



WE DO IT BETTER

## Analyst Visit

17 October 2006



## Agenda



- **INTRODUCTION**                      Gerhard Potgieter (**ARM Executive : Operations**)
- **PROJECT REVIEW**                      Mark Brasler (**Project Leader**)
- **OPERATIONS REVIEW**              Nico Muller (**Business Leader**)
- **SITE VISIT**
  - Underground                      Anthony Durrant (**Mining Leader**)
  - Concentrator                      Francois Vermeulen (**Process Leader**)



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# Introduction

*"Doing it Better . . . . ."*

**Gerhard Potgieter**

ARM Executive : Operations

13 October 2006



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# Introduction

- Joint Venture
  - Shareholder Agreement
  - Management Agreement
  - Active Participation
  
- Learning from previous projects
  
- Project in execution / construction site



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## Fundamentals

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- Owner Mining
  - Trial mining validated feasibility assumptions
  - Trackless room & pillar mining
- Outsource Concentrator & Tailings Operations
  - Specialist / non core services
- Undertaking to employ local labour



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## Project Review

*“Doing it Better . . . . .”*

**Mark Brasler**

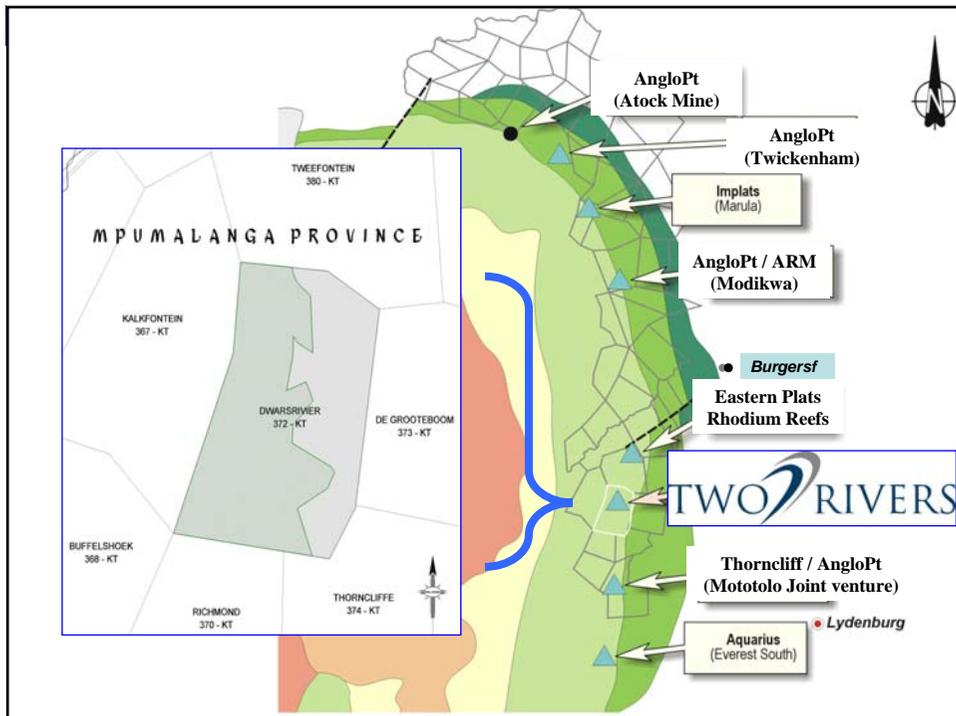
Project Leader Two Rivers Platinum

13 October 2006



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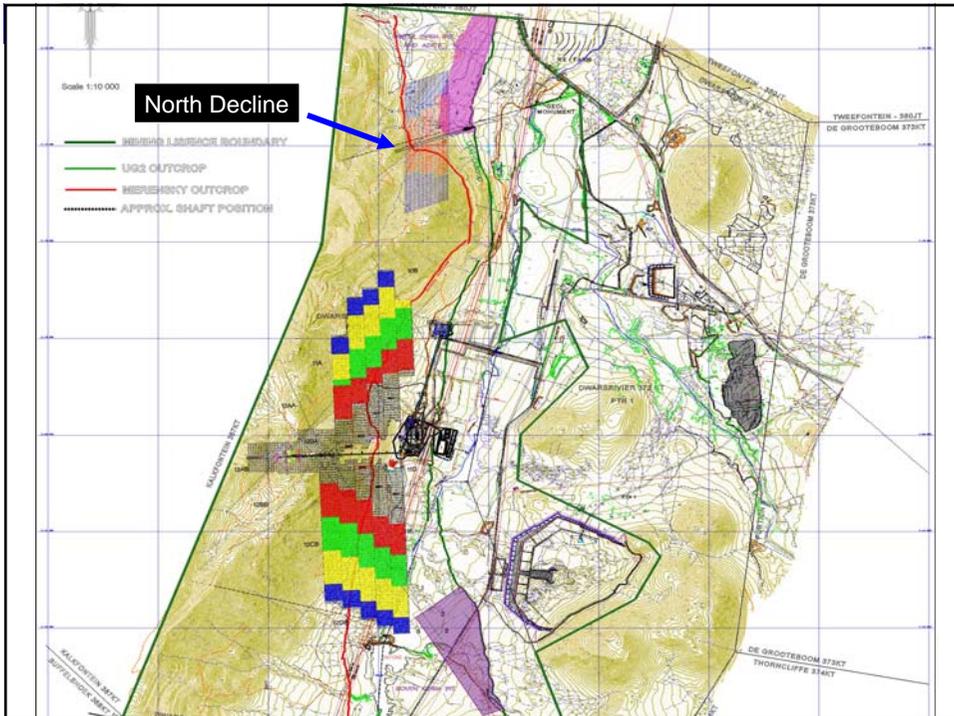




