

NORTHAM

PLATINUM LIMITED

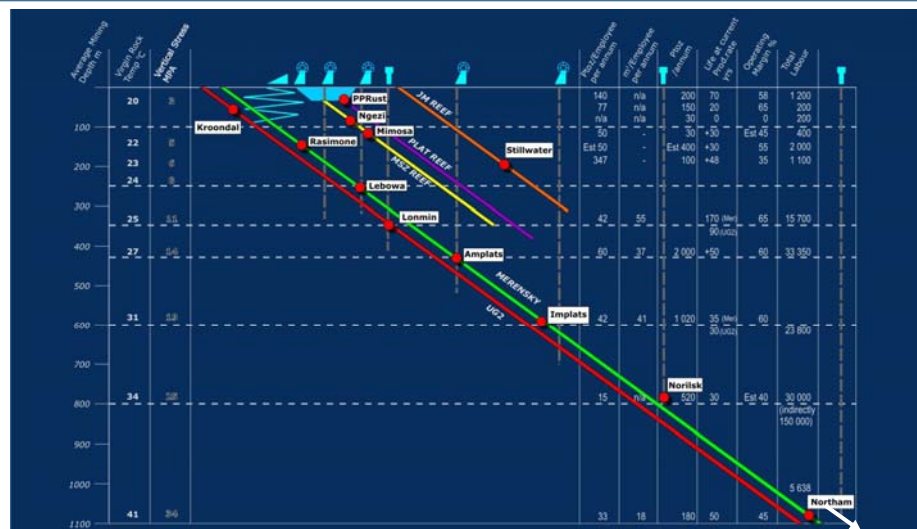
Challenges of mining PGMs at depth

Damian Smith
Chief geologist, Northam Platinum
12 July 2007

