



Inaugural
UNSW/Mitsubishi Lecture

Dragline –v- Truck & Shovel: Technical and Business Considerations

Presented By

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GUIDELINES

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

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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

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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

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CHANGES – 3 DECADES

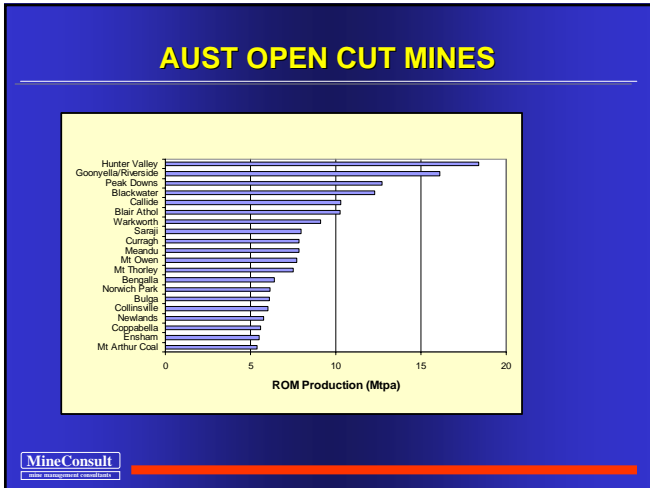
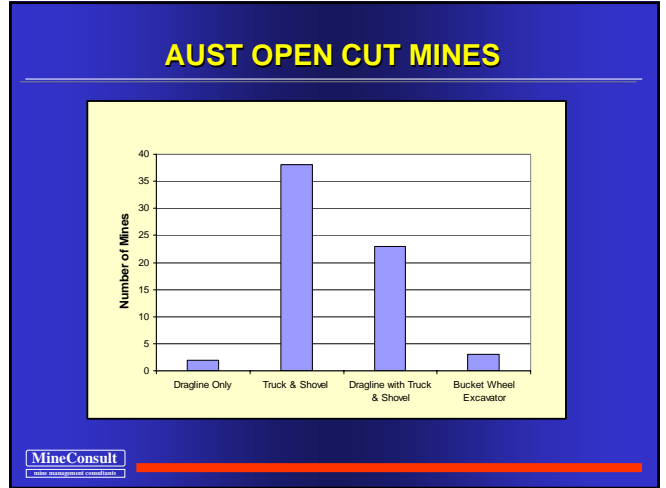
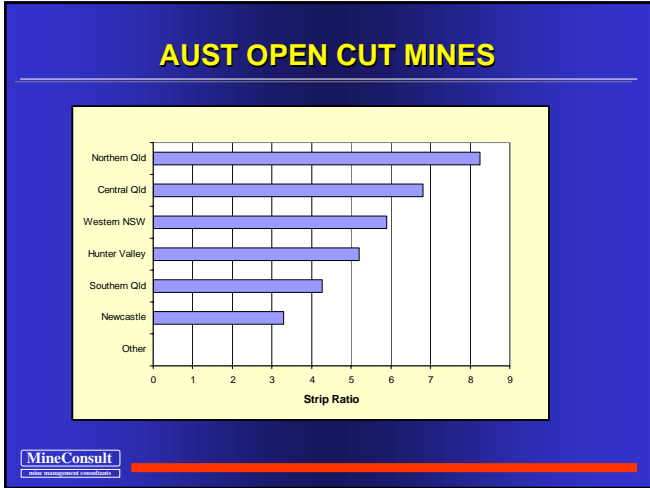
- higher annual tonneages (+10Mtpa now)
- there has been consolidation of ownership
- there is a much wider use of contractors
- mines are deeper, more complex and operate at higher strip ratios
- the equipment is larger
- less operators
- hydraulic excavators are more common

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SHAREHOLDER GUIDELINES

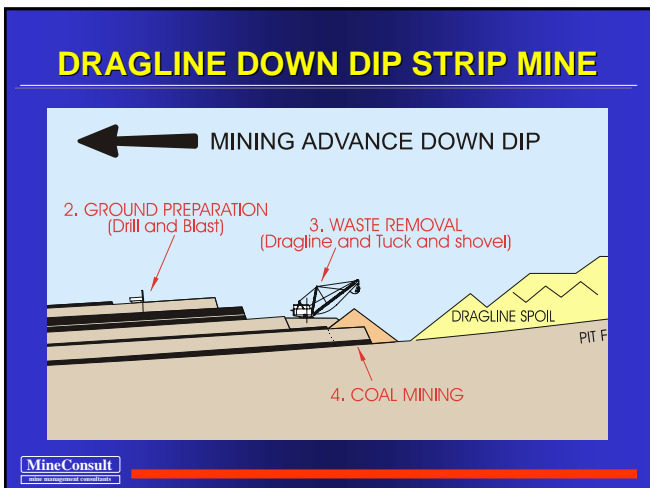
- minimal capital
- low risk
- low cost (especially relative to competitors)
- maximise value from the resource, and
- comply with statutory, safety and environmental standards.

