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DEPARTMENT OF WATER AND SANITATION

NO. 658

07 JULY 2017



**water & sanitation**

Department:  
Water and Sanitation  
**REPUBLIC OF SOUTH AFRICA**

**MINE WATER MANAGEMENT**

**POLICY POSITION**

**DRAFT FOR EXTERNAL CONSULTATION AND  
DISCUSSION**

**February 2017**

## **1. Introduction**

The National Water Act, 1998 (Act 36 of 1998) (NWA) provides a framework for the protection, use, development, conservation, management and control of water resources for the country as a whole. Chapter 2 of the NWA makes provision for the development of strategies in order to facilitate the proper management of resources. The National Water Resource Strategy-2 provides the overall framework for water resource management in the country.

Acid Mine Drainage (AMD) and related mine water impacts have in the past decade evolved to become a major environmental challenge. Whilst the challenge is limited to the mining sector during operations, it eventually becomes externalised during mining downturn, and is especially pertinent post-mining closure, especially if mine closure does not proceed according to regulatory-approved recommendations.

To deal with this challenge at a very high level, an Inter-Ministerial Committee (IMC) comprising the Ministers of Mineral Resources, Water and Environmental Affairs, Science and Technology, and the Minister in the Presidency: National Planning Commission was established. Mine water impacts, including AMD, are phenomena that plague all countries with rich mineral deposits. Depending on the geology/ mineralogy of a region, the terms Acid Rock Drainage (ARD), Acid Mine Drainage (AMD), Neutral Mine Drainage (NMD), and Saline Drainage (SD) are the characteristic nomenclature for reporting different mine water types. Given the long history of mining in South Africa, and the mineral wealth still locked across various parts of South Africa, and the potential this deposit has for local economic development and attracting foreign investment, it is prudent that the Department of Water and Sanitation (DWS) formulates a policy principle to support its response to mine water challenges.

## **2. Purpose**

The purpose of this policy document is to provide the position of the Department of Water and Sanitation (DWS) on mine water management, including AMD. To provide measures on protection of water resources from prospective, operational and historical mine activities that have negative quality impacts.

## **3. Scope of the Policy**

The mine water management policy sets out the policy principles that strive to strengthen the protection of the water resources from mine water contamination from short to long term. The policy principles enshrined herein are informed by the current legislative framework on water resource management. It further proposes an integrated departmental approach to mine water management: where legislative gap/s exist/s, this policy provides relevant and appropriate legislative remedy in order to strengthen a proactive mine water management approach.

## **4. Current Legislative Framework**

### **White Paper on National Water Policy for South Africa (1997)**

With regard to environmental protection, the White Paper on National Water Policy for South Africa, amongst others, contemplates that, (i) it is the duty of Government to make sure that water pollution is prevented, (ii) that there is sufficient water to maintain the ecological integrity of our

water resources, and (iii) that water conservation and sustainable, "justifiable economic and social development" are promoted. Essentially, it advocates for integrated goals of environment, social and economic development. It also takes cognisance that most water users also impact on the environment, and the cost of this must be accounted for in assessing the economic benefits of alternative water uses and developments. Ultimately, in order to sustain the established uses of water, the natural resource base must be suitably protected.

#### **National Water Act, 1998 (Act 36 of 1998) (NWA)**

Chapter 3 of the NWA, with specific reference to Sections 19, provides that the protection of water resources is fundamentally to their use, development, conservation, management and control. This chapter of the NWA further provides measures which are intended to ensure comprehensive protection of water resources, including measures to prevent pollution and remedy the effects of pollution of water resources.

Section 19 (1) and (2) of the of the National Water Act (NWA) states that: "An owner of land, a person in control of land or a person who occupies or uses the land on which -

- (a) any activity or process is or was performed or undertaken; or
  - (b) any other situation exists, which causes, has caused or is likely to cause pollution of a water resource, must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring.
- (2) The measures referred to in subsection (1) may include measures to -
- (a) cease, modify or control any act or process causing the pollution;
  - (b) comply with any prescribed waste standard or management practice;
  - (c) contain or prevent the movement of pollutants;
  - (d) eliminate any source of the pollution;
  - (e) remedy the effects of the pollution; and
  - (f) remedy the effects of any disturbance to the bed and banks of a watercourse".

The NWA in this regard is applied alongside other appropriate and relevant legislations which include the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) as well as the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002) (MPRDA) in order to fulfil the State's responsibility to respect, protect, and promote social and economic rights in the Constitution.