## Mine, plant & infrastructure



- Mining
  - Surface Stockpile 1 200 000 tons (October 2006)
  - Underground 185 000 tpm (LOM)
  - North Adit 40 000 tpm (LOM) Delayed
- Concentrator 2.5 M tpa MF<sup>2</sup>
  - 82.5 % recovery @ 4E 3.49 g/t
  - Design 50% waste / No DMS / optical sorting
  - Toll smelt & refine @ IRS & Springs
- Infrastructure
  - Water supply of 2.9 million m<sup>3</sup>/a secured



## Project Focus

TWO RIVERS

- To implement the capital works program within the approved budget
- To advance the concentrator ramp up schedule
- To establish a platform to sustain and improve feasibility parameters

## Milestone Dates



- Purchase land & mineral rights Dec 01
- EMPR & mining license approved Mar 03
- WULA approved Dec 03
- Trial Mining & access development Jan 04
- Project submission to ARM & Implats Dec 04
- Project release, commence construction Jun 05
- Conclude Bank Funding Agreement Sep 05
- Commence concentrator commissioning Aug 06
- Concentrator at full capacity 4<sup>th</sup> Qtr 06
- North Decline Construction Mar 07
- Commercial operations Apr 07
- Underground Mining at 185 000 tpm Dec 07



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## Project Finance



- Project Funding R 1.3 billion
  - 50% bank funded
    - 50% ABSA / 50% Nedcor
  - 50% shareholder / equity funded
    - 55% ARM / 45% Implats
- Asset Finance R 0.3 billion
  - Mining Fleet (ABSA)
  - Lydenburg Housing Development (Nedcor)



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## Resourcing



- EPCM Services
  - Concentrator & Infrastructure (DRA)
- Major contracts awarded
  - Mining access development (GLTA- Mining)
  - FFE – Mills
  - GLTA Civils – Civil construction
  - Cosira – Structural steelwork & Mechanical erection
  - Outokumpu – Thickeners & Float Cells
  - ECMP - Tailings Dam
  - Rooimech – Conveyors
  - Larox – Concentrate filter
  - Wade Walker – Portal electrical & instrumentation scope
- Lydenburg Housing development
  - Mvela Phanda Construction / Sunset Bay Partnership



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## Capital Implementation Progress (October 2006)



- + 95% complete (mine & concentrator)
  - Commitments R 1.2 billion
    - Weighted BEE / HDSA commitment 32 %
    - Expenditure R 1.1 billion
  - Site labour peak
    - Mine & Concentrator 2 200
    - Lydenburg Housing 700
- Project budget saving of  $\pm 10\%$



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## Capital Implementation : Achievements

### Team success

Executive / Shareholders / Project / Operations / Contractors / ....  
Trust in an empowered project team (C1 / satellite office)

### Realistic implementation parameters

#### Mining

##### Benchmarking

Trial Mining established the foundation to succeed

Proved mining fundamentals  
Advanced primary access development  
Stockpile Accumulation (250 000 to 1 200 000 tons)  
Optimized designs

#### Concentrator Schedule

15 months (not necessarily repeatable with current market up-tick)

#### Operational flexibility

Face redundancy (30% - 100%)  
Mill capacity (225 000 – 260 000 tpm)

### Exceeded most project objectives

Safety / Capital / Schedule / [Commissioning](#)