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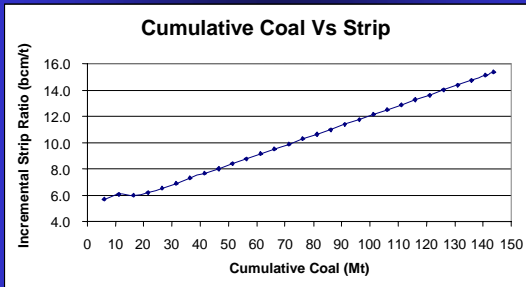
DRAGLINE VS TRUCK AND SHOVEL

	Units	Dragline	Truck and Shovel
Nominal Prime Capacity	Mbcm	26	11
Capital	\$A millions	80	34
Cash operating cost	\$A/bcm	0.80	1.60
Approximate capital and operating cost	\$A/bcm	1.30	2.50



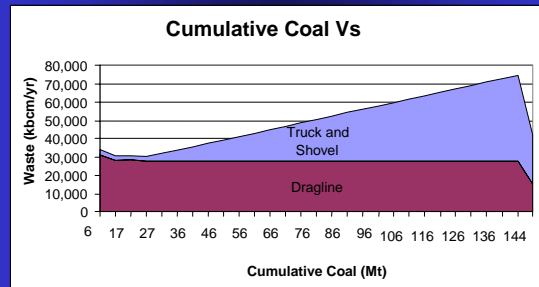
- ### EXAMPLE MINE
- 60 m to 180 m deep
 - 150Mt reserves
 - Strip ratio from 6.6 bcm/t to 15 bcm/t
 - Selling price from \$25 to \$30 per tonne
 - Existing 90 cu.m dragline
 - Truck and shovel prestrip

EXAMPLE MINE

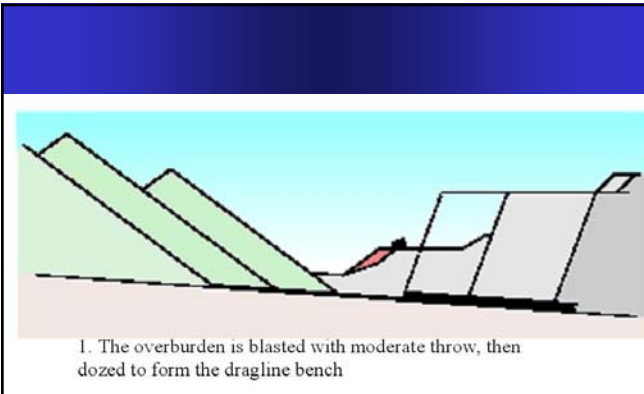


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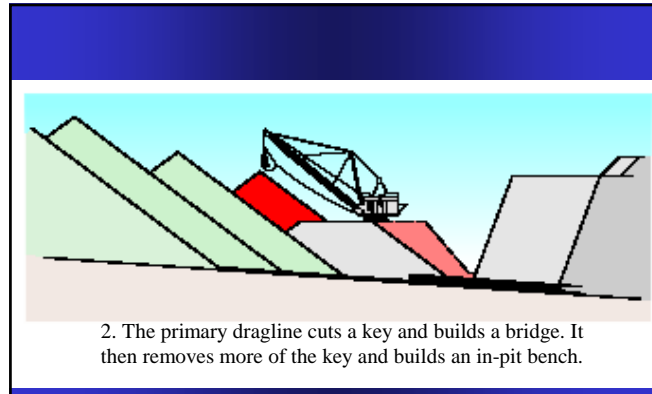
EXAMPLE MINE