#### **National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA)**

Section 28 of the NEMA dealing with the "duty of care and remediation of environmental damage", stipulates that:

- (1) Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring or in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment.
- (8) Subject to subsection (9), the Director-General or provincial head of department may recover all costs incurred as a result of it acting under subsection (7) from any or all of the following persons —
  - (a) any person who is or was responsible for or who directly or indirectly contributed to, the pollution or degradation or the potential pollution or degradation;

- (b) the owner of the land at the time when the pollution or degradation or the potential for pollution or degradation occurred or that owner's successor in title;
- (c) the person in control of the land or any person who has or had a right to use the land at the time when —
  - (i) the activity or the process is or was performed or undertaken: or
  - (ii) the situation came about: or
- (d) any person who negligently failed to prevent —
  - (i) the activity or the process being performed or undertaken: or
  - (ii) the situation from coming about:

Provided that such person failed to take the measures required of him or her under subsection (1)

### **Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002) (MPRDA)**

Section 45 of the MPRDA dealing with the Minister's power to recover costs in event of urgent remedial measures provides that:-

- (1) If any prospecting, mining, reconnaissance or production operations cause or results in ecological degradation, pollution or environmental damage which may be harmful to the health or well-being of anyone and requires urgent remedial measures, the Minister may direct the holder of the relevant right, permit or permission to—
  - (a) investigate, evaluate, assess and report on the impact of any pollution or ecological degradation;
  - (b) take such measures as may be specified in such directive; and
  - (c) complete such measures before a date specified in the directive.
- (2) (a) If the holder fails to comply with the directive, the Minister may take such measures as may be necessary to protect the health and well-being of any affected person or to remedy ecological degradation and to stop pollution of the environment.
  - (e) The Minister may recover an amount equal to the funds necessary to fully implement the measures from the holder concerned.

## **5. Key Policy Considerations**

Within the context of the existing legislation, there are a number of policy considerations that needs to be taken into account. Amongst others, one needs to start by posing policy questions in order to fully understand the existing scenario. As such, they should consider the five different phases in the whole mining life cycle (prospecting and planning, commissioning, operation, decommissioning and mine closure, and post-closure mine water management).

Firstly, during commissioning, is it currently expected of new mining ventures to demonstrate that *long-term liabilities*, with explicit reference to mine water management (i.e. potential AMD formation), are not exceeding the long-term benefits of such mining ventures? Secondly, should long-term liabilities (with respect to AMD) exist, what is the risk of it reverting to the State and what is the extent of potential State exposure? These policy areas are crucial at the conception stage of any mining venture. An integrated strategy between Government and all other role playing institutions is key to the implementation of well-defined operational guidelines, including best practice guidelines for water resource protection in the South African mining industry.

During operational phase of the mine, firstly, are legal liabilities with respect to mine water management being enforced? If so, does such enforcement yield the desired outcomes? If not, what should be improved? Secondly, the phenomena of *selling off marginal mines to smaller companies* during the end of the mine's life (as part of a closure strategy) remains a challenge. How can this matter be addressed through policy and legislation?

During decommissioning, and subsequently mine closure, one needs to consider these critical policy questions; firstly, are there entities that are legally liable for residual water pollution emanating from mines? If not, does the current policy and legal context sufficiently guide the execution of responsibilities among relevant state institutions? Secondly, if the entities can be identified, is such legal liability enforced? If not, why not? And how could improvements be made to the current policy and legal context? Apportionment of liability is perceived to be cumbersome. How can this particular matter be dealt with and what is the legislative framework that allows for this to be invoked?

It is within the scope of this policy to bring about solutions or answers or interventions in relation to the above issues as far as mine water management is concerned. Strict enforcements measures relating to mine water challenges should be applied in order to ensure realisation of both short and long term policy interventions objectives.

## 5.1. Integrated Approaches to Mining Closure

### **Problem Statement**

The delegation of powers between different government departments at the national, provincial and municipal levels is unclear. Institutional roles and responsibilities are fragmented, overlapping or vaguely defined. There is a need to rationalise and align national legislation, even our own NWA to remove ambiguity and address mine water directly.

### **Policy Principle**

Government's responsibility with respect to the handling and management of mine water is ambiguous and as a result, roles and responsibilities require clarification which will have potential policy and law review implications. The consideration of a New Trilateral Memorandum of Understanding that will include the three Departments i.e. Water and Sanitation, Mineral Resources (DMR) and Environmental Affairs (DEA) is advised. Through this trilateral agreement between the three departments, the regional mine closure plan must be developed.