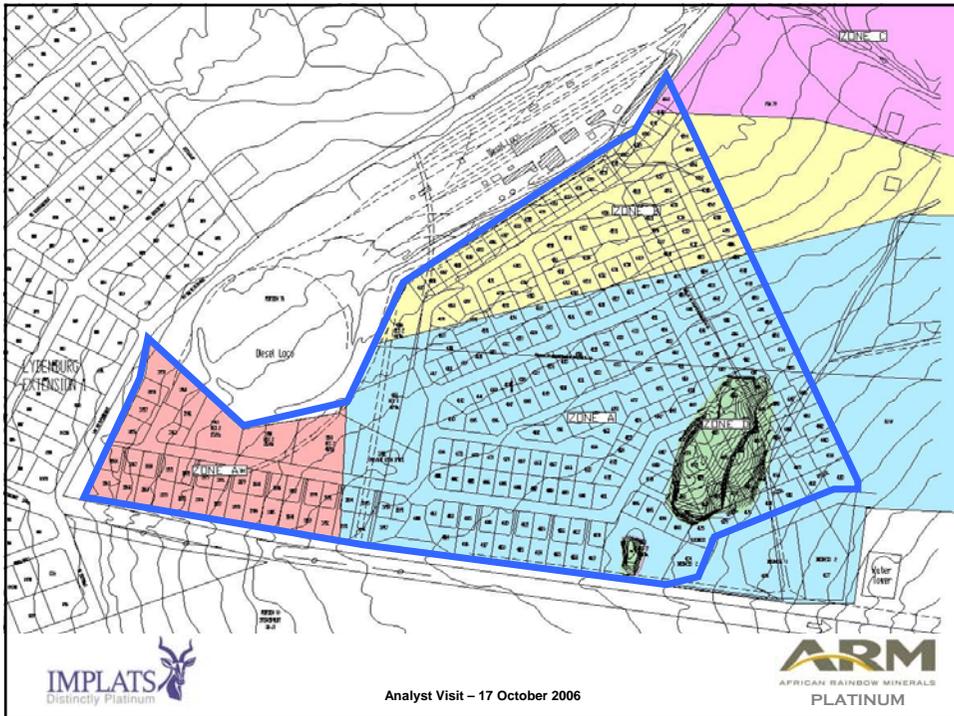


## Lydenburg Housing Development



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## Capital Implementation Challenges

TWO RIVERS

### Expedite the concentrator ramp-up

Girth gear / Mill silos / Mill gearbox lubrication / Primary mill discharge grate / ...  
 Crusher hold down bolts / Tailings barge power supply / Tailings flexible hoses / ...  
 Delivery of Strategic Spares ...

### Ongoing capital implementation scope (Focus on opening the revenue pipeline)

Mining service extensions below 4 level  
 Deluge system  
 ENGEN Diesel fuelling facilities (surface & underground)  
 Surface compressor plant  
 Richmond / Plant / Portal roads  
 Lydenburg housing (10/90/180 – 9 months behind planned schedule)

