



Department of Mineral Resources

**Progress on the management and rehabilitation of Derelict
and ownerless mines 12 October 2010**



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PRESENTATION OUTLINE

Definition

History of the legacy

The database of D&O Mines

Prioritisation & Ranking of D&O Mines

Assessment of the financial impact

Selected Rehabilitated Sites

Acid Mine Drainage in the Witwatersrand Basin

Implementation plan

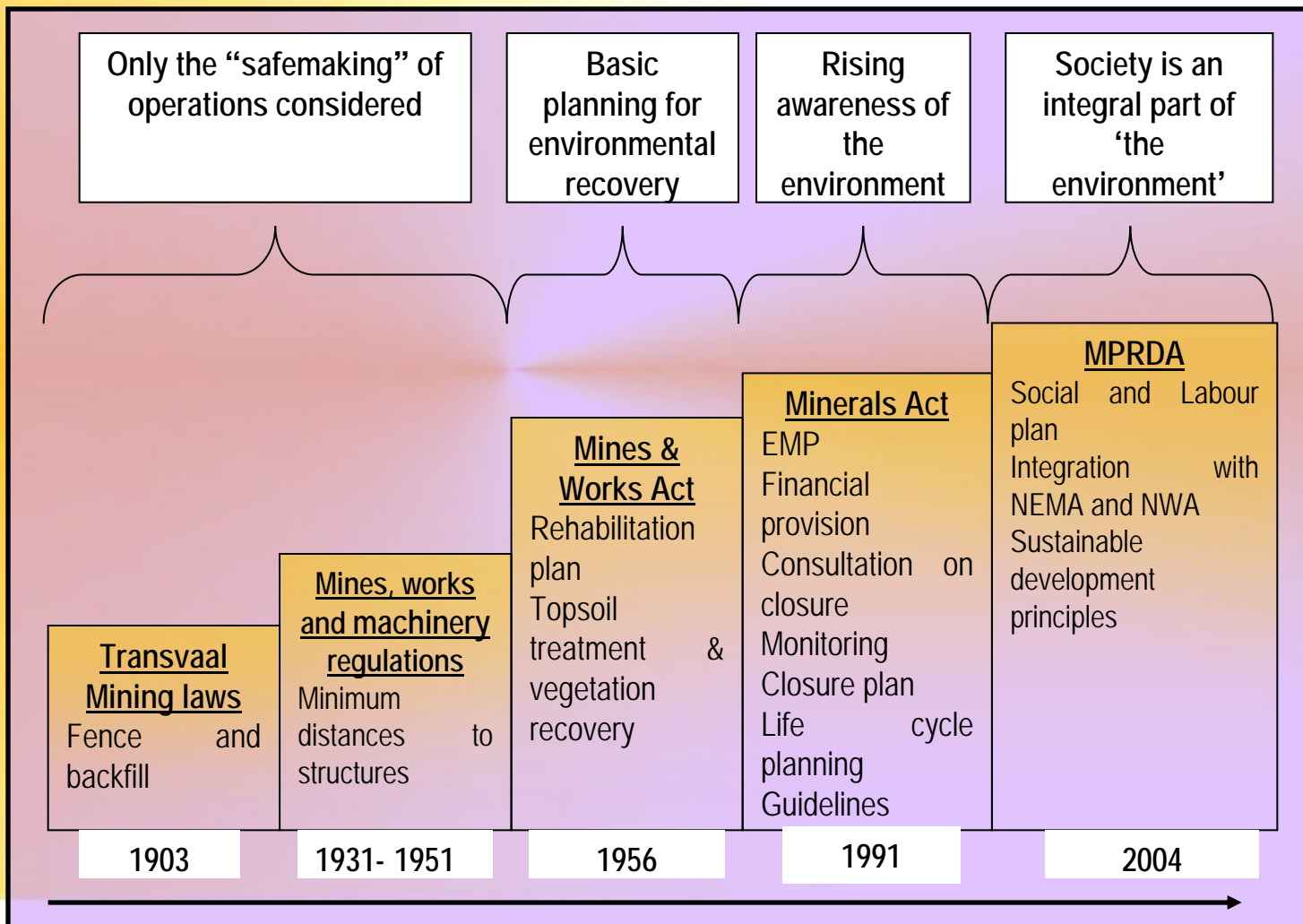
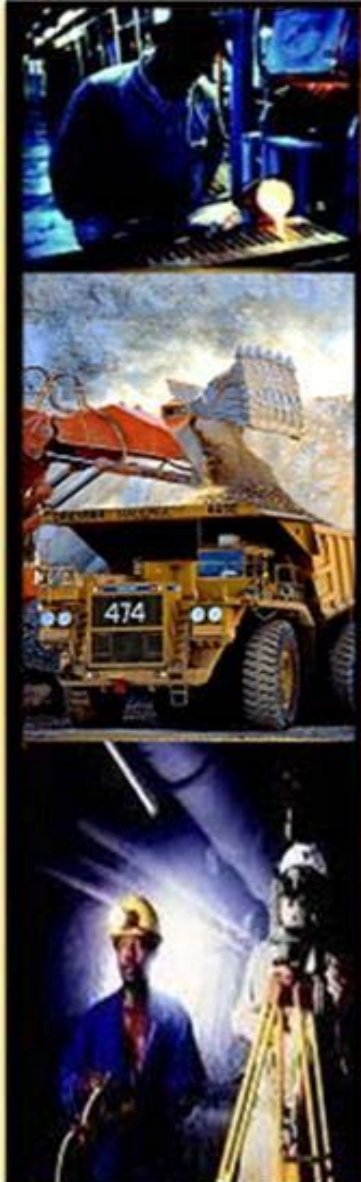
Conclusion



