7.8. 9. and 10). There has been no change since the previous audit. The new backfill tanks were based on the same design as for the TWP designs, including an impervious concrete layer. This was confirmed in a drawing showing the concrete layer consisting of 30MPa concrete and 150 mm concrete layer.
A review of bund and largest tank volumes covering: - the leach, CIP (Carbon in Pulp), Tailings, Elution, Backfill make-up, backfill distribution and Thickener indicated that the bunds were 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, either directly or through linked bunds. There are no process tanks without secondary containment on the plant. The Plant is designed with bunds and sump pumps returning all spillages to the process.
Reagent strength pipes from cyanide storage to the cyanide dosing tank run over concrete surfaces, draining to the leach bund. A procedure is in place for cyanide transfer to the secondary storage tank from the (Reagent Cyanide Storage Tanks) between 6 am and 7 am to minimise risk to people passing by. The reagent strength pipeline from offloading to storage runs across soil, but is used only twice per week for 45 minutes. The pipeline drains into the reagent strength bund. The offloading procedure requires draining following offloading. Pipeline pressure is not higher than the pressure of the offloading air and tanker (175 kPa). Thickness tests are conducted to determine maintenance requirements and pipe replacements. A concrete slab is constructed underneath the drain valves from the cyanide offloading area. A risk assessment was conducted on the cyanide offloading and transfer procedure to confirm its safety.
All slurry pipelines are situated above concrete or tarred surfaces, draining into the bunds, or into the concrete pollution control dam. The TSF pipelines are included in the PRAGMA (and now SAP) PMS system. Operations inspect the pipelines on a daily basis and this was confirmed in the sampling of inspections. The tailings pipelines are made of mild steel, lined with HDPE liners. No leaks have been observed since installation. The Tailings Lines are installed inside earth trenches, equipped with catchment paddocks at low points to collect any leaks. The South Deep Spill Prevention Control Procedure is in place.
A risk where the lines cross the Kariegaspruit stream, flowing to the Leeuwspruit, was identified. Special spillage prevention measures are in place. The pipes running over the Spruit were placed inside a concrete crossing. The signed off drawing, Doornpoort River Crossing Plan, was sighted. Maintenance Inspection Guidelines specifies no brass, copper, or aluminium components to be used for cyanide equipment. There has been no change since the previous audit.
Pipelines and crossings form part of the daily operational inspection. The pipelines are lined with an HDPE (High-Density Polyethylene) plastic lining to reduce the risk of pipe leaks due to erosion or corrosion.
The site inspection verified the use of steel tanks and pipes. No copper-based valves are used. The design criteria specified materials that are compatible with cyanide and high pH conditions. The Hydraulic design of the new tailings pumping facility at South Deep details the pumping systems designs. Special measures to prevent spillage include the slurry pipe specification for 6mm API (American Petroleum Institute) 5L GradeX42 ERW (Electric Resistance Welded) steel pipe, lined with an 8mm thick HDPE liner, which is compatible with high pH slurries. There has been no change since the previous audit.

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:
During the interview with the Project Manager of Golder Associates, it was verified that a Wilson Baily QA/QC program was implemented during the whole Doornpoort Return Water Dam project. The Quality Assurance Plan was sighted. Quality control plans were sighted by the following associated companies: WBHO (civil earthworks, platforms); Delra QCP (Gold Plant pipelines and tanks); Bambanani (peripheral pipe fittings); Isizwe (Platforms); APE Pumps (vertical spindle return water pumps); Abeyla (backfill plant pipe fittings and pipework); D&R (small pipework); Kemix (agitator and slurry tank); Deltras (welding); Weir Minerals Africa (slurry pumps); Blue Consult (tailings tank); Boshtech (Tailings tank); and Pierre and Van Dalen (3rd party inspections all mechanical and piping). The QC/QA records have been retained as referenced above, and confirmed by reviewing the hard copy records.
On the plant, two new backfill tanks were installed. The Quality Control Files Index, including the Quality Control Plan, models and drawings, material certificates, NDT(Non-Destructive Testing) reports, corrosion control certificates, photographic evidence of trial assembly, and waybills and delivery notes, were sighted.
Detailed quality control and quality assurance records for the Doornpoort Return Water Dam project and the backfill tanks were sighted and sampled.
Records, acceptance certificates, action lists and sign-offs were sighted and signed off by appropriately qualified personnel.
The 5 yearly Gold Plant Structural Report resulting from inspections conducted in November 2017 was sighted. Major repairs to leach (Tank) number 6, concrete floor repairs and corrosion protection for bottom tank plates have been completed. The 3 yearly Backfill Structural Reports from inspections conducted in 2017 and 2021 were sighted. As a result of the structural reports and risks, plans for demolition of structures and new tanks were identified and completed. A presentation was given by the Plant Engineer, which included: -

- Structures and capital planning is covered for 2022, including work on TK5 following thickness testing,
- Confirmation that the structural report has no high priority cyanide issues that need to be addressed, and that
- There are ongoing maintenance issues that are being tackled as part of the footprint reduction continuous improvement work.

With regard to the Doornpoort Return Water Dam project, the action tables are used as follow-up between the quarterly inspections to monitor progress and identify new action steps for the TSF to be operated as per the South Deep TSF Code of Practice. The issues in the action plan on wall raising were resolved and implemented, and signed off. The wall building was observed during the site inspection.

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:

DD Science Laboratories conducts **surface water sampling** at South Deep Gold Mine according to the following procedures:

- DD Science Procedure P091, "Procedure for Taking Cyanide Samples", Rev 03, 1 February 2021. **Surface water sampling procedures** have been developed by Dave Dorling of DD Science, who is a qualified Assayer.
- DD Science Method M090, "Determination of WAD Cyanide in Water", Rev 8 September 2020.

Rison Groundwater Consulting conducts **groundwater sampling** as per procedure: "Groundwater Quality Monitoring South Deep Gold Mine", April 2017, as per the South African Groundwater Sampling Manual, Water Research Commission Report, TT733/17 for cyanide specific sampling. The sampling and analytical protocols were developed by Adrian van Bart Consulting Hydrogeologist (Pr. Sci. Nat.), MSc in Geology from Rand Afrikaans University and MSc in Hydrogeology from the University of Free State, revised by Martien Prinsloo (Pr. Sci. Nat.) Consulting Hydrogeologist.