### Manage handover to new operations team

Manage capital growth

### Manage attrition within the project team (industry skills shortage)

### Project close out reporting

# Operations Review

*"Doing it Better . . . . ."*

**Nico Muller**

Business Leader Two Rivers Platinum

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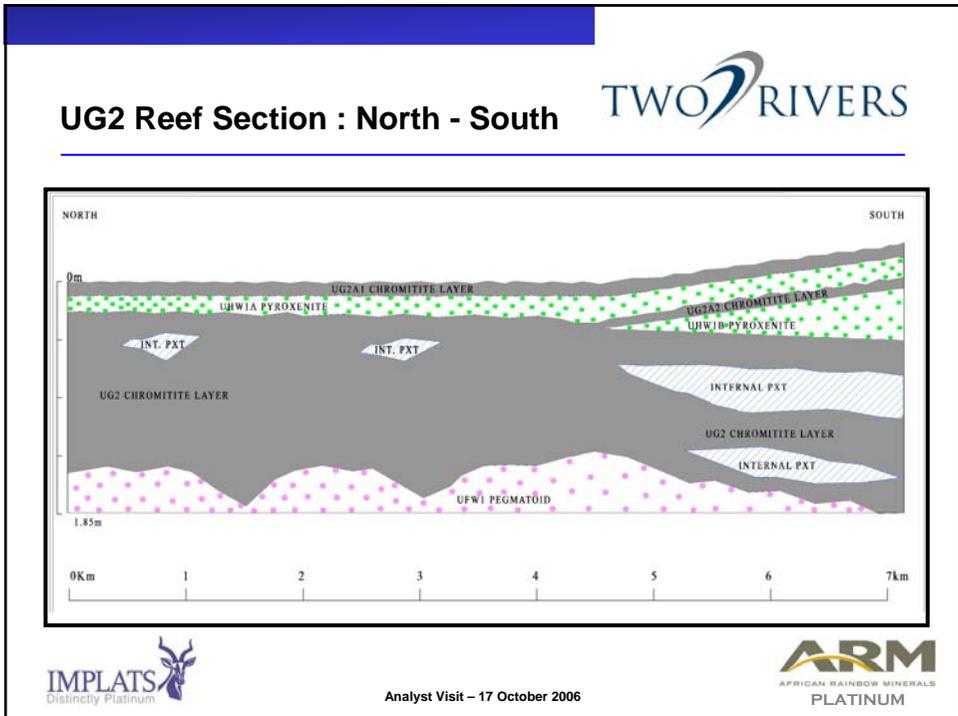
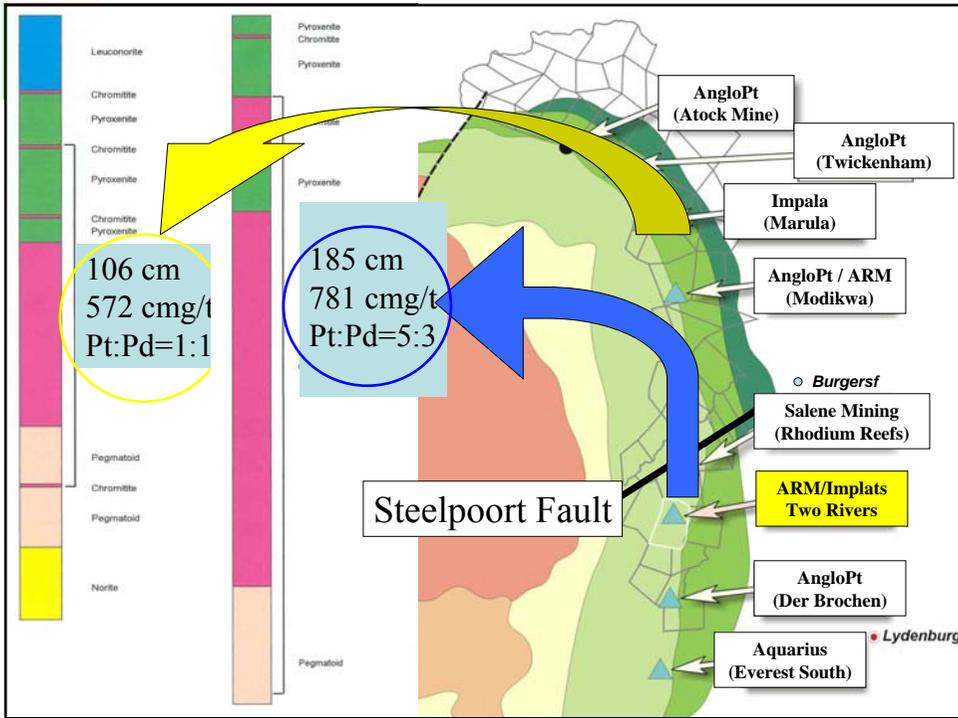


# Geology

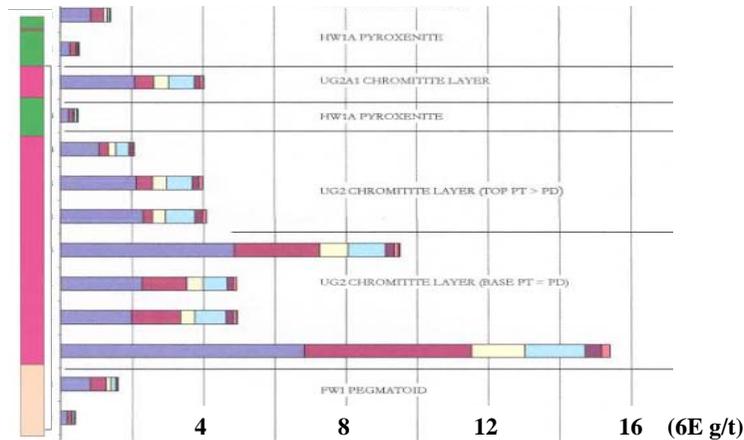


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## Typical 6E Grade Profile



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## Geology Base Parameters



- Average Dip : 10° West
- Channel Width : ≥ 1.5m
- Mining Cut : 1.85m – 2.60m
- Grade : 3.49 g/t (4E)
- Geological Losses : 30% (14%)
  - Potholes : 15% (8%)
  - Faults & Dykes : 14% (6%)
  - Repl. pegm. : 1%

Mining Method :  
Mechanized Bord & Pillar



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## Resource & Reserve Statement As at May 2006



