African Rainbow Minerals

Report on conformance to the Global Industry Standard on Tailings Management (GISTM)

2023

We do it better

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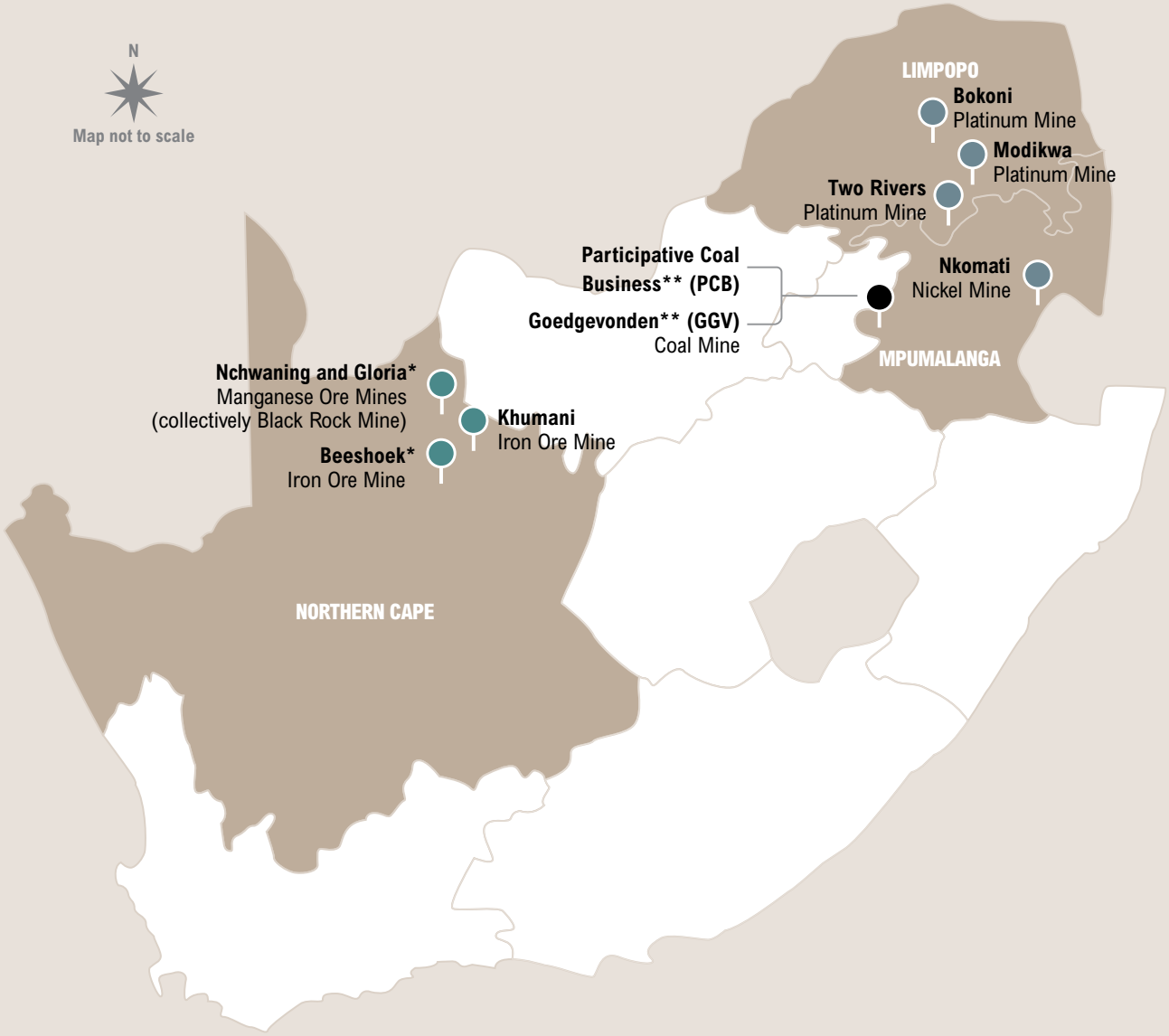
African Rainbow Minerals (ARM) is a **leading South African diversified mining and minerals company** with operations in South Africa and Malaysia. ARM mines and beneficiates iron ore, manganese ore, chrome ore, platinum group metals (PGMs), nickel and coal. It also produces manganese alloys and has a strategic investment in gold through Harmony Gold Mining Company Limited (Harmony Gold).

Information available on our website **www.arm.co.za**

Report on conformance to the Global Industry Standard on Tailings Management (GISTM)

Locality map of ARM operations



* *GISTM conformance is required only in August 2025 given the low risk classification as per GISTM.*

** *ARM is the not the responsible party for the management of the operations.*

Introduction

The Global Industry Standard on Tailings Management (GISTM) is the first global standard on tailings facility management and focuses on achieving the goal of "zero harm to people and the environment. It requires companies (operators) to take responsibility by prioritising the safety of their Tailings Storage Facilities through all phases of the mine lifecycle". This goal is well aligned with ARM values, policies and standards.

The objective of the GISTM public disclosure document is to provide confirmation that ARM operations have implemented effective risk management processes and systems to ensure that Tailings Storage Facilities (TSFs) are managed effectively and that any risk to people and the environment is identified and mitigated. ARM and its joint venture (JV) partners have adopted the GISTM at all its operations and good progress has been made in achieving full conformance. In the process of implementing the GISTM, the level of awareness of Mine personnel and surrounding communities of risks posed by TSFs was elevated. ARM and its JV partners will build on this foundation and ensure that its TSFs continue to be operated in a safe and responsible manner to the benefit of all stakeholders involved.

VP Tobias
Chief executive officer

TTA Mhlanga
Finance director

5 August 2023

Definitions

The GISTM Conformance Protocols apply to tailings facilities as a whole, not just tailings embankments. They do not apply to riverine and deep-sea systems and other types of facilities such as fresh and process water dams, stockpiles, etc (which do not conform to the definition of a Tailings Facility within the Standard). This distinction is important because while the design, construction and operation of embankments is a very important factor in influencing the safety of tailings facilities, it is not the only factor. For example, aspects related to water management (eg seepage, surface water etc) can be very important in ensuring safe tailings management.

Tailings Facility	A facility that is designed and managed to contain the tailings produced by the mine. Although tailings can be placed in mined-out underground mines, for the purposes of the Standard, tailings facilities refer to facilities that contain tailings in open pit mines or on the surface ("external tailings facilities"). For the purposes of the Standard, tailings facilities are higher than 2.5 m measured from the elevation of the crest to the elevation of the toe of the structure or have a combined water and solids volume more than 30 000m^3, unless the Consequence Classification is "High", "Very High" or "Extreme", in which case the structure is considered a tailings facility regardless of its size. For the purposes of this Standard, existing tailings facilities are facilities that are accepting new mine tailings on the date that the Standard takes effect or not currently accepting new mine tailings but are not in a state of safe closure. All other facilities will be treated as "New" for the purposes of this Standard. [GISTM]
Tailings Management System	The site-specific Tailings Management System (TMS) comprises the key components for management and design of the tailings facility and is often referred to as the "framework" that manages these components. The TMS sits at the core of the Standard and is focused on the safe operation and management of the tailings facility throughout its lifecycle (see above). The TMS follows the well-established Plan-Do-Check-Act cycle. Each Operator develops a TMS that best suits their organisation and tailings facilities. A TMS includes elements such as: establishing policies, planning, designing and establishing performance objectives, managing change, identifying and securing adequate resources (experienced and/or qualified personnel, equipment, scheduling, data, documentation and financial resources), conducting performance evaluations and risk assessments, establishing and implementing controls for risk management, auditing and reviewing for continual improvement, implementing a management system with clear accountabilities and responsibilities, preparing and implementing the OMS and EPRP. The TMS, and its various elements, must interact with other systems, such as the environmental and social management system (ESMS), the operation-wide management system, and the regulatory system. This systems interaction is fundamental to the effective implementation of the Standard. [GISTM]
Stakeholder	Persons or groups who are directly or indirectly affected by a project, as well as those who may have interests in a project and/or the ability to influence its outcome, positively or negatively. Stakeholders may include workers, trade unions, project-affected people or communities and their formal and informal representatives, national or local government authorities, politicians, religious leaders, civil society organisations and groups with special interests, the academic community, or other businesses. Different stakeholders will often have divergent views, both within and across stakeholder groupings. [GISTM]
Tailings Facility Lifecycle	The phases in the life of a facility, which may occur in linear or cyclical succession, consisting of: 1. Project conception, planning and design 2. Initial construction 3. Operation and ongoing construction (may include progressive reclamation) 4. Interim closure (including care and maintenance) 5. Closure (regrading, demolition and reclamation) 6. Post-closure (including relinquishment, reprocessing, relocation, removal). [GISTM]
Tailings Governance Framework	A framework that focusses on the key elements of management and governance necessary to maintain the integrity of TSFs and minimise the risk of catastrophic failures. The six key elements of this TSF governance framework are: 1. Accountability, Responsibility and Competency 2. Planning and Resourcing 3. Risk Management 4. Change Management 5. Emergency Preparedness and Response 6. Review and Assurance. [GISTM]

ARM Platinum

TWO RIVERS PLATINUM MINE

ARM's attributable beneficial interest in Two Rivers Platinum Mine (TRP) operation is 54%. The other 46% is held by Impala Platinum.

Locality

TRP is located in the southern sector of the Eastern Limb of the Bushveld Complex. The mine is located on the farm Dwarsrivier 372 KT and extends to portions of the farms Kalkfontein 367 KT and Tweefontein 360 KT and the farm Buffelshoek 368 KT. At latitude 24°59"S and longitude 30°07"E, the mine is approximately 30 kilometres from Steelpoort and 60 kilometres from Mashishing, Mpumalanga province, South Africa. TRP is neighboured by Mototolo Platinum Mine and Dwarsrivier, Tweefontein and Thorncliff chromite mines.

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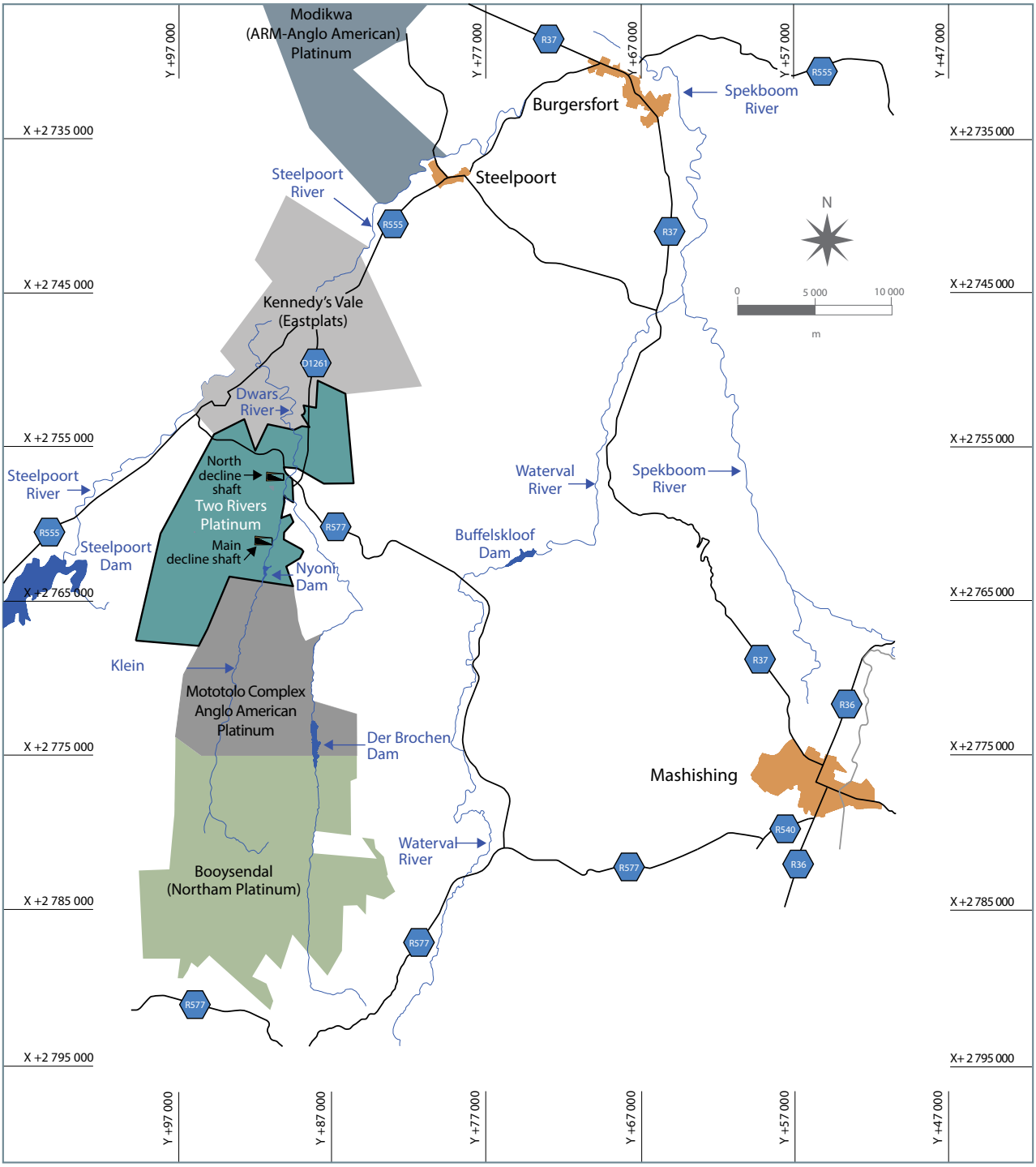
ARM Platinum continued

Locality map of Two Rivers Platinum Mine



Two Rivers Old TSF
TSF public disclosure report

Two Rivers Platinum – Old TSF public disclosure

To assess implementation of the GISTM requirements, we have used the ICMM Conformance Protocols for the GISTM. This maps the GISTM's 77 requirements using 219 clear and concise assessment criteria. The GISTM Conformance results are reported against the 77 GISTM requirements. TRP started implementing GISTM in August 2020.

