



Delivering operational excellence

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Capital Markets Day 2014
10 November 2014

BOLIDEN

Delivering operational excellence

Operational excellence

Productivity - availability
Metallurgy
Tara transformation
Project management

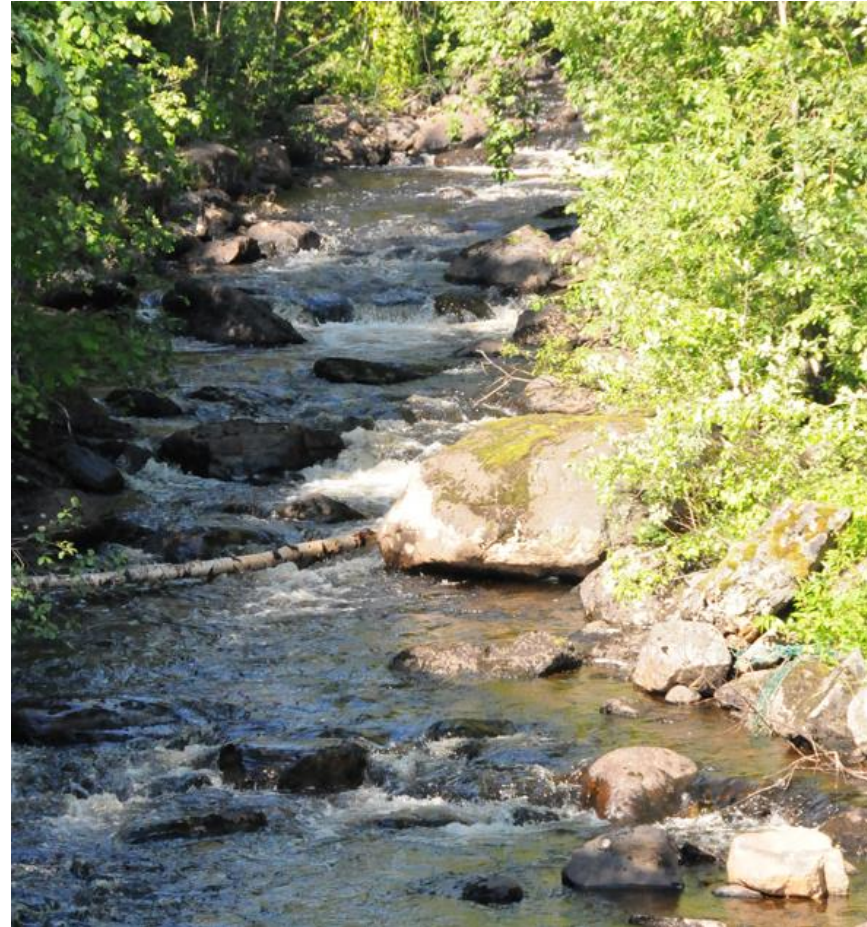
Focusing on profitable growth

Organic expansion

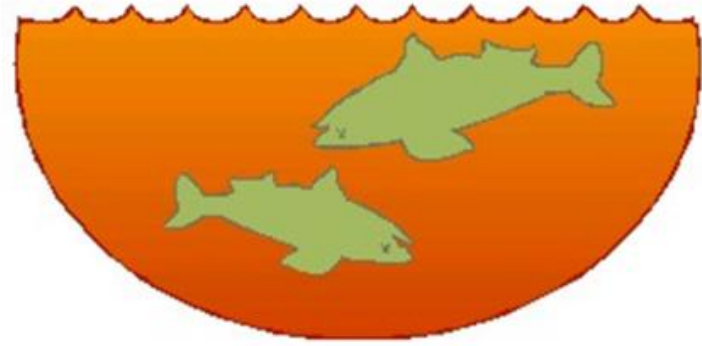
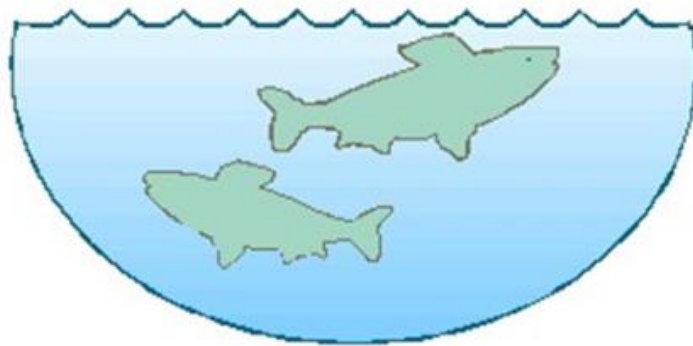
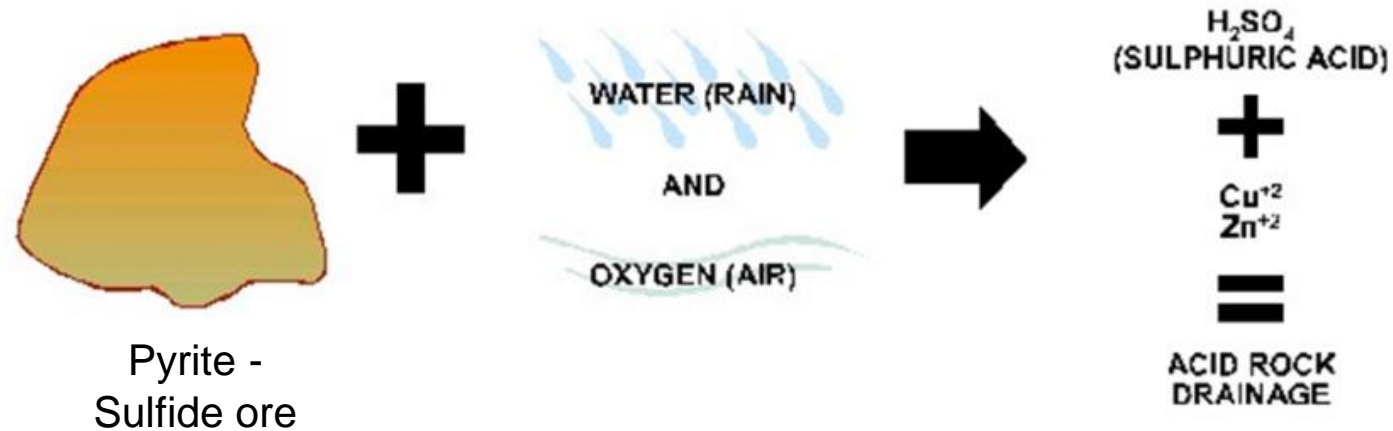
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Environmental excellence is a key focus

- Water treatment
 - Fenton
 - Biological process for nitrogen removal
- Reclamation
 - Tailings facilities
 - Waste rock
 - Sites
- TMF, Operational performance