Category	Mt	Grade (g/t)						Moz Pt	Moz 6E
		Pt	Pd	Rh	Au	(3E+Au)	(5E+Au)		
<b>UG2 Resource</b>									
Measured	13.05	2.90	1.70	0.50	0.04	5.17	6.27	1.18	2.54
Indicated	46.23	2.01	1.30	0.35	0.04	3.70	4.43	2.89	6.37
Inferred	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>59.28</b>	<b>2.21</b>	<b>1.39</b>	<b>0.38</b>	<b>0.04</b>	<b>4.02</b>	<b>4.83</b>	<b>4.07</b>	<b>8.91</b>
<b>UG2 Reserves</b>									
Stockpile	1.00	2.04	1.15	0.38	0.03	3.60	4.35	0.06	0.14
Proven	9.50	2.04	1.15	0.38	0.03	3.60	4.35	0.60	1.29
Probable	29.80	1.86	1.20	0.35	0.03	3.44	4.11	1.72	3.81
<b>Total</b>	<b>40.30</b>	<b>1.91</b>	<b>1.19</b>	<b>0.36</b>	<b>0.03</b>	<b>3.49</b>	<b>4.19</b>	<b>2.39</b>	<b>5.23</b>
<b>Merensky Resources</b>									
Measured	-	-	-	-	-	-	-	-	-
Indicated	18.7	2.06	-	-	-	3.34	3.55	1.20	2.06
Inferred	3.9	1.95	-	-	-	3.16	3.36	0.24	0.41
<b>Total</b>	<b>22.6</b>	<b>2.04</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>3.31</b>	<b>3.52</b>	<b>1.43</b>	<b>2.47</b>



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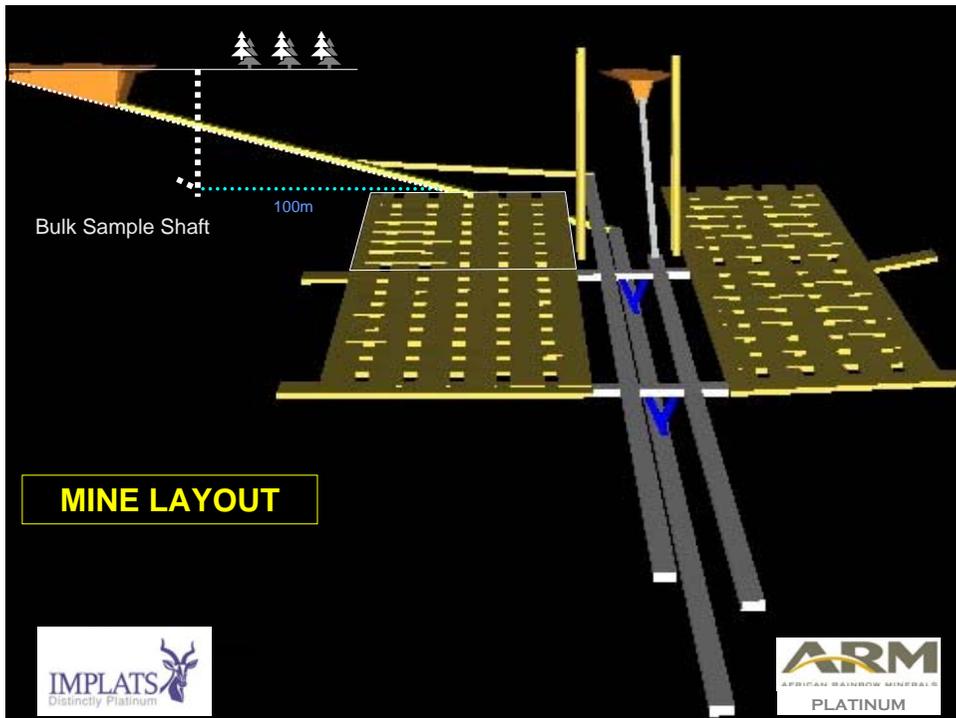


## Mining



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## Production

TWO RIVERS

- Mining Reserve 40 Mt
- Life of Mine +16 Years
  - Main Decline 185 ktpm
  - North Decline 40 ktpm
- Other Resources
  - Open Pit
  - Merensky
  - Toll Feed
  - Adjacent resources
- Average Annual Sales 220,000 Oz PGEs

IMPLATS  
Distinctly Platinum

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PLATINUM

## Mining Fleet



Activity	Machinery	Totals
Face Drilling	1X AXERA LP D/BOOMER 8 X ATLAS S1L DRILL RIG	9
Loading	1 X TORO 007 LHD (4659) 1 X WAGNER ST 600 LHD 1 X TORRO 400 LHD 15 X LHD 115 LP 1 X WAGNER ST400 LHD 1 X GHH LHD	20
Rock Bolting	8 X ROBOLT LP BOLTER 1 X DBT Bolter	9
Logistics and charging	1 X Fermal UV 17 X SECO UV 42	18
Personnel Transport	1 X Fermal Jeep 5 X Toyota 4X4 LDVs	6



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## Production Crews



- Mining Crews : 11
  - 1xMiner
  - 1xTeam leader
  - 1xDrill rig operator
  - 1xRoofbolter operator
  - 1xUV operator
  - 2xLHD operators
  - 2xPTV
  - 2xtip attendants
- Work Arrangement
  - Shift – 9 hrs
  - 2 x Shifts per day
  - 2 x 12m panels per shift
  - 3m advance per blast
  - 500 t / crew / shift
  - 45 t / man / shift
  - 20,500 t/ section / month
  - 11 day fortnight
  - Conops options