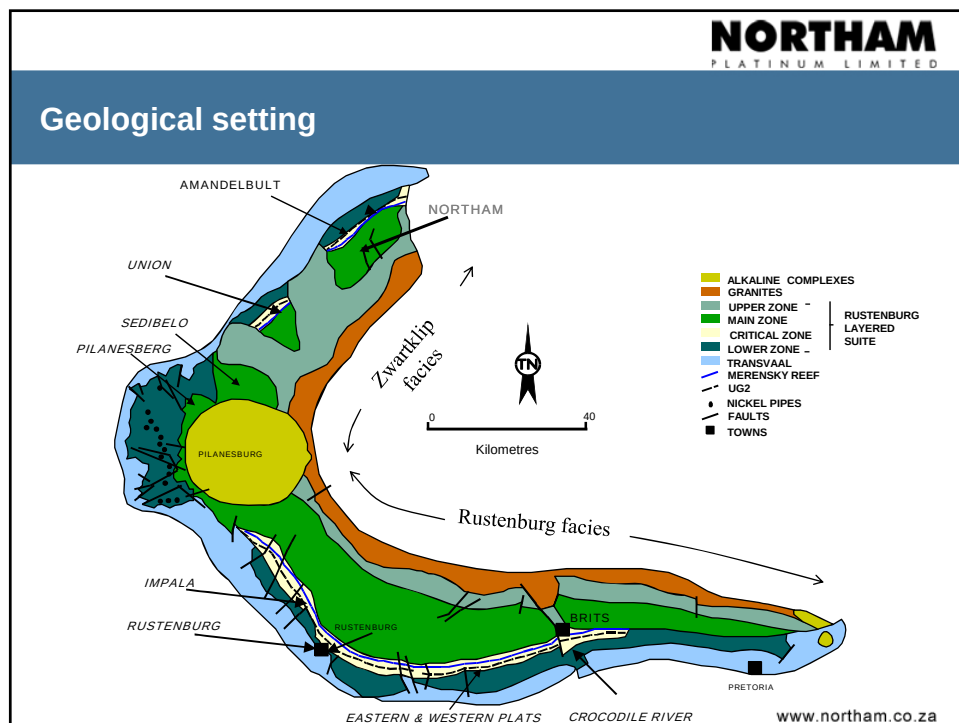
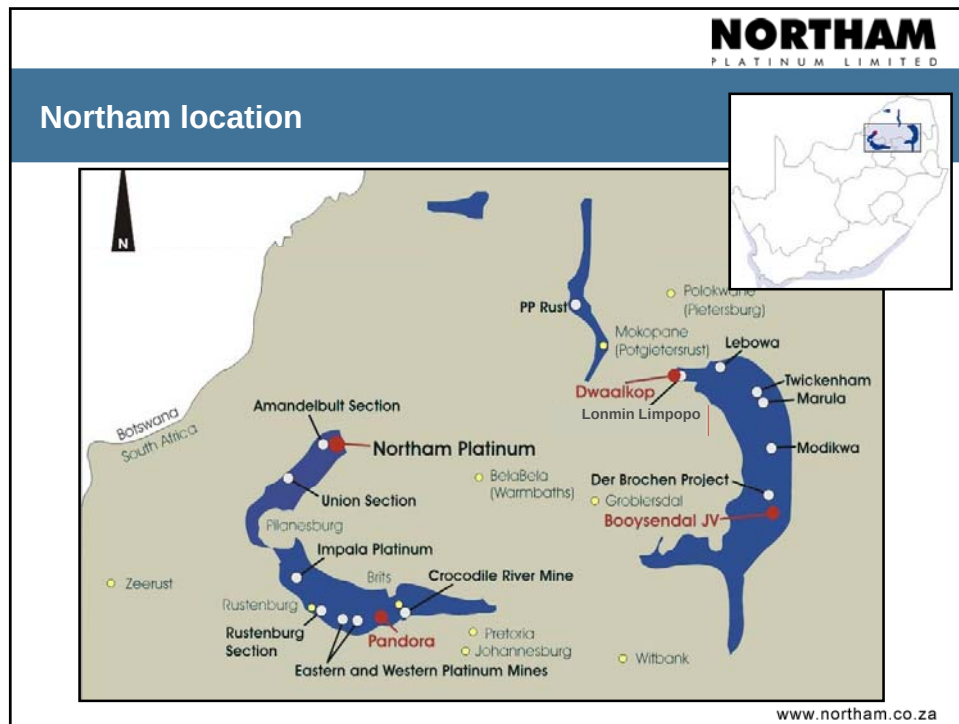
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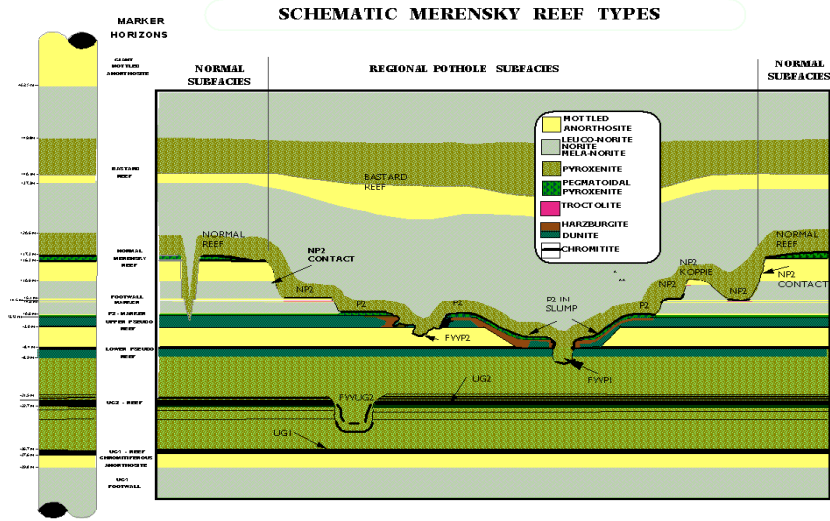
Depth of mining