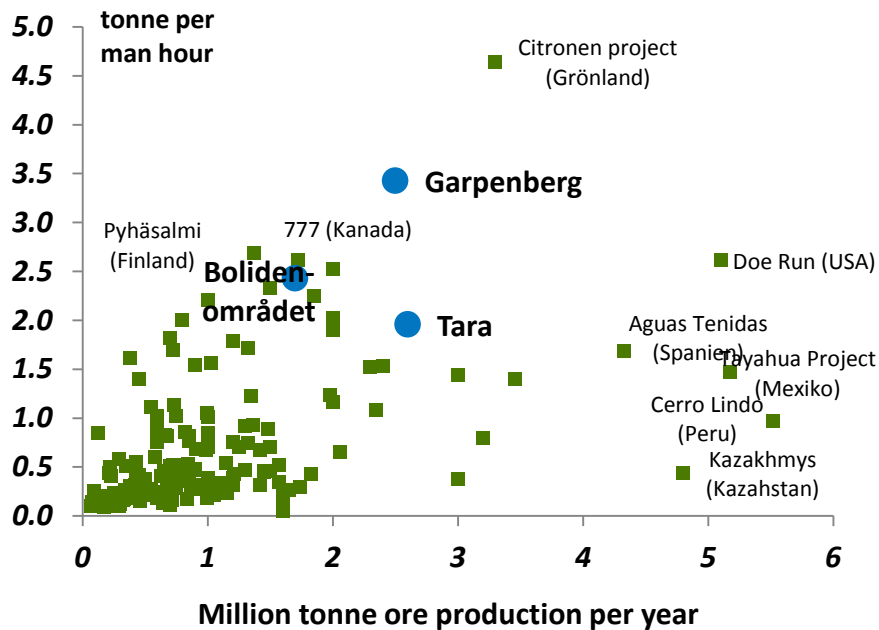


Acid mine water – oxidation of Pyrite

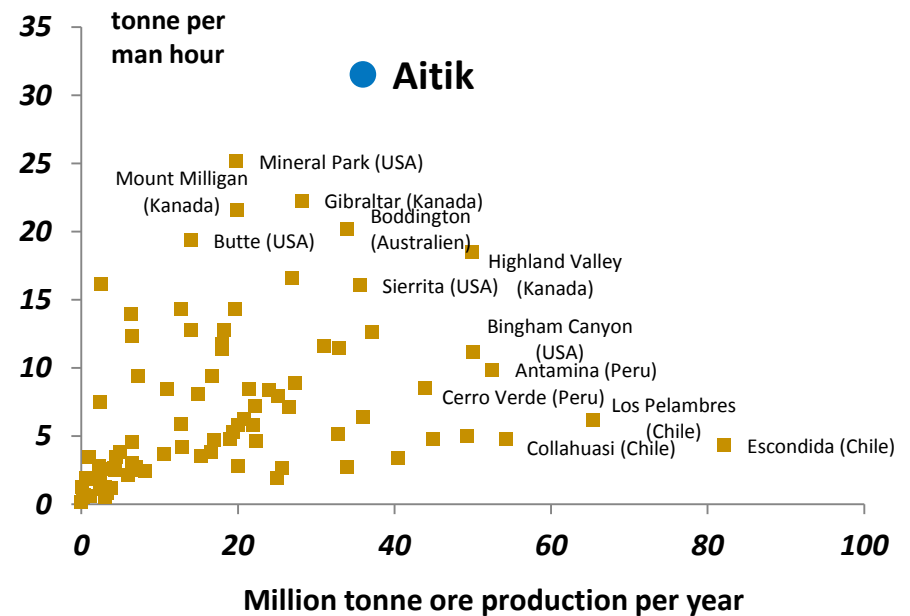


High level of productivity but more to be achieved

Zinc - underground mines 2016



Copper - open pit with mill 2014



Aitik – no 1 productivity