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HISTORY OF LEGACY...



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DEFINITION OF D&O

- Mines whose owners are not operating nor maintaining and cannot be traced
- Often confused with just abandoned mines with traceable owners
- Where owners found, law enforced!!!

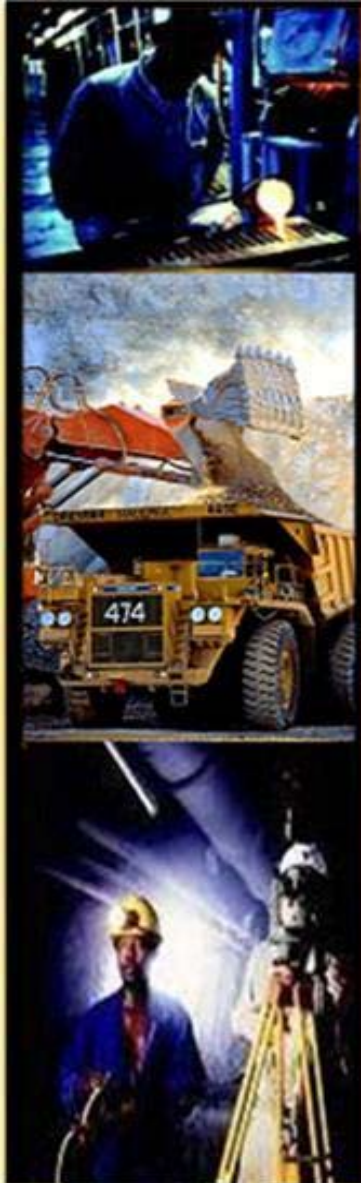


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ENVIRONMENTAL IMPACTS RELATED TO D&O MINES

- Health and safety issues due to direct access
- Surface water pollution
- Groundwater Pollution
- Air pollution
- Damage to sensitive environments
- Impacts on current and future land-use
- Impacts on heritage resources



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MEASURES TAKEN TO ADDRESS THE IMPACTS

- Developed a database on D&O
- Prioritization & Ranking has commenced
- Assessment of Financial Requirements
- Implementation of rehabilitation has commenced

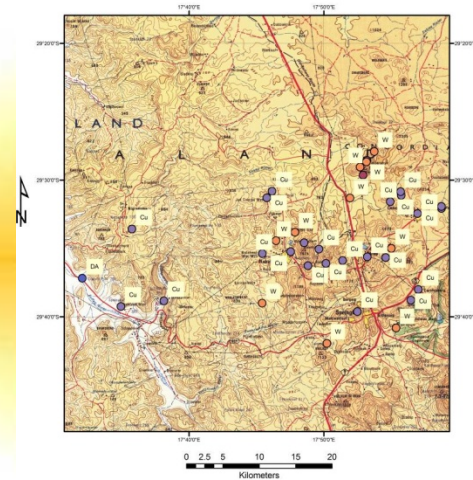


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DATABASE OF D&O MINES

- **Approximately 6 152 sites identified**
- **Compiled by:**
 - Identifying mineral deposits
 - Verification with DMR Regions and on field verification and ranking visits.
 - Compiling data from other sources, with verification
- **New applications mean that the database is dynamic *i.e.* needs continual updating over time**
- ***This is the first time in the history of South Africa that a comprehensive database has been developed.***
- This provides a detailed record of abandoned mines in South Africa, allowing systematic management of problems