The Old TSF is currently under care and maintenance. The first step was to conduct a gap analysis between our current TSF standards and the GISTM. This was followed by a detailed plan to address the social, environmental and technical gaps identified. Some of the challenges faced in implementation reflect the shortage of available technical skills in the field of tailings management. There were also initial concerns on how meaningful engagement with downstream communities could be handled without causing undue panic.

TRP conducted its self-assessment in December 2022, followed by a third-party review conducted by Jones & Wagener in July 2023.

Despite challenges, TRP is pleased to report the following GISTM conformance third-party validation results as assessed by Jones & Wagener.

GISTM conformance results

Of the seventy-seven (77) GISTM requirements, forty-six (46) of the GISTM requirements "meet" conformance and twenty two (22) of the GISTM requirements "partially meet". There are no requirements classified as "does not meet". Nine (9) of the requirements are not applicable to this asset.

The areas that are in partial conformance are related to "Topic 3 – Design, construction, operation and monitoring of the tailings facility" and "Topic 4 – Management and governance" and are expected to be in conformance by end of May 2024 and by end of October 2024, respectively.

Description of the Two Rivers Old tailings storage facility

Two Rivers Mine operates as a joint venture between Impala Platinum and African Rainbow Minerals (ARM) Platinum. It is situated on the farm Dwarsrivier in the southern part of the eastern limb of the Bushveld Complex, 45km south-west of Burgersfort, in the Limpopo province of South Africa. The location of TRP Old TSF is illustrated in Figure 1-1.

TRP Mine has an Old TSF that reached end of operational life in early 2022 and was simultaneously decommissioned.

The Old TSF has been designed for a maximum safe final height of some 50m with an overall outer slope of 1V:3H. The facility was designed to accommodate a monthly production rate of 260 000 tonnes per month until March 2022 when deposition ceased. The TSF has a return-water dam (RWD) and a stormwater dam with a combined storage capacity of around 88 000m^3.

Pertinent general information about the facility is provided in Table 2.

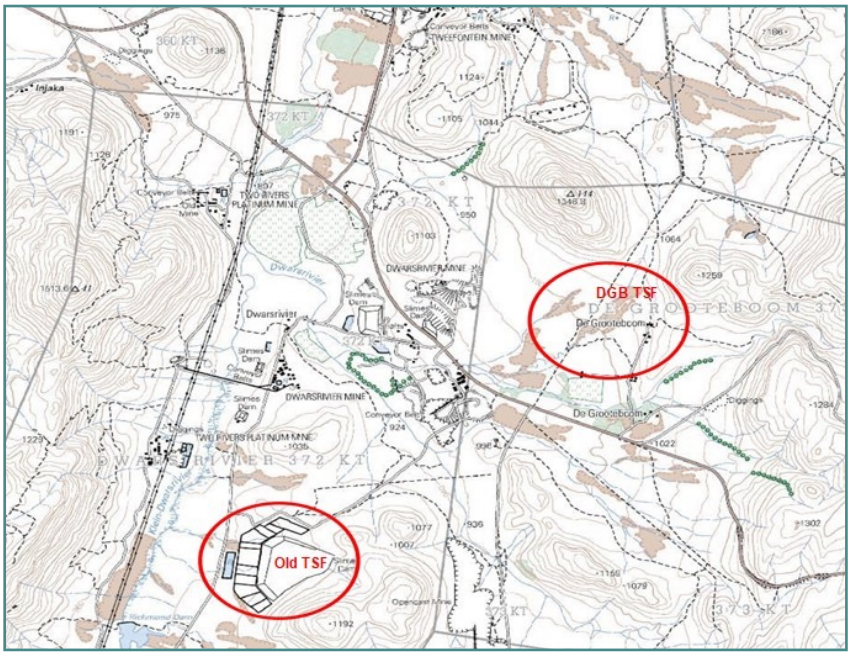


Figure 1-1: TRP tailings storage facilities locality map (De Grooteboom and Old TSFs)

Two Rivers Old TSF continued

TSF public disclosure report continued

Figure 1-2: TRP tailings storage facilities locality map (Old TSF)

Table 2: TSF general information

Description	Details
The operation	Two Rivers Platinum Mine
TSF operator	Intasol Tailings
Engineer of record	Herman Venter from HVTS Pty Ltd
Business unit	ARM Platinum division
Magisterial district	Steelpoort, Limpopo province, South Africa
List of tailings storage facilities	Old TSF
TSF co-ordinates	24 57'17.79"S 30 06'23.52"E
TSF wall raise, initial earthworks and method of tailings deposition	Initially by downstream cyclone construction, subsequently redesigned and operated for upstream cyclone construction
Current height	50m
Current footprint area	70ha
Current storage volume	24 380 000m^3
Method of deposition	The conventional cyclone method of deposition was employed on the tailings dam. This is an upstream facility

Site, tailings and foundation soils characteristics

The Bushveld Complex is divided into five limbs: the eastern, western, far western, northern and southwestern limbs. The principal platinum group element or PGE-bearing reefs in the Bushveld Complex are the Merensky Reef, the UG2 and the Platreef. These lie within the Rustenburg Layered Suite of the Bushveld Complex.

TRP is on the eastern limb of the Bushveld Complex in the Rustenburg Layered Suite and Dwarsrivier sub-suite. The geology of this sub-suite comprises primarily anorthosite and norite, with thin localised layers of chromite and pyroxenite. The strata dips to the west.

Consequence classification

A multidisciplinary GISTM consequence classification matrix was used to assess potential downstream impacts in a dam-failure scenario. Using this matrix, the TSF was classified as Extreme.

Summary of risk assessment findings relevant to the tailings storage facility

A risk assessment and control procedure was generated to proactively identify, understand and address risks related to operating the TSF throughout its life cycle.

Failure modes identified for the Old TSF are wall failure resulting from inadequate structural stability; wall failure due to internal or external erosion; wall failure due to foundation weakness; wall failure due to liquefaction; and failure due to overtopping.

Comprehensive risk assessments have been carried out for all failure modes and appropriate controls have been identified and put in place.

Two Rivers Old TSF continued

TSF public disclosure report continued

Summary of impact assessments and human exposure and vulnerability to tailings facility credible flow failure scenarios

The tailings dam breach analysis (TDBA) study was undertaken to investigate potential downstream impacts in the event of a breach and sudden release of tailings and water downstream. Results included information on inundation extents, flood-wave travel times and maximum flow depths and velocities. These are intended to inform the consequence classification of the TSF in accordance with the GISTM and for use in emergency preparedness and response planning.

The findings of this study provide the technical data to inform the dam hazard classification based on potential incremental consequences and computational output used to prepare inundation maps in support of emergency preparedness and response planning.

Due to the potential variability of tailings material properties and uncertainty on certain input parameters, a sensitivity analysis was conducted.

In the unlikely event of a failure of the Old TSF, the tailings release is expected to flow into the Klein Dwarsrivier first, then downstream to the Steelpoort River for roughly 16km. The breached tailings flow from the Old TSF is mostly contained within the floodplain of the Klein Dwarsrivier and Groot Dwarsrivier.

Description of the design for all phases of the tailings facility life cycle, including the current and final height

Current operation (current height)

The TRP Old TSF has been operating since 2006. It was originally designed to be developed as a downstream side-hill cyclone tailings dam, with a floating decant pump system. However, difficulties in achieving the required downstream profile and concomitant stability risks prompted a modification to the design in 2010. The facility initially comprised a lower and upper downstream compartment, which were combined into a single facility in 2015–2016. From then until decommissioning in early 2022, the facility operated as one compartment with continuous upstream cyclone deposition. A floating pumped decant was used to recover water. The structure currently has a maximum perimeter wall height of 50m.

Final height design

Closure criteria are the criteria required to mitigate identified closure risks. The measures involve removing infrastructure, erecting fencing, installing drainage structures, reshaping, topsoiling, ripping, seeding and planting, maintenance and monitoring.

Closure criteria are closely related to actual EMP commitments to actions required at closure as prescribed by the regulators.

The proposed closure criteria related to the Old TSF are detailed in the closure plan.

Summary of material findings of annual performance reviews and DSR, including implementation of mitigation measures to reduce risk to ALARP (as low as reasonably practicable)

In the 2022 annual performance review of the Old TSF, no material findings were made. Maintenance, surveillance and monitoring are continuing post decommissioning.

Summary of material findings of the environmental and social monitoring programme including implementation of mitigation measures

There were no material environmental findings in the annual review. The focus is on irrigation to manage dust. TRP keeps a register of all environmental and social complaints received from surrounding communities. These are recorded in the grievance register and feedback is provided to the complainant within 30 days of receipt.

Summary version of the tailings facility EPRP for facilities that have a credible failure mode(s) that could lead to a flow failure event

TRP extensively engaged downstream communities to educate and create awareness of potential risks of a TSF breach. The engagement sessions were with Dwarsrivier Chrome Mine and other stakeholders downstream of the facility. Subsequently, an EPRP was developed in consultation with downstream communities, local authorities and other private emergency services providers, eg Mine Rescue Services.

Two Rivers Old TSF continued

TSF public disclosure report continued

Dates of most recent and next independent reviews

An independent review for the Two Rivers Platinum tailings facilities was conducted by the Independent Tailings Review Board (ITRB) in July 2023. All findings from this review will be closed out.

The next ITRB is planned for July 2024 and will comprise the same members.

Annual confirmation that the operator has adequate financial capacity to cover estimated costs

TRP conducts annual rehabilitation, remediation, decommissioning and closure liability assessments to determine financial liability as required by legislation. These assessments are conducted by independent service providers. A combination of financial instruments is used to provide for the assessed financial liability.

Please refer to audited financial statement on the indicated link:

https://arm.co.za/wp-content/uploads/2022/10/2022-Annual-Financial-Statements.pdf

Also please refer to page 10 of the 2022 integrated annual report wherein reference is made to the comprehensive risk financing and transfer programme in place as it relates to tailings storage facility cover.

Approved by accountable executive

HL Mkatshana
Chief executive: ARM Platinum

5 August 2023

Two Rivers De Grooteboom
TSF public disclosure report

TRP – De Grooteboom TSF public disclosure

To assess implementation of the GISTM requirements, we have used the ICMM Conformance Protocols for the GISTM. This maps the GISTM's 77 requirements using 219 clear and concise assessment criteria. The GISTM Conformance results are reported against the 77 GISTM requirements.

TRP started implementing GISTM in August 2020.

The first step was to conduct a gap analysis between our current TSF standards and GISTM. This was followed by a detailed plan to address the social, environmental and technical gaps identified. Some of the challenges faced in implementation reflect the shortage of available technical skills in the field of tailings management. There were also initial concerns on how meaningful engagement with downstream communities could be handled without causing undue panic.

TRP conducted its self-assessment in December 2022, followed by a third-party review conducted by Jones & Wagener in July 2023.

Despite challenges, TRP is pleased to report the following the GISTM conformance third-party validation results as assessed by Jones & Wagener.

GISTM conformance results

Of the seventy-seven (77) GISTM requirements, fifty-seven (57) of the GISTM requirements "meet" conformance and twelve (12) of the GISTM requirements "partially meet". There is one (1) requirement classified as "does not meet". Seven (7) of the requirements are not applicable to this asset.

The areas that are in partial conformance are related to "Topic 3 – Design, construction, operation and monitoring of the tailings facility" and "Topic 4 – Management and governance" and are expected to be in conformance by end of April 2024 and end of September 2024, respectively.

Description of the Two Rivers De Grooteboom tailings storage facility

Additional information is also required for the estimation of TSF closure design study. A detailed plan with allocated resources has been developed to ensure the work of TSF closure design is completed as per plan.

Description of the Two Rivers De Grooteboom tailings storage facility

The De Grooteboom TSF is situated on the farm Dwarsrivier on the southern part of the eastern limb of the Bushveld Complex, 45km south-west of Burgersfort, in the Limpopo province of South Africa, as illustrated in Figure 1-1.

TRP has a newly constructed tailings storage facility (TSF), called De Grooteboom (DGB TSF), that is expected to reach its design life by around 2042. The dam is designed to handle both UG2 (Upper Group-2) and Merensky ore tailings.

The De Grooteboom TSF lies some 4km east of the UG2 concentrator plant on portion 2 and 7 of the farm De Grooteboom 372/KT.

The TSF has been designed for a maximum final safe height of around 85m at 1 072mamsl elevation with an overall outer slope of 1V:3.5H. The design tailings deposition is 300 000 tonnes per month for the first two years and 500 000 tonnes per month from year 3. The return-water dam has a standby and an operating compartment with a total capacity of 98 000m^3.

Figure 1-1: TRP tailings storage facilities locality map (De Grooteboom and Old TSFs)

Two Rivers De Grooteboom continued

TSF public disclosure report continued

Figure 1-2: TRP tailings storage facilities locality map (De Grooteboom)

Table 2: TSF general information

Description	Details
The operation	Two Rivers Platinum Mine
TSF operator	Intasol Tailings
Engineer of record	Herman Venter from HVTS Pty Ltd
Business unit	ARM Platinum division
Magisterial district	Steelpoort, Limpopo province, South Africa
List of tailings storage facilities	De Grooteboom TSF
TSF co-ordinates	24°55'42.41"S 30°08'13.56"E
TSF wall raise, initial earthworks and method of tailings deposition	Down- and upstream cyclone
Current height	14m
Current footprint area	81ha
Current storage	1 100 000m^3
Method of deposition	The conventional cyclone upstream method of deposition is used on the tailings dam. The cyclones are positioned on the crest of the slimes dam

Site, tailings and foundation soils characteristics

The Bushveld Complex is divided into five limbs: the eastern, western, far western, northern and southwestern limbs. The principal platinum group element or PGE-bearing reefs in the Bushveld Complex are the Merensky Reef (MR), the UG2, and the Platreef. These lie within the Rustenburg Layered Suite (RLS) of the Bushveld Complex.

