

# Environmental Management Plan: Monitoring Report:

**Proponent: KHAN MINE (PTY) LTD**



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## RECLAMATION OF OLD KHAN MINE TALLINGS



**CEGEOR**  
Centre for Geosciences Research cc

## **PROJECT DETAILS**

**TITLE: Environmental Management Monitoring Report for the Reclamation of old mine tailings in Mining Licences ML86A to ML 86G**

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<b>PROFESSIONAL REGISTRATION</b>	Pr.Sci.Nat
<b>EXPERIENCE</b>	Mr Siyambango is the director and founder of Centre for Geosciences Research cc Mr Siyambango is a qualified geologist, and specialist in industrial minerals and rocks. Obtained an <b>MSc in Industrial Rocks and Minerals</b> with majors in Mineral Resource Assessment & Estimation; Mineral Extraction & Management Marketing of Industrial Rocks and Minerals, Geology and Technology of Industrial Rocks and Minerals. <b>Mr Siyambango</b> is a fully trained and qualified Chemist with a <b>BSc in Geography (Environmental Studies) and Chemistry</b> . Extensively Environmental Studies and experienced in analytical instruments that are essential for mineral exploration and mineral processing. Academically and experienced trained Manager, with an <b>MBA in</b>

**Banking, Accounting and Strategic Management.** The qualification supplements the economic assessment of commerciality of mineral resources for assessment of the bankability.

# INTRODUCTION

## Monitoring, reporting and corrective action

This monitoring report, covers the monitoring report for the Bi annual report of first the period -January – June 2021. Monitoring of the EMP performance for the Mining Licences ML 86A – ML86G project by Khan mine (pty) ltd emphasizes early dictation, reporting and corrective action. It is divided into three parts, namely:

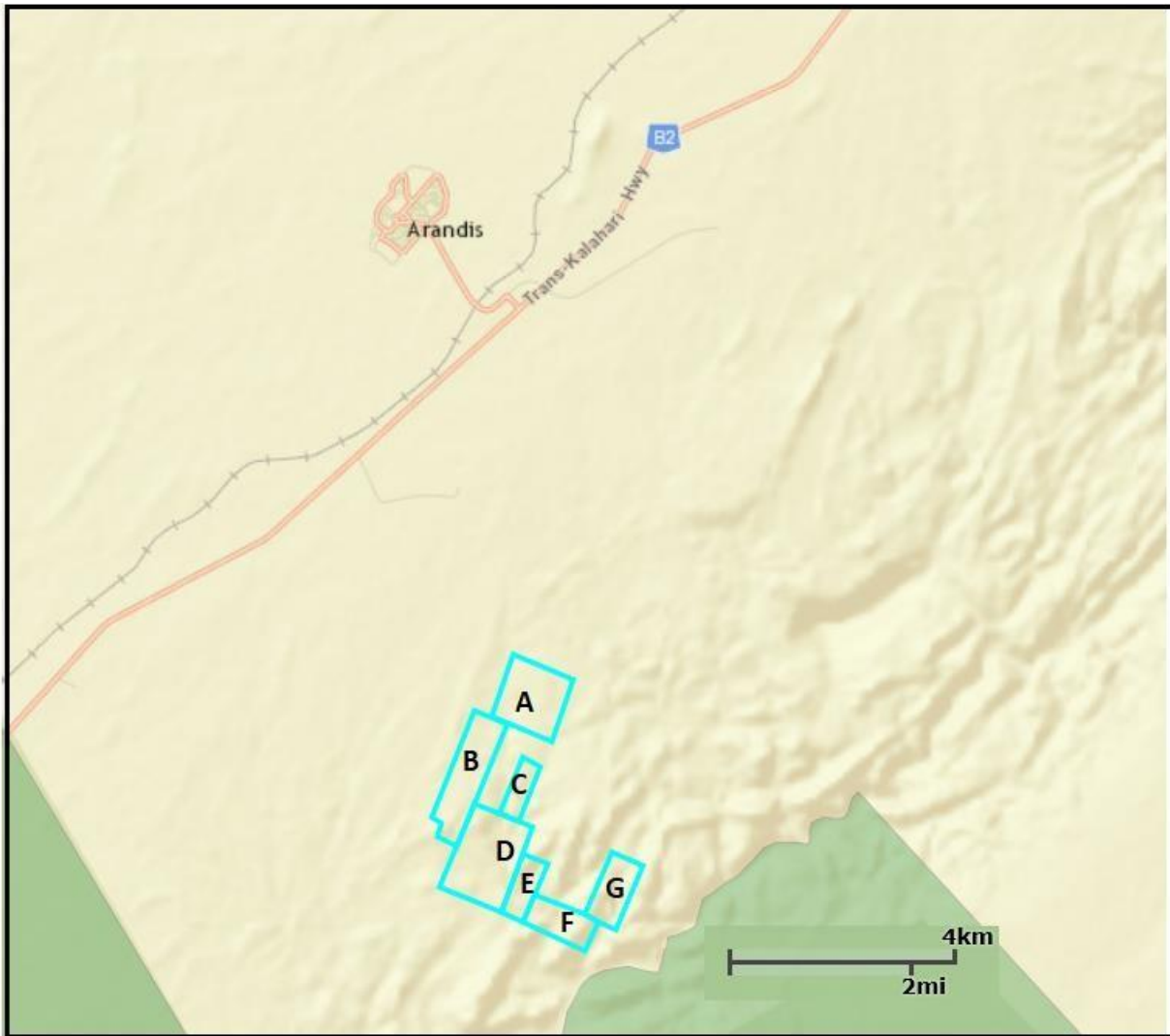
- Monitoring of activities and effects to be undertaken by the environmental coordinator (ENC)
- Reporting of all incidents and situations which have the potential of jeopardizing compliance of statutory provisions as well as provisions of this EMP.
- Taking corrective measures which are prompt, adequate and long lasting in addressing noncompliance activities or behaviour.