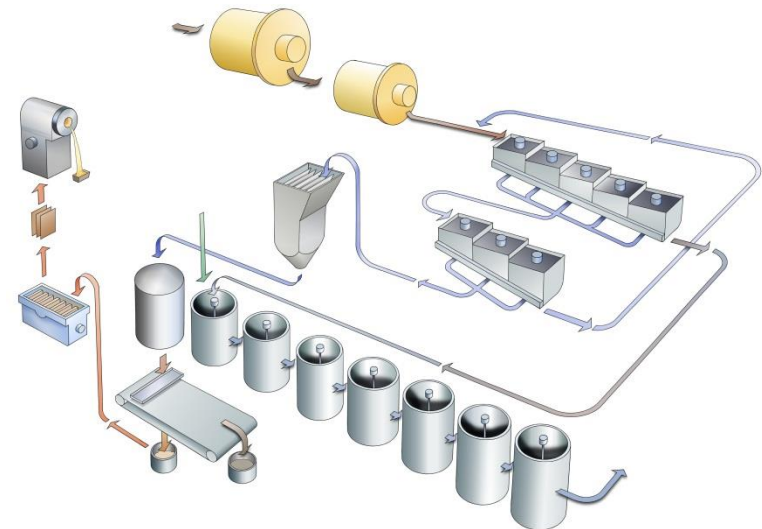
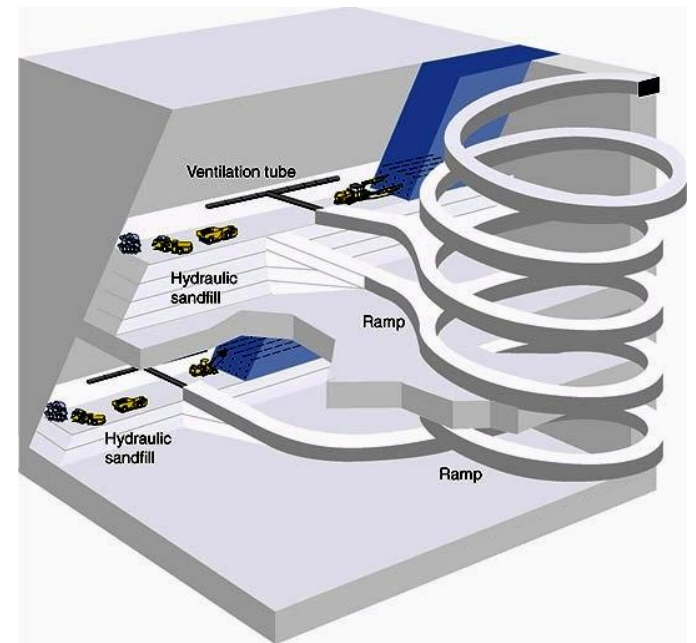
Open pit Cu mines		Percentile **
Head grade	% Cu	99
Mine	t ore/hour	1
Mill	t ore/hour	0
G&A	t ore/hour	0
Overall	t ore/hour	0
Wage rate	\$/hour	87
Labour cost	\$/t	12
Cash cost, Normal C1* - <u>All mines</u>	c/lb Cu	42