TRP is on the eastern limb of the Bushveld Complex in the Rustenburg Layered Suite and the Dwarsrivier sub-suite. The geology of this sub-suite compromises primarily anorthosite and norite with thin localised layers of chromite and pyroxenite. The strata dips to the west.

Consequence classification

A multidisciplinary team used the GISTM consequence classification matrix to assess potential downstream impacts in a dam-failure scenario. Using the GISTM matrix, the De Grooteboom TSF was classified as Extreme.

Summary of risk assessment findings relevant to the tailings storage facility

A workplace risk assessment and control procedure was generated to proactively identify, understand and address risks related to operating the TSF throughout its life cycle.

Risks identified for the De Grooteboom TSF are wall failure resulting from inadequate structural stability; wall failure due to internal or external erosion; wall failure due to foundation weakness; wall failure due to liquefaction; and failure due to overtopping.

Two Rivers De Grooteboom continued

TSF public disclosure report continued

In all cases, comprehensive risk assessments have been carried out from which appropriate controls have been identified and put in place. Details of the risks and controls are set out in the bow tie risk assessment.

Summary of impact assessments and human exposure and vulnerability to tailings facility credible flow failure scenarios

The tailings dam breach analysis (TDBA) study was undertaken to investigate credible dam breach scenarios and to identify potential downstream impacts in the event of a breach and sudden release of tailings and water downstream. Results of the study include information on inundation extents, flood-wave travel times and maximum flow depths and velocities. These are intended to inform the consequence classification of the TSF in accordance with the GISTM, and for use in emergency preparedness and response planning.

Due to the potential variability of the tailings' material properties and uncertainty on some input parameters, a sensitivity analysis was conducted.

Description of the design for all phases of the tailings facility life cycle, including the current and final height

Current operation (current height)

In the initial stages of development, the De Grooteboom TSF is designed to be managed as an upstream dam. Later in its life cycle, some deposition will take place in the downstream direction to strengthen the dam as it increases in height and capacity. Tailings slurry is pumped through rubber-lined steel pipes.

Currently, the maximum height of the storage impoundment is 14m. It is designed to eventually reach a height of 85m. The current storage impoundment volume is some 1 100 000m³, while the planned storage impoundment volume is intended to reach 95 000 000m³.

Critical controls have been placed on the following aspects of the TSF's development:

- Rate of rise or deposition rates:
  - Mitigate generating excess pore pressure in the tailings body and foundation material
  - Mitigate elevation of phreatic surfaces
  - Allow for densification and benefits of desiccative drying to take place (ie natural compaction that mitigates the potential for liquefaction, or strain softening)
  - Allow appropriate cycling times of around 30 days that assist in the safe construction of deposit walls
- Freeboard and pond location:
  - The amount of available freeboard to contain/attenuate major storms on top of the TSF without spilling and prompt decanting of excess water. The freeboard is designed for a 1:50-year storm plus 0.8m. This is verified quarterly with an accurate lidar survey of the site. The control of compliance to freeboard design ensures that beaching and freeboard generation are improved. Tailings are deposited so that the amount of fines near the outer perimeter of the TSF is minimised via the cyclone deposition method which allows segregation of coarse tailings from fines to take place.

Regular inspections and reviews are performed on the following aspects of the TSF development and reviewed by the Engineer of Record (EoR) for any major changes or deviations from design assumptions:

- Slurry density, temperature, evaporation, RWD water levels, piezometer levels and trends, drain flows and trends, surface-water quality, groundwater quality, update of slope stability Factor of Safety (FoS) by limit equilibrium methods, analysis of particle size distribution and tailings soil characteristics, and piezocone (CPTu) probing and interpretation.

Two Rivers De Grooteboom continued

TSF public disclosure report continued

Final height design

Closure criteria are the actions required to mitigate identified closure risks. This involves removing infrastructure, erecting fencing, installing drainage structures, reshaping, topsoiling, ripping, seeding and planting, maintenance and monitoring. The proposed closure criteria related to the TSF are summarised below.

Closure criteria are closely related to actual EMP commitments, ie actions to be carried out at closure as agreed with regulators. A summary of material findings of annual performance and dam safety reviews, including implementation of mitigation measures to reduce risk to As Low As Reasonable Practicable (ALARP) are implemented and closely monitored.

Summary of material findings of annual performance reviews and DSR, including implementation of mitigation measures to reduce risk to ALARP

As De Grooteboom was commissioned early 2022, any material findings will be indicated in the next annual performance review scheduled for November 2023.

Summary of material findings of the environmental and social monitoring programme, including implementation of mitigation measures

There were no material environmental findings in the annual review. Focus is on irrigation to manage dust. TRP keeps a register of all environmental and social complaints received from the surrounding communities. The complaints are recorded in the grievance register and feedback is provided to the complainant within 30 days of receipt of complaints.

Summary version of the tailings facility EPRP for facilities that have a credible failure mode(s) that could lead to a flow failure event

TRP extensively engaged downstream communities to educate and make them aware of potential risks of a TSF. The community engagement sessions were with Dwarsrivier Chrome Mine and other stakeholders on the downstream side. Subsequent to the community engagement a EPRP was generated in consultation with downstream communities, local authorities and other private emergency services providers, eg the Mine Rescue Services.

Dates of most recent and next independent reviews

An independent review for the Two Rivers Platinum tailings was conducted by the Independent Tailings Review Board (ITRB) in July 2023. All actions from this review will be closed out.

The next ITRB is planned for July 2024 and will comprise the same members.

Annual confirmation that the operator has adequate financial capacity (including insurance to the extent commercially reasonable) to cover estimated costs

TRP conducts annual rehabilitation, remediation, decommissioning and closure liability assessments to determine financial liability as required by legislation. These assessments are conducted by independent service providers. A combination of financial vehicles is used to provide for the assessed financial liability.

Please refer to audited financial statement on the indicated link:

https://arm.co.za/wp-content/uploads/2022/10/2022-Annual-Financial-Statements.pdf

Also please refer to page 10 of the 2022 integrated annual report wherein reference is made to the comprehensive risk financing and transfer programme in place as it relates to tailings storage facility cover.

Approved by accountable executive

HL Mkatshana
Chief executive: ARM Platinum

5 August 2023

Modikwa Platinum Mine

MODIKWA PLATINUM MINE

ARM's attributable beneficial interest in Modikwa's operations is 41.5%; 8.5% is held by the Modikwa communities and 50% is held by Rustenburg Platinum Mines.

Locality

Modikwa Platinum Mine is situated approximately 15 kilometres north of Burgersfort and 15 kilometres northwest of Steelpoort, along the border between the Mpumalanga and Limpopo provinces in South Africa. Located at latitude 24º40"S and longitude 30º10"E, the site is accessed via the R37 road between Polokwane and Burgersfort. The topography of the area is defined by a low-lying broad valley which strikes due north-south and is underlain by rock units of the upper critical zone of the Bushveld Complex.

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Modikwa Platinum Mine
TSF public disclosure report

Modikwa Platinum Mine public disclosure on the Modikwa TSF

To assess implementation of the GISTM requirements, we have used the ICMM Conformance Protocols for the GISTM. This maps the GISTM's 77 requirements using 219 clear and concise assessment criteria. The GISTM Conformance results are reported against the 77 GISTM requirements.

Modikwa began implementing the GISTM in August 2020. The first step was to conduct a gap analysis between current TSF standards and the GISTM. This was followed by a detailed plan to address the social, environmental and technical gaps identified.

Some challenges were faced during the implementation of detailed plans to conform with the GISTM. These included the lack of availability of technical skilled personnel to improve and support the existing Modikwa TSF management team, and availability of competent reputable laboratories with the capacity to manage highly sensitive materials. There were also initial concerns on the ability to meaningfully engage with downstream communities without causing undue panic.

Modikwa conducted its self-assessment in December 2022, followed by a third-party review conducted by Jones & Wagener in July 2023.

Despite these challenges, Modikwa is pleased to report the following GISTM conformance third-party validation results as assessed by Jones & Wagener.

GISTM conformance results

Of the seventy-seven (77) GISTM requirements, sixty-five (65) of the GISTM requirements "meet" conformance and four (4) of the GISTM requirements "partially meet". There are no requirements classified as "does not meet". Eight (8) of the requirements are not applicable to this asset.

The areas that are in partial conformance are related to "Topic 3 – Design, construction, operation and monitoring of the tailings facility" and "Topic 4 – Management and governance" and are expected to be in conformance by end of March 2024 and end of October 2024, respectively.

Description of the Modikwa Platinum Mine (MPM) tailings storage facility

MPM lies around 15km northwest of Burgersfort on the Polokwane-to-Burgersfort road (R37). The Modikwa tailings storage facility (Modikwa TSF) site is in a valley between the old Montrose and Winterveld chrome mines, some 3km east of the plant site (refer Figure 1-1). The Modikwa TSF is an upstream embankment facility with a life-of-mine of 50 years.

The return-water dam associated with the Modikwa TSF has both operating and standby compartments where return water to the concentrator plant is pumped from. Pertinent general information about the operation is detailed in Table 2.

Figure 1-1: MPM tailings storage facility

Modikwa Platinum Mine continued

TSF public disclosure report continued

Table 2: TSF general information

Description	Details
The operation	Modikwa Platinum Mine
TSF operator	Fraser Alexander Tailings
Engineer of record	SRK Consulting (South Africa) Pty Ltd
Business unit	Platinum division
Magisterial district	Steelpoort, Limpopo, South Africa
List of tailings storage facilities	Modikwa TSF
TSF co-ordinates	Modikwa TSF: 24°38'58.4"S 30°09'10.4"E
List of water dams	Modikwa TSF return-water dam (RWD)
Water dam co-ordinates	RWD: 24°38'31.1"S 30°09'46.6"E
Current height	Modikwa TSF: 43m (910mamsl)
Current footprint area	Modikwa TSF: 101ha
Current storage	Modikwa TSF: 30.8Mm^3
Other associated key infrastructures	• Silt traps at inlet to RWD • Solution trench at toe of facility • Penstock intake tower and outlet pipeline • Drains (main outlet drain, inner toe drain and elevated curtain drain)
Method of deposition	The conventional spigot method of deposition is used on the tailings facility. The spigot pipeline line is positioned on the perimeter of the crest of the facility

TSF site description and geology, foundation soils and tailings characteristics

The regional geology consists of basic and ultra-basic igneous rocks of the Rustenburg Layered Suite and Bushveld Complex. The bedrock comprises norite, pyroxenite and anorthosite of the Dwarsrivier sub-suite. The westward-dipping Merensky Reef and chromitite seams occur within this rock mass. The bedrock observed on site was norite and the soils encountered are mainly derived from the norite.

The residual black and dark-brown clay and silt observed have developed from the weathering and decomposition of the norite bedrock. These fine grained materials are highly expansive and heave as much as 100mm, as predicted in geotechnical reports. The clay and silt horizons are generally thinner or non-existent nearer to the mountains on the western and south-eastern sides of the tailings dam.

The plant residue comprises platinum tailings originating from mining and processing the Upper Group 2 G2 reef.

The consequence classification

A multidisciplinary team was involved in a workshop to apply the GISTM consequence classification matrix to assess potential downstream impacts should a breach occur on the Modikwa TSF. Using this matrix, the Modikwa TSF was classified as Extreme.

Summary of risk assessment findings relevant to the TSF

A workplace risk assessment and control procedure was initiated to proactively identify, understand and address risks related to the operation of the TSF throughout its life cycle.

Risks identified for the Modikwa TSF are wall failure resulting from inadequate structural stability; wall failure due to internal or external erosion; wall failure due to foundation weakness; wall failure due to liquefaction; failure due to penstock failure; failure due to mechanical failure; and failure due to overtopping.

In all cases, comprehensive risk assessments have been completed and identified risks were assessed and evaluated. Mitigation measures have been determined and appropriate controls identified and put in place. Details of the risks and controls are set out in the bow tie risk assessment.

Summary of impact assessments and human exposure and vulnerability to tailings facility credible flow failure scenarios

The dam breach analysis and inundation study were conducted for Modikwa Platinum Mine to evaluate the potential downstream impact of a breach in the Modikwa TSF. The breach analysis was conducted for the current crest wall elevation and for the expected final crest wall elevation. Based on the TSF characteristics, critical potential breach locations were identified.

Modikwa Platinum Mine continued

TSF public disclosure report continued

The most likely failure modes were modelled and simulated for varying hydrologic conditions.

Based on density population maps and extents of inundation resulting from models in this dam breach analysis, the population at risk was estimated.

Mitigation measures such as the emergency preparedness and response plan were generated with the involvement of downstream communities, local communities and Mine Rescue Services. An emergency environmental clean-up procedure was developed to deal with environmental spillage containment and clean-up in case of a failure of the Modikwa TSF.

Description of the design for all phases of the tailings facility life cycle including the current and final height

Current operation (current height)

The Modikwa TSF is an upstream embankment facility. Initial containment was provided by a compacted clay starter dike. The TSF was raised using an approximate overall raise rate of 1.4m per year. The decant pool or pond is controlled in the centre of the TSF.

Modikwa TSF was designed to meet the recommended industry guidelines for factor of safety. While operating the tailings facility, the FoS is regularly reviewed through stability analyses. It should be noted that proactive procedures for managing the TSF facility have been implemented, which would imply that a “performance- based” approach has also been applied.