DD Science is a SANAS (South African National Accreditation Systems) accredited Testing Laboratory, which conducts the **surface water analyses**.

The **groundwater analyses** are done at Element Material Technology South Africa (Pty) Ltd, South African National Accreditation Standards (SANAS) accredited. Their limits of detection are 0.01 mg/l WAD Cyanide.

WAD sampling conducted by South Deep Gold Mine is done in accordance with the WAD Sampling procedure, "WAD Cyanide Sample Preparation for Solutions". The WAD sampling is conducted to evaluate plant efficiencies relating to WAD CN Management. The South Deep Gold Plant WAD Sampling procedure was developed by David Mogoai (Metallurgist), BSc (Hons) Metallurgy from the University of Pretoria, and revised by Ismail Kola, NHD Extraction Metallurgy.

The document, "Water Monitoring Program", cross-references the procedures detailed above. The Water Monitoring Program was developed by Mpho Mutobvu (Supervisor Environmental), BSc. (Hons) Environmental Science from the University of Limpopo, and reviewed by Simon Mporetji (Unit Manager: Environmental), BSc (Hons) Environmental Engineering from the University of Pretoria.

The how and where samples should be taken, sample preservation techniques, chain of custody procedures, and cyanide species to be analysed are included, appropriately, in the above-mentioned procedures. Sampling conditions (weather, livestock/wildlife activity, anthropogenic influences) are included in the Water Monitoring Procedure sampling

sheet, and samples were sighted. Sampling of surface and groundwater is undertaken upgradient and down gradient of the site, details of which can be found under Standard of Practice 4.4 above.
Surface water sampled: weekly, groundwater is sampled quarterly, dams are sampled fortnightly, WAD cyanide is sampled online by the WAD 1000 analyser every 20 minutes, and wildlife mortality is checked daily by TSF staff. The Mine Environmental Department also conducts monthly wildlife inspections. Monitoring is conducted at frequencies deemed by the auditors as adequate to characterize the medium being monitored and to identify changes in a timely manner.

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:
South Deep Gold Plant has a procedure, "Demolition of Cyanide Facilities". The South Deep Gold Mine has a "Final Rehabilitation Decommissioning and Mining Closure Plan - South Deep Gold Mine 2020", dated January 2021, which was drawn up by SRK Consulting. Section 10,2 - Cyanide Management, includes cyanide decommissioning and cyanide decontamination. Included in the Closure Plan is a Gantt chart schedule entitled "Closure Plan for South Deep Metallurgical and Backfill Section". The Mine Closure Plan is reviewed every year, and the Demolition of Cyanide Facilities Procedure is reviewed at a frequency according to the Document Control Procedure.

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

X in full compliance with

The operation is in substantial compliance with **Standard of Practice 5.2**

 not in compliance with

Basis for this Finding/Deficiencies Identified:
The Closure Cost Estimate Report 2020 South Deep Gold Mine, prepared by SRK (Steffen, Robertson and Kirsten) Consulting, was sighted and was updated in November 2020. The estimates are based upon third party implementation for all active cyanide facilities. A line item was sighted, Line Item 25 - Decontamination of concrete and steel: South African Rands (R) 5.2 million. The Plan is reviewed every year, which was confirmed with the revision in November 2020.
The Placer Dome - Western Areas Joint Venture Trust has been established to fund all aspects of the South Deep Mine Closure, including cyanide decommissioning and decontamination. There is a jurisdictional requirement for the establishment of a trust fund to cover the closure costs of the mine. In addition to the trust fund, guarantees are in place with Standard Bank and Guardrisk to fund shortfalls.
A letter was sighted from Goldfields Manager Commercial Services to the Regional Manager: DMRE (Department of Mineral Resources and Energy), dated 26/4/2021, on the subject - Dec 2020 Contribution by the South Deep Gold Mine to the Placer Dome - Western Areas Joint Venture Trust, indicating the estimated fund value in December 2020 (R202 294 500) referencing a contribution paid of R 10 064 000. It is further noted that the Fund is over provided, as of 31 December 2020 by R 26 083 754.

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 South Deep Gold Plant has a comprehensive list of procedures (numbers in brackets):

- Maintenance Inspection Guidelines (MIG) (41)
- Safe Work Procedures Gold Plant Process (55)
- Safe Work Procedures Backfill Process (40)
- Safe Work Procedures Tailings (5)
- Emergency Procedures (55)
- Mechanical Procedures (82)
- Electrical Procedures (55)
- Instrumentation Procedures (46).
- Technical (30)

These are supported by 45 TSF contractor operating and management procedures. A Mandatory Code of Practice for Mine Residue Deposits (Tailings Facilities Only) Doornpoort Tailings Storage Facility is in place.

The following cyanide-related task procedures and documents were sampled and reviewed and found to minimise worker exposure to cyanide: -

1. Procedure - Decontaminate equipment,
2. Procedure - Offload Bulk Sodium Cyanide,
3. Clearance certificate for maintenance/repairs in cyanide areas and elution column,
4. Clearance Certificate SAF-FRM-0039 which includes decontamination of equipment and area before being signed off for maintenance. Sampled the certificate with job card number 103729 dated 10/6/2021 relating to the Inline Reactor new pipe installation.
5. Maintenance inspection guidelines cyanide feed pipes reagent strength cyanide. Special instructions state that all tanks and pipes are to be cleaned thoroughly with RWB water. All cyanide equipment is to be decontaminated in the decontamination bay before being taken for repairs. A Clearance permit is to be obtained before removal of all cyanide pipes and equipment, and all welded joints are to be annealed for stress relief.
6. Hot work permit, SAF-FRM-0040, rev 4, dated 2 Oct 2020.
7. Permit to work in a confined space, SAF-FRM-0045. TK6 Leach Tank repair dated 28/07/2019 permit was sighted.
8. Procedure - Inspect and Maintain cyanide storage area.
9. Procedure - Cyanide transfer to secondary storage tank between 6 am and 7 am.

TSF Standard Operating Procedures (SOPs) were also reviewed and describe how cyanide related tasks should be conducted. Three procedures were sampled and reviewed, "Operating penstock using a Liftmaster" (procedure includes a pre-task inspection, the Buddy requirement, the use of an HCN monitor and PPE requirement), "HCN monitoring" (details the operation of the HCN Monitor as well as the use of the Buddy system), and "Day wall deposition".