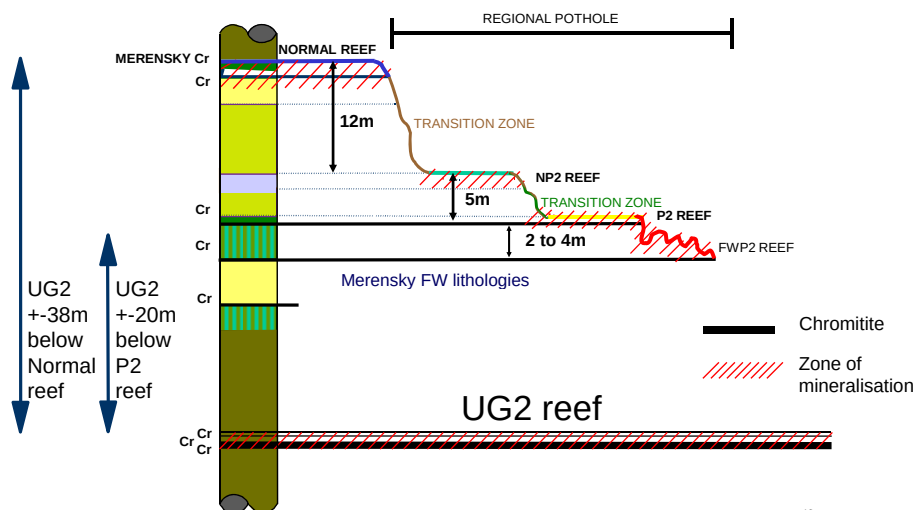
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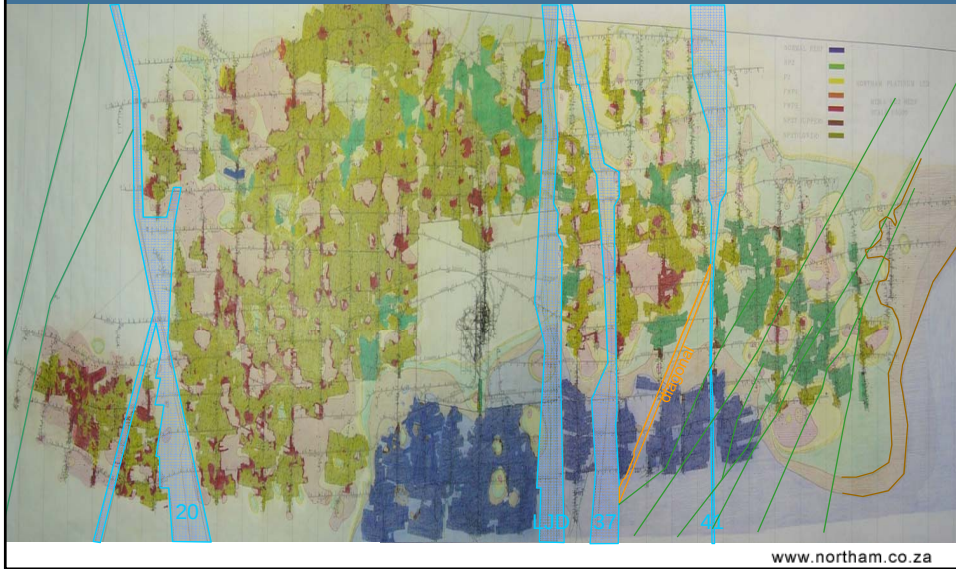
UCZ stratigraphy, Zwartklip facies



