






***Eastern Basin
Short-term solution***

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Cabinet's instruction: Parallel measures for AMD mitigation (1)

1. **Ingress control**
 - Concept aimed at preventing surface water leakage to mine void – implies reduced volume of AMD formed – translates into lower pumping and treatment costs
 - Regulators approved pit deposition in Western Basin to seal open pits
 - Florida Lake-Fleurhof Dam Canal in Central Basin – stream leak into mine void eradicated
 - Three similar canals proposed for Central Basin (pending RoD from DEA)
 - Studies underway in Eastern Basin to identify ingress hotspots with proposed solutions
 - WC/WDM programme with municipalities to decrease water loss from reticulation systems
2. **“Polluter pays” principle (NWA Section 19/20 cost recovery)**
 - Wits AMD legacy arose due to >120 years mining in the region
 - As far as is practically possible, relevant mines to be identified and legislation invoked so that these mines are held accountable for environmental liabilities ascribed to their operations
3. **Environmental Levy**
 - Discussions convened with National Treasury on proposed levy on existing mines
 - Potential revenue stream to offset costs incurred by Government
 - Engagement with stakeholders on proposed levy planned for 2015
 - Pending approval of Tax Policy Unit, levy could be implemented in the 2016/ 2017 fiscal year
 - If invoked, implication is that mining sector is contributing to AMD mitigation costs


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Cabinet's instruction: Parallel measures for AMD mitigation (2)

4. Monitoring

- Intensive monitoring (DWS, CSIR, mines and municipality) to assess AMD impacts and evaluate interventions
- Surface and groundwater improvement in Western Basin since emergency works commissioned
- Central Basin AMD plant has stabilised AMD level close to ECL – AMD impact obviated
- Eastern Basin challenged due to large, intricate void; illegal miners destroying equipment

5. Research/ Pilot Studies

- DWS managing database of potential AMD treatment technologies: 89 companies registered (lab-scale to pilot plants) –
- DWS/ WRC Task Team established to screen promising technologies for pilot scale testing in the Western Basin
- Intention is to reduce costs and secure all-round beneficial technology
- Four technologies selected for piloting in Western Basin over next three years (commence 2015)
- Mintek currently testing SAVMIN (State-funded development) on pilot scale in Western Basin (August 2014)



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Long-term solution




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Feasibility Study – Long-term Solution to Wits AMD

- Parallel process as per Cabinet instruction – identify long-term solution to remove salinity
- Study commence 30 January 2012; finalised 31 July 2013 (18-months)
- **Planning study based on:**
 - Existing information
 - Monitoring initiatives
 - Technical considerations
 - Regulatory matters
 - Financial and Procurement models
 - Institutional arrangements
 - Water resource, Socio-economic and Environmental objectives
 - Stakeholder inputs, inclusive of Government
- **MAIN OBJECTIVE OF THE FEASIBILITY STUDY:**
 - Identify the most cost-effective, technically-sound, legally-defensible, economically-viable and environmentally-sustainable LONG-TERM SOLUTION TO REMOVE OR SUITABLY REDUCE SALT LOAD IN VAAL RIVER SYSTEM DUE TO AMD



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Possible application of AMD

GOAL: To eliminate (or suitably reduce) underground mine water induced salt loading of the Vaal/Crocodile River systems

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            graph TD
            A[Water Streams Considered] --> B[Untreated AMD]
            A --> C[Neutralised AMD]
            A --> D[Neutralised and Desalinated AMD]
            B --> B1[Mining Recovery of Gold]
            C --> C1[Agriculture]
            C --> C2[Mining]
            C --> C3[Industry]
            D --> D1[Rivers]
            D --> D2[Domestic]
            D --> D3[Industry]
            
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Could be solution in the medium-term, but not recommended as sustainable LTS

Not recommended at all

Promising and further engagement with possible recipients may be required

Not recommended but could occur for short periods of time





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Key findings and immediate actions (long-term solution)