In reviewing Plant and TSF procedures, it was noted that the wearing of the necessary PPE was included, as were pre-work assessments and/or inspections.

A change management procedure covering health, safety and environment is in place and operational, and examples of major and minor change management exercises were sighted. These included the operation of a new Gekko ILR (InLine Leach Reactor), and new backfill final tailings tanks. All MOC (Management of Change) documentation is signed off by Safety, Health and Environmental Officials.

Worker input is considered through monthly Safety Representatives' meetings, and electronic minutes were sighted and sampled. A meeting dated 13 July 2020 discussed welding issues and hazardous gas. The weekly Safety, Health and Environment (SHE) meetings also consider worker inputs and electronic records were sighted and sampled. A meeting dated 26 0ctober 2020 included a monthly safety topic and discussed adverse weather conditions. Minutes include attendance list, subject description, status, responsible person, date, target date, and % complete columns. Any safety incidents that arise are, after investigation, presented at the health and safety meetings for discussion and answering of any questions.

Daily Invocom (Employee **Invo**lvement through **Com**munication for **Com**mitment & Innovation) meetings also consider worker input. An electronic report/minutes file was sighted and confirmed during the interviews with site staff. Attendance registers are kept. Invocom meeting minutes from engineering dated 13 August 2021, 10 June 2021, 12 August 2021 were sighted and sampled.

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:
West Wits ore is treated on the plant where a pH of 10.5 is standard. The Metallurgy Manager will issue instructions when pH set points are changed in the PLC (programmable logic controller) by the Instrumentation Technician. Plant and outside sections use 27 personal HCN gas monitors (Crowcon Gasman) and 3 Tetra personal HCN gas monitors. The plant uses a total of 19 HCN fixed monitors (Crowcon TxGard-IS+) at the Leach (4), cyanide cage (1), CIP feed (3), tailings (1), Smelt house (4), elution column (1), and backfill (5). The Plant ERT (Emergency Response Team) makes available personal HCN gas monitors to the Gold Fields EMS unit when it arrives at the plant. The HCN gas monitors are set to 4.7 as the first alarm and 10.0 as the second alarm.
During the site inspection, warning signs where hotspots were identified were sighted. An HCN hot spot location map for the plant, including the location of hotspots, photographs, and reasons why they were designated, along with summarized mitigation measures was sighted. Fixed HCN monitors are installed and monitored at these areas.
The Plant confirmed that maintenance and calibration are performed 6 monthly (as recommended by the manufacturer). The calibration record index and certificates from Gas Monitoring Services for the fixed monitors and plant personal monitors were sampled and reviewed for 2020 and 2021. Planned maintenance inspections on fixed monitors are carried out by plant instrument technicians weekly, looking at the controls, cabling, checking connections, testing the flow switch, calibrating, and testing the flow detector using 10ppm test gas and testing the sirens and the alarm link to the SCADA. Third-Party calibration is carried out 6 monthly by the manufacturer, and job cards are generated to trigger third-party calibration. The manufacturers' agents also carry out maintenance and calibration on contract.
The procedure, "Control, use and issue of Crowcon Mobile Gas Monitors", includes the requirement that the first alarm must be set at 4.7 ppm to allow for safe evaluation and investigation of the alarm, and the second alarm is an instantaneous evacuation alarm.

Plant and backfill warning signage (including that cyanide is present, that smoking, open flames, and eating and drinking are not allowed, and that appropriate suitable personal protective equipment must be worn) were confirmed during the inspections to be clear, adequate, appropriate, and in good condition. TSF signage was observed and confirmed to be in place during the TSF site inspections. Signs indicated that water may contain cyanide. The signage observed was in good condition and adequate.

As a certified producer under the ICMI Code, Sasol is committed to supplying all its Cyanide Code signatory customers with sodium cyanide, including a red carmoisine dye, in compliance with ICMI requirements. In an email dated 17 May 2019 to the South Deep Processing Plant Administrator, Sasol stated that, "…the first coloured cyanide delivery will be in June 2019. Please ensure to update and replace old MSDS (Material Safety Data Sheets) sheets and communicate the change to the Chemical Handlers/ER24 Paramedics. The revised MSDS containing reference to the red dye forms a part of the supply and transport contract…"

The appropriate location of safety showers and eyewash baths and fire extinguishers was confirmed during the site inspection. All showers are linked to the SCADA in the control room, as is the alarm in the control room. This was confirmed during the sample testing of safety showers and eyewash baths throughout the plant.

The fire equipment plant layout was sighted, and it was confirmed that all units are inspected monthly by a third-party contractor, CSA Fire extinguishers. Fire extinguishers are checked monthly, and if faults are identified, extinguishers are replaced with new extinguishers. Only dry chemical powder fire extinguishers are used on cyanide fires.

A weekly PM (Planned Maintenance) job card is issued for a fitter to check all safety showers and eyewashes. The checklist includes checking smooth operation, water supply, and pressure, condition of showerhead and nozzles, free flow of water, and smooth operation of the platform.

The instrument technician also performs weekly PM inspections, checking cabling and connections to the alarm and SCADA on-screen pop-ups. The local alarm and flow switch are also checked.

It was observed during the site inspection that the signage on the pipes and tanks is extensive, very clear, and in good condition. Flow direction is also included. Large, clear Pipe Colour Coding Information boards were observed throughout the plant. It was observed during the site inspection that TSF and backfill pipes are labelled appropriately, including flow direction, indicating process cyanide, at appropriate positions, where crossing roads, where people cross, and close to communities.

The latest Sasol Safety Data Sheets (SDSs) are posted at the cyanide offloading and storage areas, and are available electronically. Large size reproductions of the SDS are on boards are throughout the site. The working language on the site is English.

All exposure incidents are investigated, as per the mine-wide procedure, “South Deep Standard procedure for incident reporting”. No cyanide incidents have occurred since the last audit. The incident investigation procedure was illustrated when documentation relating to a foot injury due to a falling gate rail on 17 February 2021 was reviewed.

