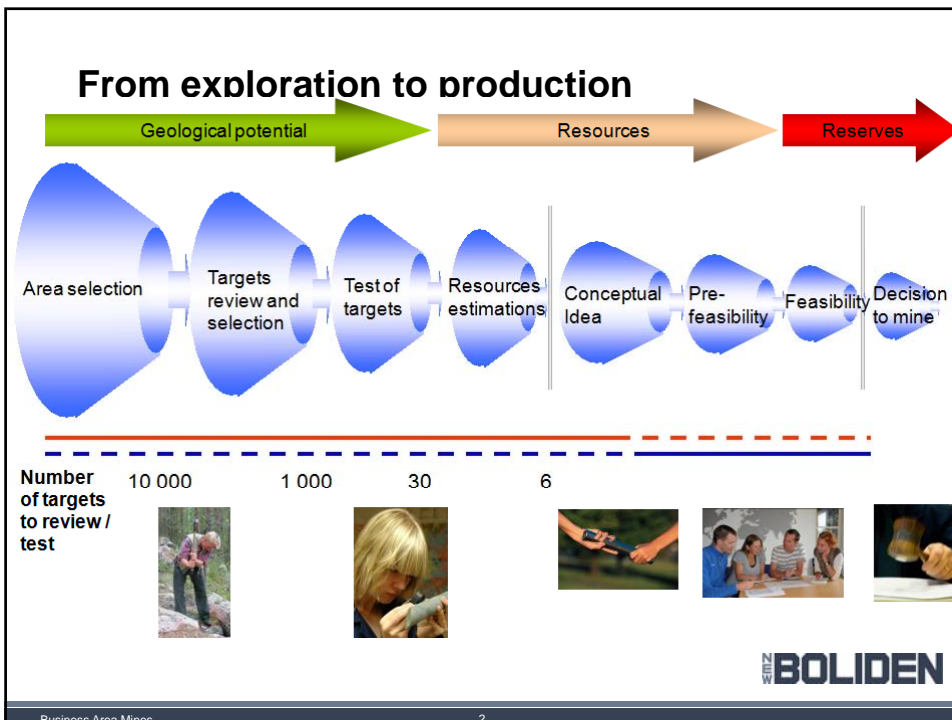




**Capital markets day
2 September 2009**

...to Mine
Ulf Marklund
Technical Director, BA Mines

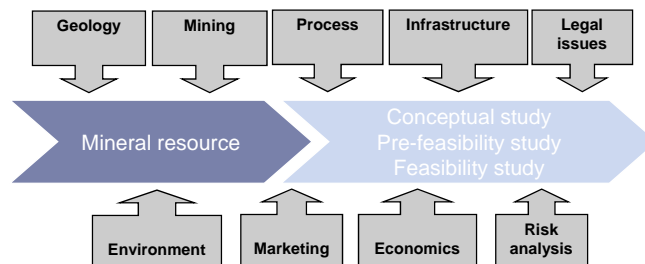


Moving a Mineral Resource to Reserves and a Mine....

- After establishing a geological model for the mineral resource, the work mainly consists of engineering work based on economic prerequisites
- Long lead times from mineral resources to mine, 5-10 years in case of a new mine
- Environmental permitting increasingly in focus

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Parts Included in a Resource Development Project



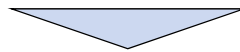
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Conceptual study



Output

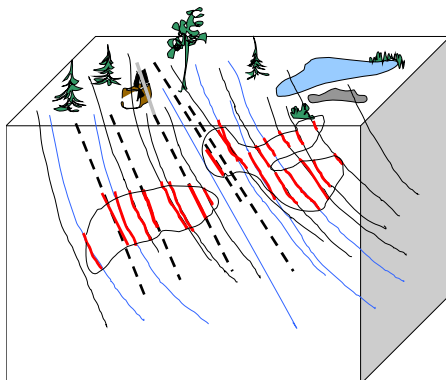
- Mine design options
- Process design options
- Preliminary market outlook
- Indicative LOMP
- Economical estimates
- Recommended options
- Drilling program



Go, No Go decision

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Going from Inferred to Indicated Mineral Resources Requires more Drilling....



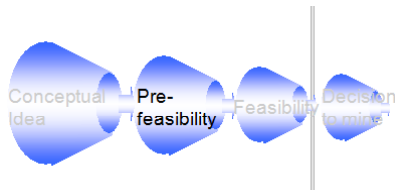
- Quantity delineated with reasonable probability
- Geology and grade model



- **Indicated Mineral Resource**

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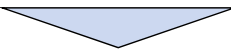
Pre-feasibility Study



- Alternative solutions studied
- Iterative process
- Accuracy +/- 20 - 25 %

Output

- Mine design
- Process design
- Plant design
- Prel LOMP
- Economic evaluation
- Ore Reserve