## Parameters of Monitoring and Audits

This report forms part of the requirements for a monitoring strategy and audit procedure as per guidelines from MET. Environmental monitoring is systematic measurement of key environmental indicators over time, and within a particular geographic area. The geographic area lies within the vicinity of Arandis. The boundaries of the monitoring area correspond to the area in which environmental impacts of the project is likely to be significant. Hence, the indicators are signals of, or proxies for, environmental or ecosystem health. As a result, this report communicate information about environmental status or change as a result of exploration / mining activities. Hence, monitoring is concerned with changes from baseline environmental conditions caused by the project activities. The monitoring in this report is based on information gathered as in regard to mining activities in Mining Licences ML 86A – ML86G:

## Mining Licence Information

<b>Premises Details</b>	Arandis Namibia
<b>Address</b>	Arandis (townlands/farms)
<b>Licensee</b>	Khan mine (pty) ltd
<b>ML No's.</b>	ML 86A, ML 86B ML 86C ML 86D ML 86E ML 86AF – ML86G
<b>Mining License Location</b>	Erongo, Arandis



**Fig 1**, Locality of ML 86A -86G, Khan Mine (pty) Ltd , Erongo Region. GPS: -22.55004 ; 14.99772

## Environmental Monitoring

Monitoring information in this report relates to the monitoring undertaken during the mining /exploration activities undertaken in ML 86A -86G (Fig 2), Khan Mine (pty) Ltd for the following environmental effects:

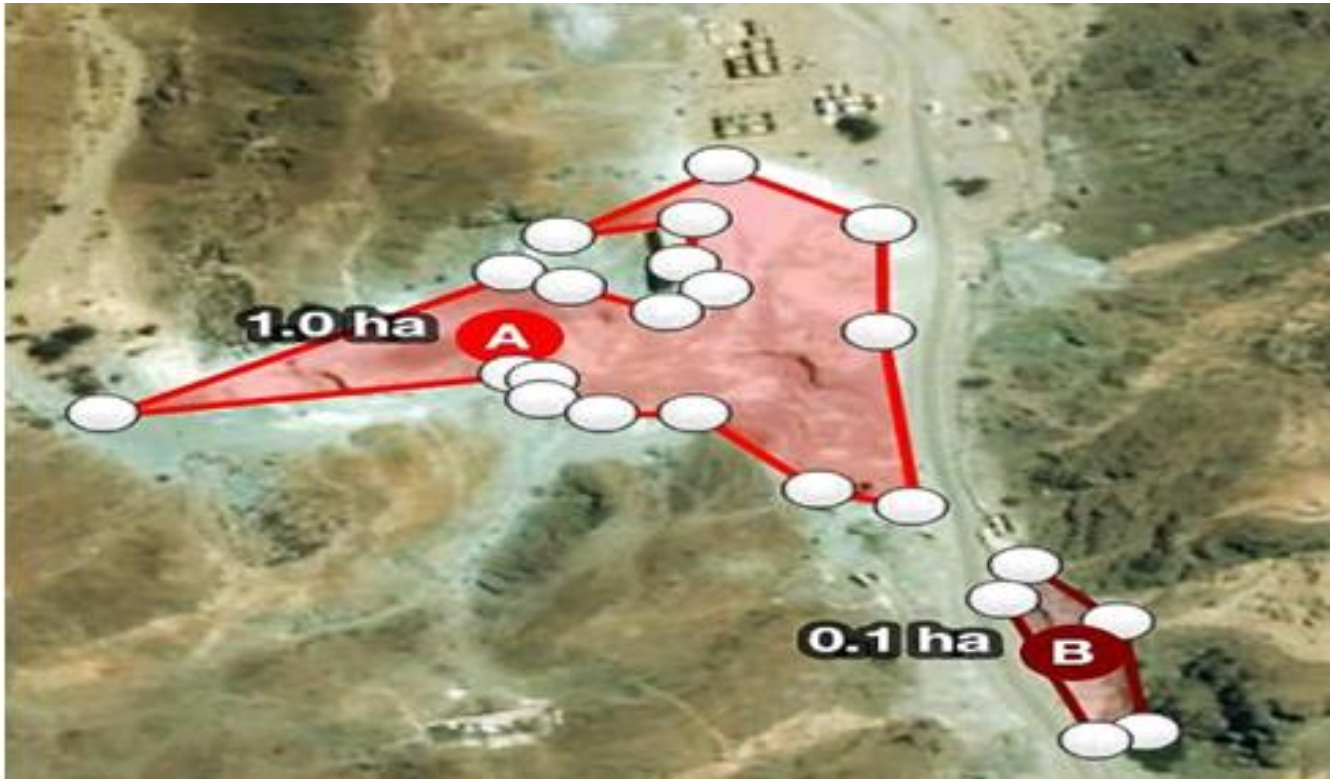
- Copper ore waste tailing sampling
- surface geological delineation of waste dumps
- Design of the process methodology for ore recovery from waste dumps, Photo 1.

Its also important tp not that no mining activities had taken place during the review, due to the effect of the COVID -19 pandemic on procurement of mining equipments and commisioning of the Mine. However more desk top work such as mine design has progressed. However, physical on site work included sampling of the tailing.





**Photo 1**, Old Khan mine tailings showing copper green precipitation in the tailings.



**Fig 2**, the suitable site is site A, that was filled against the valley, and is not in the current ephemeral river channel as compared to site B.

## Current work on review for Monitoring

Old Khan Mine entrance to tunnel, still open unrehabilitated, fig 3 . The current work has been to design a sustainable work across a range of disciplines to deliver a multidisciplinary proactive approach for improved valuable mineral extraction as well as tailings management on the current dumps. Since the Khan Mine is typical of such mine with rich tailings averaging 1% copper ore.



**Fig 3**, Old Khan Mine entrance to tunnel, still open unrehabilitated.

### **Paste and thickened waste dump reclamation current approach**

An alternative method for minimising the environmental impacts of tailings is paste disposal, and that has been adopted due to surface deposition of the current tailings. Hence such method is a viscous mixtures of tailings and water, which unlike slurries do not segregate when they are not in transit. Advantages of moving to thickened tailings include the ability to:

- reclaim water, process reagents, and energy, maximise the density of tailings, minimise tailings storage facility footprints,
- render tailings suitable for mine backfill,
- reduce potential for acid drainage (by removing water available for leaching, decreasing permeability and oxygen diffusion), and
- Minimise (or eliminate) risks of failure (Mudd and Boger, 2013).

## Mining and Machinery used

At the moment, no physical mining or extraction or process of material has taken place. Apart from shallow sampling of the material to determine the grade. During the period under review only Test work on mine tailing samples was undertake. The reason due to the prevailing COVID-19 pandemic, the work was slowed down.