Critical controls have been placed on the following critical aspects of the Modikwa TSF’s development. These controls are monitored monthly and complemented by daily, weekly, monthly, quarterly and annual reviews for any major changes or deviations from the design assumptions. The reviews are conducted by a multidisciplinary team which involves the Modikwa TSF operator, EoR, environmental specialists, mine safety personnel, RTFE and ITRB.

Tailings deposition strategy rate of rise and deposition rates

The operation of the Modikwa TSF involves a short and long-term deposition plan that is strictly followed and adjusted when required to control the pool position and ensure adequate freeboard. The deposition strategy is such that the rate of rise is limited to the designed rate. Tailings are deposited so that the amount of fines near the outer wall of the Modikwa TSF is reduced through the spigot deposition method which allows segregation of coarser tailings to take place.

Freeboard and pool control

The Modikwa TSF is designed to comply with the Government Notice 704 freeboard requirement which is a 1:50-year storm plus 0.8m. This is verified monthly with accurate surveys of the TSF. Strategic deposition plans and pool control ensure that beaching and thus freeboard generation are improved. It should be noted that it is also the current practice at Modikwa to assess the impact of the Probable Maximum Flow (24-hour) storm event on top of the TSF and to then compare the two methods and adopt the more conservative requirement for the freeboard assessment.

Wall drainage

Vertical curtain drains have been installed to control the phreatic surface within the TSF. The vertical curtain drain is constructed in lifts of approximately 1-1.5 m as the TSF progresses in height. The intent is to create a relatively dry structural wall zone (embankment) within the facility. Toe drains are installed around the Modikwa TSF to collect seepage from its base.

Stormwater management

Stormwater diversion channels have been constructed on hills upstream of the Modikwa TSF. These channels assist in diverting stormwater away from the Modikwa TSF basin and avoid clean water coming into contact with polluted water.

Slope angle and benches

The side slopes angles and benches are monitored and maintained regularly to ensure there are no deviations from the design intent during operation.

Phreatic surface monitoring

The phreatic surface at the Modikwa TSF is regularly monitored through both standpipe and vibrating wire piezometers (VWP). This is done through a dashboard that displays live results of the VWP readings. Access to the dashboard is provided to the relevant Modikwa TSF operations and management personnel, including the EoR.

Modikwa Platinum Mine continued

TSF public disclosure report continued

Penstock structure

The structural integrity of the Modikwa TSF penstock pipeline is regularly monitored for any failures or debris. This is done through regular camera inspection of the entire penstock pipeline.

Final height design

Closure criteria are the actions required to mitigate identified closure risks. This involves removal of infrastructure, erecting fencing, installing drainage structures, reshaping, topsoiling, ripping, seeding and planting, maintenance and monitoring. Closure criteria are closely related to actual EMP commitments in that, as noted, they are the actions to be taken at closure as agreed with the regulators.

The identified design criteria and constraints, as stated in the Modikwa TSF closure technical memorandum, will be used in developing prefeasibility closure design options of the facility. The design criteria may need to be reviewed in a prefeasibility B-level stage if required and/or the feasibility stage once additional information from geotechnical testing and other parallel studies are underway and concluded, and the operational stormwater management design completed.

Summary of material findings of annual performance reviews and DSR, including implementation of mitigation measures to reduce risk to ALARP (as low as reasonably practicable)

Annual performance reviews are conducted by the EoR. The following observations was made in the last review:

- Slope stability (FoS): Initial stability analysis was conducted with limited information on the material characteristics of both the tailings and the foundation. An intensive geotechnical investigation programme to evaluate the characteristics of both the foundation material and tailings is underway.
- Slope stability (FoS): Initial stability analysis was conducted with limited information on the material characteristics of both the tailings and the foundation. An intensive geotechnical investigation programme to evaluate the characteristics of both the foundation material and tailings is underway.

Once these results are available and the analysis complete, a more comprehensive and appropriate solution will be recommended to address the stability of the facility. The preliminary geotechnical investigation results indicated that additional measures may be required. Subsequently, the EoR was commissioned to conduct further geotechnical investigations involving resistivity, seismic and piezocone tests (RSCPTu), vane shear and sonic drilling and core sampling to confirm the stability of the Modikwa TSF.

A preliminary buttress has been designed and the final test results will be used to determine the requirements and specifications of the final buttress design. The final design will be based on results from the comprehensive geotechnical investigation of tailings material and the foundation soils which began in 2021 and is expected to be completed by the end of 2023.

Summary of material findings of the environmental and social monitoring programme including implementation of mitigation measures

The following environmental and social findings were noted from the annual performance review:

- Dust fallout: Generally, dust fallout results were well within both residential and non-residential thresholds. MPM has a dust-suppression programme in place at the TSF.
- Return-water dam: The RWD operating compartment was silted and full of vegetation. This compartment is planned to be desilted and unvegetated following a Bathymetric survey planned for this year.
- MPM keeps a register of all environmental and social complaints received from surrounding communities. Complaints are recorded in the grievance register and feedback is given to the complainant within 30 days of receipt.

Summary version of tailings facility EPRP for facilities that have a credible failure mode(s) that could lead to a flow failure event

Emergency preparedness and response plan

Modikwa extensively engaged downstream communities to create awareness and educate residents on the potential risks of a failure of the Modikwa TSF. The community engagement sessions were attended by local leaders, teachers, children and other members of the communities.

Subsequent to this engagement, an EPRP was generated in consultation with downstream communities, local authorities and other private emergency services providers, eg Mine Rescue Services. The EPRP at the Modikwa TSF involves early warning systems, responding to any abnormalities, emergency evacuation plans, evacuation and environmental rapid response plan.

Modikwa Platinum Mine continued

TSF public disclosure report continued

Trigger action response plan (TARP)

MPM has developed a TARP that gives guidance on the type of response required for an event that could trigger an emergency. The TARP is a tool for managing crucial situations from the MPM operations safety point of view. The TARP document sets out a set of conditions or "triggers", with corresponding actions that MPM managers and supervisors must follow when those trigger events occur. The purpose of TARPs is to provide guidance and clarity when a situation deviates from the original plan or where there is a material change in conditions that could be hazardous.

Dates of most recent and next independent reviews

An independent review of the Modikwa TSF was conducted by the Independent Tailings Review Board (ITRB) in August 2022. The ITRB included two international members and two local members.

The next independent review for the Modikwa TSF is scheduled for September 2023 and will comprise the same ITRB members.

Annual confirmation that the operator has adequate financial capacity to cover estimated costs

Modikwa conducts annual rehabilitation, remediation, decommissioning and closure liability assessments to determine financial liability as required by legislation. These assessments are conducted by independent service providers. A combination of financial vehicles is used to provide for the assessed financial liability.

Please refer to audited financial statement on the indicated link:

https://arm.co.za/wp-content/uploads/2022/10/2022-Annual-Financial-Statements.pdf

Also please refer to page 10 of the 2022 integrated annual report wherein reference is made to the comprehensive risk financing and transfer programme in place as it relates to tailings storage facility cover.

Approved by accountable executive

HJ Kruger
Business leader:
Modikwa Platinum Mine

5 August 2023

Nkomati Nickel Mine

NKOMATI NICKEL MINE

ARM's attributable beneficial interest at Nkomati Mine is 50%. The other 50% is held by Norilsk Nickel Africa (Pty) Ltd.

Locality

Nkomati Nickel Mine is located approximately 300 kilometres east of Johannesburg in the Mpumalanga province of South Africa. Situated at latitude 25º40"S and longitude 30º30"E, the mine is accessed via the national N4 highway between Johannesburg and Machadodorp, the R341 provincial road and the R351 tarred road.

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To assess implementation of the GISTM requirements, we have used the ICMM Conformance Protocols for the GISTM. This maps the GISTM's 77 requirements using 219 clear and concise assessment criteria. The GISTM Conformance results are reported against the 77 GISTM requirements.

Nkomati started implementing the GISTM in August 2020.

The co-disposal tailings storage facility is currently under care and maintenance. The first step was to conduct a gap analysis between our current TSF standards and the GISTM. This was followed by a detailed plan to address the social, environmental and technical gaps identified. Some of the challenges faced in implementation were due to the shortage of available technical skills in the field of tailings management. There were also initial concerns on how meaningful engagement with downstream communities could be handled without causing undue panic. Nkomati conducted its self-assessment in December 2022, followed by a third-party review conducted by Jones & Wagener in July 2023.

Despite challenges, Nkomati is pleased to report the following GISTM conformance third-party validation results as assessed by Jones & Wagener.

GISTM conformance results

Of the seventy-seven (77) GISTM requirements, sixty (60) of the GISTM requirements "meet" conformance and seven (7) of the GISTM requirements "partially meet". There are no requirements classified as "does not meet". Ten (10) of the requirements are not applicable to the Nkomati Co-disposal TSF.

The areas that are in partial conformance are related to "Topic 3 – Design, construction, operation and monitoring of the tailings facility" and "Topic 4 – Management and governance" and are expected to be in conformance by end of March 2024 and end of August 2024, respectively.

Description of the Nkomati Co-disposal tailings storage facility

Nkomati Nickel Mine (NNM) is located on Slaaihoek, Nkomati and Onverwacht farms in the eastern escarpment of Mpumalanga. This is in the Uitkomst Complex located some 20km north of Badplaas, 80km west of Barberton and 107km south-west of Nelspruit in the Machadodorp area. The co-disposal TSF lies 6km from the processing plant.

- The co-disposal facility was designed by Geo Tail and commissioned in 2009. Due to the steep topography of the impoundment and increased production for phase 2, the deposition was initially split between two compartments. Waste rock was placed mechanically to build the first-phase impoundment wall for the initial 100ktpm tailings production from the MMZ plant. A second compartment was constructed with waste rock to increase overall capacity and accommodate most of the PCMZ plant tailings and CWP tailings from the phase 2 expansion project. The thickened slurry was pumped to both compartments which subsequently combined to form a single compartment.
- The capacity of the compartments was designed so that the two would attain the same elevation at 1 425mamsl, after which deposition continued in a single combined compartment, impounded by the downstream and upstream waste rock-constructed embankments.
- The facility has an intended design life of 20 years and a final elevation of 1 450mamsl. Although tailings are currently only at 1 427mamsl, the perimeter embankments have been raised to the final elevation, providing ample freeboard while the facility is under care and maintenance.

Nkomati Co-disposal continued
TSF public disclosure report continued

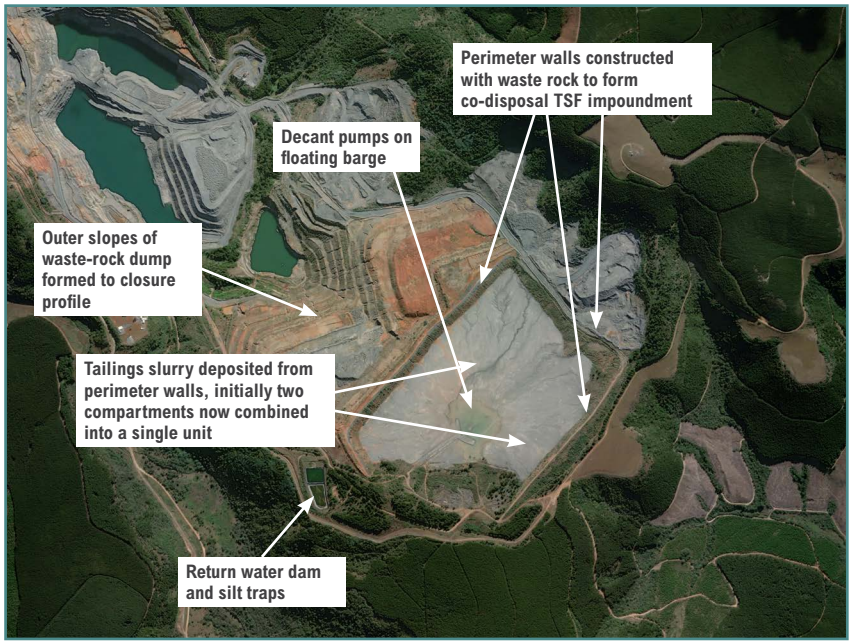


Figure 1-2: Co-disposal TSF layout

Table 2: Co-disposal TSF general information

Description	Details
The operation	Nkomati Nickel Mine
TSF operator	Stefanutti Stocks Pty Ltd
Engineer of record	Bulwark Consulting Engineers
Business unit	ARM Platinum division
Magisterial district	Gert Sibande district, Mpumalanga Province, South Africa
List of tailings storage facilities	Co-disposal TSF
TSF co-ordinates	25°45'21.22"S 30°38'13,42"E
TSF wall raise, initial earthworks and method of tailings deposition	Full impoundment facility with perimeter walls constructed with compacted waste rock
Current height	74.5m at 15 March 2023
Current footprint area	100ha
Current storage	28 834 323m^3
Method of deposition	Conventional spigot method of deposition employed on tailings dam. Slurry delivery pipeline with spigot outlets positioned on the crest of perimeter walls

Site, tailings and foundation soils characteristics

The regional geology comprises the Uitkomst Complex, composed of layered ultramafic to mafic rocks, hosting Ni-Cu-Cr-Co-PGM mineralisation. This layered complex was emplaced into the basal units of the westward-dipping Transvaal Sequence, underlain by the Archaean Nelshoogte Granite.

The mining area is characterised by its undulating topography and steep valley sides; mainly due to its position below the escarpment and because of the large number of mountain streams and tributaries cutting through the landscape. The main valley in the Nkomati Mine area is northwest-southeast trending and drained by the Gladdespruit River, which flows south of the Onverwacht TSF and into the Inkomati River system. Several tributaries have been identified which flow into the Mngubhudla River, which is located around 1km west of the TSF. The Vygeboom dam is located south-west of the Onverwacht TSF.