The legislative amendments should be considered for incorporation into a National Mine Water Strategy, with the aim of enabling Government to have enhanced control and legal administration of the mine water challenges and issues and to further give more clarity on responsibilities and obligations. This should not only apply after mine closure but should also enable Government to apply regulatory provisions and mines to implement pro-active steps long before mine closure. Roles and responsibilities must be clear and specific agreements on the process of mine closure even prior to actual mining must be addressed.

## 5.2. Apportionment of Liabilities

### Problem Statement

The MPRDA may play a leading role in the mining sector, but persons/companies/institutions still have to comply with other statutory duties under the NEMA and the NWA. Liability thus is based on a consistent and comprehensive application of the abovementioned (not limited to) legislations. This suggests that any person/company/institution that can be proven to fall within the ambit of Section 19 NWA, and/ or Section 28 NEMA, and/ or Section 45 MPRDA, can be held legally liable for damages and/ or negative impacts caused by mine water,

The legislation needs to be strengthened, to give the DWS a strong legislative basis to impose sanctions and apportion of liabilities. The best funding models to deal with historic pollution should be identified. Abandoned mines need to be rehabilitated by DWS in cases where water security is at risk. Within the context of mine water, and given the magnitude of this challenge, it remains prudent that possible apportionment of liabilities be considered within the existing legislative frameworks. This will provide a legal basis for holding parties potentially liable for negative effects and damages of mine water related pollution and/or any other negative impacts that can be related to mine water.

### Policy Principle

In terms of liability, the polluter pays principle should be applied to mine water in all its forms. This term, mine water, includes ARD, AMD, NMD, SD, and metallurgical process waters of concern is not formally defined in South African legislation; however international norms and definitions should be considered as multi-national mining houses recognise them, and have also incorporated them in their legal frameworks elsewhere in the world. Where subcontracting exists, the mine remains responsible. A provision on mine water management dealing with all potential mine water hazards is needed. The provision should deal with them holistically in terms of the classification and categorisation of mines.

## 5.3. Optimum use of Appropriate and Cost Effective Technology

### Problem Statement

The DWS recently completed a Feasibility Study to identify the best plan of action for a long term solution that uses a proven acid mine water treatment technology and produces useable water. Options for passive, biological, chemical and physical treatment were assessed. The only technologies which are proven for treatment of the expected volumes to the required standard, and which constitute the Reference Project are:

- High Density Sludge (HDS) for neutralisation and metal removal (Chemical Treatment), as per the Short Term Intervention (STI), currently being implemented in the Witwatersrand.
- Reverse Osmosis (RO) for desalination (Physical Treatment); and
- Ion Exchange (IX) for uranium removal (Physical-Chemical Treatment) if required

### Policy Principle

The selected technology should be situational based. It should be sustainable, clean (with minimal residuals and/or easily manageable residues) and economical. A regulatory framework should be established to facilitate technology assessment and demonstration, ensure skills and capacity for

managing, operating and maintaining the technology, as well as exploiting local human capital development. The technology should not only be cost effective but also comply with the required Resource Quality Objectives (RQO's). The DWS will lead, champion and devise opportunity and mechanism for continuing research in support of optimum use of appropriate and cost effective technologies.

#### 5.4. Classification and Differentiation of Mines

##### **Problem statement**

The current legal and policy context does not draw a clear distinction between the handling and regulation of (1) new, (2) active and (3) historic mines (including abandoned mines). The current legal and policy context does not impose special and/ or stricter measures in the case of mines with a significant adverse impact potential. Specific conditions should be imposed on mines that have an acid generation potential.

##### **Policy Principle**

The regulatory environment on mine water management applying to new mines will be different (probably, in many respects, stricter), if compared to that applying to active and/ or historic mines. The Best Practicable Environmental Option (BPEO) to deal with mine water drainages should be implemented by existing mines. Historic mines should be maintained. Although current policy does differentiate between the different categories of mines, such policy should be strengthened. Legislation should support policy and may potentially require review.

**Category A Mines:** All gold and coal mines; Any mine with any kind of extractive metallurgical process, including heap leaching; and any mines where pyrite could occur in the mineral deposits.

