

**MINE WATER MANAGEMENT IN  
THE WITWATERSRAND  
GOLDFIELDS WITH SPECIAL  
EMPHASIS ON ACID MINE  
DRAINAGE**

PRESENTATION TO CABINET  
9 February 2011

**Terms of Reference**

- Assess what has been done
- Reappraise the risk
- Assess available solutions
- Viability and costs of short-term interventions
- Propose integrated lasting and sustainable medium- and long-term solutions/measures
- Explore possible partnerships with the private sector

## Reporting Structure

**Inter-Ministerial Committee (IMC) on AMD**  
Ministers of Mineral Resources, Water Affairs, Science and Technology  
and the Minister in the Presidency: Planning Commission

↑  
**Task Team (TT)**  
Directors General

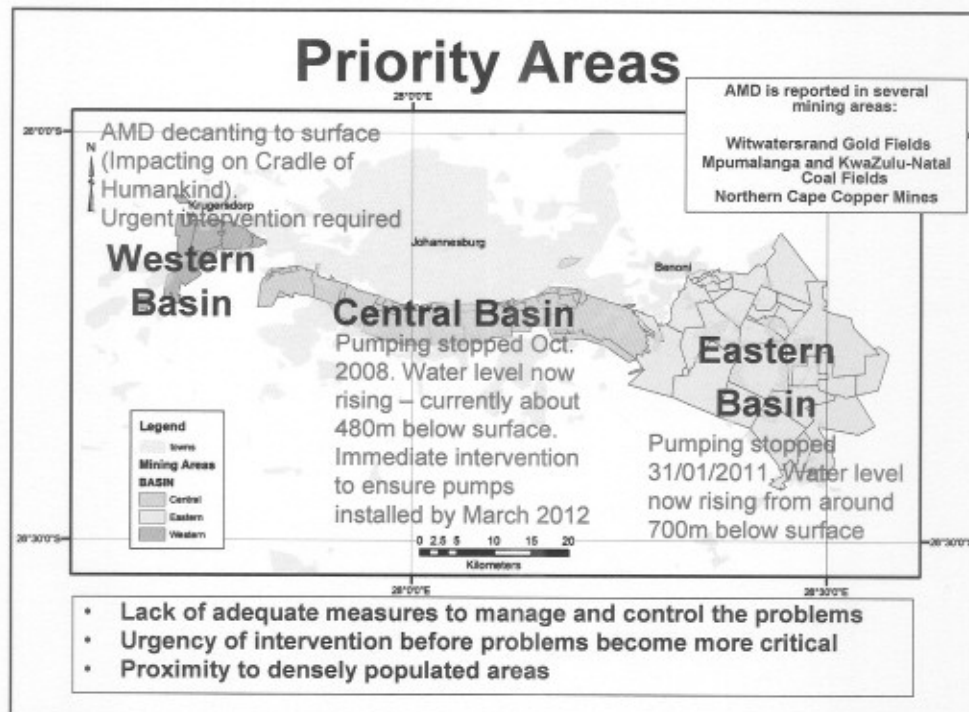
↑  
**Team of Experts (ToE)**  
Council for Geoscience  
Department of Water Affairs  
Department of Mineral Resources  
Water Research Commission  
CSIR  
Mintek  
**Advisors:**  
Prof T S McCarthy – Wits  
Prof J Maree – TUT  
Prof G Steyl – UFS  
Prof B Zhao – University of Fort Hare