The site is underlain by the gneiss of the Nelshoogte Pluton. In general, the pluton is deeply weathered to depths in excess of 25m, with hard rock only encountered at depths of over 30m below surface. In the vicinity of the return-water dam, the depth of weathering of the gneiss has been limited to 5m to 10m. The gneiss has been extensively intruded by diabase (ie pre-Karoo dolerite).

The transported soils on site mainly consist of topsoil, hillwash and alluvium. Residual soils on the site consist of diabase and gneiss. Two types of bedrock were encountered during the site investigation, namely gneiss and diabase.

Except in lower-lying areas within the well-defined drainage channels, groundwater seepage was not encountered in investigation test pits.

Nkomati Co-disposal continued

TSF public disclosure report continued

Groundwater seepage is expected to be maintained in these low-lying areas around the various streams. Seepage is expected to increase concurrent with and during rainy seasons.

The residual gneiss was identified as providing the best material for constructing the TSF starter walls and for general engineered fill.

The Malmani subgroup "meta" dolomite is more prominent in the pit 1 and 2 areas, with Pretoria Group sediments (Timeball Hill Formation) outcropping near pit 3.

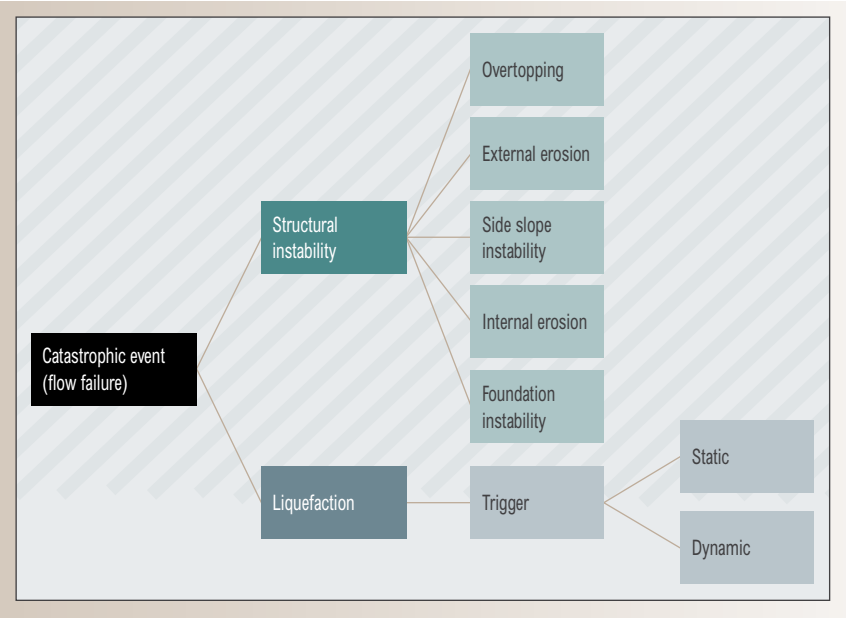
Consequence classification

A multidisciplinary GISTM consequence classification matrix was used to assess potential downstream impacts in a dam-failure scenario. Using this matrix, the co-disposal TSF was classified as Extreme.

Summary of risk assessment findings relevant to the tailings storage facility

A workplace risk assessment and control procedure was generated to proactively identify, understand and address risks related to operating the TSF throughout its life cycle.

Risks identified for the facility are wall failure resulting from inadequate structural stability; wall failure due to internal or external erosion; wall failure due to foundation weakness; wall failure due to liquefaction; failure due to mechanical failure; and failure due to overtopping.



In all cases, comprehensive risk assessments have been carried out and identified risks assessed. Mitigation measures have been determined and appropriate controls identified and put in place. Details of the risks and controls are set out in the bow tie risk assessment.

Summary of impact assessments and human exposure and vulnerability to tailings facility credible flow failure scenarios

The dam break analysis study determined affected areas that may be impacted by a (hypothetical) breach of the co-disposal TSF. The breach analysis was conducted for a tailings elevation of 1 428.5mamsl and the final crest wal elevation of 1 450.0mamsl.

Based on the TSF geometry, wall configuration, surrounding topography, downstream infrastructure and community settlements, critical potential breach locations were identified. The most likely failure modes were modelled, namely: piping, collapse, and liquefaction (which were simulated accordingly for rainy-day hydrologic conditions). A sensitivity analysis of tailings material parameters and certain input parameters was conducted to determine the "worst-case" downstream impact.

This study also assessed the resulting flow depth, flow velocity and estimated arrival time at selected identified areas that could be affected by a TSF breach.

Nkomati Co-disposal continued
TSF public disclosure report continued

Results of the study have been used to inform the mine emergency preparedness and response plan (EPRP).

Figure 4-1: Topography local to the co-disposal TSF used for the dam break impact assessment

Description of the design for all phases of the tailings facility life cycle, including the current and final height

The co-disposal TSF is impounded to final design height with waste rock. The current maximum height is 74.5m. During operation, slurry from the PCMZ and CWP process plants was pumped into the basin created within the waste-rock walls. An open-end slurry deposition method was used to create a beach that slopes away from the perimeter embankments to a centralised supernatant pool. The supernatant is pumped from the pool to the HDPE-lined silt trap and return-water dam south-west of the facility. Wall seepage as well as any groundwater flows are collected and report to a downstream sump (downstream portion of the original open pit 2). The current storage volume in the co-disposal TSF is 28 834 323m^3.

The waste-rock impoundment configuration of the facility forms an inherently stable structure.

Freeboard and pool control

The co-disposal TSF is designed to comply with the Government Notice 704 freeboard requirement for a 1:50-year storm plus 0.8m. The development of the perimeter walls to their final height provides compliant freeboard for the life-of-mine. The position of the supernatant pool is contained within the beached tailings and maintained central to the decant pumps.

Stormwater management

Stormwater runoff from the outer slopes of the waste-rock walls is designed to be collected and discharged in a controlled manner. There is no upstream catchment requiring diversion channels to direct stormwater away from the TSF.

Slope angle and benches

The side slopes angles and benches are monitored and maintained regularly to ensure there are no deviations from the design intent during operation.

Decant structure

Supernatant water is removed from the facility via floating barge-mounted pumps delivering into a HDPE pipeline discharging to the return-water dam.

Current operation (current height)

NNM has the following monitoring regime for the co-disposal TSF:

- Weekly inspection of underdrains, side slopes, incidents/accidents that occurred, freeboard, position and surface area of pool, seepage, pipeline condition, pump condition, return-water dam.

Final height design

Closure criteria are the actions required to mitigate identified closure risks. This involves removal of infrastructure, erecting fencing, installing drainage structures, reshaping, topsoiling, ripping, seeding and planting, maintenance and monitoring. The proposed closure criteria related to the co-disposal TSF are closely related to EMP commitments as they comprise actions to be implemented at closure as agreed with regulators.

Concurrent development of the closure profile of the outer slopes of the waste-rock dump has been integrated into the operation of the co-disposal facility.

Nkomati Co-disposal continued

TSF public disclosure report continued

Summary of material findings of annual performance reviews and DSR, including implementation of mitigation measures to reduce risk to ALARP

No material findings (defined as high to very high risks) were identified in the 2022 annual performance review. The following were noted from this review:

- Erosion gullies on the outer side slopes of the waste-rock dump of the co-disposal TSF need to be regularly repaired.
- Some of the benches and the final perimeter embankment crest need ongoing maintenance, but basin freeboard is acceptable, ie the pool is remote from perimeter walls.

The following recommendations were made for the TSF:

- Complete rehabilitation phases for the outer slopes of the waste-rock dump.
- Repair downstream drainage system.
- Clean silt trap and repair HDPE liner.

No notable stability concerns have been raised over life of the facility. Some low to medium risks have been identified and are being addressed (an example is ongoing checking of dust and groundwater monitoring data).

Summary of material findings of the environmental and social monitoring programme, including implementation of mitigation measures

The following environmental and social findings were noted from the annual performance review:

- Review of groundwater monitoring and dust monitoring data.
- Desilt return-water dam and reinstate sections of damaged HDPE liner.
- Nkomati Nickel Mine maintains a register of all environmental and social complaints received from surrounding communities. The complaints are recorded in the grievance register and feedback is given to the complainant within 30 days.

Summary version of the tailings facility EPRP for facilities that have a credible failure mode(s) that could lead to a flow failure event

Nkomati TSF inundation zones

NNM extensively engaged downstream communities to create awareness and educate them on the potential risks of a TSF breach. The community engagement sessions were attended by local leaders, teachers, children and other members of the communities.

Following on from this engagement, an EPRP was developed in consultation with downstream communities, local authorities and other private emergency services providers, eg Mine Rescue Services.

Trigger action response plan (TARP)

NNM has developed a TARP that gives guidance on the type of response required for an event that could trigger an emergency. The TARP is a tool used for managing crucial situations from the NNM operations' safety point of view. The TARP document sets out certain conditions or "triggers" with corresponding actions that NNM managers and supervisors must follow when those trigger events occur. The purpose of TARPs is to provide guidance and clarity when a situation deviates from the original plan or where there is a material change in conditions that could be hazardous.

Dates of most recent and next independent reviews

An independent review of the facility was conducted by Independent Tailings Review Board (ITRB) in July 2023. The next independent review is scheduled for July 2024 and will comprise the same ITRB members.

Annual confirmation that the operator has adequate financial capacity to cover estimated costs

NNM conducts annual rehabilitation, remediation, decommissioning and closure liability assessments to determine financial liability as required by legislation. These assessments are conducted by independent service providers. A combination of financial vehicles is used to provide for the assessed financial liability.

Please refer to audited financial statement on the indicated link:

https://arm.co.za/wp-content/uploads/2022/10/2022-Annual-Financial-Statements.pdf

Also please refer to page 10 of the 2022 integrated annual report wherein reference is made to the comprehensive risk financing and transfer programme in place as it relates to tailings storage facility cover.

Approved by accountable executive

HL Mkatshana
Chief executive:
ARM Platinum

5 August 2023

Nkomati Onverwacht
TSF public disclosure report

Nkomati Onverwacht TSF public disclosure

To assess implementation of the GISTM requirements, we have used the ICMM Conformance Protocols for the GISTM. This maps the GISTM's 77 requirements using 219 clear and concise assessment criteria. The GISTM Conformance results are reported against the 77 GISTM requirements.

Nkomati started implementing the GISTM in August 2020.

The Onverwacht TSF is currently under care and maintenance. The first step was to conduct a gap analysis between our current TSF standards and the GISTM. This was followed by a detailed plan to address social, environmental and technical gaps identified. Some of the challenges faced in implementation were due to the shortage of available technical skills in the field of tailings management. There were also initial concerns on how meaningful engagement with downstream communities could be handled without causing undue panic.

Nkomati conducted its self-assessment in December 2022, followed by a third-party review conducted by Jones & Wagener in July 2023.

Despite challenges, Nkomati is pleased to report the following GISTM conformance third-party validation results as assessed by Jones & Wagener.

GISTM conformance results

Of the seventy-seven (77) GISTM requirements, sixty (60) of the GISTM requirements "meet" conformance and seven (7) of the GISTM requirements "partially meet". There are no requirements classified as "does not meet". Ten (10) of the requirements are not applicable to this asset.

The areas that are in partial conformance are related to "Topic 3 – Design, construction, operation and monitoring of the tailings facility" and "Topic 4 – Management and governance" and are expected to be in conformance by end of June 2024 and end of November 2024 respectively.

Description of the Nkomati Onverwacht tailings storage facility

Nkomati Nickel Mine is located on Slaaihoek, Nkomati and Onverwacht farms in the eastern escarpment of Mpumalanga. This is in the Uitkomst Complex some 20km north of Badplaas, 45km west of Barberton and 47km south-west of Nelspruit in the Machadodorp area.

The Onverwacht TSF was designed to accommodate a monthly production rate of 412 000tpm of MMZ, 48 000tpm of PCMZ and 30 000tpm of CWP.

The facility is14km south-east of the main mine site at 25°49'53.17"S and 30°38'39.99"E. The TSF was started in 2010 and is currently inactive.

The final design elevation for Onverwacht TSF is 1 180mamsl. Currently, the top of the containment wall is at an elevation of 1 165mamsl.

Figure 1-1: Onverwacht TSF

Nkomati Onverwacht continued

TSF public disclosure report continued

The Onverwacht TSF was initially constructed as a cross-valley facility in 2009, with completion in February 2010. This was part of the Nkomati expansion operation to receive tailings from the MMZ plant. The TSF is 14km south and at an elevation 300m below the Nkomati process facility. A single 350mm diameter tailings line delivers tails from the plant to the Onverwacht impoundment. The tailings pipeline is an HDPE-lined spiral welded pipe, constructed using 40m lengths of pipes coupled together. The design of the facility provides for a final capacity of 90 million tonnes of tailings deposition. An engineered starter dam was constructed to a height of 42m at the low point of the valley, in which the embankment was constructed, with two lifts in the middle section of the dam, as follows:

- The first consists of a wide base, situated in the lower portion of the valley, with a cross-sectional width of ~190m and a height of 17.5m at the tallest point.
- The second lift has a cross-sectional width of 95m and height of 24.5m.
- The crest length of the starter dam was 980m. This engineered embankment used over 1 million cubic metres of compacted fill. A curtain and toe drain were installed at the starter embankment and these drain under gravity to a seepage collection pond downstream of the main embankment. Seepage is collected and pumped to either the return-water dam (RWD) or TSF as required.

The design life of the tailings facility was initially 18 years. However, as production rates in the processing plants increased over the initial design, the deposition plan has been adjusted. The remaining life of the Onverwacht TSF was reported as 10 years, as of 2018, which provides adequate tailings deposition capacity for the remaining life-of-mine which considered mine production until 2026.