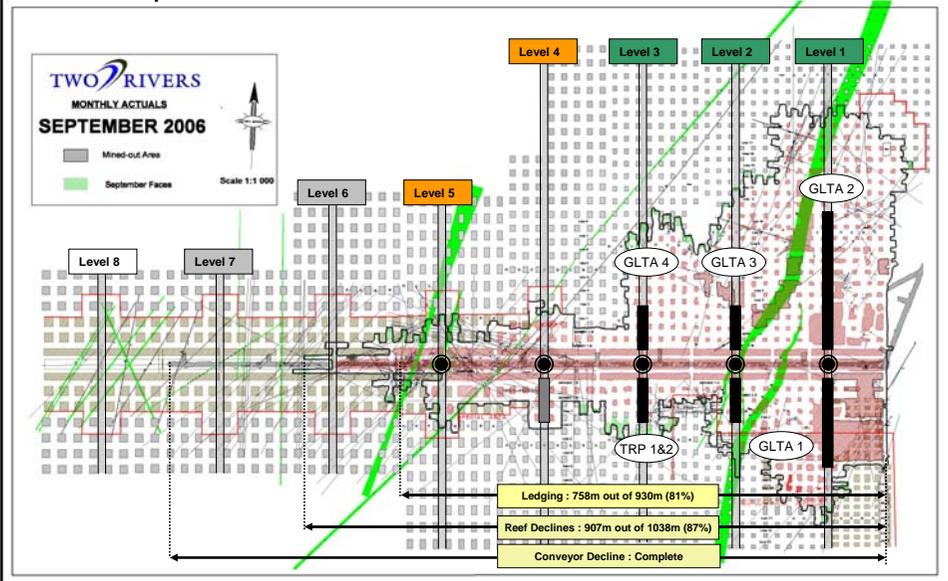


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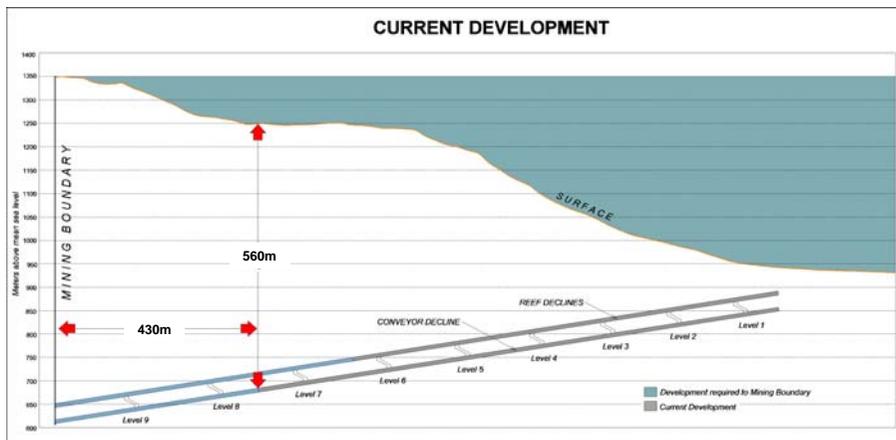


