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Water and Tailings Storage Facilities Management

[Signature]

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1. **Purpose**

This note presents a summary overview of the dam safety management adopted at the Letseng mine. It is intended to give a detailed summary of the measures which indicate that the dams at Letšeng are well managed and monitored and consequently considered safe. This note and accompanying documents aim to outline the measures which have been put in place at Letšeng to ensure the safe and responsible operation of the three significant dams at Letšeng which include the Old Tailings Storage Facility (TSF), the Patiseng TSF and the Mothusi Water Storage Facility. The note also refers to the emergency planning and management measures currently in place to safeguard the downstream communities and minimise any adverse impacts in the highly unlikely event of a catastrophic dam wall failure.

2. **Overview**

The operation currently has one active tailings storage facility (Patiseng TSF), one standby tailings storage facility (Old TSF) and one fresh water dam (Mothusi). Several risk assessments and studies have been conducted over the past ten years to determine the risk exposure of the above-mentioned facilities and the effectiveness of the controls that have been put in place to limit any risk exposure to acceptable levels.

Emergency plans, including community training and awareness sessions, have been developed for the highly unlikely event of a failure of any of the facilities. Communication systems have been put in place to warn downstream communities immediately should such a failure occur. Business continuity plans have also been developed in preparation for the unlikely event of facility failure.

The water levels of the Patiseng storage facility and Mothusi dam are well managed and currently low. The old TSF is seen as a standby facility and is only used when the Patiseng TSF is not available. Pond water from the Old TSF is pumped directly to the plants. All the facilities have V-notches that are connected to a flow monitoring system. This system is monitored in the control room in Plant 1 and safety limits have been set that triggers automatic alerts for the operator to respond to if the measured flows are higher or lower than the established limits. Rainfall is also continuously monitored and the frequency of
inspections of the Mothusi dam wall are increased in cases of higher than normal precipitation. Therefore, in the case of a prolonged period of rain or snow, the operation will be able to monitor any increases in water flow through the V-notches and identify possible at-risk scenarios.

a. **Summary of precautionary measures.**

Table 1 below outlines the precautionary and emergency planning measures implemented by, and in place at, Letšeng. The remainder of this section provides detailed information on the aspects mentioned in Table 1.

**Table 1: Summary of precautionary and emergency planning measures in place at Letšeng.**

<table>
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<tr>
<th>Storage Facility</th>
<th>Internal Inspections</th>
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<tr>
<td>Patiseng TSF</td>
<td>Daily inspections and weekly surveys of water level, beach length and freeboard as well as overall dam condition.</td>
<td>Quarterly structural stability inspections by Bulwark. Annual structural stability assessment by Knight Piesold.</td>
<td>• Facility Risk Assessment. • Flow Modelling Study. • Resistivity surveys.</td>
<td>• Flow monitoring via V-notches. • Emergency assessments and planning for wall failures. • Communication towers in downstream villages. • Mobile phone contact with communication custodians. • Alarm activation from within villages or Letšeng emergency control centre. • Business continuity planning.</td>
</tr>
<tr>
<td>Old TSF</td>
<td>Weekly inspections.</td>
<td>Quarterly structural stability inspections by Bulwark.</td>
<td>• Facility Risk Assessment. • Flow Modelling Study. • Resistivity surveys.</td>
<td>• Flow monitoring via V-notches. • Emergency assessments and planning for wall failures. • Communication towers in downstream villages.</td>
</tr>
</tbody>
</table>
3. **Dam inspections**  
   
a. **Tailings Storage Facilities**

Construction and Mining Solutions (CMS) has been appointed as the specialist operator for the TSFs. The CMS Site Manager carries the subordinate manager appointment and is directly responsible for the operation of the residue storage facilities. The mine management team responsible for the management of the TSFs is led by the Metallurgical Manager.

The operation has a crew of dedicated TSF assistants who monitor various discharge points and any abnormalities at the Patiseng TSF. Any anomalies found during inspection are immediately reported and inserted into the daily checklists to be signed off by the CMS Site Manager who then also informs the Metallurgical Manager. In
addition, a non-conformance register is opened and signed by both CMS and the Metallurgical Manager or his representative to ensure close-out of the non-conformances. The TSF crew completes a report that outlines all physicals included in the inspection as well as any other factors that would impact on the safe and responsible management and construction of the TSF. CMS maintains a daily logbook (referred to as the daily diary) and undertake meetings on a weekly and monthly basis, which includes Minopex who are responsible for the operation of the Old TSF. Mine management attends the quarterly inspections and meetings and CMS documents a critical parameter monitoring report on a monthly basis.

Weekly surveys of the Patiseng and Old TSFs are conducted to establish water level, beach length and freeboard as well as overall dam condition. The minimum beach length for the Patiseng TSF is 100 meters. The current beach length is 139m and the free board at 5.8m, which provides an additional safety factor. Weekly meetings are held by CMS, Minopex and the Letšeng Metallurgical Manager every Tuesday, during which the outcomes of the surveys are reported and discussed and measures are implemented to mitigate any deviations.

To further strengthen management and monitoring of the TSFs, an online management system is being developed following the appointment of the new TSF Engineer in December 2018. This system will be used to assist with and increase transparency of the management of the facility. The system will allow input by the Operator, Engineer and the Letšeng responsible manager and any deviation from standard practice or safe operation will be flagged immediately by the system.