* Cash cost Normal C1, Wood Mackenzie Q3 2014 estimate for 2014

** All mines in Woodmackenzie model, Q2 2014 estimates for 2014

World-class design

- Fundamentals
 - Geological target, conceptual study
 - Mineral resource, pre feasibility
 - Mineral reserve, feasibility study
- Mine
 - Interaction infrastructure – production areas – stopes
- Concentrator
 - Mill
 - Flotation
 - Dewatering
 - TMF



Increasing performance at mine and mill

- **Key productivity drivers at mine**
Minimizing lead time between work processes at faces/stopes/benches
- **Key drivers for the concentrator**
Optimizing availability of mill/flotation/dewatering and metallurgical performance



Integrated control system drives efficiency

- Integrated control system for mine and mill
 - Increased efficiency
 - Lower costs
- Mobile control room
 - Enables operators to monitor and adjust in real time
- Control system integrated with maintenance system
 - Only one original document
 - All share same info
 - Improved surveillance
 - Easier to spot errors
 - Diary improves visibility over time
- Wlan
 - Enable status control and operational guidance



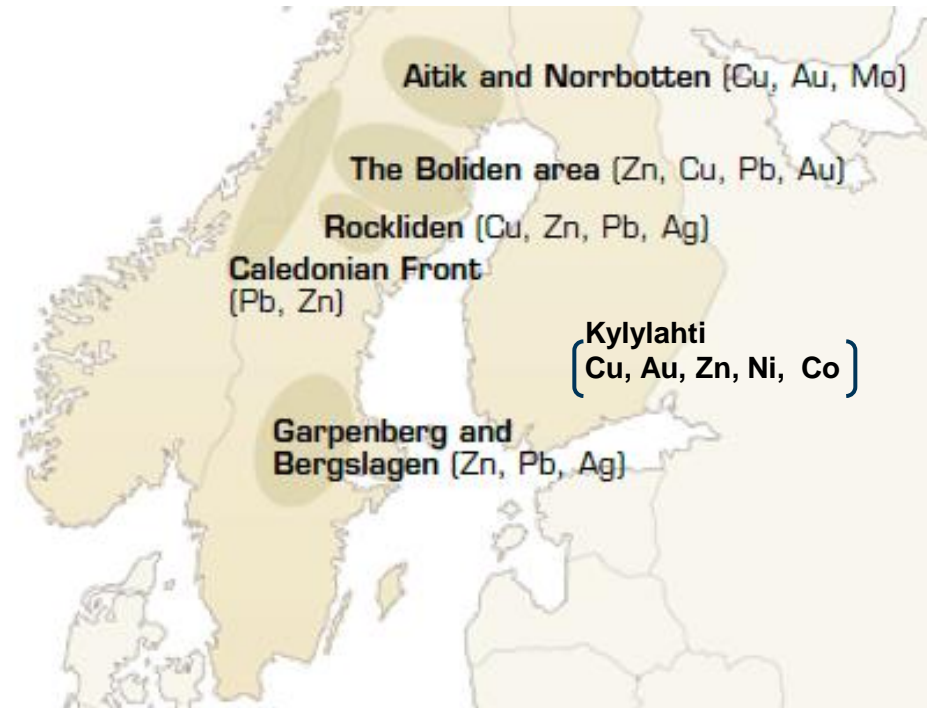
Wlan

Enable status control and operational guidance



Leading expertise in handling complex ore

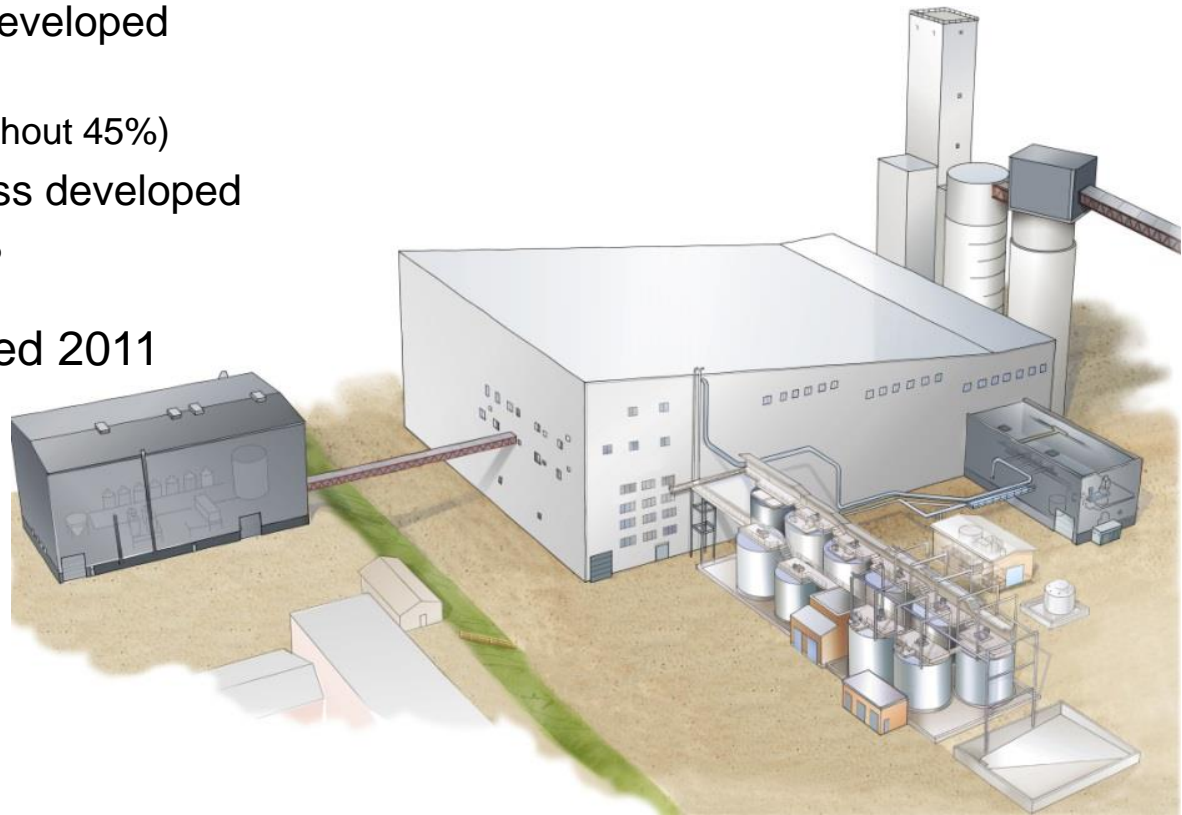
- 90 years of mining complex ore
- Complex deposits with increasing grades of penalty elements
- Case: Kankberg



Patented process with high recoveries

Kankberg – leaching of gold and tellurium from goldtellurides

- Conceptual study initiated 2008
 - Conventional leaching plant, method not an option
 - A hot leaching process developed
 - Boliden patent
 - Gold recovery 85% (without 45%)
 - Tellurium leaching process developed
 - Tellurium recovery 65%
- New process commissioned 2011



