GUIDELINES

• specific to the Australian coal industry
• wide audience (undergraduates, operators and bankers)
• needs to cover basics and advanced

AIMS

• to share some experiences
• to describe the basic features of draglines and truck and shovel systems
• to quantify how dragline design can be varied to meet different guidelines

APPROACH

1. Broad overview of the Australian industry
2. Basic features of truck and shovel and dragline mining systems
3. Introduce an example mine
4. Quantify three different digging options

SHAREHOLDER GUIDELINES

• minimal capital
• low risk
• low cost (especially relative to competitors)
• maximise value from the resource, and
• comply with statutory, safety and environmental standards.

CHANGES – 3 DECADES

• higher annual tonnages (+10Mtpa now)
• there has been consolidation of ownership
• there is a much wider use of contractors
• mines are deeper, more complex and operate at higher strip ratios
• the equipment is larger
• less operators
• hydraulic excavators are more common
AUST OPEN CUT MINES

Strip Ratio

North Qld
Central Qld
Western NSW
Hunter Valley
Southern Qld
Central Qld

AUST OPEN CUT MINES

Dragline Only
Plant & Shovel 
Dragline with Truck 
& Shovel

DRAGLINE VS TRUCK AND SHOVEL

Nominal Prime Capacity

SA/bcm

2.50

Approximate capital and operating cost

SA/bcm

1.30

$A/bcm

1.60

$A millions

34

Capital

$A/bcm

1.08

Cash operating cost

$A/tonne

26

DRAGLINE VS TRUCK AND SHOVEL

EXAMPLE MINE

- 60 m to 180 m deep
- 150Mt reserves
- Strip ratio from 6.6 bcm/t to 15 bcm/t
- Selling price from $25 to $30 per tonne
- Existing 90 cu.m dragline
- Truck and shovel prestrip
1. The overburden is blasted with moderate throw, then dozed to form the dragline bench.

2. The primary dragline cuts a key and builds a bridge. It then removes more of the key and builds an in-pit bench.

3. The in-pit bench is dozed while the dragline is relocating.

4. The pullback dragline rehandles the in-pit bench into the previous row of spoil piles.
5. The primary dragline then takes most of the remaining in situ block to spoil.

**PROCESS**

1. Schedular
2. Fleet Calculator
3. Economic model
4. Results

**RESULTS**

<table>
<thead>
<tr>
<th>Item</th>
<th>Units</th>
<th>Shallow Fast 45m</th>
<th>Base Case 65m</th>
<th>Deep Slow 90m</th>
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</thead>
<tbody>
<tr>
<td>Average production</td>
<td>Mtpa</td>
<td>8.9</td>
<td>5.0</td>
<td>2.5</td>
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<tr>
<td>Percent Dragline</td>
<td>%</td>
<td>44</td>
<td>60</td>
<td>81</td>
</tr>
<tr>
<td>Percent Track and Shovel</td>
<td>%</td>
<td>64</td>
<td>40</td>
<td>9</td>
</tr>
<tr>
<td>Average Operating Cost</td>
<td>S/t</td>
<td>24.26</td>
<td>20.32</td>
<td>17.56</td>
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<tr>
<td>Relative NPV @ $25</td>
<td>SM</td>
<td>425</td>
<td>437</td>
<td>375</td>
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<tr>
<td>Relative NPV @ $25</td>
<td>SM</td>
<td>130</td>
<td>251</td>
<td>233</td>
</tr>
</tbody>
</table>

**RESULTS**

[Graphs showing coal and waste production schedules.]
1. Can vary dragline and T&S designs with a considerable range of results
2. There is no right or wrong
3. If shareholders are presented a range of options they can make informed business decisions

"Thank you"

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