Quarterly meetings and inspections of the structural stability of both the Patiseng and Old TSF facilities were conducted by Geo Tail until end of 2017 and by Geotheta in 2018. Findings reported following these reviews are escalated to the CMS Site Manager and the Letšeng Metallurgical Manager. Quarterly inspections and management meetings are attended by Letšeng Diamond Mine management, CMS operational management as well as the appointed Professional Engineer.
In September 2018, an Internal Audit was conducted by GEM Diamonds. The audit was focused on CMS contract administration as well as the operation of the Patiseng TSF in accordance with the design criteria as set out by Geo Tail.

Following this internal audit Patterson & Cooke audited the slimes system in November 2018. Additional work was conducted on the plant 2 thickening circuit to improve the bed depth of the slimes to improve the slimes density. The system is being monitored closely and additional initiatives have been identified to improve the slimes density, which are planned for execution during H2 of 2019.

The phase 3 Patiseng deposition project was completed in December 2018. In addition, the infrastructure for the platform and phase 5 to 7 has been fully installed with commissioning of phase 5 to start on the 6th February 2019. The new return water dam for this project will be finalized by the 12th February and commissioning expected to take place by the 15th February 2019.

b. Mothusi Dam
The Mothusi dam was constructed in 1980 by the then mine operators, the De Beers Group, as a starter wall for the impoundment of kimberlite tailings. It was never used for impounding tailings but became a water impoundment structure, as the river flow upstream of the dam basin was not diverted around the reservoir (as is common for valley-fill tailings dams), and no low-level outlet was provided. Since operations recommenced at Letšeng, the dam continues to be used as a dam impounding water and not as a tailings dam. The dam was rehabilitated in 2017, where the stability of the dam slopes was improved by placement of additional tailings and gravel on the upstream and downstream embankments, construction a dual media filter layer on the downstream embankment, and raising and widening of the dam crest. These rehabilitation measures assured the slope stability of the dam to within acceptable ICOLD (International Committee on Large Dams) standards and norms.

Weekly internal inspections are conducted on Mothusi dam by the Engineering department. These inspections include monitoring of seepage, dam levels, overall dam condition and ingress into Mothusi Dam from the Old TSF. Letšeng performs quarterly dam safety inspections of the Mothusi dam which are reviewed by AECOM. In addition to the above a boat with a fish finder has been purchased by the mine in order to
monitor pools on the dams, the information is then fed into the dynamic water balance which is also used as a monitoring tool to predict disasters associated with heavy rainfall.

4. **External Consultants**

Bulwark has been contracted by Letšeng, through the Metallurgical Manager, to perform quarterly structural stability inspections on both the Patiseng and Old TSF as well as an annual audit on the management of these facilities. As mentioned previously in this report, the quarterly inspections and management meetings are attended by Letšeng Diamond Mine management, CMS operational management as well as the appointed Professional Engineer. The annual audit investigates the management of the TSFs in accordance to the recommendations of the quarterly investigation reports.

AECOM was contracted by the Letšeng initially to perform quarterly structural stability inspections on the Mothusi dam, in line with the RSA Dam Safety Regulations and other best practice guidelines. Following the successful implementation of the remedial works for the rehabilitation of Mothusi dam in 2016, the quarterly inspections are now done by Letšeng, reviewed by AECOM, while AECOM does the comprehensive annual dam safety inspections. The findings of these inspections are tabled and monitored through internal management meetings.

The outcomes of the quarterly inspections are monitored through various internal management forums and form part of the risk management process at Letšeng. Findings or any outcomes to be actioned are recorded during the meetings, reviewed and monitored. The members of the quarterly meetings are the Chief Operating Officer, Metallurgical Manager, HSE Manager, Mining Manager, Minopex, CMS, MMIC Site Managers, AV Site Managers and finally the MRM Manager. This ensures all non-conformances are dealt with immediately and swiftly. The meeting outcomes also form part of the Manco and environmental steering committee meetings.

In addition, any pertinent risks to the health and safety of Letšeng staff, downstream communities or the environment is reported to the Group HSSE
Superintendent and reported at the Quarterly Letšeng Board SHE Sub-Committee meetings.

5. **Emergency Response**
Emergency assessments have been conducted following which plans were put in place to prepare for the unlikely event of a facility wall failure. The first emergency assessment was conducted in 2012 by an external consultant under the guidance from the HSE department; this assessment is reviewed annually by the Letšeng HSE team. The emergency assessments were once again reviewed in 2014 and 2015 by an external consultant as it formed part of the Letšeng Business Continuity planning process. The emergency assessments and response plans are also audited annually during the KPMG Business Continuity Audits as well as the ISO 45001 Audit. Both audits found the assessments and response plans to be effective.

In December 2018, a Patiseng dam wall failure drill was conducted to determine the Mine’s capacity to respond to a crisis. The Crisis Management Plan, which details the methodology by which the Mine manages the impact of a crisis, was followed and successfully implemented.

The Survey Department has plotted the high-water level mark in each of the potentially affected villages in the event of a wall failure. The villagers have been taken through training with regards to the steps to be taken in case of such an emergency, including the determination of assembly points and head count after the event. Emergency drills with the downstream villages are conducted annually and these have been successful.

In the unlikely event of a dam wall failure or any imminent emergency, the alarm is activated from the central control centre located at the Mine’s emergency room. The alarm can also be activated by the community should they become aware of an emergency.