- **Recommended solution:**
 - **Expand emergency works and de-salinate AMD thus ensuring water security in the VRS to avoid socio-economic and environmental disasters**
- Direct Agency(ies) to implement on Design-Build-Operate-Maintain (DBOM) contract
- Secure suitable funding with cost-recovery
- Commence with Environmental Impact Assessment
- Appoint service providers for construction through Agency(ies)
- Secure off-take agreements for beneficial use of reclaimed (purified) AMD
- Initiate studies in the Western Basin (real-time, pilot plant testing)
- Communicate with stakeholders





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Progress (long-term solution)

- DWS & NT approval on use of LHWP funding mechanism to fund Wits AMD mitigation
 - Government Guarantee as per letter from Minister of Finance (22 April 2014)
 - Cost-recovery from the Vaal River Raw Bulk Water Tariff applicable
 - Funding mechanism subject to TCTA being directed by Minister of Water and Sanitation
- Proposed Implementing Agent(s) identified – appointment(s) pending
- Roll-out of LTS pending sanction of Minister and/ or IMC on AMD
- Target date for commissioning LTS is 2016/ 2017



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CAPEX and OPEX Estimates

Description	Basin		
	Western	Central	Eastern
<i>R million</i>			
CAPITAL COSTS (CAPEX) – STI	550	650	1360
Grand Total for CAPEX	2560		

Description	Basin		
	Western	Central	Eastern
<i>R million</i>			
CAPITAL COSTS (CAPEX) – LTS	1 410	2 280	2 970
Grand Total for CAPEX	6 660		

Average Annual O&M and Lifecycle Costs (OPEX) – STI and LTS	230	330	430
Grand Total for OPEX per annum	990		

Base Date: March 2012

*Excluded: Pipelines to possible remote industrial users;
Acquisition of servitudes; Movable furniture and equipment; and Professional Fees.*

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AMD mitigation implications on Vaal Tariff

Emergency works

- 2015/ 2016 projected increase of R0.23 per m³
- 2016/ 2017 projected increase of R0.29 per m³