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:
The operation has water, oxygen, resuscitators, Tri-Pac cyanide antidote kits (stored in fridges), two-way radios, and alarm systems available for use at cyanide unloading, storage, and mixing locations. It was confirmed during site inspection that First Aid rooms are located at the off-loading area, in the plant, and at the backfill area. The First Aid rooms contain water, oxygen, and Tri-Pac antidote kits available for use. All foremen and artisans have radios for communication. It was confirmed during site inspection that mandown alarms are placed at appropriate positions in the plant, including hot spot areas.
At the TSF, medical oxygen is available for the dam crew at boxes at the penstock, two on top of the dam, and one in the vehicle and first aid room. First aid boxes are also available: One at the penstock, two on top of the wall, one in the TSF vehicle, and one in the first aid station. Eight chemical suits, masks, and canisters are also available. Communication from the TSF is by cell phone to the TSF Foreman and the plant control room, as per the SSMS emergency response procedure.
First aid equipment, including Tri-Pac cyanide antidotes, is inspected and checked. The electronic records file was sampled, reviewing 11 July 2020, 10 March 2021, 17 November 2019, and 23 April 2018. Antidotes are ordered in time for delivery before the expiry of the current batch. The emergency equipment inventory is updated regularly, and antidotes are ordered as per the procedure, "Cyanide Antidote kit (TriPac cyano Kit)". The procedure requires suppliers to forward stock levels 3 months before the expiry of existing stock. The Emergency equipment inventory is updated regularly.
At the TSF, the electronic file on the inspection of emergency equipment was sighted and sampled for March 2019, October 2020: and May and November 2021. The inspection checklist includes:- Oxygen cylinder and Masks, Cell Phones, and HCN gas Monitors. The electronic file for first aid box inspection was also sampled and checked for 2019 (January to July) and 2021 (January to July). The Doornpoort Tailings Storage Facility First Aid Equipment Monthly inspection electronic files were reviewed and sampled for 18/5/2020, 9/12/2019, and 5/8/2021.
There are written emergency response plans to respond to cyanide emergencies at the plant and the TSF. The South Deep Gold Mine, Standard Procedure for Cyanide Emergency Preparedness and Response, deals with Plant emergencies. The Overall Mine Emergency Plan covers TSF emergency procedures. The contractor, SSMS, has its own emergency response procedure.
The operation has its own on-site capability to provide first aid or medical assistance to workers exposed to cyanide: There are trained first responders for each shift. The Plant has a fully equipped first aid room on site. ER24 (ambulance and paramedics contractors) is part of the emergency response for Gold Fields. 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. ER24 is 24 hour emergency response and have oxygen, a resuscitator, PPE, radio, and qualified personnel available to assist with any cyanide exposure incident. ER24 has a protocol for responding to a cyanide emergency on the Plant and Chemical Offloading Bay. This was confirmed during an interview with a senior ER24 Official. The protocol "Transportation of Ingested / Inhaled / Absorption Cyanide Patient", signed by Peter Van Der Merwe, Manager: Site-Based Medical Services ER24, was sighted.

The operation has developed procedures to transport workers exposed to cyanide to locally available qualified off-site medical facilities. The procedure, "Emergency procedure for person contaminated with cyanide", was sighted. The control room operator will call ER 24, as per section 3.7. of the procedure. The ER24 Call-out Procedure for Cyanide Poisoning states that the patient will be taken to the receiving hospital.

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. An updated letter dated 14 September 2021 from the Hospital Manager of the Lenmed hospital, confirming continuing agreement to treat cyanide patients and participate in annual full cycle cyanide drills, was sighted. The Hospital, as well as ER24, was involved in discussions covering the Covid pandemic scenario and cyanide emergencies. The meeting minutes dated 10 August 2021 were sighted, and section 5 discusses Covid 19 protocols and their effects on cyanide patient admission. The operation confirmed that the medical facility has adequate, qualified staff, equipment, and expertise to respond to cyanide exposures - refer to full cycle emergency drill 27 August 2021. Attendance lists of hospital staff given cyanide awareness training presented to staff on 10th September 2021 were sighted.

A Managerial Instruction dated 11 August 2020, delaying emergency drills and cyanide first aid training until January 2021 owing to Covid 19 complications, was sighted. This explains the disruption to existing time tabling and scheduling for emergency cyanide training and drills. Cyanide training for ER24 includes cyanide first aid and cyanide awareness training, which was undertaken. Attendance records dated 26 February 2021 included two ER24 Paramedics. ER24 and Lenmed Hospital are involved with cyanide emergency full cycle drills.

Reports and information on cyanide drills sighted are as follows: -

1. Full Cycle emergency drill 27 August 2021

- Mandown drill cyanide gassing at offloading to Lenmed Randfontein Hospital.
- Objective to establish capabilities of ER24 Paramedics and Lenmed Hospital staff.
- The patient was a resususcitation doll to enable proper resuscitation methods to be applied.
- Findings include reviewing availability and quantities of PPE, plus suitability of gloves used when taking blood samples. A feedback meeting was held on 27/8/2021 and included concerns and recommendations. These corrective actions are in progress and are included in the Action Tracker system.

2. Cyanide Pipe Rupture Emergency Response, dated 27 July 2021

- The drill purpose was to test offloading bulk sodium cyanide procedure, cyanide equipment rupture, cyanide release during receiving activity, or after hours, clean-up process of cyanide storage, and cyanide emergency response procedure.

-Learning points included the installation required of a new access gate to the area next to the airlock. A subsequent desktop drill report was sighted to complete the spill drill that could not be undertaken due to access problems following changed security arrangements around the area. It was verified during the desktop drill that spill response and clean up provisions were adequate to deal with a spill in the area. The need for additional rapid emergency access was identified, and an additional security gate is included in the area. Supporting arrangements for access to gate keys has been put in place and will be implemented.

3. TSF - 216/6/2019 HCN Gas drill, 2. 20/6/2020 Cyanide gas drill

The drill report includes the scenario, date, times, specific items and evaluation, overall rating, and additional comments, as well as an attendance register.

4. TSF - Emergency Mock drill report dated 28 Aug 2019-dam failure

- The scenario includes a 1:50 year storm event resulting in the southern compartment of the return dam failing, releasing water into the closest stream.
- The emergency mock drill report includes an Organogram, Emergency response to RWD failure, Appointments - South Deep Mine, SLR Consulting, Observation, sequence of events, response time, Spillage clean-up/rehabilitation, environmental sampling, concerns and observations, Remedial Action Plan System and 19 concerns and recommendations.