**Category B Mines:** Mines with a low risk for water quality impacts; and Mines with a potential significant and/ or permanent impact on the yield/ availability of water, dynamics of the river, riparian rights, etc.

**Category C Mines:** Big mines with no significant impact on water where Resources Quality Objectives for ideal conditions will be realised; and small low impacting mines. Depending on the change in mine operation, mine might be re-categorised.

#### 5.5. Promotion of Sustainable Mining Development

##### **Problem statement**

There is a perception that mining is often authorised, irrespective of whether the long-term "sustainability" outweighs the long-term "cost of impact", including the costs for managing mine water. More investigation is required on the possibility to use the green approach in mining. This will involve investigations on green technologies, sustainable mining methods, etc. and the evaluation of socio-economic sustainability.

##### **Policy Principle**

New mining ventures should prove, beforehand, that the cost to deal with the residual impacts associated with mining (e.g. AMD) is catered for. A Cost-Benefit-Analysis (CBA) should be demonstrated. Prospective mining companies should comply with the DWS best practice guidelines for water resource protection in the South African mining industry, specifically Im act

Prediction and Water Management Aspects for Mine Closure.

The investigation of the long term benefits, including sustainability and the benefits of green technology should be prioritised. Monitoring and Evaluation tools should be in place to address the ongoing impact in all stages of mining from initial planning through development and operation, and to closure and rehabilitation. The environmental impact of mines is cumulative and requires several years to take effect; therefore there is a need for continuous monitoring and assessment post mining closure. Leading Practice (LP) to mine water management should be considered for sustainable mine development.

## 5.6. User commitment to sustainable water resource protection

### Problem statement

Apportioning liability remains problematic. The NWA has gaps with regards to "*retrospective liability*". The application of retrospective liability is currently provided for under the NEMA. The impacts caused by mine water drainages e.g. AMD is often externalised by the mining sector, whether during active mining or subsequent to mine closure. Financial provision predominantly applies to surface rehabilitation.

### Policy Principle

The transfer of the mine to another company should not exonerate the selling company from their environmental obligations, unless the purchasing company can prove financial provisions to address any environmental liabilities associated with the mine they are purchasing. The application of retrospective liability should be considered. Financial provisioning made by mines should be sufficient to deal with the mitigation of all mine water management related impacts, including impacts due to current and/ or future decants. The cost to address mine water drainages e.g. AMD should be internalised by the mining industry. This policy position is notably also aim at protecting and empowering poor and vulnerable communities who should be part of decision making process throughout the whole mining value chain including mine water management life cycle.

## 5.7. Environmental Vigilance and Continuous Improvement

### Problem statement

From a mine water management perspective, there often appears to be a mismatch between environmental planning and the actual interventions earmarked for implementation. Access to information by the general public also appears to be a major challenge limiting the overall public from participating. The DMR mandate, *i.e.* to promote minerals development, appears to be incompatible with DWS's mandate, *i.e.* to protect and use water resources sustainably. Mining authorisations often appear to be granted for mines that are to mine in water sensitive areas. From a mining sector perspective — significant impacts due to AMD are often attended to on a case-by-case basis. From a regulatory perspective — an "*Integrated Master Plan*" is currently required for the regulation of future mining developments. Mining authorisations appear to be granted on an *ad hoc* basis without the necessary consultations amongst the relevant Government Departments (DMR, DWS and DEA). It is hoped that the recently-adopted one environmental permitting system will address this gap.

**Policy Principle**

Continuous environmental risk appraisal is required and is to be linked to appropriate actions taken when necessary. Mines should be compelled to do impact prediction to improve environmental preparedness. Regular internal and external auditing is necessary with corresponding reporting. Self-regulation promotes legal compliance. Prohibition of mining in water sensitive areas in order to comply with the Class, RQOs and the Reserve should be promoted. Planning for mining should take cognizance of vulnerable water resource areas, and where necessary such areas should be demarcated as "no go" areas. It is especially pertinent that the ultimate socio-economic benefit of mining be quantified against potential long-term water resource impacts and that outcome guide the decision on whether to authorise mining activity in sensitive areas. The information about the mine water management must also be made accessible to the public in order to promote active participation.

In some instances, regional cooperation and minerals development planning amongst mining companies may yield better economies of scale and more affordable solutions. Mines should be compelled to collaborate with respect to certain matters, based on the regional "*Master Plan*" from the regulator for minerals development.

Regional "*Master Plans*" for minerals development should be considered to regulate the regional consequences of new and active mining in a catchment context. Regional closure planning will ensure a regional perspective on mine closure.