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GROUPING & PRIORITISATION

- Grouping sites according to commodities and their expected environmental impacts
- Grouping sites according to provinces and the scale of rehabilitation
- Sites which pose immediate threat to communities were prioritised
 - Asbestos Sites
 - Openings, trenches and Shafts within the Gauteng region/ Witwatersrand Gold Basin



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PRIORITY PROJECTS

PROVINCE	SITES IDENTIFIED FOR LOCALISED REHABILITATION PROJECTS	SITES IDENTIFIED FOR LARGE-SCALE REHABILITATION PROJECTS
Limpopo	Open shafts in the Giyani Greenstone Belt, Asbestos workings	
Gauteng	Remaining Open Shafts in the Scott Asbestos Mine Edendale Lead Mine	Water, radioactivity, windblown dust and safety issues related to abandoned gold and uranium mines in the Witwatersrand Goldfields.
Kwazulu-Natal		Water and safety issues related to abandoned coal mines
Eastern Cape	Lusikisiki Quarry	
Northern Cape	Open shafts on "Cornish Mines" in the Namaqualand Copper District & Asbestos Workings	Water impacts related to copper mining in the Namaqualand Copper District.



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RANKING OF D&O MINES

- Given the large number of sites, priority to be given to those sites posing the greatest risk to society and the environment
- Ranking was implemented to refine the prioritisation
- 85 sites have been ranked and a number of priority areas have been identified for immediate rehabilitation
- **ongoing process will take about 5 years depending on availability of funds**



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ASSESSMENT OF FINANCIAL IMPACTS

- A desktop approach has been utilised:
 - Assumes that all mines/workings will be rehabilitated
 - Uses the guideline document for financial provision as well as estimates for specific sites
 - A figure of approximately R30 billion is estimated for the State's liability due to D&O Mines.
 - The figure is not static – It has to be reviewed on regular basis



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THE COSTS OF REHABILITATION VARIES: NO SIMPLE MODEL !!

- Some mines have minimal impact on the environment and will require no rehabilitation
- Others will require basic rehabilitation to satisfy safety requirements
- In some cases specialised rehabilitation is suggested, for example the installation of bat grates in shafts in conservation areas



Rehabilitation • End Use

Rehabilitation • End Use



Bat grate installed on an abandoned mine in a conservation area in the USA



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REHABILITATION ACHIEVEMENTS TO DATE SINCE 1994

- Asbestos Mines
 - A total of 48 sites have been rehabilitated
 - Northern Cape & Limpopo
- Gold Mines
 - 108 dangerous trenches and shafts rehabilitated
 - General Maintenance of D&O slimes dams in Gauteng to maintain the grass and prevent runoff



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REHABILITATION ACHIEVEMENTS TO DATE SINCE 1994 .. CONT

- Coal Mines
 - Prevention of access to dangerous coal mine (Transvaal & Delagoa Bay Mine near Emalahleni)
 - A plan for full rehabilitation developed (cost over R100 million to implement)



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Strelley Mine: Northern Cape Before