7. EMERGENCY RESPONSE Protect communities and the environment through the development of emergency response strategies and capabilities.

Standard of Practice 7.1: Prepare detailed emergency response plans for potential cyanide releases.

X in full compliance with

The operation is

- ☐ in substantial compliance with **Standard of Practice 7.1**
- ☐ not in compliance with

Basis for this Finding/Deficiencies Identified:

The operation's cyanide emergency response plan is contained in the integrated " South Deep Gold Mine, Standard Procedure for Cyanide Emergency Preparedness and Response". The overall Mine Emergency Plan covers TSF emergency procedures. In addition, the TSF contractor, SSMS, has its own "emergency response procedure - South Deep".

The cyanide emergency procedure considers a range of scenarios and addresses the responses in the procedure, along with use of the operational procedures. The operation has risk assessed the possibility of a catastrophic HCN gas release, and there was no risk identified for this scenario. There is an Emergency Procedure for a cyanide transport tanker on-site road incident, to cover transportation accidents. Section 7.3 deals with

releases during unloading of cyanide. Section 7.7 addresses releases of cyanide during fires and explosions. Section 7.1 responds to tank, pipe and valve rupture and the SSMS emergency response procedure also deals with TSF aspects. Section 7.5 deals with overtopping of ponds and impoundments, and the SSMS (Stocks and Stocks Mining Services) emergency response procedure also deals with TSF aspects. Section 7.10 addresses power outages and pump failures. Section 7.6 considers uncontrolled seepages. As there are no cyanide treatment, destruction or recovery systems in place for treating discharges of cyanide solutions to surface waters, this does not form a part of the emergency procedure.
Furthermore, a failure of the hydrogen peroxide dosing system was not deemed to create a cyanide emergency. However, there is an emergency procedure for persons contaminated with hydrogen peroxide. Section 7.8 deals with the failure of Tailings Dams, and SSMS has its own emergency response procedure and Emergency Procedure, "Dam Structural Failure", which also deals with TSF aspects. Sasol's transport subcontractor, Tanker Services (an ICMI-certified transporter), is responsible for transportation-related incidents outside of the Plant. Tanker Services has a cyanide emergency response plan, which considers bulk liquid sodium cyanide solution transport.
Clearing site personnel and potentially affected communities from the area of exposure is addressed in the Emergency procedure for total gold plant evacuation. There are no potentially affected communities, and thus this is not addressed in the emergency procedure. The use of cyanide antidotes and first aid measures for cyanide exposure forms a part of the Cyanide first aid protocol procedure. Control of releases at their source and containment, assessment, mitigation, and future release prevention is addressed in Section 6.8 - Decontamination of cyanide spillages within bunded areas, and Section 6.10 - Decontamination cyanide spillages outside bunded areas.

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:
On-going feedback to the workforce after emergency drills is given to update them on the ERP and associated drills. Stakeholder Communities are variously informed, primarily via community dialogues referred to in Standards of Practice 9.1 and 9.2 below. Refer to Standards of Practice 9.1 and 9.2 below.
ER24 and Lenmed Hospital are involved in full-cycle emergency drills, including feedback sessions. The feedback sessions are a method of updating. Contracts and agreements are in place with both ER24 and Lenmed Hospital for participation in cyanide drills and feedback sessions.

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:
Section 4.1 – Responsibilities of the Cyanide Emergency Management Team, sub-section 4.1.1 – Cyanide Emergency Coordinator addresses the question of authority and duties and responsibilities. In the same section under 4.1.2 – Cyanide Emergency response Team Members, the members are identified.
The plant training matrix details the training requirements for emergency team members. There is a call-out procedure for emergency response and call out contact details are posted on noticeboards throughout the plant and in the control room.
There is a standard procedure for emergency response equipment and a procedure and checklist covering monthly first aid room and equipment inspections. There is also an Emergency Response Equipment Inventory spreadsheet detailing Gold Plant, Backfill Plant, Reclamation Sites, Offloading, Doornpoort, ER24 and Lenmed Hospital emergency equipment, which was sighted.
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. An updated letter dated 14 September 2021 from the Hospital Manager of the Lenmed hospital, confirming continuing agreement to treat cyanide patients and participate in annual full cycle cyanide drills, was sighted. The Hospital and ER24 was involved in discussions covering the Covid pandemic scenario and cyanide emergencies. The meeting minutes dated 10 August 2021, including section 5 discussing Covid 19 protocols and their effects on cyanide patient admission, was sighted. The operation confirmed that the medical facility has adequate, qualified staff, equipment, and expertise to respond to cyanide exposures. Attendance lists of hospital staff given cyanide awareness training presented to staff on 10th September 2021 were sighted.
A Managerial Instruction dated 11 August 2020, delaying emergency drills and cyanide first aid training until Jan 2021 owing to Covid 19 complications, was sighted. This explains the disruption to existing timetabling and scheduling for emergency cyanide training and drills. Attendance records dated 26 February 2021, including two ER24 Paramedics, were sighted. Cyanide training for ER24 includes cyanide first aid and cyanide awareness training. ER24 and Lenmed Hospital are involved with cyanide emergency full cycle drills.

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 South Deep Gold Mine, Standard Procedure for Cyanide Emergency Preparedness and Response, Section 8.1 Communication with communities and authorities governs communication with communities and authorities and Section 8.2 Internal Communication, indicates how internal communication is undertaken. The South Deep Communication Procedure, Section 3.1. Communication with external parties, governs communications with external parties such as the Media.