Go, No Go decision

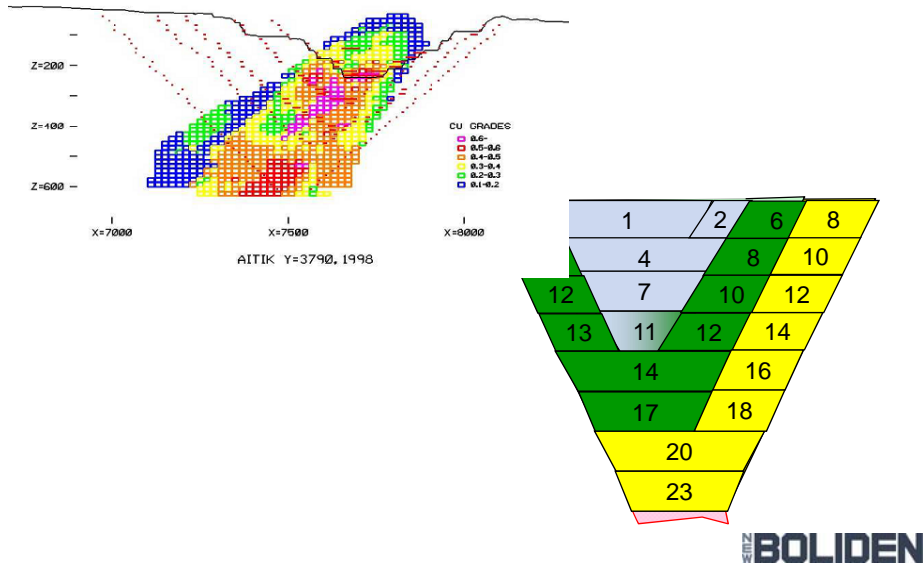
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Mine design

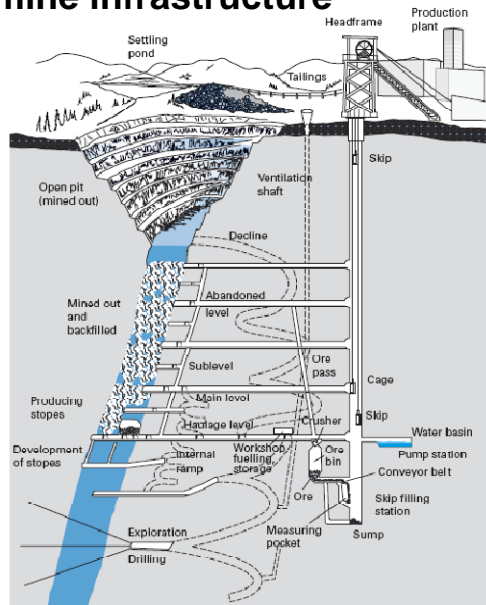
- Most important
 - Knowledge of ore body and rock conditions
 - Efficient mine infrastructure
 - From basic design establish plans in long and short term for mining out the ore reserve (LOMP)
- Mining method
 - Method selection crucial
 - Many criteria for method selection
 - Shape of ore body and rock quality
 - Best suited scale of equipment and stopes
 - Amount of ground support needed
 - Control of ore recovery and waste dilution
- Infrastructure
 - Type of hauling and hoisting
 - Ventilation and water handling
 - Size and conditions of drifts and ramps
 - Possibility for automation

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Sequencing and Production Plan



U G mine infrastructure



Process design

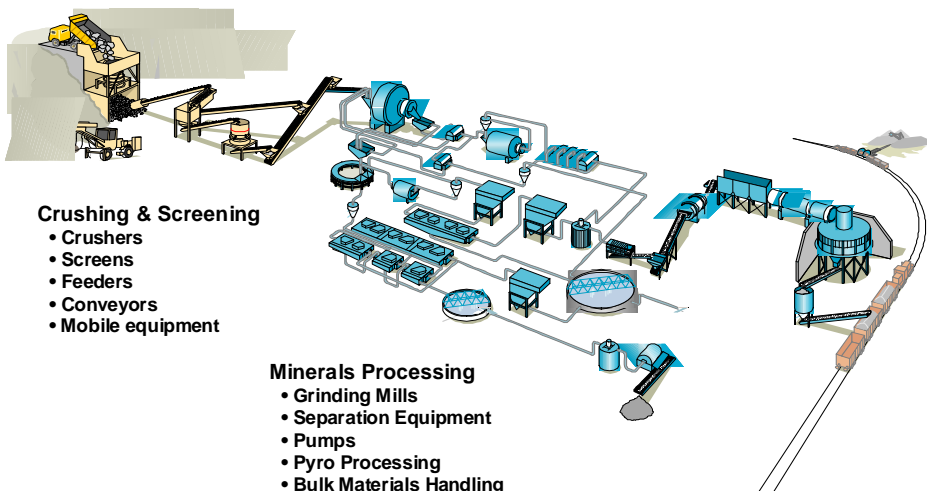
- Most important
 - Recoveries of metals
 - Concentrate quality
 - Penalty elements
- Process route
 - Type of process grinding and separation
 - Energy consumption
 - Chemicals consumption
- Equipment
 - Capacity, +- grindability
 - Variations in feed grades