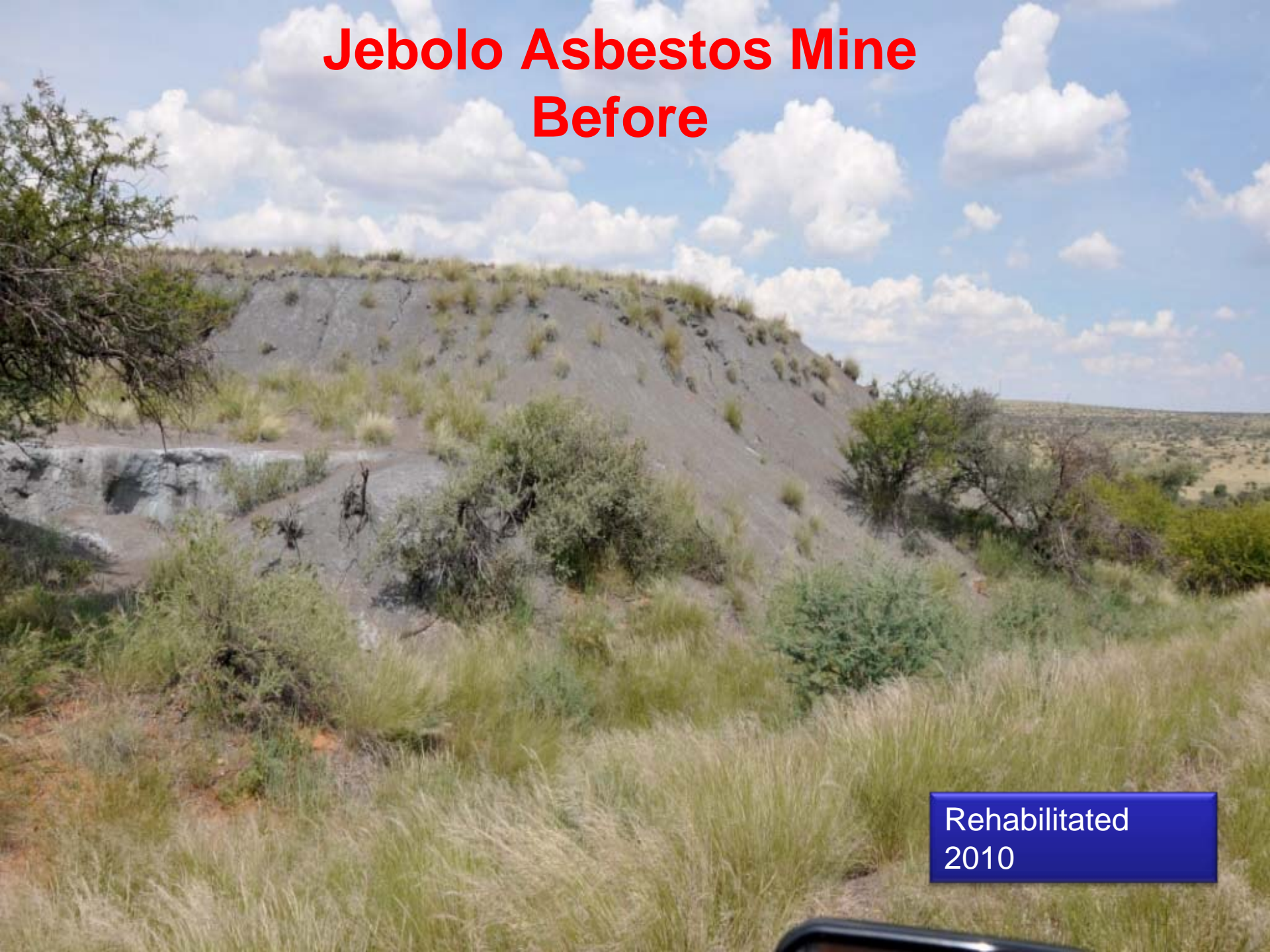
Rehabilitated
2010

Strelley Mine: Northern Cape - After



Employment :
42 Workers

Jebolo Asbestos Mine Before



Rehabilitated
2010

Jebolo Asbestos Mine: Northern Cape After



Employment :
14 Workers

Prieska Asbestos Old Mill Site: Northern Cape before

Rehabilitated
2010

Prieska Asbestos Old Mill Site: Northern Cape

After

Employment :
37 Workers



Government Surveyor confirming depth of soil cover on Prieska site. (Several test pits – July 2010)