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 South Deep Gold Mine, Standard Procedure for Cyanide Emergency Preparedness and Response addresses the following: -
- Section 6.7 - "Contain Cyanide Spillage" -
- Section 6.8 - "Decontamination of Cyanide Spillages within bunded Areas" - rinse and dilute any remains of solid cyanide with process water, under controlled conditions, pump the solution back to the process, ensure pH is above 10 before pumping.
- Section 6.10 - "Decontamination of Cyanide Spillages outside a bunded area" - contain spilled material with berms, bunds etc., dispose of contaminated soil and absorbent material onto the TSF (Tailings Storage Facility). It is reported that No chemicals will be used to clean up spills, only absorbent materials and if not available, sawdust, soil or sand will be used. If the quantity of contaminated absorbent material is large, a front-end loader bucket should be used to collect it. A grader can be utilized to grade the absorbent material into a windrow for collection if necessary.
- Section 6.16 - "Clean up the spill"- After all liquid and contaminated absorbent material on the surface is cleaned up, the underlying soils/rocks should be inspected to determine the depth of penetration of the spill. Soils which have been contaminated must be collected using shovels, front end loader bucket, grader blade, and dozer blade. In every instance at a minimum the ground surface in the area of a spill must be scraped and the soil/rock generated collected and added to the absorbent materials.
- Section 6.17. - "Disposal of contaminated material".

Drinking water is a reticulated supply provided by the Rand Water Board and not via boreholes and surface water. In this case, the provision of potable water is not applicable.
In section 6.7.7, it is specified, "…Do not use detoxification chemicals like Ferrous Sulphate, Hypochlorite, Hydrogen Peroxide…".
The Water Monitoring Program is also followed for emergency samples and includes sampling techniques, parameters to be analysed for, and sample preservation. Section 7.2, "Records for Special/Emergency cyanide samples", addresses the labelling of emergency / special samples and further states that the sample log sheet must be marked as Emergency / Special. The procedure for Clean-up of Process Strength Cyanide Spillage directly refers to the Water Monitoring Procedure for sampling locations and requirements.

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 Procedure for Cyanide Emergency Preparedness and Response is reviewed every 3 years, or when an emergency/accident occurs, that is sufficiently significant to trigger a revision of the procedure.
Reports and information on cyanide drills sighted are as follows: -
1. Full Cycle emergency drill 27 August 2021
- Mandown drill cyanide gassing at offloading to Lenmed Randfontein Hospital.
- Objective to establish capabilities of ER24 Paramedics and Lenmed Hospital staff.
- The patient was a resuscitation doll to enable proper resuscitation methods to be applied.
A feedback meeting was held on 27/8/2021, including concerns and recommendations.- Findings include reviewing availability and quantities of PPE, plus suitability of gloves used when taking blood samples. These corrective actions are in progress and are included in the Action Tracker system.
2. Cyanide Pipe Rupture Emergency Response, dated 27 July 2021
- The drill purpose was to test offloading bulk sodium cyanide procedure, cyanide equipment rupture, cyanide release during receiving activity, or after hours, clean-up process of cyanide storage, and cyanide emergency response procedure
-Learning points included the installation required of a new access gate to the area next to the airlock. Sighted a subsequent Desktop drill to complete the spill drill that could not be undertaken due to access problems following changed security arrangements around the area. It was verified during the desktop drill that spill response and clean up provisions were adequate to deal with a spill in the area. The need for additional rapid emergency

access was identified, and an additional security gate is included in the area. Supporting arrangements for access to gate keys has been put in place and will be implemented.

3. TSF - 216/6/2019 HCN Gas drill, 2. 20/6/2020 Cyanide gas drill

The drill report includes the scenario, date, times, specific items and evaluation, overall rating, additional comments, and an attendance register.

4. TSF - Emergency Mock drill report dated 28 Aug 2019-dam failure

- The scenario includes a 1:50 year storm event resulting in the southern compartment of the return dam failing, releasing water into the closest stream.
- The emergency mock drill report includes an Organogram, Emergency response to RWD failure, Appointments - South Deep Mine, SLR Consulting, Observation, sequence of events, response time, Spillage clean-up/rehabilitation, environmental sampling, concerns and observations, Remedial Action Plan System and 19 concerns and recommendations. The emergency escape procedure was revised, based on a mock drill conducted in the previous recertification period, for the feed belt tunnel.

The bulk cyanide offloading procedure, SD-PRC-BPLANT-PRO-275-001, was revised (Rev 15), based upon an incident that occurred on another site where the cyanide supplier supplies cyanide to. Step 4.12 was added - Ensure that the bolts are long enough and not damaged.

Add to step 4.15 - Replace blank flange with 4 bolts and nuts and fit flange cover and lock the padlock with (4) bolts and nuts. (Ensure that at least 4 new bolts and nuts are always in stock for future offloading).

Revision 16 of the procedure was based on an issue identified during the pre-checklist for offloading, "Add to step 4.12 – Inspect offloading hose for damage or cracks before lock is removed".

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 staff working on the plant, including contractors and TSF operators, receive cyanide awareness training which is refreshed every 18 months. TSF employees receive refresher training bi-annually when returning from leave.

Cyanide Awareness Training was presented by Sasol Base Chemicals to all Gold Plant and SSMS employees. This training is now presented by Plant Trainers after doing "train the trainer" courses and also using the Sasol training material. A Managerial Instruction

(Doc SD-MI-MET-100-005 dated 24 August 2021) was drawn up to confirm employees deemed competent by the Head of Metallurgy to facilitate cyanide product awareness training based on training received from SASOL for employees: - Rendani Nekhavhambe, Punzo Nemahemi, Margie Van Vuuren, and Melissa Maritz. 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 affected person; and
- Key principles of administering medical oxygen.

Cyanide First Aid Training is conducted every year for first responders. On-site Cyanide First Aid Training is presented by Contractor Training Matrix (a training provider) and is conducted at South Deep Plant. Attendees (staff working on the plant, including contractors and TSF operators) are assessed to assist in an emergency situation, whether it be a cyanide contaminated patient (conscious or unconscious) or cyanide spillage.
The Induction and Orientation Procedure stipulates induction requirements for short term contractors, full-time contractors, new and ex-leave employees.
Records are retained for the working life of the employee. Interviewee records were checked as a sampling of record keeping. This was deemed satisfactory.

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 training matrix for all positions on the plant is in place, detailing the required SHEQ (Safety, Health, Environment and Quality) training (including cyanide safety) for all plant employees. Refresher training is done when tasks change and when it is identified as a need resulting from PTO (Planned Task Observation) assessments. SSMS (TSF contractors) conducts in-house refresher task training annually. A Training Needs analyses for Safe Work Procedures (SWP) document includes the names of the staff members and required training per person. Required PTO observation is annotated in red when due, and when completed, annotated in blue. The training needs analyses show the elements necessary for each person and job.
The operation has appointed experienced, competent, Supervisors to provide task training. In addition, Andre Swartz, the Plant Superintendent with 26 years of experience in plant operations and management, has completed the "Train the Trainer" course.