The deposition method results in supernatant water flowing from the dam wall towards the tails water pool at the head of the valley, positioning it against the native topography and remote from the wall. From the pool, a floating barge pumps water to the return-water dam, which is in a valley upstream to the north-east of the TSF. From here, the water is recycled back to the plant via a 14km HDPE return-water pipeline.

Table 2: TSF general information

Description	Details
The operation	Nkomati Nickel Mine
TSF operator	Stefanutti Stocks Pty Ltd
Engineer of record	Bulwark Consulting Engineers
Business unit	ARM Platinum division
Magisterial district	Gert Sibande district, Mpumalanga province, South Africa
List of tailings storage facilities	Onverwacht TSF
TSF co-ordinates	25°49'53.17"S 30°38'39.99"E
List of water dams	Onverwacht return-water dam (RWD)
Water dam co-ordinates	25°49'25.33"S 30°38'31.14"E
TSF wall raise, initial earthworks and method of tailings deposition	• Open-ended dropper pipe deposition up to elevation 1 135m for two years • Upstream cycloning method until 1 150m elevation • Cycloning from 1 150m elevation until final elevation 1 178masl (current elevation 1 165masl)
Current height	63m
Current footprint area	130ha
Current storage	37 294 451m^3 Onverwacht RWD: 250 000m^3
Method of deposition	In accordance with the design, cycloning deposition is used for the latest phase of development of the tailings dam wall. The tailings delivery line and cyclone feed supply lines are positioned on the crest of the facility

Nkomati Onverwacht continued
TSF public disclosure report continued

Site, tailings and foundation soils characteristics

The mining area is characterised by its undulating topography and steep valley sides; mainly due to its position below the escarpment and because of the large number of mountain streams and tributaries cutting through the topography. The main valley in the Nkomati Mine area is northwest-southeast trending and drained by the Gladdespruit River, which flows south of the Onverwacht TSF and into the Inkomati River system. Several tributaries have been identified which flow into the Mngubhudla River, which is some 1km west of the TSF. The Vygeboom dam is south-west of the Onverwacht TSF.

According to the geological report, the site is underlain by the gneiss of the Nelshoogte Pluton. In general, the pluton is deeply weathered to depths in excess of 25m, with hard rock only encountered at over 30m below surface. In the vicinity of the return-water dam, the depth of weathering of the gneiss has been limited to 5m to 10m. The gneiss has been extensively intruded by diabase (ie pre-Karoo dolerite).

The transported soils on site mainly consist of topsoil, hillwash and alluvium. Residual soils on the site consist of diabase and gneiss. Two types of bedrock were encountered during the investigation, namely gneiss and diabase.

Except in lower-lying areas within the well-defined drainage channels, groundwater seepage was not encountered in the formed test pits.

The alluvium, gulleywash and residual diabase soils are generally of poor quality and were considered unsuitable for use in constructing the TSF starter wall. The residual gneiss provided the best soil for use in constructing the starter wall and for general engineered fill. Use can also be made of reworked residual gneiss, provided the upper-most zone of these soils is discarded.

The Uitkomst Complex comprises layered ultramafic to mafic rocks, hosting Ni-Cu-Cr-Co-PGM mineralisation. This layered complex was emplaced into the basal units of the westward-dipping Transvaal Sequence, underlain by the Archaean Nelshoogte Granite.

The Malmani subgroup “meta” dolomite is more prominent in the mining pit 1 and 2 areas, with Pretoria Group sediments (Timeball Hill Formation) outcropping near pit 3, all located adjacent to the run-of-mine processing plants.

Consequence classification

A multidisciplinary GISTM consequence classification matrix was used to assess potential downstream impacts in a dam-failure scenario. Using this matrix, the TSF was classified as Extreme.

Summary of risk assessment findings relevant to the tailings storage facility

A workplace risk assessment and control procedure was generated to proactively identify, understand and address risks related to operating the TSF throughout its life cycle.

Risks identified for the Onverwacht TSF are wall failure resulting from inadequate structural stability; wall failure due to internal or external erosion; wall failure due to foundation weakness; wall failure due to liquefaction; failure due to mechanical failure; and failure due to overtopping.

In all cases, comprehensive risk assessments have been carried out from which appropriate controls have been identified and put in place. Details of risks and controls are set out in the bow tie risk assessment.

No notable stability concerns have been raised over the life of the facility. Some low to medium risks have been identified and are being addressed (an example is ongoing checking of dust and groundwater monitoring data).

Nkomati Onverwacht continued
TSF public disclosure report continued

Summary of impact assessments and human exposure and vulnerability to tailings facility credible flow failure scenarios

The dam breach analysis study determined affected areas that may be impacted by a hypothetical breach of the Onverwacht TSF. This study also assessed the resulting flow depth, flow velocity and estimated arrival time at selected identified affected areas should the TSF breach. The results of the study are used to inform the mine's emergency preparedness and response plan.

The most likely failure modes were modelled, namely: overtopping, collapse and liquefaction (which were simulated accordingly for rainy-day hydrologic conditions). Liquefaction failure was expected to result in the most severe impact downstream.

Due to the potential variability of the tailings material properties and uncertainty of some input parameters, a sensitivity analysis was conducted. Results of the sensitivity of these parameters (including released volume, volumetric concentration of solids, Manning's surface roughness coefficients and time-to-breach peak flow) indicate that the largest variation in the extent of inundation is as a result of variation in the total released volume.

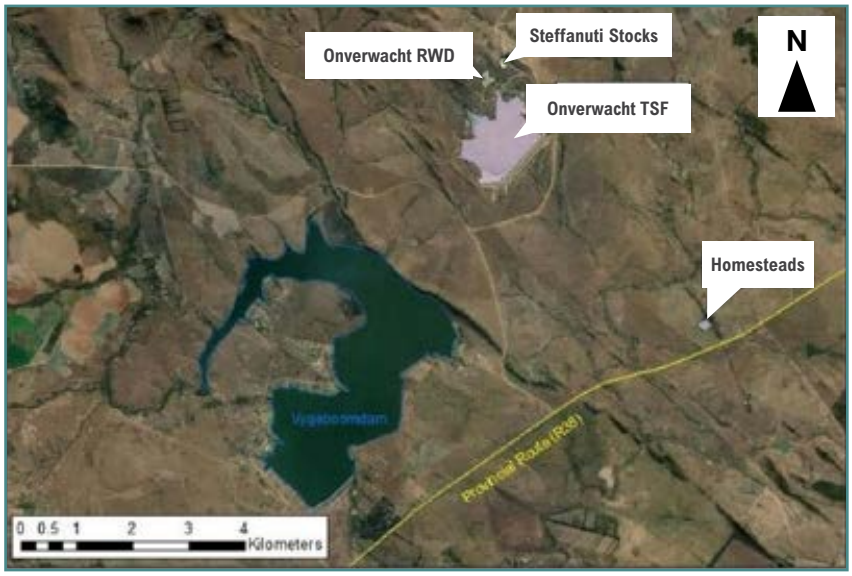


Figure 4-1: Onverwacht TSF areas of interest

Description of the design for all phases of the tailings facility lifecycle including the current and final height

The Onverwacht TSF is a valley-type facility with a current height of 63m. Slurry from the MMZ, PCMZ and chrome process plants were historically pumped to this facility. Deposition originally took place behind a 42m high engineered starter embankment. An upstream cyclone deposition method was implemented above the starter wall crest. The current storage volume is 37 294 451m^3.

The supernatant water is pumped from the pool, located within the main drainage course, to the HDPE-lined return-water dam upstream of the facility. A downstream scavenger borehole system has been implemented to control the potential pollution plume.

- Critical controls have been placed on the following aspects of the TSF's development:
  - Rate of rise or deposition rates
  - Generation of excess pore pressure in the tailings body and foundation material
  - Elevation of phreatic surfaces
  - Densification and benefits of desiccative drying
  - Cycling times of some 30 days that assist in the safe construction of deposit walls.

Nkomati Onverwacht continued
TSF public disclosure report continued

- Freeboard and pond location:
  - The freeboard is designed for a 1:50-year storm plus 0.8m. The freeboard is verified quarterly with an accurate lidar survey of the site. Tailings is deposited so that the accumulation of fines near the outer perimeter of the TSF is minimised through the cycloned deposition method which facilitates segregation of coarse tailings from fines.

Regular inspections and reviews are performed on the following aspects of TSF development and reviewed by the EoR for any major changes or deviations from design assumptions:

- Slurry density; temperature; evaporation; RWD levels; piezometer levels and trends; Drain flows and trends; surface-water quality; groundwater quality; update on slope stability FoS by limit equilibrium analysis methods, the particle size distribution, tailings characteristics and piezocone (CPTu).

Current operation (current height)

The Onverwacht TSF is an embankment facility. Its development progresses in thin lifts to control the rate of rise. The deposition method results in supernatant water flowing from the dam wall towards the tails water pool at the head of the valley, positioning it against the native topography and remote from the wall. From the pool, a floating barge pumps water to the RWD, which is in a valley upstream to the north-east of the TSF.

NNM has the following monitoring regime for Onverwacht TSF:

- Weekly inspection of:
  - Underdrains
  - Solution trenches
  - Catchment paddocks
  - Side slopes
  - Incidents/accidents that occurred
  - Freeboard, beach, pool area
  - Seepage
  - Valves
  - Piezometers
  - Return-water dam.

Records of flow data are also kept so any deviations can be identified.

- Monthly structural stability assessments consider the following:
  - Deposition rate
  - Slurry density (average)
  - Minimum freeboard
  - Pool size or volume
  - Return-water storage capacity
  - Rainfall (storm event)
  - Drain flows.

Final height design

Closure criteria are the actions required to mitigate identified closure risks. This involves removal of infrastructure, erecting fencing, installing drainage structures, reshaping, topsoiling, ripping, seeding and planting, maintenance and monitoring. The proposed closure criteria related to the TSF are closely related to EMP commitments, ie actions to be done at closure as agreed with regulators.

Summary of material findings of annual performance reviews and DSR, including implementation of mitigation measures to reduce risk to ALARP

No material findings (defined as high to very high risks) were identified in the 2023 annual performance review. The low to medium risks identified are being addressed so that material findings do not occur.

A focus area for the current care and maintenance phase is to continue implementing required erosion control measures, ie stormwater control measures on existing perimeter embankment crest.

The following were noted from the annual performance review:

- Erosion control measures needs to be maintained for the top surface perimeter embankment.
- Dust suppression need to be implemented to control nuisance dust on the top surface of the TSF.

The basin freeboard is acceptable.

The following recommendations were made for the Onverwacht TSF:

- Investigate the feasibility to increase design criteria for stormwater diversion trenches to 1:10 000-yr storm event.
- Engineer perimeter embankment crest and rehabilitate upstream side slope.
- Implement irrigation system for dust control in the basin.

Nkomati Onverwacht continued
TSF public disclosure report continued

Summary of material findings of environmental and social monitoring programme, including implementation of mitigation measures

The following environmental and social findings were noted from the annual performance review:

- NNM received a complaint regarding dust from the exposed crest and basin. The complaint was recorded in the grievance register and action immediately taken to address the complaint and provide feedback to the complainant.
- Recommendation to review dust monitoring data was made due to dust from the basin.

Summary version of tailings facility EPRP for facilities that have a credible failure mode(s) that could lead to a flow failure event

Onverwacht TSF inundation zones

NNM extensively engaged downstream communities to create awareness and educate residents on potential risks of a TSF breach. The engagement sessions were attended by local leaders, teachers, children and other members of the communities. Subsequently, an emergency preparedness and response plan (EPRP) was developed in consultation with downstream communities, local authorities and other private emergency services providers like Mine Rescue Services. The EPRP will be shared with local authorities.

Trigger action response plan

NNM has developed a TARP that gives guidance on the type of response required in an event that could trigger an emergency. The TARP is a tool used for managing crucial situations from the NNM operations' safety point of view. It sets out a set of conditions or "triggers" with corresponding actions that NNM managers and supervisors must follow when those trigger events occur. The purpose of TARPs is to provide guidance and clarity when a situation deviates from the original plan or where there is a material change in conditions that could be hazardous.

Dates of most recent and next independent reviews

An independent review of the facility was conducted by Independent Tailings Review Board (ITRB) in July 2023. The next independent review is scheduled for July 2024 and will comprise the same ITRB members.

Annual confirmation that the operator has adequate financial capacity (including insurance to the extent commercially reasonable) to cover estimated costs

NNM conducts annual rehabilitation, remediation, decommissioning and closure liability assessments to determine financial liability as required by legislation. These assessments are conducted by independent service providers. A combination of financial vehicles is used to provide for the assessed financial liability.

Please refer to audited financial statements on the indicated link:

https://arm.co.za/wp-content/uploads/2022/10/2022-Annual-Financial-Statements.pdf

Also please refer to page 10 of the 2022 integrated annual report wherein reference is made to the comprehensive risk financing and transfer programme in place as it relates to tailings storage facility cover.

