RESPONSIBLE TAILINGS MANAGEMENT

Tailings arise from the processing of mined ore. During processing and beneficiation the ore is finely ground and mixed with water and chemicals to separate minerals from waste. The waste that remains after beneficiation is a mix of finely ground waste rock and water known as tailings or slurry, which is disposed in tailings storage facilities.

F2020 FOCUS

Responsible tailings management

There are eleven tailings storage facilities (TSFs) at ARM operations, four at Nkomati Mine, three at Black Rock Mine, and one each at Beeshoek, Khumani, Two Rivers and Modikwa mines. The design and construction of TSFs include physical barriers appropriate to the risk to prevent pollution of groundwater. Ongoing monitoring of surface water runoff around waste rock dumps and TSFs is conducted to alert operations to negative impacts. Ground water modelling predicts the potential impact of tailings disposal on aquifers and allows for mitigation measures.

Our main priority is ensuring the stability of our TSFs. The responsible and safe management of tailings is a strategic issue with major financial and reputational value. As such, it is a corporate and board priority. Reporting on tailings is included in the agenda of the quarterly sustainable development committees of every Joint Venture board/exco, as well as the ARM audit and risk committee and social and ethics committee of the board and ultimately to the ARM board of directors.

A professional engineer is appointed by each operation to perform annual structural stability audits and quarterly monitoring of the safety and stability of each TSF. The latest structural stability reports confirm the TSFs at ARM's managed operations as stable.

Tailings management and governance measures

Recent international catastrophic failures of tailings storage facilities (TSFs) have increased the focus of investors, NGOs and other stakeholders on responsible tailings management. In 2016, the International Council on Mining and Metals (ICMM) published a Position Statement on "Preventing Catastrophic Failure of Tailings Storage Facilities" that includes a TSF governance framework. This framework enhances focus on those key elements of management and governance necessary to maintain integrity of TSFs and minimise the risk of catastrophic failures.

ARM, as a member of the ICMM, undertook a review of its TSFs in accordance with the framework and included it in the annual review of management controls at ARM managed TSFs by a multi-disciplinary internal team. This process has subsequently been replaced by the external reviews that were commissioned in 2019.

Following the tragic failure of a TSF in Brumadinho, Brazil in January 2019, the Investor Mining and Tailings Safety Initiative called for a new independent and publicly accessible international standard for tailings dams based on the consequences of failure.

In February 2019, the ICMM Council committed to convening of an independent review of global tailings management practices, with co-convenors UNEP (United Nations Environmental Programme) and PRI (Principles for Responsible Investment) – under leadership of independent chair, Dr Bruno Oberle[3]. The outcome of this Global Tailings Review (GTR) process is a Global Industry Standard on Tailings Management (GISTM), which has as its main objective the safer operation of tailings facilities. ARM has been actively involved in the process and welcomes the GISTM, which was launched on 5 August 2020.

During April 2019, ARM (in collaboration with our joint venture partners) responded to a request for information by a number of investors represented by the Church of England Pensions Board and the Swedish Council of Ethics. ARM's comprehensive TSF disclosure is available on our website at www.arm.co.za. (link: https://www.arm.co.za/sd/files/arm-summary-tailings-storage-facilities-disclosure.pdf)

3 Dr Oberle is a Swiss biologist and environmental scientist, and Director General of the International Union for Conservation of Nature (IUCN)

TSF management at ARM operations

TSF management is overseen by the following roles:

Owner

At each operation managed by ARM, an internal competent person (in most cases the manager of the process plant) has been appointed as the responsible manager (the manager) in terms of the Mine Health and Safety Act (MHSA), to oversee the operation of each tailings storage facility (TSF).

Professional engineer

A professional civil/geotechnical engineer (the engineer) is appointed at each operation to conduct annual structural audits and quarterly surveillance monitoring of the TSFs.

Operator

A specialist TSF operating company (the operator) has been appointed at all mines (except Beeshoek Mine due to the low risk of the TSF) to operate the TSF in close cooperation with the manager and audited by the engineer each quarter.

Legislative requirements are assessed and incorporated into the TSF management system. Each operation has submitted and implemented the mandatory Code of Practice (COP) on the operation of mine residue facilities according to the guidelines of the South African Department of Mineral Resources and Energy (DMRE) and the South African National Standard on the management of Mine Residue, SANS 10286. Internal and external reviews take place as required. Operating manuals and procedures have been developed and are aligned with the COPs.

Routine daily, weekly and monthly inspections are performed both by the operating company and the operation. The engineer, the operator and mine personnel conduct quarterly inspections, and submit quarterly reports to the manager. The engineer is responsible to conduct annual structural stability audits. Records kept by operations include tailings dam designs, construction drawings, continuation reports, annual reports and minutes of mandatory meetings.

In 2019, ARM undertook to commission independent external review of the TSFs in alignment with global best practice to enhance our TSF management systems. The external review of the TSFs, which includes review of management systems and governance processes, was completed and we are in the process of implementing recommendations for improvement, both at operational and corporate level.