An entry control clock card is used to control employee entry to the Plant. The card is only issued once induction/refresher training is completed. A signed-off route form (tracking of returning of ex-leave employees, new employees, and contractors) includes the signature of the training officer.
Competency is indicated on the matrix, based on Planned Task Observations (PTOs). A blue annotation means competency is confirmed, and a red annotation means that it is not confirmed.
Task training effectiveness is tested by PTOs done by the Supervisor. Supervisors must undertake 3 PTOs required per week, 12 per month. Sighted PTO summaries per employee/discipline and sampled nine employees PTOs done in 2019 and seven employees PTOs done in 2021.
Task training records are retained for 50 years. The records of interviewees were reviewed, and it was confirmed that records have been retained since the commencement of the plant. The records include the training they have received and include the employee's name and the trainer, the date of training, the topics covered, and how the employee demonstrated an understanding of the training materials. Records are retained for the working life of the employee. Interviewee records were reviewed and found to be satisfactory.
The General Training Matrix for Doornpoort, including the various task procedures covering TSF operations, was sighted. All the staff names and tasks are included in the matrix, and it was observed that the training is up to date. The Stefanutti Stocks Mining Services (SSMS) training plan includes training elements required and the tasks themselves. Training is done as per the list of procedures. SSMS conducts in-house refresher task training annually. Training is done by Carl Shultz, the Senior SHEQ Manager, who has completed a "Train the Trainer" course, and Training Facilitator and Training Assessor courses. He has also completed 10 years' work experience on TSFs.
TSF Employees are trained using the Safe Working Procedures (SWPs) before starting to work on the TSF. An example of the Operating Penstock using the Lift Master SWP training exercise was sighted, which included the attendance resister and signatures of attendees dated 18/8/2021. An Electronic list of SWPs was reviewed. The company induction records, including assessment results for each employee, were sighted and reviewed. The assessment pass mark is 100% on the 28 questions.
SSMS (Stocks and Stocks Mining Services) conducts PTOs to evaluate effectiveness - The hardcopy PTO file was sighted 3 PTOs for 2019 and 2021 were sampled and found to be satisfactory.
Record keeping commenced from 1991 and will be retained for the life of the employee.

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:

The training matrix for all positions on the plant detailing the SHEQ training (including cyanide) required was sighted. Cyanide first aid refresher training is refreshed annually. Although all staff (all cyanide offloading, production, and maintenance personnel) are trained in cyanide releases, first responders are trained to react as emergency responders. Each shift has an Emergency Response Team (ERT) of 5 members. Plant Emergency Response Teams are trained in decontamination and first aid procedures. First-line responders on all shifts, are paraded for overtime to complete cyanide first aid training. Maintenance personnel receive annual cyanide training that includes emergency response, but they are not trained as first line responders. Gold Fields internal first aid training is conducted by an on-site Qualified Paramedic. Mock drills are conducted as part of the training. A separate training shift is in place to conduct emergency training using drills that are stopped and started when corrective action is needed. A record of a cyanide first aid "stop and fix" drill dated 23 February 2021 was sighted. This method of training was started from the beginning of 2021. The use of necessary response equipment is trained during the cyanide first aid, mock drill training and awareness session. A remedial action tracking system document (corrected and preventative action) for a cyanide gassing "stop and fix" training drill dated 2 February 2021was sighted and reviewed.

There are no off-site emergency responders except the Lenmed hospital. An agreement is in place with the Lenmed Hospital, dated 30 October 2017, stating that the Hospital is willing to accept and treat cyanide related emergencies. An updated letter dated 14 September 2021 from the Hospital Manager of the Lenmed hospital, confirming continuing agreement to treat cyanide patients and participate in annual full cycle cyanide drills, was sighted. The Hospital and ER24 were involved in discussions covering the Covid pandemic scenario and cyanide emergencies - sighted meeting minutes dated 10 Aug 2021 section 5 discusses Covid 19 protocols and their effects on cyanide patient admission. The operation confirmed that the medical facility has adequate, qualified staff, equipment, and expertise to respond to cyanide exposures - refer to full cycle emergency drill 27 Aug 2021. Attendance lists of hospital staff given cyanide awareness training presented to staff on 10th September 2021 were sighted.

SSMS Emergency response team training includes cyanide first aid, veld fire awareness, cyanide awareness, snake handling, and the emergency response plan. Refresher training is conducted annually.

Reports and information on cyanide drills sighted are as follows: -

1. Full Cycle emergency drill 27 August 2021

- Mandown drill cyanide gassing at offloading to Lenmed Randfontein Hospital
- Objective to establish capabilities of ER24 Paramedics and Lenmed Hospital staff.
- The patient was a resuscitation doll to enable proper resuscitation methods to be applied.
- Findings include reviewing availability and quantities of PPE, plus suitability of gloves used when taking blood samples. A feedback meeting was held on 27/8/2021, which included concerns and recommendations. These corrective actions are in progress and are included in the Action Tracker system.

2. Cyanide Pipe Rupture Emergency Response, dated 27 July 2021

- Drill purpose was to test offloading bulk sodium cyanide procedure, cyanide equipment rupture, cyanide release during receiving activity, or after hours, clean-up process of cyanide storage, and cyanide emergency response procedure.
-Learning points included the installation required of a new access gate to the area next to the airlock. Sighted a subsequent desktop drill to complete the spill drill that could not be undertaken due to access problems following changed security arrangements around the area. It was verified during the desktop drill that spill response and clean up provisions were adequate to deal with a spill in the area. The need for additional rapid emergency access was identified, and an additional security gate is included in the area. Supporting arrangements for access to gate keys has been put in place and will be implemented.

3. TSF - 216/6/2019 HCN Gas drill, 2. 20/6/2020 Cyanide gas drill

The drill report includes the scenario, date, times, specific items and evaluation, overall rating, additional comments and an attendance register.

4. TSF - Emergency Mock drill report dated 28 Aug 2019-dam failure

- The scenario includes a 1:50 year storm event resulting in the southern compartment of the return dam failing, releasing water into the closest stream.
- The report includes an Organogram, Emergency response to RWD failure, Appointments - South Deep Mine, SLR Consulting, Observation, sequence of events, response time, Spillage clean-up/rehabilitation, environmental sampling, concerns and observations, Remedial Action Plan System and 19 concerns and recommendations.