Approved by accountable executive

HL Mkatshana
Chief executive: ARM Platinum

5 August 2023

Ferrous

KHUMANI IRON ORE MINE

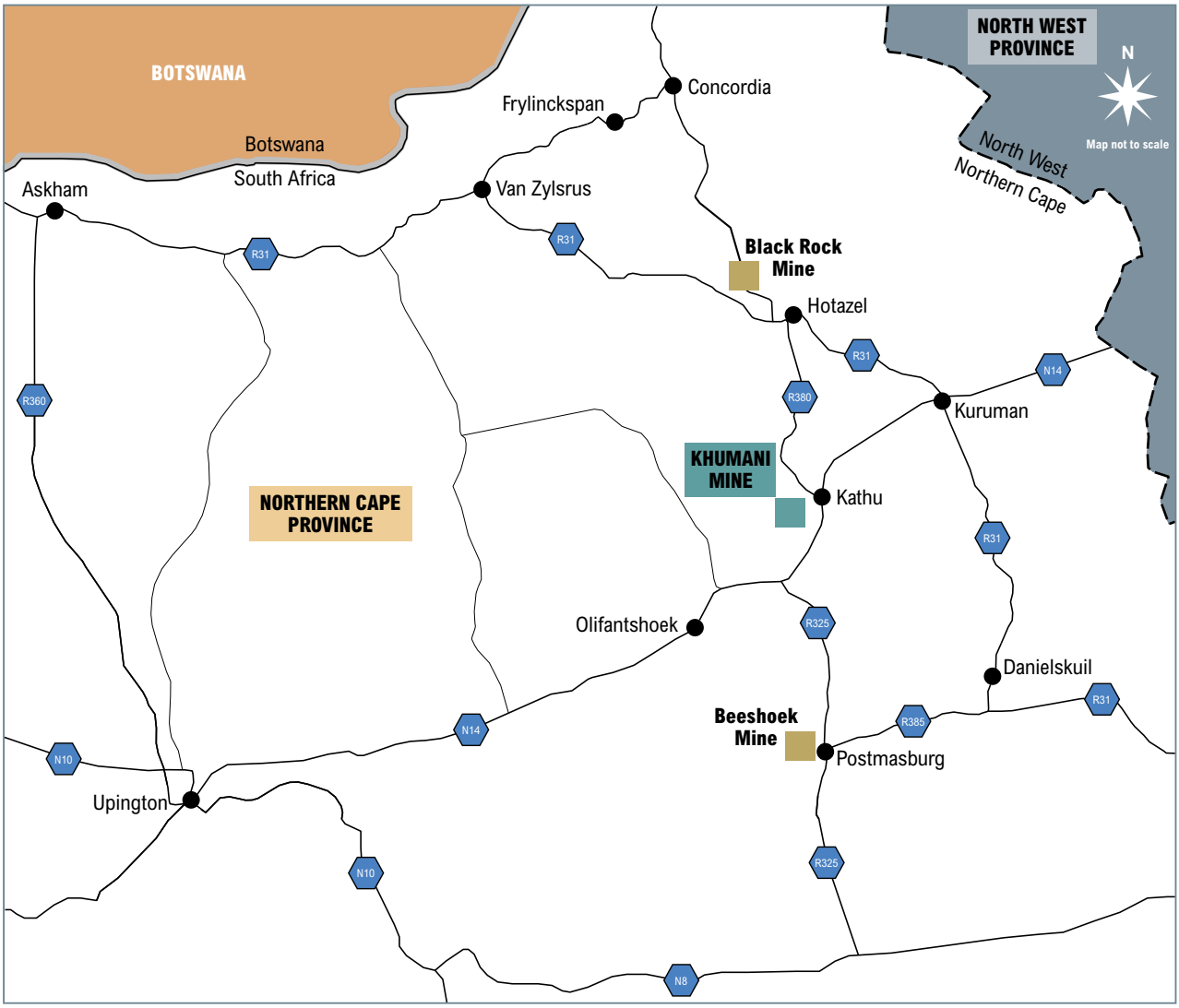
Locality

Khumani Iron Ore Mine is an asset of Assmang Proprietary Limited, which is equally owned by African Rainbow Minerals Limited (ARM) and Assore Limited. Khumani Mine is located on both sides of the N14 approximately 20 kilometres south of the town of Kathu. Khumani Mine is situated on the farms Parson 560 Bruce 544, King 561 and Mokaning 560. Khumani is approximately 200 kilometres north-west of Kimberley in the Northern Cape. The Khumani open-pits are adjacent to, and south-east of, Kumba Iron Ore's Sishen Mine. Khumani Mine is located at latitude 27°45'00"S and longitude 23°00'00"E.

Contents

ARM Ferrous continued

Locality map of Khumani Mine



Khumani Paste Disposal Facility (PDF)
Public disclosure report

Khumani Mine public disclosure on the Khumani PDF

To assess implementation of the GISTM requirements, we have used the ICMM Conformance Protocols for the GISTM. This maps the GISTM's 77 requirements using 219 clear and concise assessment criteria. The GISTM Conformance results are reported against the 77 GISTM requirements.

Khumani Mine began implementation of the GISTM in August 2020. The first step was to conduct a gap analysis between current tailings facility standards and the GISTM. This was followed by a detailed implementation plan to address identified social, environmental and technical gaps.

Khumani Mine conducted a compliance audit in November 2022 (led by an environmental lawyer). The mine internal audit/self-assessments against meeting GISTM requirements are done continually. The self-assessment was also compared with an assessment checklist template for meeting GISTM compliance. The third-party validation was done by Jones & Wagener in July 2023.

Khumani Mine is pleased to report the following GISTM conformance third-party validation results as assessed by Jones & Wagener.

GISTM conformance results

Of the seventy-seven (77) GISTM requirements, fifty-five (55) of the GISTM requirements "meet" conformance and fifteen (15) of the GISTM requirements "partially meet".

There are zero (0) requirements classified as "does not meet". Seven (7) of the requirements are not applicable to this asset.

The areas that are in partial conformance are related to "Topic 3 – Design, construction, operation and monitoring of the tailings facility" and "Topic 4 – Management and governance" and are expected to be in conformance by end of February 2024 and by end of August 2024 respectively.

Khumani Paste Disposal Facility (PDF) continued

Public disclosure report continued

Description of the Khumani Mine tailings storage facility

The Khumani Mine (KHM) does not have a traditional tailings storage facility, the tailings are first dewatered (through primary and secondary paste thickeners) to ensure that the material deposited onto the facility has a high percent of solids and low water content, hence the thickened tailings, paste-like consistency, and use of a Paste Disposal Facility (PDF), which is situated on the farm King to the north of the King Mine open pit operations and 30km south of Kathu (refer Figure 1-1).

The KHM PDF provides for containment of thickened tailings behind the principal impoundment embankment, which is an engineered broad valley-type structure across a sloping hillside valley, creating an impoundment that has a half elliptical shape. The PDF was constructed in phases: phase 1 followed a downstream construction method and phase 2 (current methodology) occurs independently on compartments 1 and 2, using an upstream construction method. The PDF has a life of sixteen (16) years.

The facility has a primary return-water dam (RWD1) to store any excess water decanted off the PDF basins and another return-water dam on standby. Water from the RWDs is pumped back to the Parson plant operations to optimise recovery. Pertinent general information about the operation is detailed in Table 2.

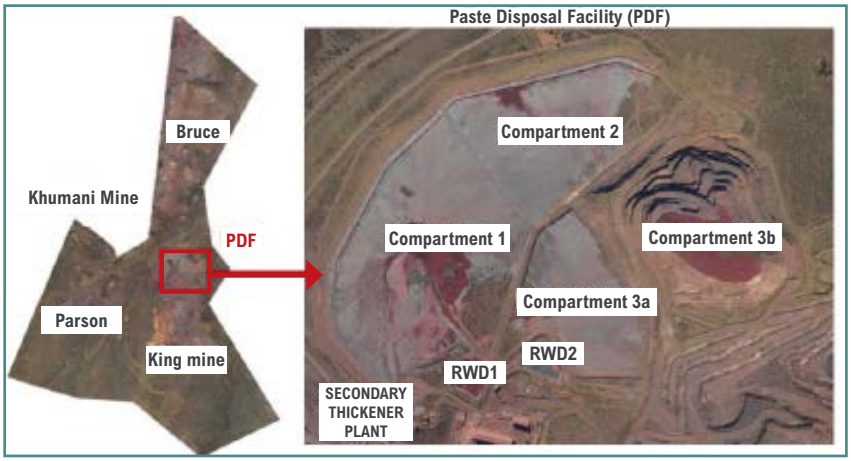


Figure 1-1: Khumani Mine paste disposal facility location and general layout

Table 2: PDF general information

Description	Details
The operation	Khumani Iron Ore Mine
PDF operator	Stefanutti Stocks Inland
Engineer of record	Geo Tail SA Pty Ltd
Business unit	ARM Ferrous division
Magisterial district	John Taolo Gaetsewe district municipality Gamagara local municipality, Northern Cape, South Africa
List of tailings storage facilities	Khumani Mine paste disposal facility
PDF co-ordinates	Long: 23°0'43.51"E; Lat: 27°50'21.36"S
List of water dams	Return-water dams 1 and 2
Current height	Khumani PDF: 23m (1 233mamsl)
Current footprint area	Khumani PDF: 170ha
Current storage	Khumani PDF: 14.9 million m^3
Other associated key infrastructures	• Return-water dam, silt trap • Standpipes, vibrating wire piezometers, underdrains • Deposition pipelines • Process and stormwater primary and secondary decanting systems • Return-water pipelines
Method of deposition	Multiple open-end delivery stations are used to distribute non-segregating tailings into the basin of the PDF which is split into four compartments (no 1, 2, 3a and 3b)

Khumani Paste Disposal Facility (PDF) continued

Public disclosure report continued

Site description and geology, foundation soils and tailings characteristics

The area of the KHM PDF is underlain by sedimentary and metamorphic rocks of the Gamagara Formation, Postmasburg Group and Griqualand-West Supergroup. The Postmasburg Group of the Griqualand-West Sequence is considered to be broadly contemporaneous with the Pretoria Group.

The underlying rocks in this area mostly consist of quartzite, flagstone, shale, chert breccia and interlayered dolomite and chert at depth. The ferruginous and manganiferous shale and chert have been mineralised in places to form hematite. Although shale, quartzite and chert were intersected in the boreholes drilled in the area, the most common rock type is quartzite.

The ground profile across the PDF footprint can be described as follows: aeolian sand overlies most of the PDF basin from surface to depths of 0.8m to over 5.5m. The upper 0.3m to 1m of the aeolian sand had roots and was therefore described as topsoil. The topsoil layer consisted mostly of slightly moist, reddish-brown, very loose, pinhole voided, silty sand with roots of aeolian origin. The aeolian sand underlying the topsoil was described as dry to slightly moist, reddish-brown, loose to dense with depth, pinhole voided, silty sand without roots.

Plant residue deposited into the PDF comprises iron ore fines with a semi-paste consistency.

Consequence classification

The consequence of failure classification of the mine PDF was done by the appointed Engineer of Record in January 2020, and updated in 2021, by assessing downstream conditions documented in the knowledge base. The assessment and selection of the classification was based on the dam breach assessment for the credible catastrophic failure modes. The GISTM classification consequence matrix indicated the KHM PDF as having a Very High classification.

Summary of risk assessment findings relevant to the tailings storage facility

A well-defined risk management system/programme for reviewing tailings safety is in place at the KHM PDF. This proactively identifies, interprets and addresses risks related to the management and operation of the PDF throughout its life cycle.

A system of managing and monitoring critical parameters ensures the PDF is operated safely and efficiently, in accordance with good environmental practice and in a manner guided by legislation (Mine Health and Safety Act or MHSA). Critical parameters are monitored and targets set are defined in the PDF's operations, maintenance and surveillance (OMS) manual, with actual values reported in monthly PDF surveillance and compliance reports.

Substantial work has been done in the last twenty-four (24) months to understand the stability of the Khumani Mine PDF. A geotechnical investigation, involving both in-situ and laboratory testing, was conducted and an assessment for seismic liquefaction triggering was also done. The assessments adhered to the principles and requirements of the GISTM.

The fieldwork component of the investigation included cone penetration testing (CPTu) with pore water pressure measurements, including dissipation tests, and seismic cone penetration testing (SCPTu). The laboratory testing included particle size distribution tests, foundation indicator tests, slurry consolidometer tests as well as drained and undrained triaxial compression testing. This material and stability assessment was completed in March 2023.

Based on the in-depth stability assessment the overall stability and liquefaction risk on Khumani's PDF was found to be low.

Risks identified for the Khumani PDF are failure due to overtopping and foundation failure due to dolomitic instability (sinkhole formation). These are credible catastrophic failure modes but are not associated with the probability of this event occurring and do not reflect the facility's safety.

The continuous risk assessments, implementation of preventative operational controls and the potential failure modes analysis on the KHM PDF support the principle of ALARP – as low as reasonably practicable – to further reduce potential consequence to people and the environment downstream of the facility.

Summary of impact assessments and human exposure and vulnerability to tailings facility credible flow failure scenarios

The current dam breach analysis and inundation study for the Khumani Mine PDF are based on credible catastrophic failure mechanisms. The purpose of the dam breach assessment is to evaluate the potential downstream impact of a hypothetical breach in the Khumani PDF. The breach analysis was conducted for the current crest wall elevation and expected final crest wall elevation.

Based on the PDF characteristics, critical potential breach locations were identified, and the most likely failure modes were modelled and simulated for varying hydrological conditions.

Khumani Paste Disposal Facility (PDF) continued

Public disclosure report continued

Based on population density maps and extents of inundation resulting from models in this dam breach analysis, the population at risk was estimated. The downstream communities were meaningfully engaged to raise awareness about the impact of a failure of the Khumani PDF in the unlikely event that it occurs.

Mitigation measures include the KHM PDF emergency preparedness and response plan (EPRP). The EPRP of the Khumani PDF includes plans to deal with environmental spillage containment and clean-up in case of a failure. Further involvement of local communities, including downstream communities and Mine Rescue Services is done via the KHM environmental forums.

Description of design for all phases of the tailings facility life cycle, including current and final height

Current operation (current height)

The KHM PDF starter embankment for the main embankment was constructed of engineered earthen fill borrowed from the basin of the PDF. A seepage cut-off drain was included in the starter embankment design. The phase 1 lift of the main embankment was constructed using waste rock produced from mining operations, following a downstream construction method. The phase 2 lift (current) methodology occurs independently on compartments 1 and 2, using an upstream construction method.