# Mining Layout

End of September 06



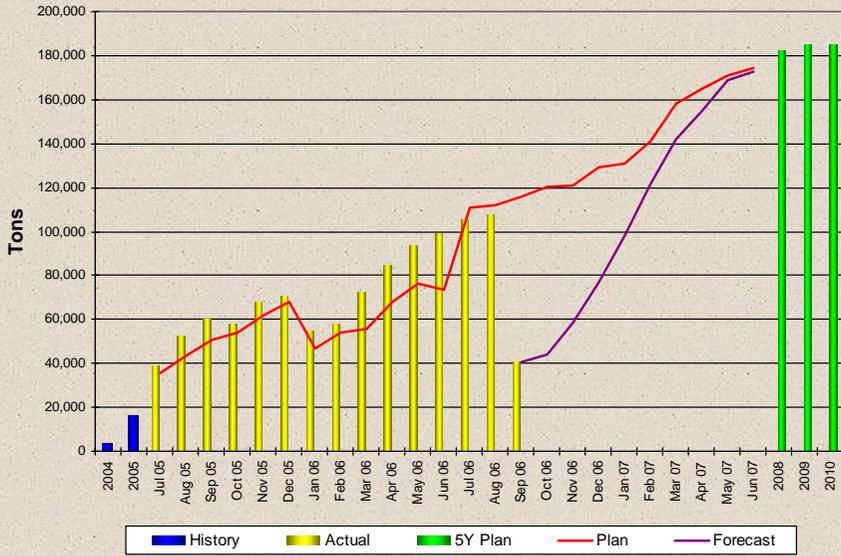
# Decline Cross Section



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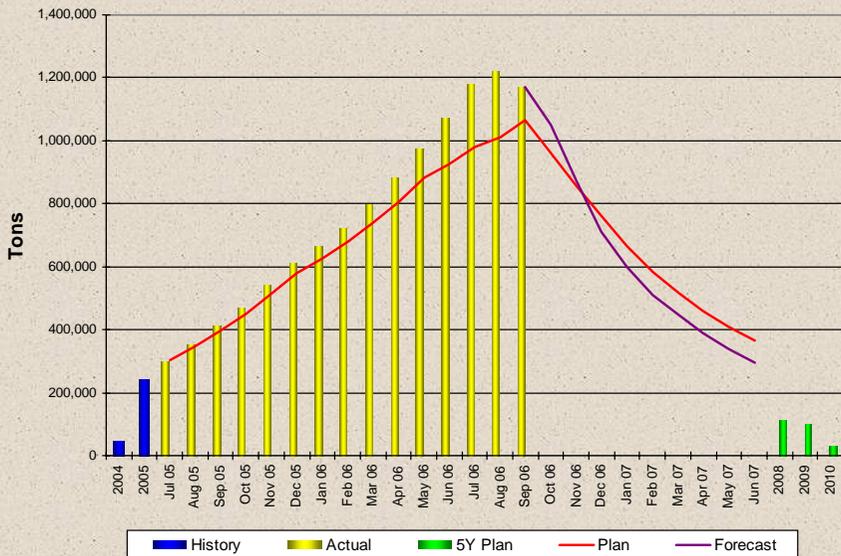


# ROM TONS



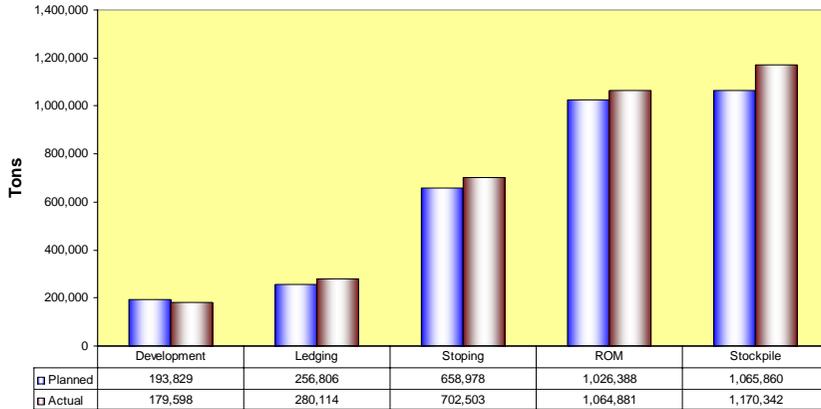
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# Reef Stockpile



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## Overall Production Performance Jul 05 – Sep 06



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## Concentrator Plant



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## Concentrator Plant



- Plant Commission
  - Commissioning started ahead of schedule
  - Critical commissioning challenges resolved
  - Awaiting final strategic spares
  - Full throughput by end of year
  - Early recoveries higher than planned
- General
  - Contractor operations (EPC)
  - 82 staff (contractor & mine)
  - Conops
  - 2 x 12hr shifts per day
  - 4 on 4 off cycle



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## Commissioning Challenges



Mill Silo Damage



Mill Discharge Screen



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## Plant Commissioning

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Mill Gearbox Bearing



Girth Gear



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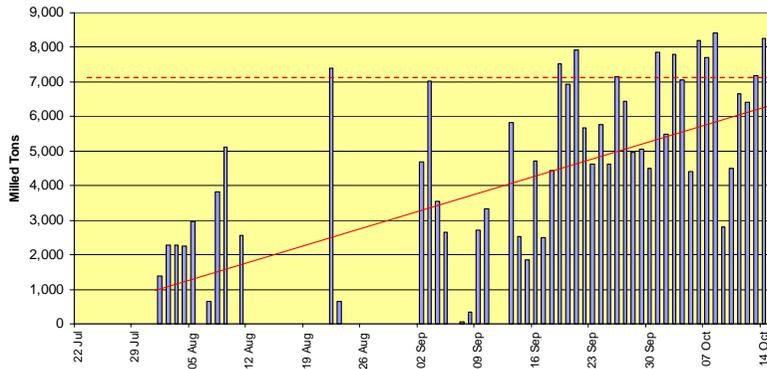
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## Plant Performance