### List of machines/equipment and quantity used in sampling

Item	Quantity
Shovel	2
Sampling bags	20
Water Bottle	25L
Hand Held Portable XRF	1
4X4 Toyota	1

## On site Monitoring compliance to EMP- ML 86A -86G, Khan Mine (pty) Ltd , Erongo Region

### Waste disposal infrastructure

Bins are be provided, and all litter is disposed of at the nearest municipal dumping site (i.e. Arandis Town Council Dumping site). Industrial waste mainly wire, cable, drill bits, these items are collected and removed from the sites. No unused machines, part where observed on site.

Chemical Toilets (Mobi Loo) are also erected on sites for the use of the workers.

### Loss of Fauna and Flora diversity

The vegetation types that are found in this area are classified in none value category basically acacia invasive shrubs ( fig 4) . In addition to vegetation various invertebrates also host the area. Regardless of the low value of the existing vegetation on site and along the road, current activities undertaken during the exploration / mining process had a minimum effect on the vegetation and the invertebrates. Therefore management measures have been in place to minimise the above impacts by targeting the bare rock area.





**Figure 4:** Types of vegetation and vegetation cover close to the dump tailings.

Hence, Biodiversity (i.e. fauna and flora) is likely to have been affected by the project during the mining process. But due to the size of the project and duration the impact is manageable.

**Environmental Monitoring Check list: ML 86A -86G, Khan Mine.**

**Table 1: Litter**

Mitigation	Compliance	Follow up Action Required	By Whom	When	Date Completed
Are disposal drums available or full?	Yes	Continuous Awareness To the workers	HSE manager	ongoing	Up to end of exploration / mining
Is there any litter around the surrounding?	yes	non	Site Manager	ongoing	Up to end of exploration/ mining

**Table 2: Oil spillage or used oil**

Mitigation	Compliance	Follow up Action Required	By Whom	When	Date Completed
Are disposal drums available or full?	Yes	The drums needs to be labelled	Site manager	ongoing	Up to end of exploration/ mining
Is there any oil spills around the site and its surroundings ?	YES	Continuous Awareness To the workers	Site manager	ongoing	Up to end of exploration/ mining

**Table 3: Land and Soil Disturbance**

Mitigation	Compliance	Follow up Action Required	By Whom	When	Date Completed
Are there any deviations from the provisions of the EMP on land and soil disturbance?	YES	Test mining Blocks to the Designated area only	Site Manager / HSE manager	Ongoing Exploration When trenching	Up to end of exploration / mining
Are car track barricades in place?	Yes	More signs to be displayed along the barricade	Site Manager / HSE Manager	ongoing	Up to end of exploration / mining

**Table 4: Air Pollution**

Mitigation	Compliance	Follow up Action Required	By Whom	When	Date completed
Are there any deviations from the provisions of the EMP on air pollution?	Yes ( dust mostly from moving vehicles on gravel access road)	Regularly Watering of the gravel road especially during the long dry season	Site Manager / HSE manager	ongoing	Up to end of exploration/ mining
Are the fume and particulate levels acceptable ?	Yes (machinery used are in compliance)	Regularly service machinery using diesel	Site Manager / HSE manager	ongoing	Up to end of exploration

**Table5: Biodiversity**

Mitigation	Compliance	Follow up Action Required	By Whom	When	Date Completed
Are there any deviations from the provisions of the EMP on biodiversity ?	Yes (minimal on tailing dumps trenching)	Continuous awareness  To the workers not to harvest plants or pouching	Site Manager / HSE manager	ongoing	Up to end of exploration
It is traipses harvesting plant taking place feeding of animal or introduction of animals?	Yes	Continuous awareness  To the workers not to harvest plants or pouching	Site Manager / HSE manager	ongoing	Up to end of exploration

**Table 6: Compliance**

Mitigation	Compliance	Follow up Action Required	By Whom	When	Date Completed
Are staff members and site visitors aware of the provisions of the EMP?	yes	Continuous awareness by educating the workers	Site Manager / HSE manager	ongoing	Up to end of exploration /mining
Is there a copy of the EMP on site?	Yes	Keep duplicate copies	Site Manager / HSE manager		