Petra Diamonds Limited (Petra)

GISTM tailings facility disclosure
Cullinan Diamond Mine No. 7 Dam

GISTM consequence classification: Extreme
Tailings facility status: Operational

We set out below the information required to be disclosed pursuant to principle 15.1B of the Global International Standard on Tailings Management (GISTM)

1. Description of Facility

1.1. The Cullinan Diamond Mine (the Cullinan Mine or the Mine) is located in the town of Cullinan, 46.2km north of Pretoria in the Gauteng Province. Figure 1-1 below shows the location of the Mine and the location of the mine residue facilities. CDM is operated by an indirectly owned subsidiary of Petra, Cullinan Diamond Mine (Pty) Limited (CDM).

1.2. The No. 7 dam (the Facility) is the only fine tailings storage facility at the Cullinan Mine. Deposition occurs through an upstream construction method using open ended deposition points. Dried tailings material is mechanically positioned on the outer wall. Decanting of accumulated water takes place via a pumping facility that return water to the processing plant.

1.3. The Facility was originally constructed in a natural valley in the late 1950s, with a significant buttress of course tailings being added in the 1970s to improve overall stability of the Facility. No chemicals are added as part of the diamond extraction process. There are however slightly elevated levels of fluoride present in the host rock. The effluent water is at a slightly elevated pH, with some suspended solids and slightly elevated levels of fluoride.

1.4. Downstream of the Facility is a 1,300ha buffer zone between the Mine and the nearest community.

Figure 1-1: Mine Layout

2. Consequence classification

2.1. Owing to the potential impact on the adjacent community, under the GISTM classification, the Facility is classified as “Extreme”.

2.2. The classification of the Facility is based on the GISTM consequence classification matrix where each of the following criteria is rated in five categories from low to extreme, where the highest rating of any of the criteria determines the facility’s consequence classification:

2.2.1. potential population at risk;

2.2.2. potential loss of life;

2.2.3. environmental impact;

2.2.4. health, social and cultural impact; and

2.2.5. risk to infrastructure and economics

2.3. The above areas are rated as either low, significant, high, very high or extreme. 3. Risk assessment summary

3.1. Petra’s Enterprise Risk Manage Framework (the ERM) governs the manner in which enterprise risks are measured and managed. The risk assessment process follows a system where the “baseline” risk of each of PDL’s operations are evaluated by the relevant management teams. Due to the inherent high levels of risk associated with tailings facilities, the risks associated with these facilities are evaluated in greater detail.

3.2. An issue-based risks assessment process is then triggered where the inherent risks of the tailings facilities are being evaluated by a multi-disciplinary team. These inherent risks (without controls) are then further evaluated and existing controls are added to determine the level of residual risk with current controls at an estimated effectiveness level. If the residual risks are higher than tolerance levels additional mitigation plans are actioned to further decrease the residual risk.

3.3. Risks associated with Petra's tailings facilities are evaluated through the life cycle of the facilities and include risks associated with the design, construction, operation and closure of facilities.

3.4. From an ERM perspective, the main unwanted event is the failure of impoundment walls of the Facility. The current controls implemented to mitigate this risk are:

3.4.1. adoption of a groupwide tailings management policy which commits Petra to the implementation of the GISTM principles;

3.4.2. implementation of a groupwide tailings management procedure;

3.4.3. appointment of individuals responsible for the roles of Accountable Executive, Independent Review Board, responsible tailings facility engineers and Engineers of Record;

3.4.4. periodical external reviews of operational and engineering systems;

3.4.5. use of construction methods as approved by the Engineers of Record;

3.4.6. monitoring of facility parameters through a hierarchical inspection process. The results from these inspections are evaluated against trigger action points for parameters such as free board, beach lengths, wall heights, piezometer levels, drain flows etc. and

3.4.7. development of emergency response plans informed by the dam break analysis.

3.5. Material enterprise risks are reviewed quarterly and reported to Petra's Executive Committee.

4. Impact assessment

4.1. A failure analysis was conducted on the Facility, with the inundation area determined using flow scenarios such as depth of flow and velocity. The impacted area was evaluated from a human, social and environmental impact perspective. This information was used to establish the "consequence classification" of the facility derived from the down-stream impacts of a failure of each of the impoundment walls.

4.2. Petra has adopted a human rights policy aligned to the United Nation's Guiding Principles. This policy is guiding actions to prevent infringements of human rights. Our Environmental Management policy guides actions towards environmental impact assessment of the inundation area e.g. water quality assessments.

4.3. The potential impacted area forms the basis of identifying potential stakeholders that will be represented in the local disaster forums and communication forums towards the community.

5. History and description of the Cullinan Diamond Mine No. 7 dam facility

5.1. Construction of the Facility started in 1957 as part of the mining activities. The Facility is constructed in a valley with three impoundment walls containing the mine residue and water in the basin. The impoundment walls are known as the Main Wall, the Valley Wall and the Township Wall (as shown in Figure 1-1).

5.2. <u>Main and Valley Walls</u>:

5.2.1. The initial impoundment walls (Main wall and Valley wall) were constructed upstream from previously used tailings facilities. The primary wall was constructed with coarse tailings material. Since

then, the Facility has been referred to as the No. 7 Dam. Early in the life cycle of the Facility, stability concerns were addressed through:

(a) increasing its the down-stream slope angle;
(b) adding buttresses on the down-stream side of the Main Wall to increase overall stability; and
(c) installing a rock filter drainage system under the berms (buttress) to reduce water pressure in the wall and to keep the downstream slope dry.

5.2.2. In addition, a blanket of fine slimes on the upstream face of the Main Wall has been progressively deposited to form a less permeable barrier which reduces seepage into the Main Wall.