TWO RIVERS

### CONCENTRATOR PLANT



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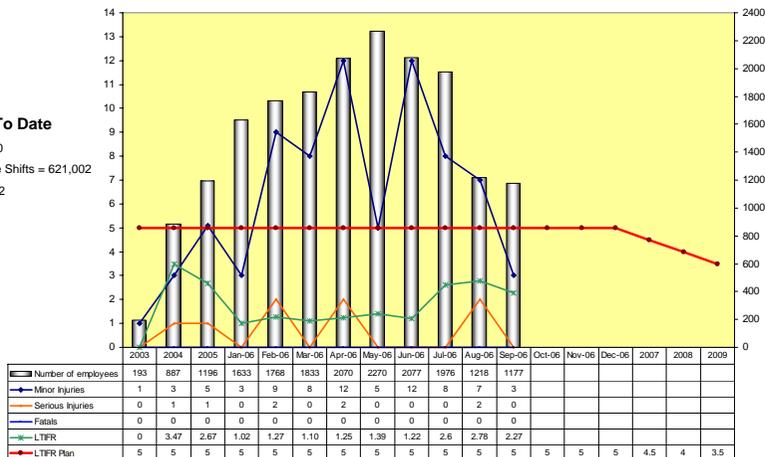
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# General

# Safety Performance

**Project To Date**  
 Fatalities = 0  
 Fatality Free Shifts = 621,002  
 LTIFR = 1.22



## Operating Cost

Jul 06 – Sep 06



2007 Financial Year : 1 <sup>st</sup> Quarter				
Description	Unit	YTD Actual	Plan	Var
<b>Operating Cost</b>	<b>R mil</b>	<b>72.0</b>	<b>94.2</b>	<b>22.2</b>
Mining	R mil	35.7	37.8	2.1
Process	R mil	19.0	31.1	12.1
Other On Mine Costs	R mil	17.3	25.3	8.0
<b>ROM Tons</b>	<b>kt</b>	<b>253</b>	<b>338</b>	<b>-86</b>
<b>Cash Operating Cost</b>	<b>R/t</b>	<b>285</b>	<b>278</b>	<b>-7</b>

**Notes**

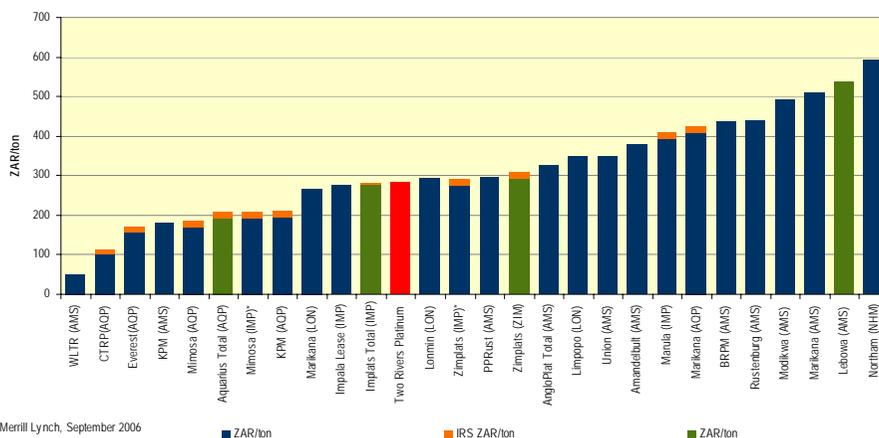
- Other On Mine Costs excludes change in value of unsold stock
- Increase in unit costs due to lower production (strike)
- Unit operating costs reflect current costs during ramp up - not steady state costs



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## Industry Cost Curve



Merrill Lynch, September 2006



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## Operational Labour



- Total labour plan = 1000 people
  - 650 Mine employees
  - 350 Contracted out services
- Employment of local labour
  - To the extent possible
  - Initial skills through contracting



IMIU - 30 March 2006

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## Licensing & Permits



- North Open Pit
  - Application submitted in 2003
  - Rejected in May 2006
  - Appeal process
- North Decline
  - Full application required & well advanced
  - Scoping document
  - Authorities & I&A Parties consultation concluded
  - Submission date : 27 October
- New Order Mining Rights
  - Expected submission date : Feb 07
  - Technical skills (artisans, foreman)



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## The Way Forward

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- Production
  - Recruitment & Training
  - Decline Extension
  - Additional Fleet
  - North Decline
  - Full Calendar Operations
  - Continuous Improvement (LTIFR, R/t, t/man, . . . )
- Skills Development
  - UG Training Section
  - Training Fleet
  - Simulators
  - Learnership Programs
  - Regional Training Infrastructure
- Concentrator Plant
  - Tailings dam return water
  - Critical Spares Delivery
  - Process Optimisation (recovery, availability, throughput, . . . .)



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## The Way Forward

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- Licensing & Permits
  - North Decline Environmental Authorisation (Nov 06)
  - New Order Mining Rights (Feb 07)
- Local Communities
  - Skills Development Programs
  - Local Economic Development (SMME's)
- Management Systems
  - ERP
  - Production monitoring
  - SHEQ



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# *Thank You Questions ?*