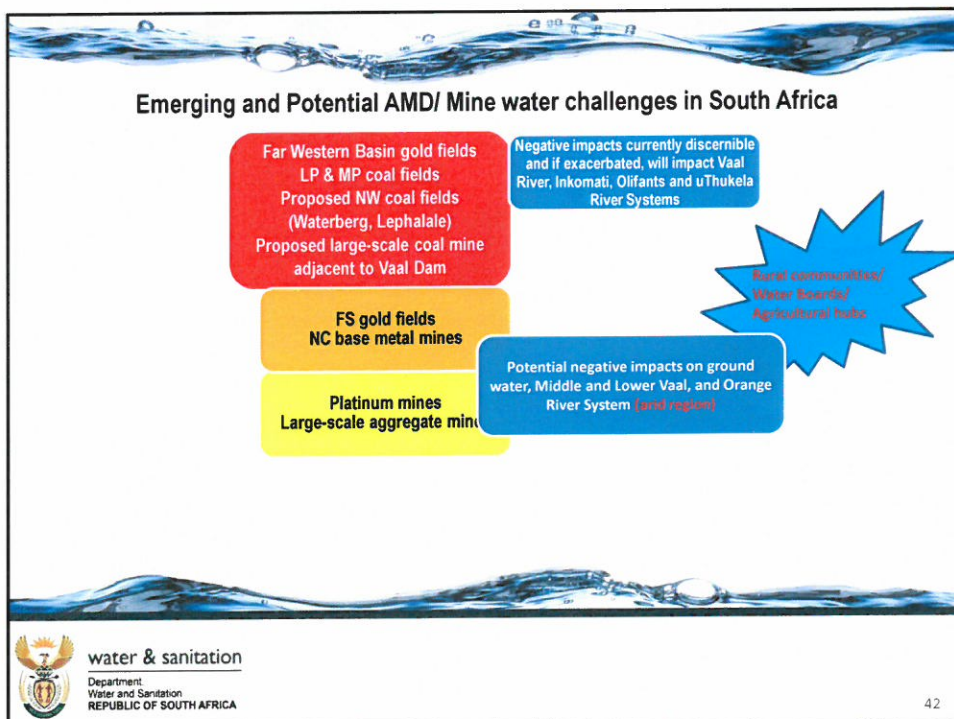
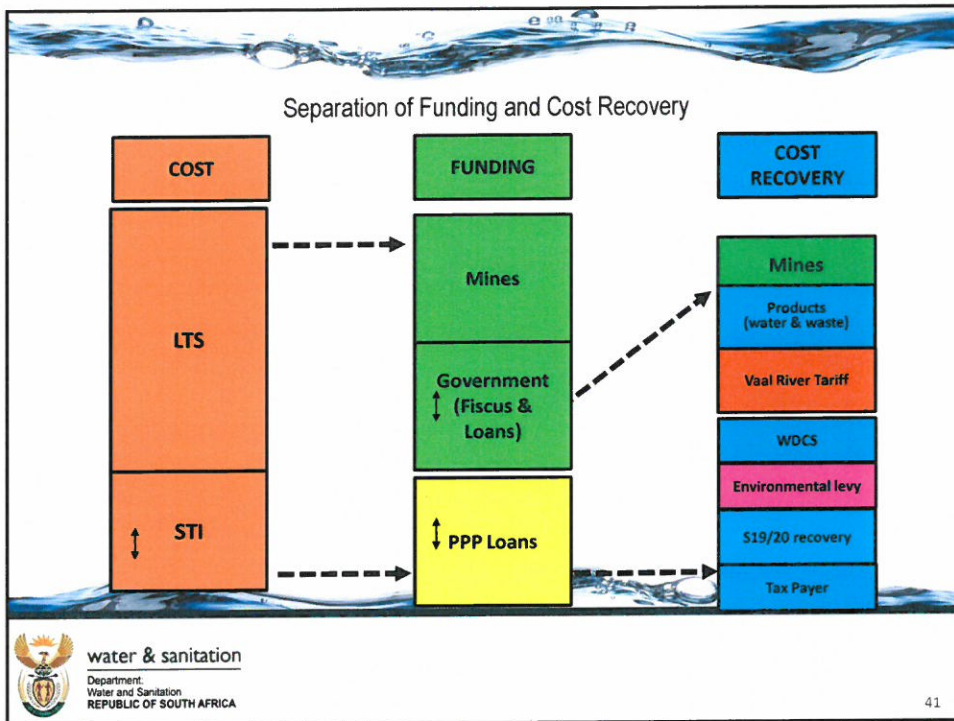
Long-term solution (neutralisation and de-salination)