In addition, ARM committed to completing dam breach analysis of our TSFs to ensure a comprehensive understanding of the potential impact on stakeholders including communities, the environment and the infrastructure. These studies and reports have been slightly delayed by the Covid-19 pandemic, but draft reports have been received and are in the process of being finalised. These reports will inform enhanced emergency response planning.

Tailings storage facilities (TSFs)

Ensuring the safe and stable operation of the TSFs at the ARM mines is a priority, both at operational level and at the corporate level by the joint venture partners at each operation.

ARM Platinum division

The technical committees of each mine, represented by both joint venture partners, consider details regarding the status and compliance of the TSFs at quarterly meetings. A professional engineer is appointed by each mine to oversee operation and construction in compliance with designs, conduct quarterly inspections and annual stability audits. The TSFs at all three mines were certified as stable during the latest annual audits.

Each operation reports in terms of TSF compliance and status to the joint venture partners at quarterly steering committee and sustainable development committee meetings.

In line with industry best practice, independent external reviews of the TSFs at each operation were conducted during the year by a globally renowned expert at Nkomati and Two Rivers mines and an independent specialist consulting firm at Modikwa Mine. The independent external review at Two Rivers Mine included the current TSF as well as the design of the new TSF. At Modikwa Mine, the independent review team noted that "TSF operations, monitoring and surveillance are generally well managed and no major concerns were noted" and provided a number of key comments for improvement. A TSF team comprising the operational management and members of both joint venture partners, work together to review recommendations and the status of implementation.

At Nkomati Mine, the independent external reviewer noted that "the Onverwacht and Co-disposal facilities can be operated safely and effectively for their remaining design life. Designs have been optimised and are robust against reasonable expected deviations in environmental conditions, plant throughput and tailings properties. Monitoring and surveillance are done to a high standard and hence any deviation in performance from the design should be detected early enough to implement remedial action. The monitoring and surveillance should be continued after decommissioning until steady state conditions are evident". The Nkomati technical team oversees TSF management in collaboration with the operational team.

At Two Rivers Mine, the independent external reviewer found technical controls to be excellent and noted the management system as world class, with some recommendations around documentation and change management which are being implemented.

ARM Ferrous division

A professional engineer is appointed by each mine to oversee operation and construction in compliance with designs, conduct quarterly inspections and annual stability audits. The TSFs at all three mines were certified as stable during the latest annual audits.

An internal compliance dashboard to reflect critical parameters, has been developed and compliance is reported quarterly by each mine. The Assmang exco and social and ethics committee consider TSF compliance and status reports at each quarterly meeting.

Independent external reviews of the TSFs at each operation, were conducted by a globally renowned expert during the year. These reviews included the management systems, designs and stability related to TSFs. The independent reviewer noted at both Khumani and Black Rock mines, that the management of the TSFs is done to a high standard and that the level of assessment and auditing is considered as world class. There were no major findings or deviations identified and recommendations for improvement are being implemented by each operation.

After assessment of the risk and potential zones of influence upon failure of each TSF, dam breach analyses were conducted at Khumani and Black Rock mines. At Khumani Mine, the emergency response plan has been revised to address potential impact and an emergency drill including relevant stakeholders, including regional emergency services and traffic management authorities, is planned for November 2020. At Black Rock Mine, containment berms are being constructed to protect mine infrastructure which could potentially be affected in the event of failure.

ARM corporate

The external review of the TSFs identified the requirement for a TSF management policy and standard in addition to the governance standards which are already in place. These, as well as reporting dashboards on critical compliance elements, are in the process of development. The ARM TSF policy and management standard will be aligned with appropriate good practice standards nationally and internationally, including the GISTM. The ARM TSF management policy will be finalised before the end of October 2020. The TSF management standard is being developed by a corporate team with input from operations and their appointed professional engineers to align with the GISTM launched on 5 August 2020, for implementation during the next 3 to 5 years in accordance with the ICMM commitment.

In addition to governance and operational measures described elsewhere in this section, a review of tailings management at each TSF is conducted annually by the risk engineer from the International Mining Industry Underwriters (IMIU) during the annual risk survey. Detailed comments and recommendations relevant to TSFs are included in the IMIU report for each operation. The IMIU recommendations are added to each operational risk profile and progress is tracked quarterly. The IMIU recommendations are included in governance reporting to both the ARM audit and risk committee and the social and ethics committee as well as the joint venture sustainability and audit and risk committees.

Focus for F2021

- Raising awareness and further educating the workforce on responsible environmental stewardship, especially focusing on climate change and water.
- Setting long-term water and carbon targets.
- Continued reduction in carbon emissions.
- Continued improvement in understanding and reporting on performance in terms of climate change and water.
- Continued engagement with stakeholders to understand concerns around environmental stewardship.
- Further refinement in terms of implementation of the Water Accounting Framework.
- Rehabilitation and closure.
- Responsible tailings management.
- The ARM TSF management standard and Global Industry Standard on Tailings Management (GISTM).