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ENVIRONMENTAL PROTECTION

# WATER DILEMMA

Political leadership essential to mitigate acid mine drainage problem

MEGAN WAIT | STAFF WRITER

A much anticipated report on acid mine drainage (AMD) has been referred back to the panel of experts by the Inter-Ministerial Committee for further work on options and cost implications. The report was tabled on October 21 but not made public.

Meanwhile, fears have escalated that a solution will not be implemented in time to prevent the decant of AMD into ecologically sensitive riverine and wetland systems, particularly in the face of seasonal rainfall in the coming months.

Environmentalists have termed AMD the single most significant threat to South Africa's environment. At the moment, the central basin, in Johannesburg, is rising between 0.3 m/d and 0.9 m/d, leaving it about 530 m from uncontrollable decanting, and is believed to be heading for an ecological disaster.

The University of Cape Town's Climate Systems Analysis Group information shows that the heaviest seasonal rainfall for Gauteng will be from December to January.

Public Environmental Arbiters chairperson and Federation for a Sustainable Environment CEO **Mariette Loefflerink** tells *Mining Weekly* that, at the moment, the western mining basin is fully flooded and that this year's rainy season will exacerbate the problem.

"This water, which has been classified as highly 'acute toxic water', has fed into the Tweelopiespruit, which flowed into the Krugersdorp Game Reserve during the 2009 to 2010 rainy season. This has caused irreparable environmental damage to the quality of surface and groundwater, and caused all

aquatic biota to be wiped out. The Hippo dam, which has two hippopotamuses, has also been covered in sludge, containing radioactive metals."

Visiting the site with Council for Scientific and Industrial Research (CSIR) geohydrologist **Phil Hobbs**, *Mining Weekly* found that the sludge in the Hippo dam had receded but red sludge was still visible in the dam, with no sighting of hippopotamus.

While heavy rainfall may impact on mine water levels, there are also problems in pumping and treating the mine water.

She also says that beleaguered miner Aurora must, to prevent flooding, pump up to 108-million litres of mine water a day but, currently, as a result of financial constraints, it is only pumping between 30-million and 50-million litres a day. The eastern basin is flooding and this water is being discharged untreated into the highly compromised Vaal barrage system, which includes the Blesbokspruit.

Loefflerink emphasises that this will not only affect the environment but will also impact on buildings within the Johannesburg central business district. "We also anticipate seismic events and ground movement," she adds.

Democratic Alliance MP Shadow Minister of Water and Environmental Affairs **Gareth Morgan** raised this issue with the Department of Water Affairs (DWA) on September 17. He asked whether the department had established any link between rising acid mine water in the basins of Gauteng and seismic activity in the region. The DWA last week replied that the question fell outside the mandate of the department and should be referred



**POLLUTED**  
Water in the mine dump is visibly dark red from tailings

to the Department of Mineral Resources (DMR). He has done this, but still has had no response from the department.

Morgan rejected the answer, stating that the Minister of Water and Environmental Affairs should have had an opinion on the situation and that it was unacceptable that there had not been an answer from the DWA.

Meanwhile, Loefflerink says that, when she and the mines presented the problem to government on July 21, a response from the Parliamentary portfolio committee was released, stating that it realised the urgency of the matter and that action would be taken within a week or two; it also presented the short-, medium- and long-term plans to tackle the problem.

She adds that the mines also presented the case in 1996 in the shape of the Strategic Water Management Plan Report to the DWA and to the Parliamentary portfolio committee in 1999. "I also presented it to former director-general of Water Affairs **Pam Yako**, in February and March 2009, and to the government task team on water and mining on two occasions in 2009," she says.

"Notwithstanding the significant news coverage, and non-governmental organisations' (NGOs') and civil society's repeated requests for access to information, government and its officials failed to engage with society. There has been a perplexing lapse into silence (since September), preceded by statements by the DWA and the Water



**ANTHONY TURTON**  
One must simply review remediation as a way to restore investor confidence, which would make funding available

and Environmental Affairs Minister, which accused NGOs and activists of being opportunistic, alarmist and [being motivated by] commercial interest."

Refuting the DWA statement that organisations were playing on the fears of the public regarding the availability of water in Gauteng, as well as in South Africa at large, to secure funding, Loefflerink states that the minimal funding of R13 000 a month she is being sponsored by a gold-mining company is purely for conducting awareness creation workshops to enlighten ill-informed and uninformed mining communities of the risks and hazards pertaining to mining pollution, including AMD.

Meanwhile, water scientist Professor **Anthony Turton** tells *Mining Weekly* that the missing link to tackle the problem of



**SPILLING OVER**  
Mine water spills into a catchment dam, where it gets treated with caustic soda



**MARIETTE LIEFFERINK**  
Government has failed to engage

AMD is indeed political leadership. "We became world leaders in deep-level mining and water resources [because these were] prioritised by government. Sonjica has simply been unable to show leadership of the calibre of the likes of **Trevor Manuel**. She and her predecessor have squandered the time, since the 2002 Western basin decant, to be proactive.