5.3. Township Wall:

5.3.1. The Township wall is located northeast of the processing plant and was constructed north of the former municipal swimming pool. The purpose of the Township Wall is to prevent inundation of the golf course located to the southeast of the swimming pool. Drains were constructed prior to constructing the Township Wall. The outlet pipes from the four drains discharge to the old municipal swimming pool (repurposed as a sump), from where it is pumped back to the Facility.

5.3.2. The base of the site of the Facility is located on the Rayton formation of the Transvaal Geological Sequence, which comprises quartzites and shales which form the sides of the valley. The valley was created through the increased weathering of the gabbro and softer material in the area.

6. Conclusions and recommendations from independent review

6.1. The following conclusions and recommendations were recorded in the latest (2024) Dam Safety Review conducted by the Engineer of Record (EoR):

6.2. Conclusions:

6.2.1. Based on a lack of information, it is currently not possible to assess the stability of the No. 7 Dam to a sufficient level of confidence. In the absence of the required information an idealised stability assessment was done along the proposed VWP line. It should be noted that these analyses are only indicative, but the results do show that it is critical to assess the stability of the facility to an acceptable level of confidence. It is recommended that the foundation conditions should be verified through geotechnical investigation, as well as the completion of the planned installation of the VWP's.

6.2.2. To do that, a detailed geotechnical investigation and the installation of Vibration Wire Piezometers (VWP) are required. A total of 8 VWPs are in the process of being installed, of which 7 are already completed. Based on the information from the VWP the EoR will determine the scope/necessity of further geotechnical drilling/work.

6.2.3. A bathymetry study was conducted to measure the density variation in 7 dam at 145 positions. This provides data to track the change in the bottom level of the dam, as well as the level of usable water that has a density of 1050g/l or less.

The bathymetry investigation has shown that there is a significant increase in the bottom level of the dam. The results show that the density variation is homogeneous throughout the dam. There is a thickening of the dense material from the bottom of the dam upwards.

It was also found from the previous surveys that there is a linear increase in the 1050g/l level. Extrapolating this increase shows that the 1050g/l cut-off will reach a level of 1455.53masl by December 2026, which is one meter below the average water level of 1456.53masl, (assuming that the water level doesn't change).

6.2.4. Over the review period the water level on the facility was maintained below 1 457 mamsl. This had a positive effect on the available freeboard, which remained above the currently adopted freeboard requirement for the Main, Valley and Township walls.

6.3. Recommendations:

6.3.1. The composition and state of the material comprising the Main wall, Valley wall, Township wall and stability berms need to be investigated.

Recommendations received are to be discussed with the newly appointed EoR regarding further investigations possibly comprising test pitting, additional surface geophysical testing, rotary core and sonic drilling, CPTu testing and laboratory testing.

6.3.2. Bench penstocks were installed to prevent the ponding of water along the Main Wall and Valley Wall benches in August 2022. Areas disturbed during the construction of the bench penstocks and discharge pipes were revegetated thereafter. Vegetation has established poorly, and the vegetation blankets require reseeding. It was reported that the supplier visited the site and will provide further recommendations to CDM.

6.3.3. There is a current recommendation that Vibrating Wire piezometers be installed in order to provided sufficient information to inform the stability assessments.

6.3.4. Emergency preparedness: A dam break assessment was completed in July 2022 and the Mine is proceeding with community engagement, particularly with residents within the inundation zone as determined by the dam break assessment. Community engagement is follow the prescribed frequency stated in the Code of Practice for the Facility.

7. Environmental and social monitoring

7.1. Environmental and social monitoring is conducted through Petra's HSEQ system, which complies with the ISO: 45001 and ISO 14001 standards.

7.2. Monitoring activities conducted include monitoring of:

7.2.1. the underground water quality;

7.2.2. quality and quantity of water in the pond that is released to the environment from time to time to manage water level on the Facility;

7.2.3. drain water quality;

7.2.4. surface water quality; and

7.2.5. air quality.

8. Emergency preparedness and response

8.1. A site-specific Emergency Preparedness and Response Plan is in place for the Facility (the Plan). The Plan includes:

8.1.1. ranking of potential emergency situations and actions to address the foreseen situations;

8.1.2. a list of resources required to assist with immediate response;

8.1.3. individual responsibility matrix;

8.1.4. establishment of an emergency control centre and associate procedures; and

8.1.5. a list of representatives of down-stream residents.

8.2. In case of an emergency down-stream residents will be informed if evacuation is required through various public forum (including e.g. community policing forums).

8.3. Conceptual long term recovery plans are in the process of being developed. Detailed planning, however, is only be possible after an event occurs.

9. Independent Review Planning

9.1. An annual review of the Facility is conducted by the Engineer of Record, which includes a review of progress of previous actions and a record of new conclusions and recommendations. The review for FY 2025 is currently being prepared.

9.2. The Independent Review Board does a further annual review and prepares a report for the accountable executive, CDM General Manager. The Independent Review Board is conducting an annual review of the facility and the 2025 report is awaited.

9.3. A dam safety review is conducted and reported on a 5 yearly basis as per regulatory requirements. The latest report (CY 2024) was recently submitted to the relevant regulatory bodies.

9.4. In addition to the above, status updates on the Facility are presented at a quarterly inspection and status monitoring meetings.

10. Financial capacity

10.1. Petra is the indirect holder of 74% of CDM, the operator of the Facility, with the balance being owned by an Employee Share Trust and Petra's Black Economic Empowerment partners. The details of the financial provision which Petra has made in relation to the estimated costs of planned closure, early closure, reclamation and post-closure monitoring and maintenance of the Facility, as well as the adequacy thereof, are as set out in our most recent set of audited financial statements, which are available on Petra's website at: https://www.petradiamonds.com/investors/results-reports/.