Municipality to develop the site as a memorial park for victims of asbestos

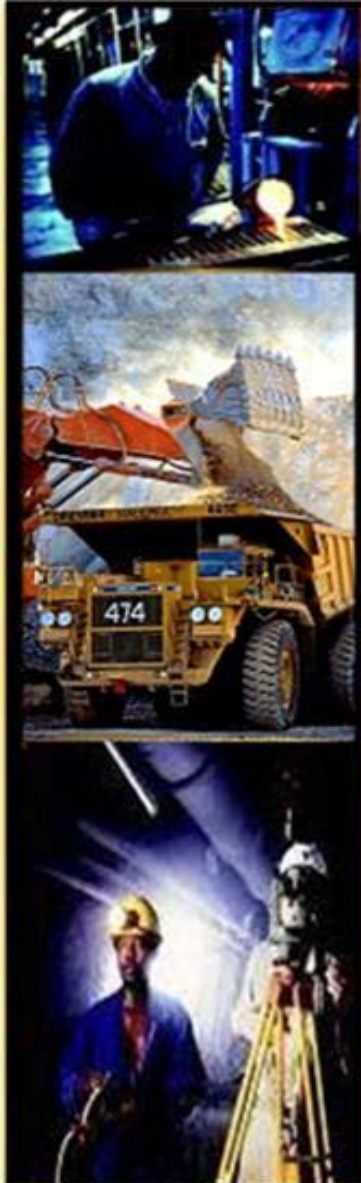
CLOSURE OF TRENCHES & SHAFTS IN WITWATERSRAND GOLD BASIN

Daily route
of school
kids



1000m deep
abandoned shaft

Western
Johannesburg

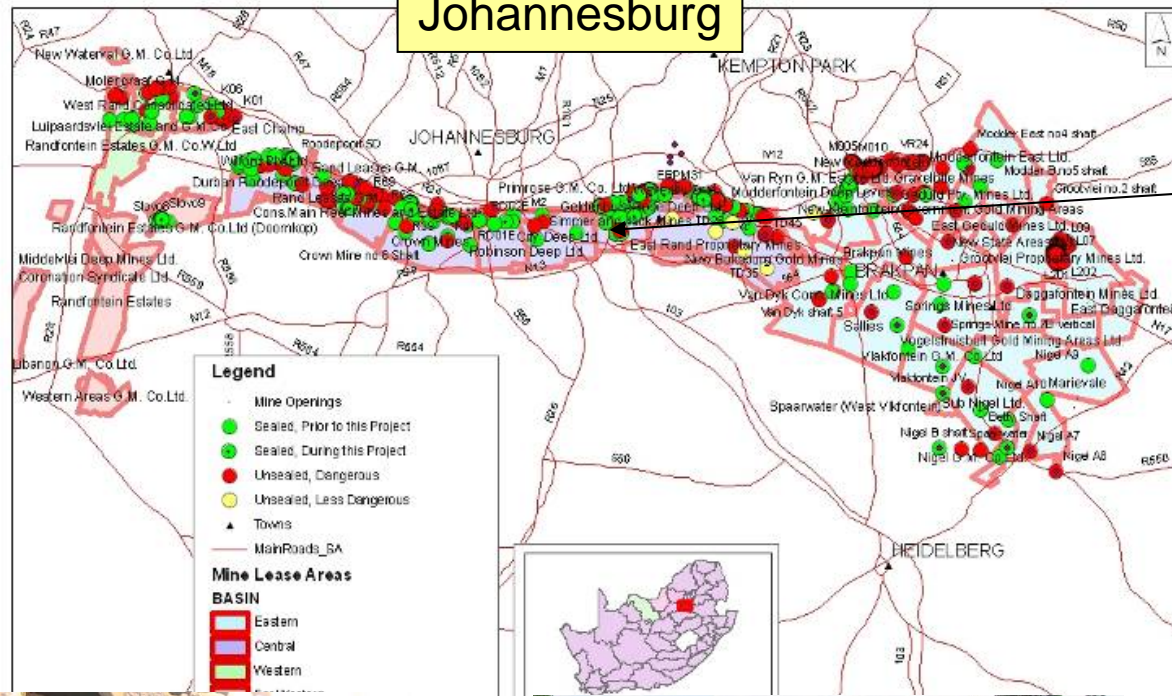


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Distribution of Unsafe Holes/Sh shafts

Johannesburg



900 holes in 3 provinces.

244 in central Johannesburg alone.

Each hole classified according to the risk it presents to the community.



The Final Product

- Servitudes registered



2,5 ton concrete landmark placed over sealed shaft as a reminder of shaft below and to prevent anyone building on it.



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PUBLIC AWARENESS

- Raising awareness



UNSAFE MINE OPENINGS IN THE OLD GOLD MINING AREA IN JOHANNESBURG

There are a number of abandoned mine openings scattered throughout the Witwatersrand area, many of these are dangerous. The Department of Minerals and Energy (DME) aims at improving the health and safety of people in the area.

IMIGODI YEMAYINI ENGAPHEPHILE YASE NDAWENI ESE OLD GOLD MINING E JOHANNESBURG

Kunemigodi eminingi yezimayini angasetsheziwa esabalele endaweni yase Witwatersrand, uphiko luka Hulumeli lokwezoMbiwa phansi nezaMandla lunenjongo yokuphucula impilo kanye nokuvikela izimpilo zabantu bakule ndawo.

MEKOTI YA MEEPO YEO E SEGO YA ŠIRELETŠWA TIKOLOGONG YA JOHANNESBURG

Go na le mekoti ya meepo yeo e tlogetšwego go tloga bogologolong, gomme e phatlaletšego le tikologo ya Witwatersrand. Bontsi bja meepo ye ya go tlogelwa e kotsi. Kgoro ya Diminereale le Enetši e ikemeleditše go hibolola maphelo le polokego tla batho ba tikologo.

