IMPLATS
Site visit
October 5, 2001

Efficiencies – Pieter Anderson

“Soaring to new heights”
Efficiency highlights

- Excellent production efficiencies with room for improvement
- Highest ever stoping efficiencies achieved by Impala.
- Outstanding shaft performances:
  - Two shafts achieved more than 56 centares per panel man
  - 12 # produced 577 centares per panel team in FY2001.
Efficiency highlights

- 4 # improved from 31 centares per panel man to current performance of 43 over the last few months (39%)
- Top 20 performing stoping teams
  - Constant efficiency achievement of 70 centares per panel man in 2001
  - Teams averaged 685 centares per panel team per month with a 23 metres face advance (100% of potential)

Top performing crew captain

Oupanyana Molefe (VA1D)

- 81 centares per panel man
- 722 centares per month
- 9 man team
- Sep ’01 performance:
  - 101 centares per panel man
  - 1 043 centares produced
  - 10 employees at work
Soaring to new heights – our potential

- Current stoping face advance of 17 metres per team per month vs a 23 metre potential
- A 36% improvement on stoping face advances is not a dream
- One additional blast (one metre) per team per month equals R400 million turnover per annum
- Additional six metres per team per month potential still available
- Development efficiencies have the most room for improvement (50% to potential)

Our first step – Daily Production System

- Implemented a Daily Production System (DPS) on all our shafts
  - This provides mining operations with detailed daily information on reasons for non-production, achieved and planned production per production team amongst other things
  - This is most useful in identifying trends and problem areas quickly
  - Our objective is a proactive approach towards utilising the system and its information
Our lost blast problem

Lost blast distribution - Stoping

- 33% People
- 12% Equipment
- 25% Material
- 2% UnNat Environment
- 20% Nat Environment
- 8% Blasting

Joint effort between the mining operations and FIXCO initiatives
Under the management of dedicated “FIXCO champions”
Focussing to improve identified problem areas

“Re-energised” Fixco process
Daily reporting – “Smartie box”

- Our goal is a Safe, Quality, Daily Blast
- Keep it simple by creating pictures (Tell the story)
- Identify trends easily (Don’t flash info)
- Information available per team per day
- Focus on lost blast and low blast
- Face advance per blast
- Focus more on potential and revenue
## Trends and analysis - Spotlight

**Lost blast due to Power Failure**

<table>
<thead>
<tr>
<th>Days</th>
<th>No. of lost blasts</th>
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- Total Impala – 57 Lost blasts
- 6 Shaft - 5 Lost blasts
- 8 Shaft - 6 Lost blasts
- 12 Shaft - 3 Lost blasts
- 14 Shaft - 3 Lost blasts
- 8 Shaft - 29 Lost blasts
- 8 Shaft - 3 Lost blasts

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## A new production bonus – July 01

- Same effort same pay (Mining methods and occupations)
- Cut off points introduced (Minimum requirements).
- Focus on production outputs (advance) per team without sacrificing labour productivity
- "Pot" - concept introduced for development teams
- Additional face advance bonus to Crew Captains up to R2 000 per team
### Production bonus

#### Effort Scale – Zero to 100%

<table>
<thead>
<tr>
<th>Effort Scale (%)</th>
<th>Ave. Efficiency per Team</th>
<th>Ave. Advance per Team</th>
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<tbody>
<tr>
<td>30%</td>
<td>240</td>
<td>330</td>
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<tr>
<td>40%</td>
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<td>90%</td>
<td>1450</td>
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<tr>
<td>100%</td>
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Legend:
- Cut-Off
- Current average
- Reality
- Potential

### What else did we do?

- Centralised blasting system implemented on all shafts to reduce the number of lost blasts due to misfires
- Daily lost blast committee meetings focus on reasons for lost blasts have proved to be a success
- Exception reporting and focusing on problem areas
“Intensive Care Unit” approach

- 120 stoping ICU teams identified
- 40% of total lost blast problem in these teams
- If we increase the ICU team’s productivity by 30%
  - 520 000 Additional tons pa
  - Potential 2 100 kg pa (R260 million turnover)
- These teams improved over last three months:
  - 17% increase in productivity
  - 61 000 additional tons
  - R41.2 million extra turnover

Focus on 20% stoping ICU Teams

ICU Teams improved by 47 ca per team (17%) resulting in 61 000 additional tons and R 41.2 million turnover since June ’01
Panel lengths decreased

Total Impala – Panel lengths

- An average of 1.5 m panel length more per team
  - Equals 200 000 centares pa
  - Increase total face length by 1 500 m
  - Equals 800 000 channel tons pa
  - Potential 3 360 kg (R420 million turnover)
  - Grade improvement
  - Increase in efficiency

What-if scenario – Increased panel lengths
Development and optimisation

- Re/pre development ratio vs stoping production
- Increase in development team sizes to gain better advances per team
- Optimisation
  - Fixco initiative concerned with optimisation of raise lines to gain maximum efficiencies on half level production
- Looking at processes to ease operations

Optimisation & Re/Pre Development

<table>
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<th>UG2 (Jun '01 - Aug '01 Ave)</th>
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Table showing various data and calculations related to development and optimisation.
The way forward

- Improving people skills
- Focus on revenue output without sacrificing labour efficiencies
- Other key drivers:
  - Advance per team
  - Advance per blast
  - Team sizes
  - Panel lengths
  - ICU team training

The way forward

- Reconciling and one version of the truth
- Proactive approach
  - Collection of lost blast information before 08h00
  - Services departments take action and assist same morning to prevent possible lost blast
- Ongoing process of converting data into management information to assist in formulating action plans
- Computers planned for all Mine Overseers.
New technology

Technology advancement prediction

<table>
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<tr>
<th></th>
<th>Stopping efficiency</th>
<th>Shaft head costs</th>
<th>Stope labour</th>
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<tbody>
<tr>
<td>Conventional</td>
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<td>Drill/blast</td>
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<td>Rock splitting</td>
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<td>Bord and pillar</td>
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Graph showing the advancement prediction for stopping efficiency, shaft head costs, and stope labour.