With reference to the ecosystems protection guidelines, all vulnerable water resource areas should be mapped.

### 5.8. Institutional Arrangements on infrastructure management/ Transfer after Mine closure

**Problem statement**

The Mining Charter provides that mines are expected to design and plan all operations so that adequate resources are available to meet the closure requirements of all operations. Section 28(2) (c) of the MPRDA contemplates that mines should report on their compliance to the Mining Charter on annual basis. However in instances where a mine is declared insolvent and subsequently closes, the responsibility is inherited by the State who then has to ensure the continuous rehabilitation of derelict and ownerless mines. Technically, the mine escapes liability and the rehabilitation fund provided prior by the mine is often not sufficient for continuous infrastructure management and rehabilitation. As a result, mine water is left unmanaged if transfer has not taken place which then typically becomes a State liability.

**Police Principles**

In the interest of optimum water resource protection, a legislative provision on institutional arrangements of infrastructure management/ transfer post mine closure is needed for proper infrastructure/ assets transfer. Mines should provide infrastructural management plans for prior, during and post mine closure. Relevant institution/s should be in place to oversee and regulate this process.

## 5.9 Reuse of treated mine water, including AMD

### Problem statement

Evidence depicts that supplying South Africa's growing population with clean, safe drinking water is a significant challenge. Not only is the country's water infrastructure in need of refurbishment in some places and entirely absent in many others, but access to sufficiently large quantities of potable water is increasingly becoming a challenge. Acid mine water often contains toxic heavy metals and radioactive particles, or is acidic and can be extremely harmful to the health of humans, animals and plants. Situated in the Witbank Coalfields in the Mournelenge Province of South Africa, the EMalahleni Waste Water Reclamation Plant uses reverse osmosis to desalinate underground water, and provides potable water that is used to benefit local needs. It should be noted that whilst reverse osmosis is the front runner for most treatments, there is a plethora of other treatments and technologies that can be used. This is done through partnership between Anglo American, EMalahleni Local Municipality and BHP Billiton Energy Coal South Africa (BECSA). While this is encouraging and should be supported and the responsibility is clear when mine is still in operation, however the challenge is when the mine has reached its life span (mining activities ceased), there is no appropriate mechanism to continue to take operational responsibilities to sustain AMD Management Operations.

### Police Principles

It is possible to use treated mine water to help alleviate the water shortage in the country. A few flagship projects are already in operation that produces drinking water quality from active coal mines, through desalination systems, and this water is then fed into the municipal networks. Mining companies should explore the benefits of using treated mine water for their operations and or to provide it to the municipal networks. The mining companies should see the Acid Mine Drainage, and other mine water pollutants, as shared risk and opportunity. Appropriate Mechanism in the form of Private Public Partnership (PPP) should be adopted to guarantee the continuation of AMD management operations for continued dual benefits of portable water provision and pollution minimisation treatment.

## 6. Way forward

In the current legislation(s): NEMA, MPRDA and NWA, it is worth noting that mine water management is not formally defined and this may continue to hinder process of dealing with mine water management decisively. These policy principles may require legislative review or policy alignment. The existing frameworks place the government in the position of having to be reactive rather than proactive as far as mine water management is concerned.

The formalisation of a Mine Water Management Unit in the Department will accomplish an integrated and composite approach ensuring efficient coordination of all mine water management related initiatives and activities within the Department and amongst all other Departments and Institutions. The functions of the Unit will be aligned with the objectives of the Department's Annual Performance Plan for the period 2015-2019.

Parallel to the formulation and development of the policy position, emergency interventions are currently underway to address mine water challenges in the gold fields of the Witwatersrand mining region. Additionally, tandem activities such work streams dealing with finance and regulatory

matters, mine water monitoring, research to support future decision-making, pilot testing of emerging mine water treatment technologies, ingress control, and the potential applications of cost recovery and/ or an environmental levy in the mining sector (as plausible revenue streams for mine water management) are ongoing. These activities remain to be optimised as guided by the final policy position.

The mine water problem is not going to be solved by a single intervention, but will require the integrated implementation of a range of measures including considering using of treated mine water for operations and or providing it to the municipal networks which should be lead by pragmatic and progressive policies and legislations.

## **Approval**

This policy position is approved by

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**MINISTER OF WATER AND SANITATION**

**DATE:**

# **WARNING!!!**

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