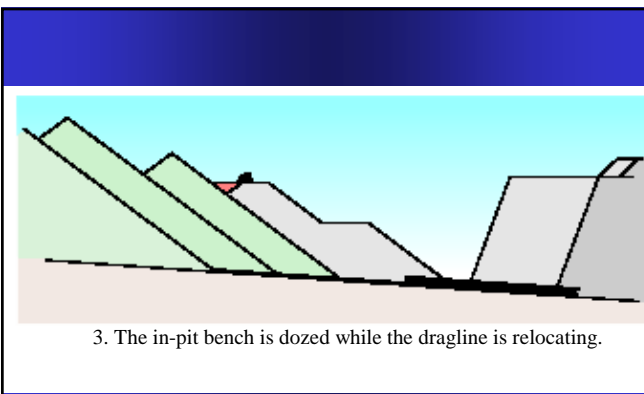
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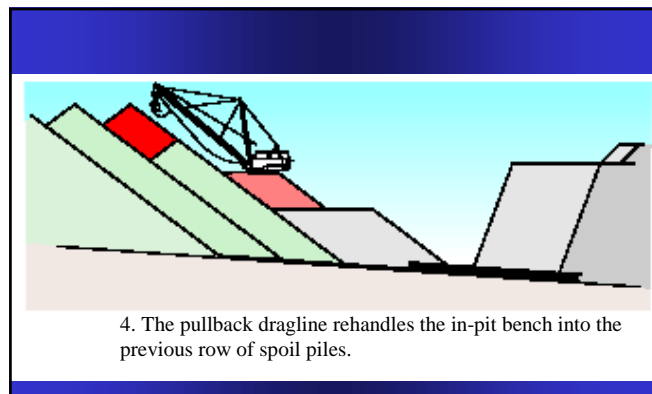
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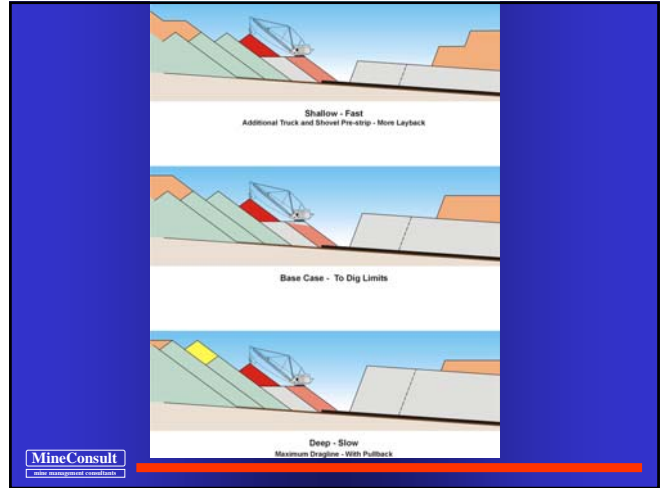
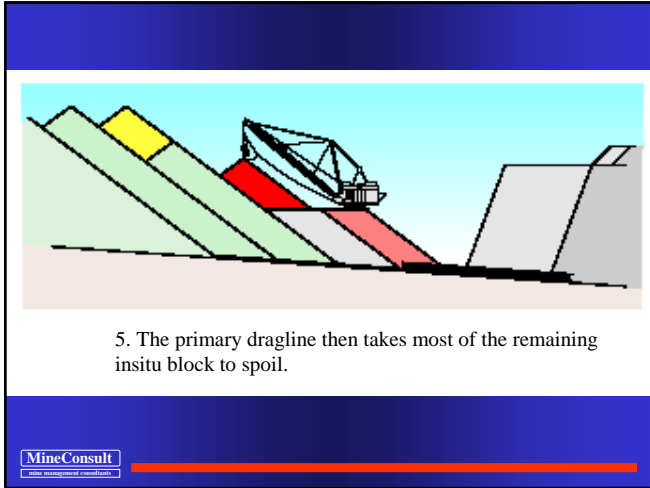
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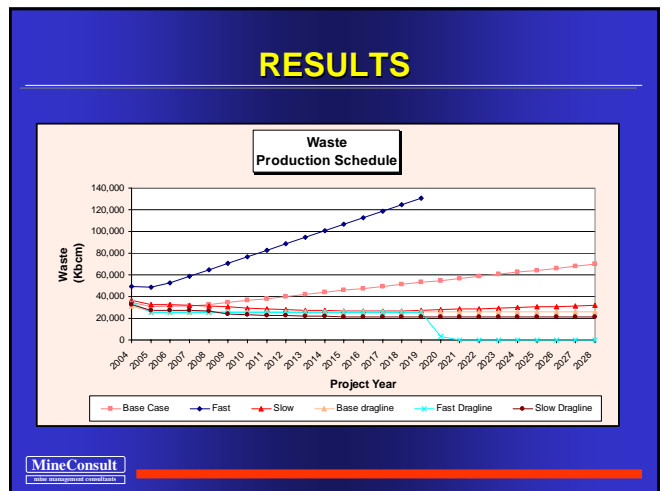
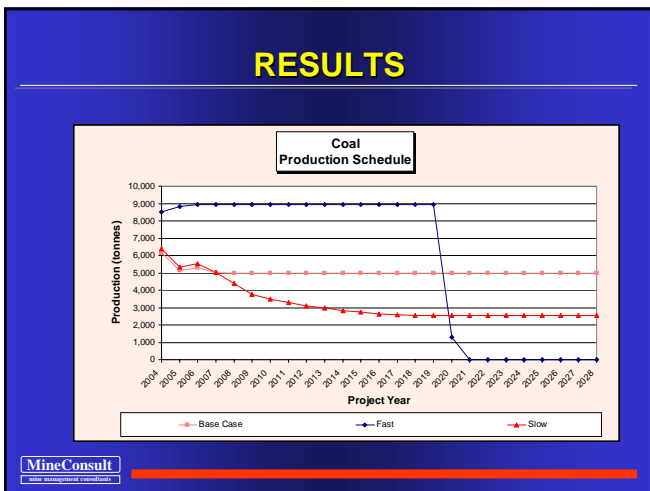