Mining in the old mine shafts is illegal and dangerous. Likonotza umabani wesekumbiwa phansi ezimayini zakutala kungaphandle kwemvume yomthetho kanti kutsi kujingali. Go epa mo mepongwa kgale go leditwa, gomme go kotsi.

STAY OUT AND STAY ALIVE
QAPHELA UKUZE UHLALE UPHEPHILE
KATOGA GOMME O DULE O PHEDILE

the dme
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This message has been brought to you by the Department of Minerals and Energy to ensure your health and safety.

Lominyezo uhuvelywe kuni abaphiko lukatulumeni lokwezoMbiwa phansi nezaMandla ukugcinakisa ukuvikela kanye nokuphucula impilo zabantu. Molaetša wo o rometšwe ke ba kgoro ya Diminereale le Maatša go kgentšhisa maphelo le tšhiketšego ya gago.

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‘Stay Out and Stay Alive’

Educational material distributed to 100,000 people living close to unsafe shafts. 3 local languages used with simple cartoons



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REAL TIME ISSUES

Acid Mine Drainage management Plan

Department not waiting for a horror show!!!



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OBJECTIVES

- Prevention of ingress of surface water and groundwater to underground mine voids (Florida Canal)
- Establishment and recommendation of management solutions to reduce dependency on pumping to manage flooding of mines and spillage to surface (decant)
- Prediction of when and where decant will occur should pumping operations cease
- Prediction of the effects on the environment and the health risks associated with polluted mine water decanting to surface
- Development of management options to avoid uncontrolled decant of polluted mine water onto surface.



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PREVENTION OF INGRESS OF SURFACE WATER AND GROUNDWATER TO UNDERGROUND MINE VOIDS

- What has been achieved?
 - Multiple ingress areas/points identified
 - Florida canal under construction
- What remains to be done?
 - Short-term actions to limit ingress (e.g. cleaning culverts in the Blesbokspruit)
 - Verification of other ingress areas and proposal of solutions
 - Construction of ingress management measures
 - Monitoring of stream flows



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Establishment and recommendations of management solutions to manage flooding of mines and decant

- What has been achieved?
 - Regional closure strategies
 - Ingress management measures proposed
 - Intensive study of decant processes and impacts
 - Investigation of passive treatment technologies
 - Monitoring of water levels and quality
 - Monitoring seismic activities within the area
- What remains to be done
 - Implementation of flooding and decant control measures proposed in Regional Closure Strategies
 - Pilot studies and implementation of passive treatment technology
 - Ongoing monitoring of water levels and decant points to provide reliable information



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DEVELOPMENT OF MANAGEMENT OPTIONS TO AVOID UNCONTROLLED DECANT OF POLLUTED MINE WATER

- **What has been achieved?**
 - Studies of ingress and decant have identified management options including
 - Construction of canals
 - Controlled decant points
 - Assessment of treatment options including passive technologies
- **What remains to be done?**
 - Assessment of various options
 - Implementation of options
 - Pilot testing and implementation of treatment technologies



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PREDICTION OF WHEN AND WHERE DECANT WILL OCCUR SHOULD PUMPING OPERATIONS CEASE

- What has been achieved?
 - Decant points and times have been predicted
 - 18 months to environment critical levels (ECLs)
 - 30 months to surface (This will not be allowed to happen)
- What remains to be done?
 - Refinement of predictions as more information becomes available from our continued research