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Enhet/verksamhet

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Process and Plant design



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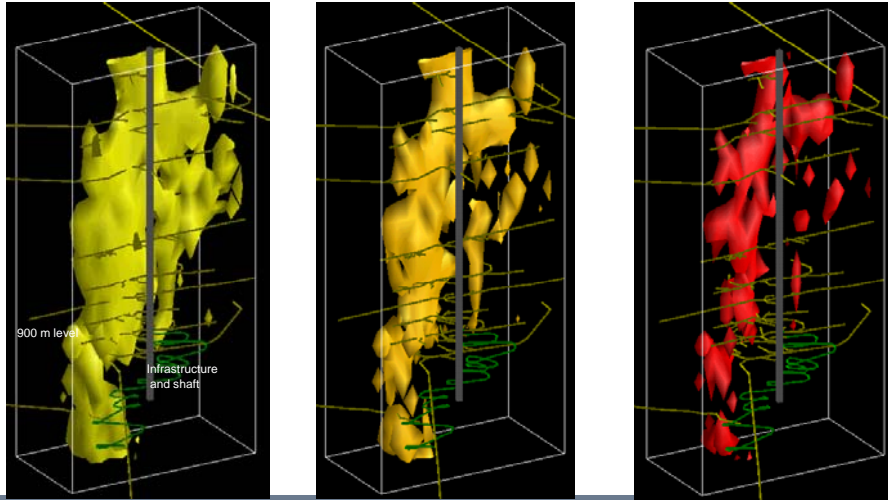
Business Area Mines

12

Effects of Costs and Metal Prices on Ore Reserve

← Increasing metal price / Decreasing production cost

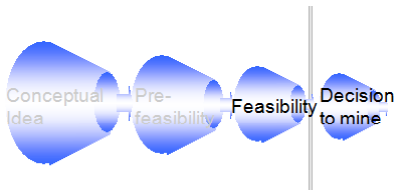
Decreasing metal price / Increasing production cost →



Business Area Mines

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Feasibility study



- Capex accuracy +/- 10 - 15 %
- Head grades accuracy +/- 5%

Output

- Mine design
- Process design
- Economic evaluation
- Ore Reserve
- Detailed equipment list
- Lay Out Drawings
- Implementation plan
- Sensitivity analysis
- Permits
- LOMP



Board of Directors

BOLIDEN

BA Mines

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LIFE OF MINE PLAN

		B2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Revenues	MSEK	775	732	850	1 015	1 011	1 011	1 011	1 011	654	654	446	
OPEX	MSEK	519	530	512				453	438	438	438	438	123
EBITDA	MSEK	256	202	337				558	573	216	216	8	
DEPRECIATION	MSEK				150	150	150	150	150	150	150	150	150
EBIT	MSEK				197	363	363	408	423	66	66	-142	-150
CAPEX	MSEK	-199	-315	-377	-192	-116	-74	-104	-84	-89	-77	-100	
Sustaining		85	220	330	150	85	45	75	55	60	45	70	
New projects		114	95	47	42	31	29	29	29	29	32	30	
Development													
Cash Flow	MSEK	57	-113	-40	156	397	438	453	488	127	140	-92	-123
NSR	SEK/ton	646	636	607	597	594	594	594	594	385	594	594	
UNIT COST	SEK/ton	433	461	366	393	293	293	266	257	257	398	584	
ORE PRODUCTION	kton	1 200	1 150	1 400	1 700	1 700	1 700	1 700	1 700	1 700	1 100	750	
CONC PRODUCTION													
Cu	kton			9	11	11	11	11	11	11	7	5	
Zn	kton			155	188	188	188	188	188	188	121	83	
Pb	kton			35	43	41	41	41	41	41	27	18	
METAL IN CONC													
Au	kg	171	210	255	310	310	310	310	310	310	201	137	
Ag	kg	57 720	68 080	77 700	88 060	88 060	88 060	88 060	88 060	88 060	56 980	38 850	
Cu	ton	1 200	1 150	1 400	1 700	1 700	1 700	1 700	1 700	1 700	1 100	750	
Zn	ton	81 000	71 415	81 900	99 450	99 450	99 450	99 450	99 450	99 450	64 350	43 875	
Pb	ton	24 000	19 872	24 192	29 376	28 560	28 560	28 560	28 560	28 560	18 480	12 600	
EBIT	MSEK	146	202	337	347	513	513	558	573	216	216	8	
Cash flow	MSEK	57	-113	-40	156	397	438	453	488	127	140	-92	-123
Investment	MSEK	-199	-315	-377	-192	-116	-74	-104	-84	-89	-77	-100	
CASHCOST 1	c/lb Zn	56	45	44	40	37	37	37	37	37	37	39	56
NPV	MSEK	1024											
IRR	%	23											

Economics

Production

KPI