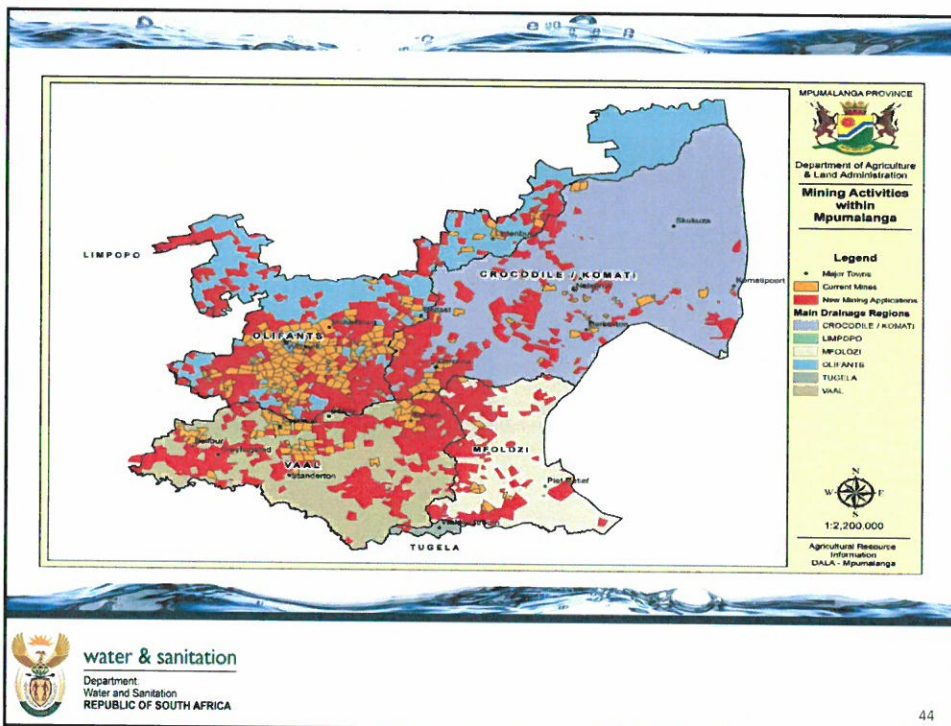
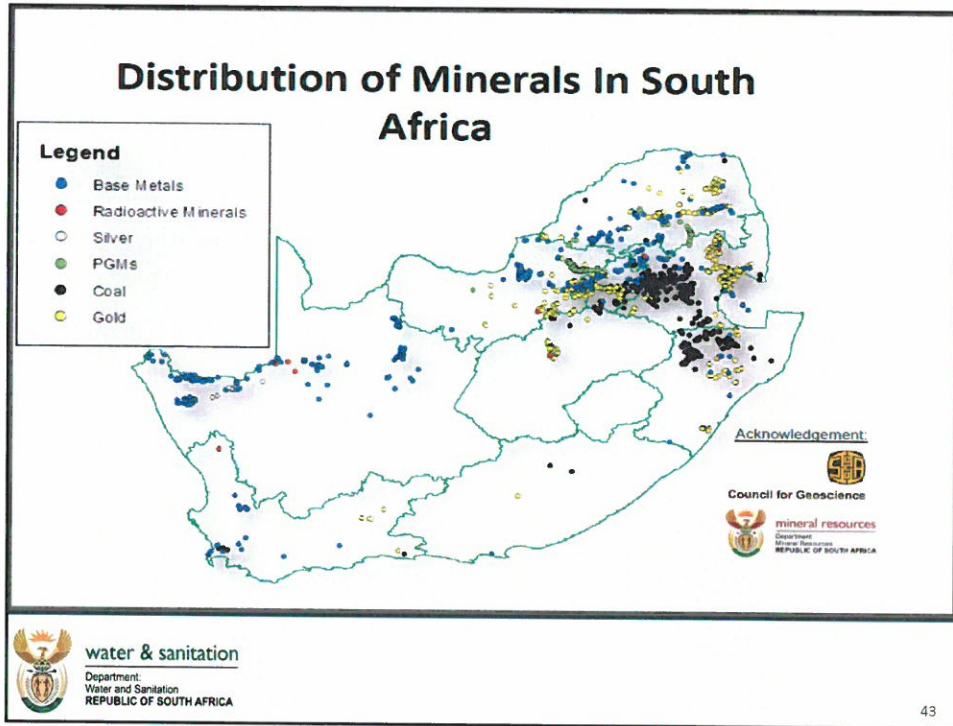
- 2017 onwards, projected increase of R0.99 per m³

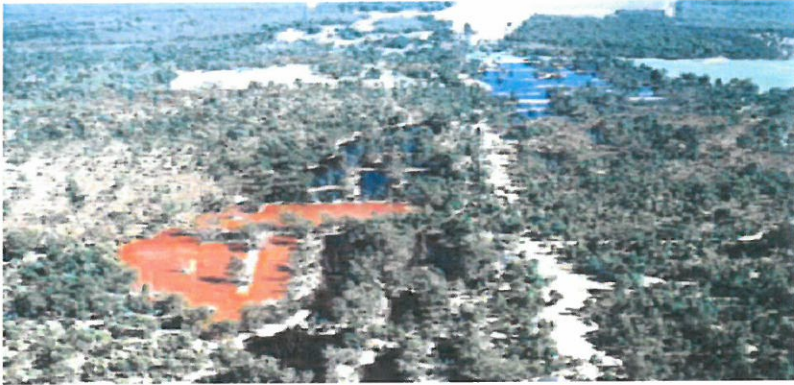
Consultations on the projected increase with Vaal River Raw Bulk Water Users have commenced and further engagements will continue