## Assessment of Available Information

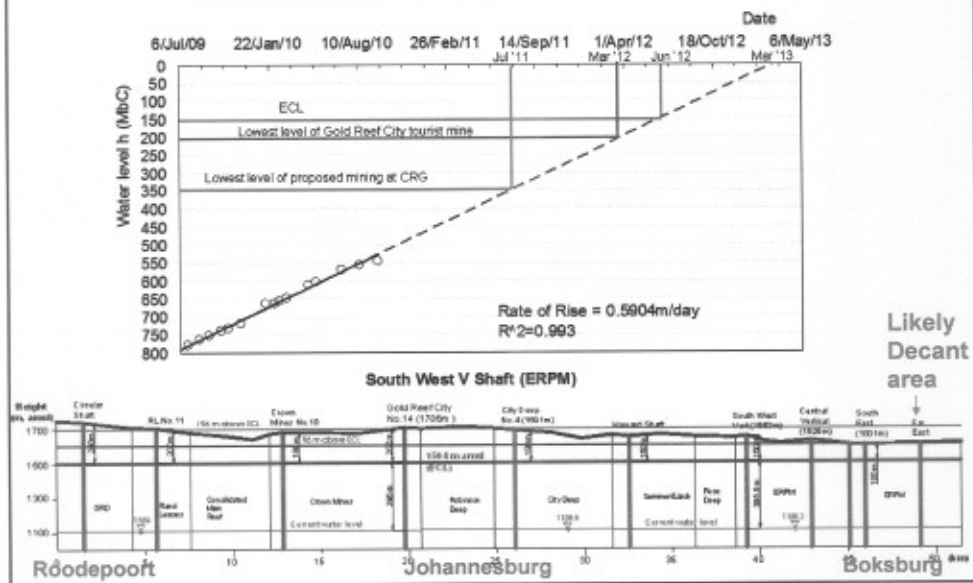
- AMD-related research undertaken by Science Councils & Universities
- Sufficient information exists, describing the problem and the technologies required to address it, locally and internationally to make informed decisions and to inform action on the current AMD problems
- Targeted research/studies required to address gaps and optimise solutions
- Almost all mining countries experience AMD problems

## Reappraisal of Risks

- Risks due to flooding:
  - Shallow groundwater resources compromised
  - Possible land instability e.g. sinkholes
  - Foundations & infrastructure threatened
  - Induces seismicity
- Risks due to AMD decant:
  - Water security threatened
  - Contamination of aquatic systems
  - Natural resources & heritage compromised

