

# ENVIRONMENT AND THE SOUTH AFRICAN GOLD MINING INDUSTRY



CHAMBER OF MINES  
of South Africa

MINING  
FOR SCHOOLS

Mining by its very nature has an impact on the environment. Government, labour representatives and mining companies constantly seek new ways to avoid, minimise or mitigate the negative impacts of mining on the environment



## WATER USE:

South Africa is a water scarce country and a large volume of water is used for the mining and processing of gold. For many years, the gold mining industry has been using this scarce resource responsibly, lessening consumption by reusing and recycling water and aiming for zero discharge with the help of water treatment plants.



## AIR QUALITY:

Several activities associated with the gold mining process can impact the air quality in and around operations, potentially also affecting communities and habitats.

Air quality control measures range from bag filters to gas scrubbers for fixed point stacks, to water irrigation or biodegradable chemical sealants for dirt roads and tailings facility surfaces, to the vegetation of mine dumps.



## WASTE MANAGEMENT:

The gold mining industry endeavours to reduce, reuse and recycle in an effort to move towards zero waste and lessen our total mining environmental footprint.



## ENERGY CONSUMPTION AND CLIMATE CHANGE:

The gold mining industry has for many years been committed to becoming more energy efficient. The industry mostly consumes indirect energy in the form of electricity, which is generated by coal-fired power stations. The industry invests time and expertise in formulating energy saving projects, not just for cost reasons but also because of its desire to reduce greenhouse gas emissions which contribute to climate change.



## MINE REHABILITATION:

Once mining has come to an end, land must be rehabilitated to assist its appropriate and productive use post-mining. Rehabilitation and closure are incorporated into overall planning from initial concept stage and during the life of mine. This includes ensuring that the necessary funding mechanisms for rehabilitation are in place.



## LAND MANAGEMENT AND BIODIVERSITY:

When vegetation is removed during the establishment of mining operations, it can destroy natural habitats and damage ecosystems, which can lead to the extinction of plants and animals in the area.

To mitigate this risk, biodiversity management plans are implemented at mining sites. Plans can include:

- establishing nurseries to cultivate species to revegetate affected or remediated land
- working in partnership with conservation and wildlife organisations to set aside and protect areas of land which are rich in biodiversity or are home to species of flora or fauna of importance

## ENVIRONMENT AND LEGACY ISSUES

Gold mining has released contaminants into the environment of the West and Central Rand for more than a century, creating a challenging legacy issue for South Africa, the government and the industry today.

### ACID MINE DRAINAGE:

Acid mine drainage (AMD) forms when water and oxygen combine with sulfide minerals to produce highly acidic water. This water contains elevated concentrations of heavy metals, which are in some cases radioactive. AMD comes from two main sources:

- Abandoned mine voids fill with groundwater or rainwater that reacts with unmined, underground ore to form AMD and may eventually decant at the surface
- Mine waste, known as tailings, can produce AMD when it comes into contact with water. Rain and surface water runoff from tailings dumps and ore stockpiles can also generate AMD

AMD has contaminated lakes and rivers in parts of the Witwatersrand. The polluted water decanted - reached the surface - for several years in the West Rand, beginning in 2002, and it has threatened to do the same in the Central Rand. Two new government-led treatment plants have largely stemmed the flow of decant. In 2016, the government initiated a project to improve the treatment process, and this is expected to be operational by 2020.

### DUST:

More than 100 years of gold mining have resulted in some 200 waste dumps - or tailings dams - being deposited in the Johannesburg area. In some cases, these dams contain elevated concentrations of heavy metals.

Dust from mine dumps can become a nuisance to communities, particularly during dry, windy weather. Dust control measures are used, such as irrigation and vegetation of the dams and dust fall-out is measured and monitored.

Fortunately, a number of mining companies are re-processing dumps. Once the heavy metals have been extracted from these dams, the remaining material is redeposited in modern, mega dumps.