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Acid Mine Drainage: Upper Olifants


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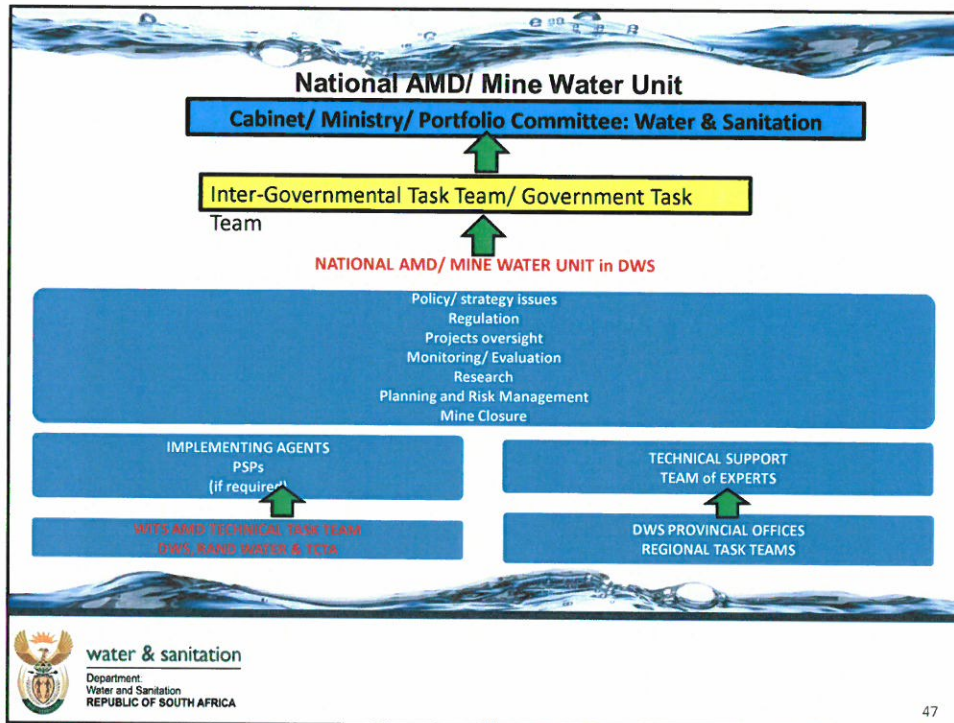
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Bottlenecks requiring immediate resolution

- LHWP funding mechanism must be unlocked for project continuity
- O&M service provider to be appointed for Central Basin
- Further upgrade to Western Basin to treat sporadic surface decant (Mintails' proposal)
- Direct Agency(ies) for long-term solution implementation to promote
 - EIA
 - Land access
 - PSP appointment
- Consultations must be finalised with VRS users to explain Tariff increment
- Off-take agreements for de-salinated AMD from LTS must be concluded
- **Establish AMD/ Mine Water Unit with national functions ito:**
 - Oversight
 - Project management
 - Integration and co-ordination of processes within DWS, other relevant national and provincial depts, as well as private sector
 - Pre-emptive management of AMD/ mine water issues across SA
 - Operational mines (~104)
 - Multitude of derelict mines (State liability)
 - Proposed mines in all mining provinces must be assessed for socio-economic gains versus impact on environment


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STATUS QUO ON MINES OPERATING WITHOUT WATER USE AUTHORISATION (July 2014 – October 2014)

- Hundred and four (104) mines were identified using water unlawfully
- Eighty one (81) mines were investigated
- Twenty three (23) are in the process of being investigated
- Forty three (43) Pre-directives were issued against mines
- Twelve (12) Directives were issued against mines
- Six (6) Criminal cases were instituted against mines
- Fifty one (51) applications for water use authorisations were received by DWS
 - Six (6) withdrawals by applicants
 - Four (4) decline
 - Four (4) pending Delegated Authority decision
- Forty eight(48) did not apply for water use authorisation
- Five (5) Water Use Authorisation were issued:
 - Two (2) General Authorisations
 - Three (3) Water Use Licences

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