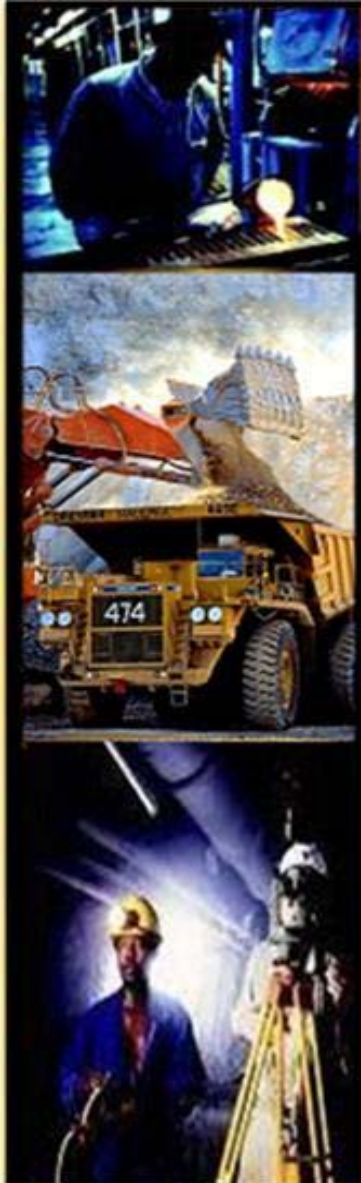


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IMPLEMENTATION

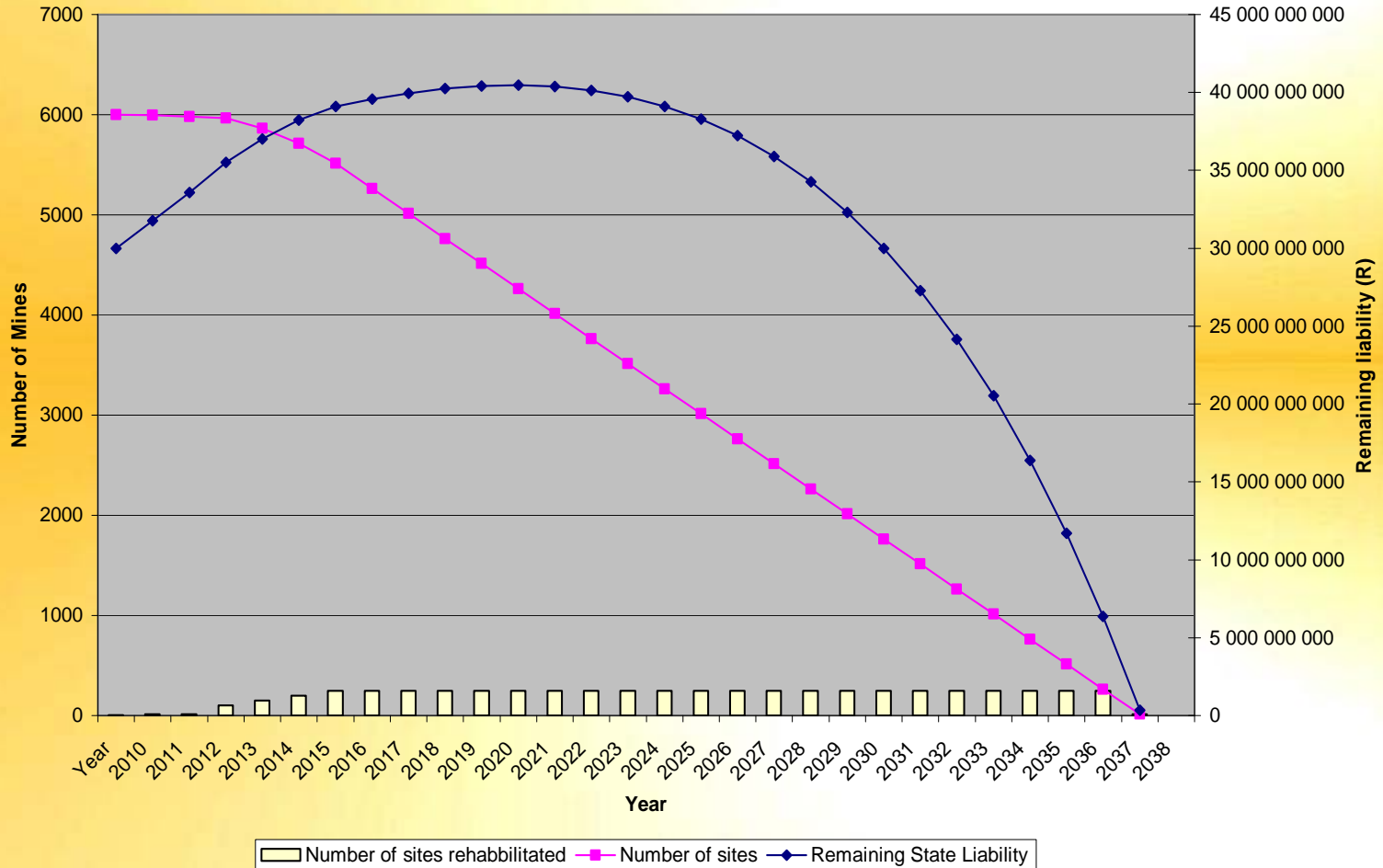
MEDIUM TERM PLAN: TEN YEAR IMPLEMENTATION PLAN



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IMPLEMENTATION



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IMPLEMENTATION CONT...