"In my view, they have shown no leadership and now, at the eleventh hour, they appoint a so-called specialist team to advise, when this problem has been coming for a decade. I believe that this simple incompetence at Ministerial level means that we need Presidential leadership, which I fully support," he says.

Turton believes that, although government should assist in managing the AMD problem, it should not alone be held liable. "How can government be held liable when the mines caused the problem? It

is a simple legal issue: did mining cause AMD? Yes. Did mining companies profit? Yes.

"Government must enforce a law that must apply to every citizen, corporate or otherwise, if we are to survive as a democracy. It is about significant powerful actors – mining companies – increasing profits by being a law unto themselves," he adds.

Liefferink agrees, adding that it would be unsustainable to expect mining companies that are still operating today, using the 'last man standing' concept, to pay for previous mining companies' misdeeds. "No one wants to carry the cost for their predecessors, or future costs," she explains.

She reiterates Turton's view that government should promulgate a more visible law of liability. "We must know who has to pay, what percentage government and, indirectly, the taxpayer are contributing and what percentage the mining companies must pay. This must be implemented through short-term and long-term plans and must be done with urgency. Proactive measure management plans should be enforced and, when there are contraventions to government's directive, there should be an enforcement of compliance."

**Cradle of Humankind**

Meanwhile, Hobbs says that CSIR geohydrologists are keeping a close eye on the effect of AMD on surface water and groundwater resources in the Western basin and the Cradle of Humankind World Heritage Site.

The partially treated and untreated mine water flows through the Krugersdorp Reserve and beyond, where it enters the dolomitic Zwartkrans compartment and the southern portion of the Cradle of Humankind. Apart from mine water, the area is also affected by municipal wastewater effluent.

The CSIR is leading a study to establish a comprehensive surface and groundwater monitoring programme for the area. The study includes the development of a sound conceptual model of the groundwater regime in terms of flow directions, boundary conditions and water quality aspects based on historical information, long-term monitoring data and new data and information.

It is also developing a better understanding of the close relationship and interaction between groundwater and surface water in the largely dolomitic environment.

"This is crucial for the implementation of a relevant and effective water resource monitoring programme. The study is also assessing the risk posed to the numerous United Nations Educational, Scientific and Cultural Organisation-inscribed fossil sites, such as Sterkfontein and Zwartkrans, by changes in the quality of surface water and groundwater," Hobbs says.

He says, however, that there have been small successes. "Gold miner Rand Uranium is able to deal with its quantities of water, which it is obligated to treat. When testing the water, we found that the pH balance was near neutral, reading at 6.9, but there is still a high salinity count, indicative of a high salt loading, such as sulphate. But, otherwise, we are not doing too badly."

**Funding to Solve AMD**

At a recent roundtable, held at Electra Mining 2010 and hosted by water treatment and process improvement company Nalco Africa and attended by industry players, such as gold-mining companies Barrick Gold and Harmony Gold, the issue of water scarcity and AMD was also raised.

Delegates noted that the problem had been identified 15 years ago,

and that a lot of exceptional work had been carried out in terms of technology and treatment methods. However, they felt that the attempts to solve the problem were not moving forward, as it is costly for the mines.

Turton avers that the funding dilemma is an excuse. "I am aware of one significant institutional investor that has exposure to up to R50-billion in real estate, with some developments being at risk from AMD. This calls for a calculation cost: benefit becomes relative to the cost of placing great assets at potential risk. If one takes only a small fraction of the loss in investor confidence as a value, then the cost of treatment becomes relatively affordable. One must simply review remediation as a way to restore investor confidence, which would make funding available. It is not a question of funding, but rather the confidence arising from transparency and credibility associated with the proposed solutions," he says.

Liefferink adds that, in terms of the Mineral and Petroleum Resources Development Act (MPRDA), before mining rights can be granted, the Minister of Mineral Resources must determine a rehabilitation fund, which must include latent or residual impacts. In terms of the MPRDA, the Minister has the right, at any time, to liquidate the rehabilitation fund or part of it, to address critical environmental impacts. "My repeated requests to the DMR to disclose where these funds are held, or to liquidate the rehabilitation funds to address the flooding of the basins and the decant of AMD, were abortive," she concludes.

The further recommendations of the panel of experts will be awaited with some anxiety as there is wide consensus that funding and technology should be implemented as soon as possible to prevent further decanting and possible disaster. We may yet see the implementation of an anticipated private-public partnership to provide a technically and economically viable and self-sustaining solution for AMD for years to come. But a solution will need to be found urgently.

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