The paste facility progresses in thin lifts to ensure optimum consolidation of the deposited paste material. The decant pool on each compartment is controlled by decanting excess water off the basins and the pool is kept away from the outer embankment.

The rate of rise is also limited to the design rate of rise.

The Khumani Mine PDF was designed to meet the recommended industry guidelines for factor of safety (FoS). During the operation of the tailings facility, the FoS is continually reviewed through stability analyses.

Critical controls have been placed on the following aspects of the Khumani Mine PDF's development. These controls are monitored monthly and complemented by daily, weekly, monthly, quarterly and annual reviews for any major changes or deviations from design assumptions. The reviews are conducted by a multidisciplinary team which involves the Khumani PDF operator, EoR, environmental specialists, mine safety personnel, plant engineers, RTFE and ITRB:

Tailings deposition strategy, rate of rise and deposition rates

The operation of the Khumani PDF involves a short- and long-term deposition plan that is strictly followed and adjusted to ensure proper pool control and adequate freeboard. The deposition strategy is such that the rate of rise is limited to the approved design.

Freeboard and pool control

The Khumani PDF is designed to comply with the Government Notice 704 freeboard requirement for a 1:50-year storm plus 0.8m. The actual facility freeboard also exceeds the freeboard required to retain a 1:10 000-year storm event (or probable maximum precipitation). Freeboard is verified monthly with accurate surveys of the facility. Strategic deposition plans and pool control ensure that beaching and thus freeboard generation are improved.

Wall drainage

A seepage cut-off drain is installed in the PDF starter embankment to collect seepage from the base.

Stormwater management

Stormwater diversion channels have been constructed on the eastern side, upstream of the paste facility. These channels assist with diverting stormwater away from the PDF footprint and avoid clean water coming into contact with polluted water.

Slope angle and benches

The side slope angles and benches are monitored and maintained regularly to ensure there are no deviations from the design intent during operation.

Phreatic surface monitoring

The phreatic surface at the KHM PDF is regularly monitored through both standpipe and vibrating wire piezometers (VWP). This is done through a dashboard that displays live results of VWP readings (daily). Access to the dashboard is provided to the relevant paste facility stakeholders such as the RTFE, PDF operator and EoR.

Final height design

Closure criteria are the actions required to mitigate identified closure risks. This involves removal of infrastructure, erecting fencing, installing drainage structures, reshaping, topsoiling, ripping, seeding, and planting, maintenance and monitoring. Closure criteria are closely related to actual EMP

Khumani Paste Disposal Facility (PDF) continued

Public disclosure report continued

commitments in that, as noted, they are the actions to be taken at closure as agreed with the regulators.

The conceptual closure plan of the Khumani PDF, as detailed in the continuation report, will be used as the basis in developing prefeasibility closure design options of the facility. Once additional information from specialised studies such as hydrogeology, vegetation assessments, visual impact assessments and other parallel studies are concluded, the detailed closure plan for final height design can be finalised.

Summary of material findings of annual performance reviews and DSR, including implementation of mitigation measures to reduce risk to ALARP (as low as reasonably practicable)

Annual performance reviews are conducted by the EoR. The following additional risk control measures were recommended in the last annual performance review:

- **Side slope stability**
  Complete liquefaction study: project is 100% completed. An intensive geotechnical investigation programme (CPTu and seismic CPTu), specialised laboratory testing, a probabilistic seismic hazard and stability assessment were completed in March 2023. The conclusion to this Khumani PDF materials and stability assessment is that overall stability and liquefaction risk on Khumani's PDF is considered to be low.
- **Overtopping**
  Implement a Turret decant system (to improve current methodology by facilitating decanting of shallower pools). This project is currently being implemented.
- **Foundation failure**
  Ensure compliance with dolomite risk management plan: This project is 100% completed. The dolomite risk management plan (DRMP) is adhered to, and a site audit was done by Jones & Wagener in May 2023 to update the existing DRMP.

Summary of material findings of the environmental and social monitoring programme including implementation of mitigation measures

The following environmental and social additional risk control measures were recommended by the EoR from the annual performance review:

- **Vegetation**
  Continue with mechanical vegetation removal: This project 100% adhered to, and a further herbicide application is planned for September 2023.
- **External erosion**
  Prepare a progressive rehabilitation plan for the paste side slopes of compartments 1 and 2: This project is in progress with the appointed environmental specialists conducting studies on the optimum vegetation establishment approach for the PDF side slopes.

Khumani Mine keeps a register of all environmental and social complaints received from surrounding communities. The officer: ISO and quality has confirmed that no NCRs (non-conformance reports) have been received in relation to the Khumani Mine PDF in the last twelve (12) months.

Summary version of tailings facility EPRP for facilities that have a credible failure mode(s) that could lead to a flow failure event

Emergency preparedness and response plan (EPRP)

The Khumani Mine PDF emergency preparedness and response plan is based on credible flow failure scenarios and the assessment of potential consequences downstream of the facility.

The EPRP serves as a guide in the event of a credible catastrophic failure occurring to ensure a state of readiness in Khumani Mine to manage and execute emergency preparedness and response activities if the PDF should fail.

These activities are specifically aimed to provide immediate response to save lives, supply humanitarian aid and minimise environmental harm. The plan further aims to guide activities to minimise property damage, ensure essential services are repaired or quickly reinstated; and reduce disruption to Khumani Mine operations.

Khumani Mine extensively engages downstream communities to create awareness and educate residents on the potential risks of a failure of the KHM PDF. The community engagement sessions were attended by farmers, municipality representatives and emergency services, and town residents.

Trigger action response plan (TARP)

Khumani Mine has developed a TARP for the paste disposal facility that gives guidance on the type of response required in the event that an emergency is triggered. The TARP is a tool used for managing crucial situations from the Khumani operations' safety point of view. This document sets out certain conditions or "triggers" with corresponding actions that the Khumani Mine managers and supervisors must follow when those trigger events occur.

Khumani Paste Disposal Facility (PDF) continued

Public disclosure report continued

The purpose of the TARP is to assist in decision-making and taking appropriate action where conditions on the PDF progress through a series of changes from normal towards failure.

Dates of most recent and next independent reviews

An independent review of the Khumani Mine PDF was conducted by the Independent Tailings Review Board (ITRB) in November 2022.

The next independent review is scheduled for 7 November 2023 and will comprise the same ITRB members.

Annual confirmation that the operator has adequate financial capacity (including insurance to the extent commercially reasonable) to cover estimated costs

Khumani conducts annual rehabilitation, remediation, decommissioning and closure activity assessments to determine closure financial liability as required by legislation. These assessments are conducted by independent service providers. A combination of financial vehicles is used to provide for the assessed financial liability.

Please refer to audited financial statement on the indicated link:

https://arm.co.za/wp-content/uploads/2022/10/2022-Annual-Financial-Statements.pdf

Also please refer to page 10 of the 2022 integrated annual report wherein reference is made to the comprehensive risk financing and transfer programme in place as it relates to tailings storage facility cover.

Approved by accountable executive

A Joubert
Chief executive: ARM Ferrous

5 August 2023

Glossary of terms

ALARP	As low as reasonably practicable
ARM	African Rainbow Minerals
CC	Consequence classification
CCS	Consequence classification of structures
CDSF	Co-disposal TSF
Co	Cobalt
CoP	Code of practice
CP	Competent Person
CPTu	Cone Penetration Test
Cr	Chromium
Cu	Copper
CWP	Chrome wash plant
DBR	Design basis report/continuation report
DSR	Dam safety review
DRMP	Dolomite risk management plan
EAP	Emergency action plan
EMP	Environmental management plan
EoR	Engineer of Record
EPRP	Emergency preparedness and response plan
FoS	Factor of safety
GISTM	Global Industry Standard on Tailings Management
JV	Joint Venture
GoN	Government notice
ITRB	Independent Tailings Review Board
ICMM	International Council on Mining and Metals
KHM	Khumani Mine
LFI	Learning from incidents
LOM	Life-of-mine
Mamsl	Metres above mean sea level
MAP	Mean average precipitation
MHSA	Mine Health and Safety Act
MMZ	Main Mineralised Zone
MPM	Modikwa Platinum Mine
MRF	Mineral residue facility
NNM	Nkomati Nickel Mine
OMS	Operations, maintenance and surveillance
PAR	Population at risk
PCMZ	Chromatic Peridotite Mineralised Zone
PDF	Paste disposal facility
PLL	Potential loss of life
PMP	Probable maximum precipitation
RTFE	Responsible tailings facility engineer
RWD	Return-water dam
SABS	South African Bureau of Standards
SCPTu	Seismic Cone Penetration Test
SANS	South African National Standard
RSCPTu	Resistivity and Seismic Cone Penetration Test
TARP	Trigger action response plan
TDBA	Tailings dam breach analysis
TRP	Two Rivers Platinum Mine
TSF	Tailings storage facility
VWP	Vibrating wire piezometer

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Directors

Dr PT Motsepe (executive chairman)
VP Tobias (chief executive officer)
F Abbott*
M Arnold**
TA Boardman*
AD Botha*
JA Chissano (Mozambican)*
WM Gule*
B Kennedy*
AK Maditsi*
TTA Mhlanga (finance director)
HL Mkatshana
PJ Mnisi*
DC Noko*
B Nqwababa*
Dr RV Simelane*
JC Steenkamp*

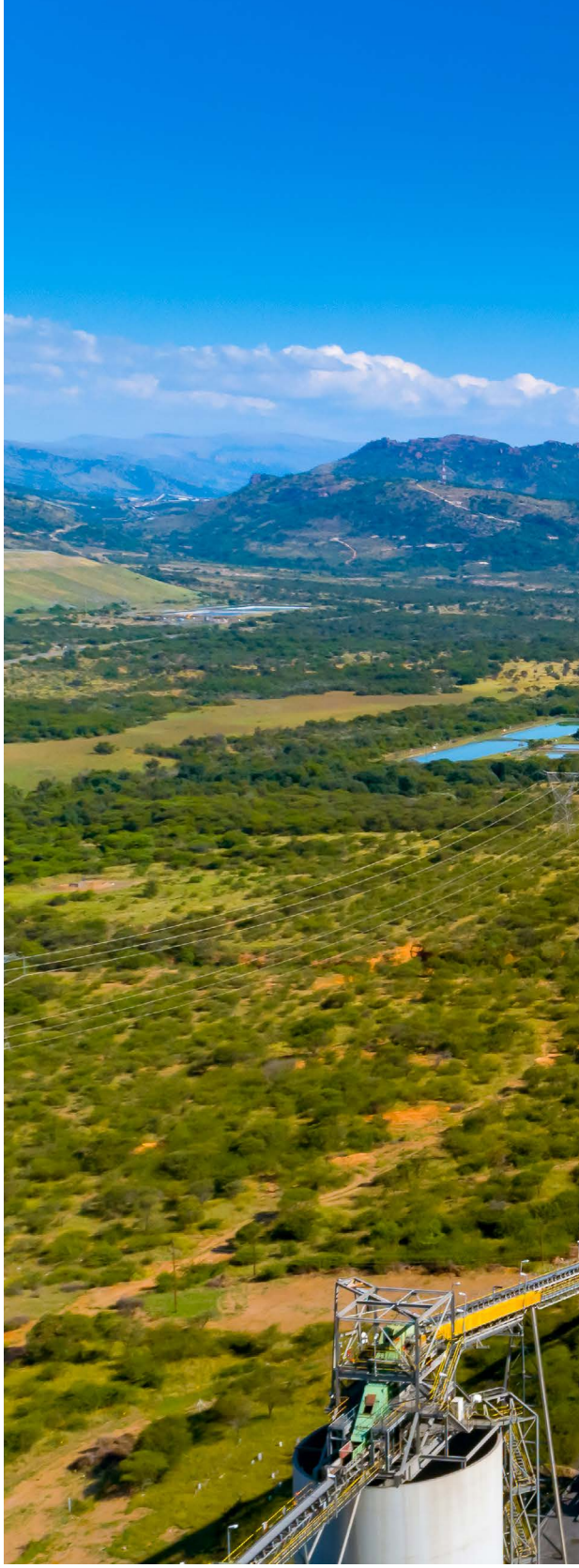
* *Independent non-executive.*
** *Non-executive.*

We appreciate your feedback

In the interests of continuous improvement and fulfilling the information and engagement needs of our stakeholders, we welcome any feedback on the content and format of our reports. Please direct these to the investor relations department. Email: iradmin@arm.co.za.

Forward-looking statements

Certain statements in this document constitute forward-looking statements that are neither reported financial results nor other historical information. They include statements that predict or indicate future earnings, savings, synergies, events, trends, plans or objectives. Such forward-looking statements may or may not take into account and may or may not be affected by known and unknown risks, uncertainties and other important factors that could cause actual results, performance or achievements of the company to be materially different from future results, performance or achievements expressed or implied by such forward-looking statements. Such risks, uncertainties and other important factors include: economic, business and political conditions in South Africa; decreases in the market price of commodities; hazards associated with underground and surface mining; labour disruptions; changes in government regulations, particularly environmental, health and safety and tax regulations; changes in exchange rates; currency devaluations; inflation and other macro-economic factors; electricity supply disruptions, constraints and cost increases; supply chain shortages and increases in the price of production inputs; the unavailability of mining and processing equipment or transportation infrastructure; the impact of the Covid-19 pandemic; and the impact of tuberculosis. The forward-looking statements apply only as of the date of publication of these pages. The company undertakes no obligation to update publicly or release any revisions to these forward-looking statements to reflect events or circumstances after the date of publication of these pages or to reflect any unanticipated events.



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