Records retained for the working life of the employee. The records of interviewees were reviewed and confirmed that records are retained since the commencement of the plant, including training they have received and including the names of the employee and the trainer, the date of training, the topics covered, and how the employee demonstrated an understanding of the training materials. TSF records are retained for the working life of the employees.

Doornpoort dam drills are attended by the Training Official, TSF Foreman and appropriate training are given.

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 Mine has a Community Relations Department in place. The Department has conducted comprehensive Stakeholder Mapping for Westonaria, which was sighted. The communities identified include Bekkersdal, Hillshaven, Jachtfontein, Kalbasfontein, Poortjie, Simunye, Thusanang, Venterspost and Westonaria. The Stakeholder Engagement schedule for 2020 was sighted and reviewed and included community open days, which also cover environmental and cyanide issues.
Community Bodies regularly contacted include the Rietspruit Water Catchment Forum (legal structure by national Department of Water Affairs); and the Rand West Local Municipality Environmental Forum.
Stakeholders were invited for mine visits, and photographs of events and attendees at past visits were sighted. There are also monthly Community engagement open days. Visits by Universities and schools are also arranged.
Evidence of the following meetings was sighted:

- An Environmental Workshop and tour for Bekkersdal Community: The meeting register (attended by 68 people) of the visit to the Mine on 2/2/2019 was sighted.
- The Simunye Community Open Day on 4/4/2019, included Government Officials from the Environmental Department and the Departments of Labour and Home Affairs, was attended by around 80 people.
- The Westonaria Community Company Relationships Feedback meeting on 13/4/2021 was attended by 68 people.
- A Community Open Day was held on 24-01-2019. Some 15 issues were listed on the log form. None were about cyanide, but others referred to job vacancies and requests for literacy training.
- A Community Open Day was held on 12-03-2020. 17 issues raised with no cyanide issues, but job requests and community training requests.

The File of Stakeholder Engagement Record Sheets from various neighbouring communities, including Bekkersdal, Hillshaven, Jachtfontein, Kalbasfontein, Poortjie, Simunye, Thusanang, Venterspost and Westonaria, was sighted and reviewed.
Community meetings are normally held monthly but decreased to quarterly due to Covid-19 Government restrictions.

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 Mine has a Community Relations Department in place. The Department has conducted comprehensive Stakeholder Mapping for Westonaria, which was sighted. The

communities identified include Bekkersdal, Hillshaven, Jachtfontein, Kalbasfontein, Poortjie, Simunye, Thusanang, Venterspost and Westonaria. The Stakeholder Engagement schedule for 2020 was sighted, reviewed, and included community open days, which also covered environmental and cyanide issues.
Community Bodies regularly contacted include the Rietspruit Water Catchment Forum (legal structure by national Department of Water Affairs); and the Rand West Local Municipality Environmental Forum.
Stakeholders were invited for Mine Visits, and photographs of events and attendees at past visits were sighted. There are also Monthly Community engagement open days. Visits by Universities and schools are also arranged.
Evidence of the following meetings was sighted:

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- A Community Open Day was held on 12-03-2020. 17 issues raised with no cyanide issues, but job requests and community training requests.

The File of Stakeholder Engagement Record Sheets from various neighbouring communities, including Bekkersdal, Hillshaven, Jachtfontein, Kalbasfontein, Poortjie, Simunye, Thusanang, Venterspost and Westonaria, was sighted and reviewed.
Community meetings are normally held monthly but decreased to quarterly due to Covid-19 Government restrictions.

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:
A picture pamphlet (comic strip) in Sotho and English has been prepared to illustrate and explain the offloading of Cyanide at South Deep Mine. The pamphlet is distributed during the annual community meetings. Hard copies of all PowerPoint presentations given at meetings are distributed on request. Stakeholders are mostly illiterate, and verbal presentations are given during an open day where presentations are given in the local languages: English, Setswana, Sesotho, Zulu, and Xhosa.

Safety and Health: Mandatory SAMRASS (South African Mines Reportable Accidents Statistical Systems) reporting to the DMR (Department of Mineral Resources) of all lost-time injuries and fatalities, serious incidents, e.g., TSF failures, gassing incidents, loss of consciousness. All SHE (Safety, Health and Environment) statistics are included in the annual report.

Environmental: For all water-related level 3 and above, incidents are reported to DWA (Department of Water Affairs). Monthly (dashboard report) and quarterly (Directors review Note), all level 2 and above incidents are reported to Corporate office with detailed descriptions. The Rietspruit Forum (the public water users forum) receive level 3 and above, incident reports and water quality incidents are reported. Environmental statistics will be reported in the Corporate annual report with level 3 incidents and above included with a description. All incidents are reported and available in the sustainability report, which is published online. There have been no incidents in the past three years.

Any significant SHE incidents are reported to the appropriate government departments, which do not make these incidents publicly available as a rule. However, the Company reports the incidents in their annual reports after appropriate investigations.

The following Goldfields Integrated Annual Reports were sighted: -

Gold Fields 2018 Integrated Annual Report
https://www.goldfields.com/pdf/investors/integrated-annual-reports/2018/iar-2018.pdf

Gold Fields 2019 Integrated Annual Report
https://www.goldfields.com/reports/annual-report-2019/pdf/full-iar.pdf

Goldfields Integrated Annual report 2020
https://www.goldfields.com/pdf/investors/integrated-annual-reports/2020/iar-2020.pdf

It was reported that any level 3-5 incidents would be specified in the annual report. As there were no level 3-5 incidents in 2019 – 2021 for any of the GFL (Goldfields Limited) operations including South Deep. Examples were referenced from the 2018 report.

In 2018, GFL reported two Level 3 environmental incidents (2017: two), one in Peru and one in Ghana (p95). Gold Fields has had no Level 4 or 5 environmental incidents for well over ten years, but the two Level 3 incidents had the potential to impact water supply to the nearby communities. GFL teams acted quickly to remediate the events and communicated transparently with regulators and communities on this issue. The number of Level 2 incidents fell by 18% to 68 in 2018 from 83 in 2017.