Simplified stratigraphy



Merensky reef distribution

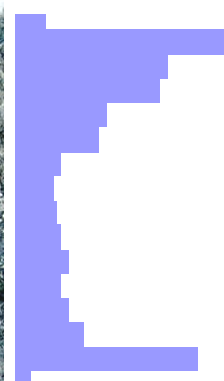


Merensky reef types

NORMAL REEF



GRADE PROFILE



NP2 REEF



GRADE PROFILE



Merensky reef types

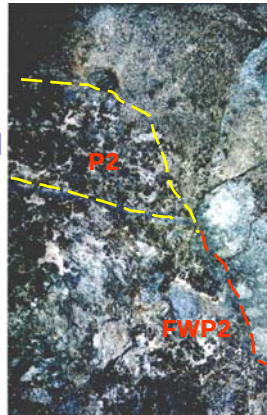
P2 REEF



GRADE PROFILE



FWP2 REEF

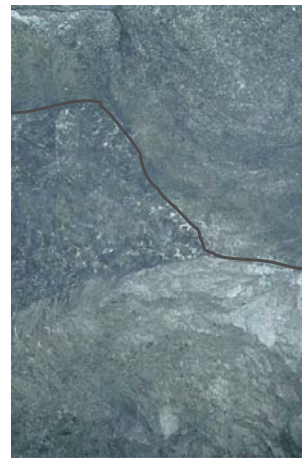
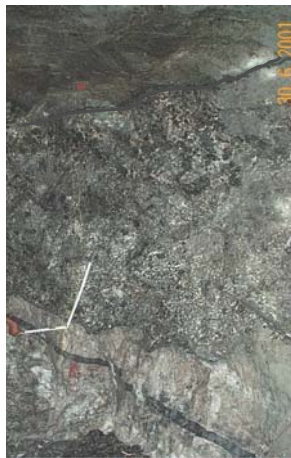


GRADE PROFILE



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Transitions and reef disruption – Normal Reef



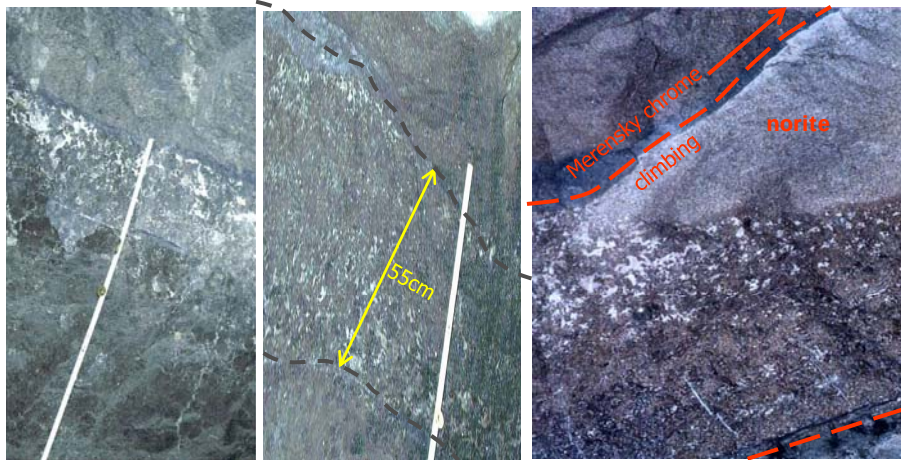
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Transitions and reef disruption – NP2 Reef



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Transitions and reef disruption – P2 Reef



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Geothermal gradient

- Average mining depth is 1750 mbc
- High VRT from 45°C to 72°C
- Backfill
- High ventilation requirements
 - Downcast air 850 m³/sec
 - Bulk air cooler – chilled to 10°C
 - Chilled water plant – chilled to 5°C
 - In-stope coolers

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Rock stress

- Virgin stress up to 70 MPa
- Three structural trends
- Seismically active dykes
- Bed separation
- High abutment stresses

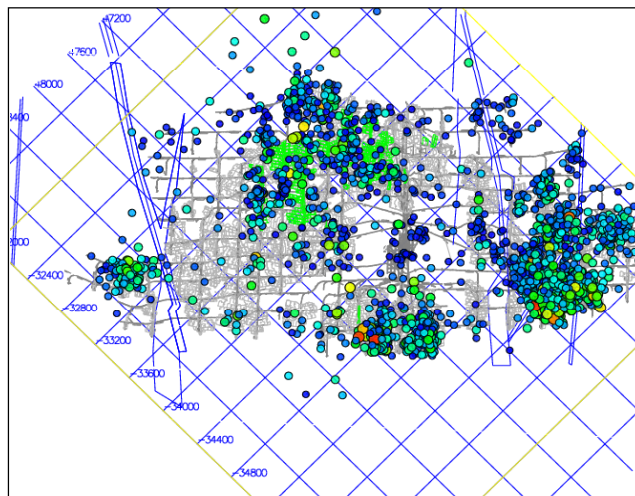


Rock stress



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Rock stress



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Rock stress



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Rechargeable ground water

- Associated with NW-SE fissures
- High yield
- High temperature (reflects VRT)
- High pressure (hydrostatic head)
- Potential flooding hazard



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Summary



- Thorough understanding of geology is key
- Interconnectivity of physical constraints
- Integration of geology into planning & production processes

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