- Medium to long term plan
- Review on MTEF basis
- Review towards end of ten years
- Continuous update on technologies
- Update on best practices

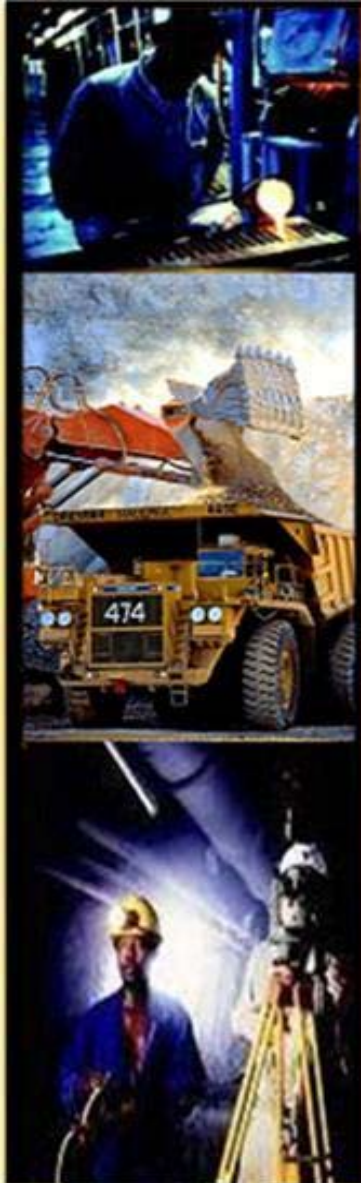


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IMPLEMENTATION CONT...

- Three phases for implementation
- **Phase one: 2010-2013**
 - Methodological development (Rehabilitation manual)
 - Prioritisation of large scale sites
 - Implementation of projects with greater risks and impacts on society and environment
 - Setting up structures for pumping and treatment (large scale)
- **Phase two: 2013-2016**
 - Rehabilitation of large scale sites with medium risk and impacts
 - Monitoring and evaluation
 - Development of management technologies where larger programmes e.g. pumping and treatment does not balance the economies of scale (passive treatment designs)



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IMPLEMENTATION CONT...

- **Phase three: 2016-2020**
 - Full scale rehabilitation of all sites and management for those requiring management going forward
 - Implementation of other management solutions e.g. passive treatment
 - Monitoring and evaluation
 - Evaluation of latent impacts
- **Review of rehabilitation plan for further long term implementation**
- **Review of budget taking inflation into account**



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FINANCIAL PROJECTIONS..

- Estimated cost for the ten year plan
= R1,456,710,750 bil
- Projection has not considered inflation
- Most large scale projects not included
(one large mine costs **R130,000,000.00**)



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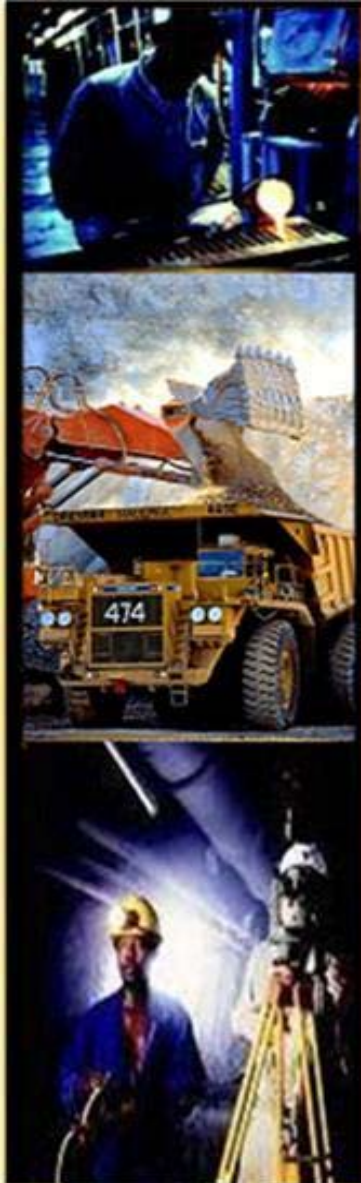
CONCLUDING REMARKS

- D&O challenge bigger than thought
- Creation Dates back to 1600s – first diamond mine in 1661 (Northern Cape)
- **349 years of damage!!!!**
- **Can never be resolved in less than 16 years**
- Nature of mining such that some of the impacts will forever be there – critical question is how to manage them?
- **Famous Rio Tinto river – the red Spanish river**
- **Mining 5000 years ago – AMD still there!!!!**
- Investment in management principles and technologies critical
- Dialogue on funding options
- Proper planning in place



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THANK YOU



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