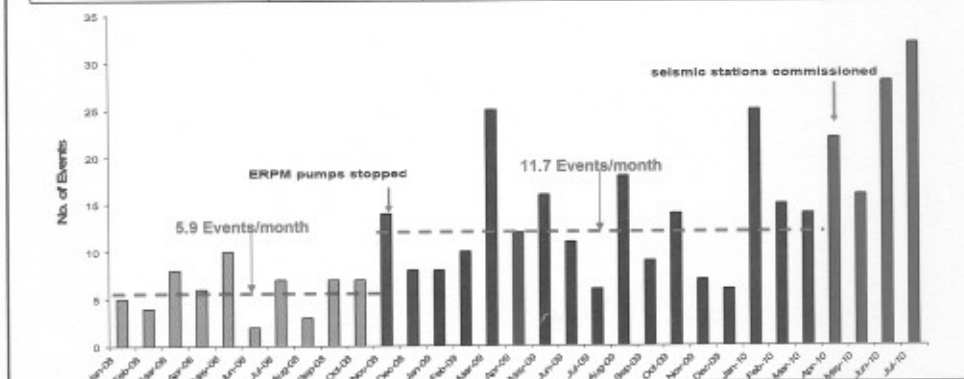


# When and where will the Central Basin decant?

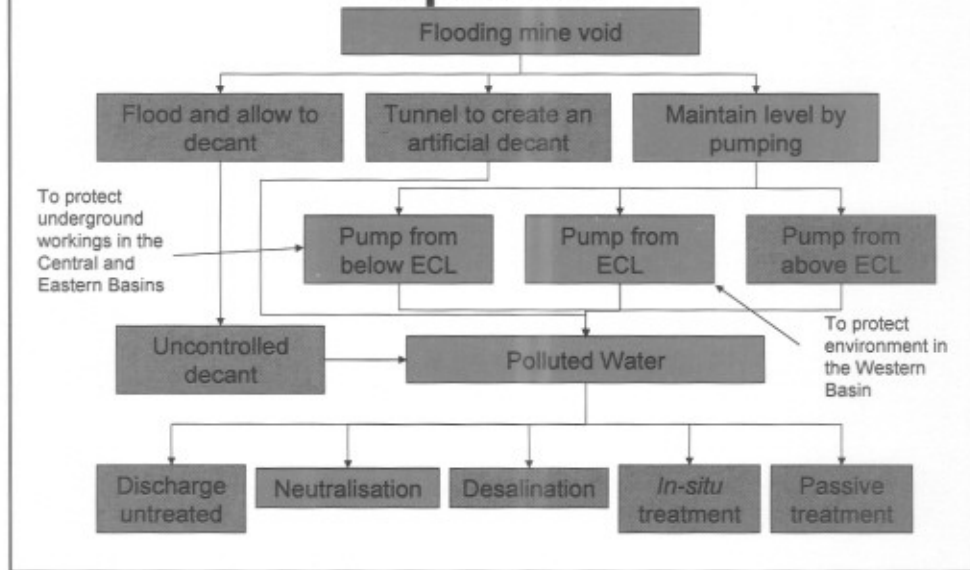


# Impacts of Mine Water: Pollution and Seismicity

Parameter	Western Basin	Central Basin	Eastern Basin	DWA Guideline (Category 4 Industrial Use)
pH	3.5	2.8	6.65	5-10
Electrical conductivity (mS/m)	510	467 <sup>(a)</sup>	246	250
Total dissolved solids (mg/l)	6580	4936 <sup>(b)</sup>	2041	1600
Sulphate (mg/l)	4010	3700	1037	500
Iron (mg/l)	697	112	38	10



## Assessment of short-term options



## Implementation plan

Action	Time frame	Delivery period
Install required infrastructure to lower or maintain water level in the mine voids to the ECL and construct new or upgrade existing treatment facilities	Immediate in the Western and Central Basins to ensure environmental protection. Monitor developments w.r.t. Grootvlei in the Eastern Basin.	6-12 months construction period
Continuous monitoring of water and geotechnical impacts	Commence immediately	Infrastructure installed within 1 year. Continuous monitoring.
Prevention of ingress	Commence immediately	Interventions identified within 1 year
Stakeholder engagement	After Ministers' Meeting	Ongoing

## Budget Summary

Item	Capital Expenditure	Operating Costs (p.a.)	Longer-term costs
Pumping	12 800 000	70 000 000	
Treatment	160 000 000	40 880 000	
Ingress Prevention	251 650 668		626 261 506
Monitoring	17 210 000	10 375 000	
<b>Totals</b>	<b>441 660 668</b>	<b>121 255 000</b>	<b>626 261 506</b>

Provisional budget allocated to DWA for design and construction of mine water management infrastructure:

2011/12: R 75 000 000

2012/13: R150 000 000

## Recommendations

1. Prevent decanting by pumping
2. Implement ingress control measures to reduce the rate of flooding and the eventual decant/pumping volume and costs
3. Water quality management
  - Neutralisation and metal removal in the short-term
  - Removal of salt loads from river systems to be considered in the medium- to long-term (direct use or desalination to potable quality)

Continued...

## **Recommendations (continued)**

4. Improve monitoring and undertake research to inform better decision making
5. Manage and monitor other AMD sources within the Witwatersrand e.g. diffuse sources such as slimes dams
6. Investigate and implement an environmental levy on operating mines to help cover the costs of mining legacies

## **Latest Events**

- Cabinet has approved recommendations
- IMC will make announcement this week
- Instructions from act. DG during meeting with TCTA:
  - Establish an internal Task Team to lead process
  - Submit an Implementation Plan by Tuesday 22 February to be ready for IMC meeting on Wednesday
  - Submit detailed Implementation Plan by Friday 25 February 2011 for Minister.
  - Implementation Plan to include i.e; Communication Strategy, stakeholder involvement (mainly mine houses), directive to appoint TCTA, section 19 and 20 directives to engage mines, establish a Monitoring Team.
  - Implementation Plan should have milestones based on critical dates.