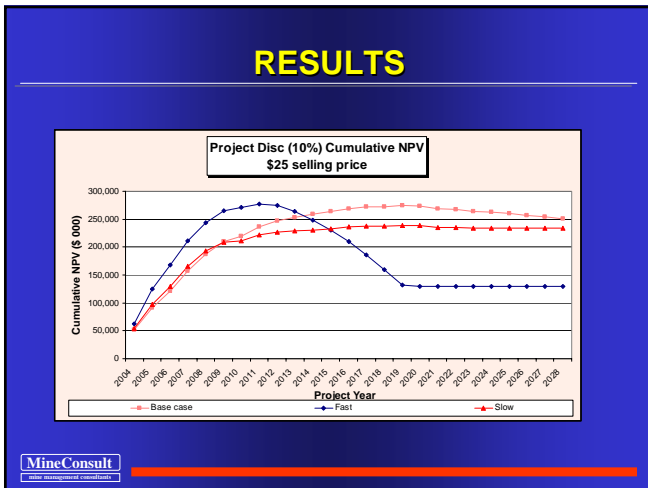
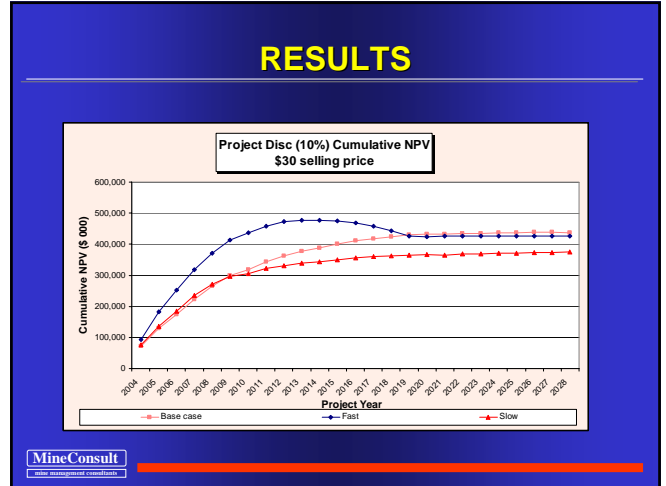
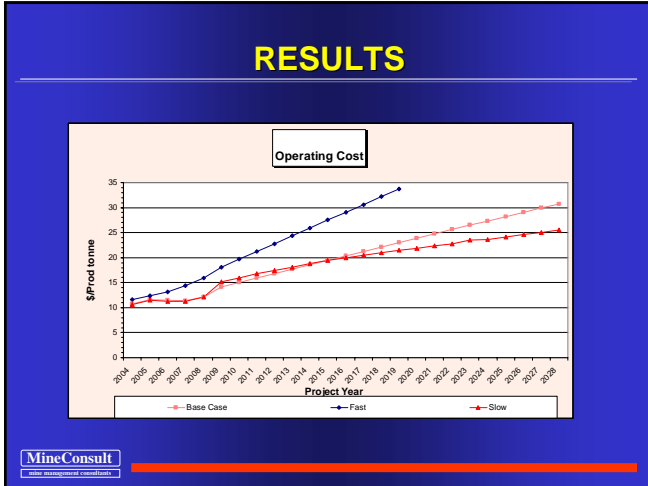
PROCESS

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

RESULTS

Item	Units	Shallow Fast(45m)	Base Case(65m)	Deep Slow(90m)
Average production	Mtpa	8.9	5.0	2.5
Percent Dragline	%	44	60	81
Percent Truck and Shovel	%	64	40	9
Average Operating Cost	\$/t	24.26	20.32	17.56
Relative NPV @ \$30	\$M	425	437	375
Relative NPV @ \$25	\$M	130	251	233





- ### CONCLUSIONS
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
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“Thank you”

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