Restructuring Tara for improved profitability



Lowering headcount

2013	700
2014 Q3	620
2015	590

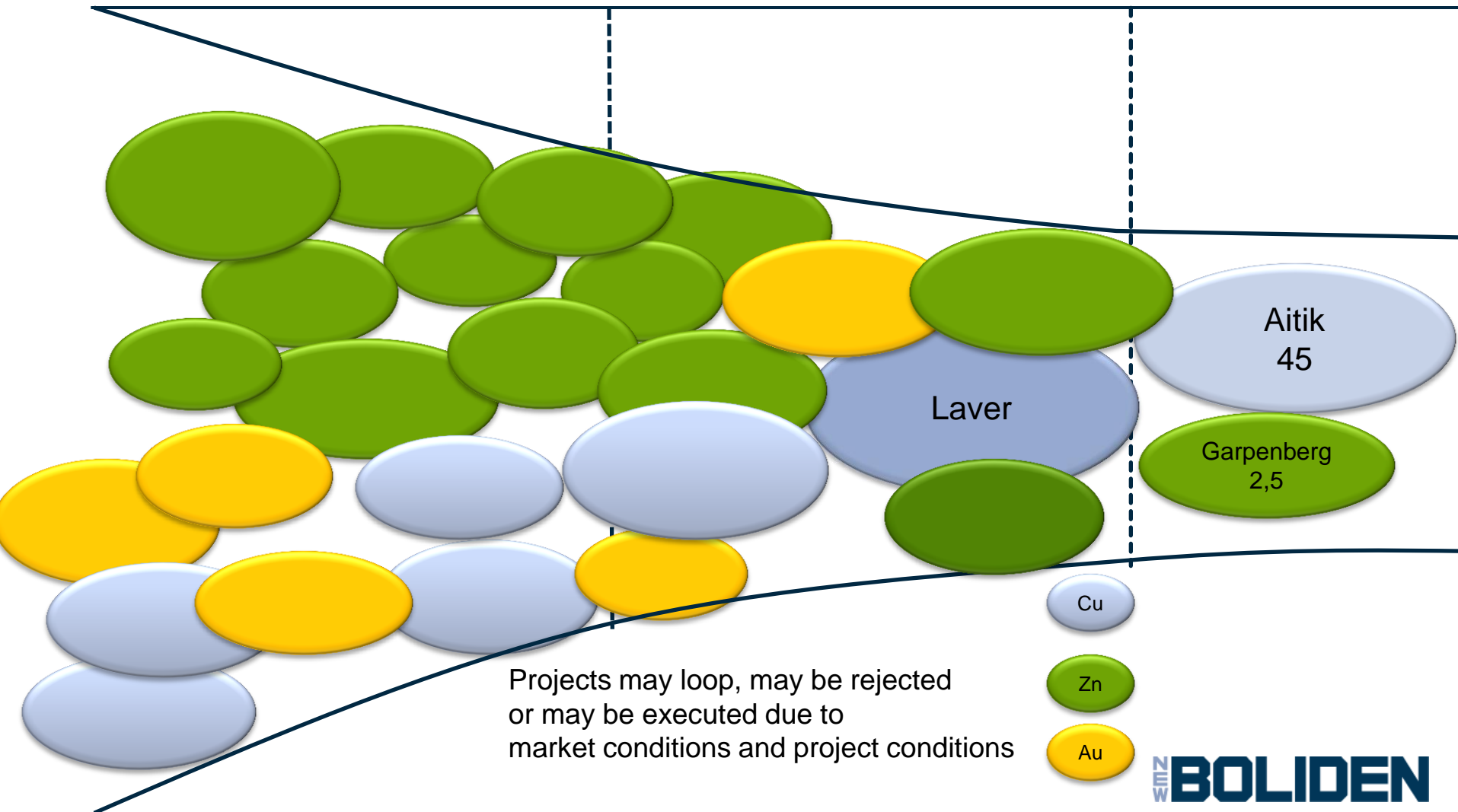


Decrease mobile fleet

Optimization on-going

Future growth based on solid project pipeline

Future options Conceptual study Pre feasibility study feasibility study execution



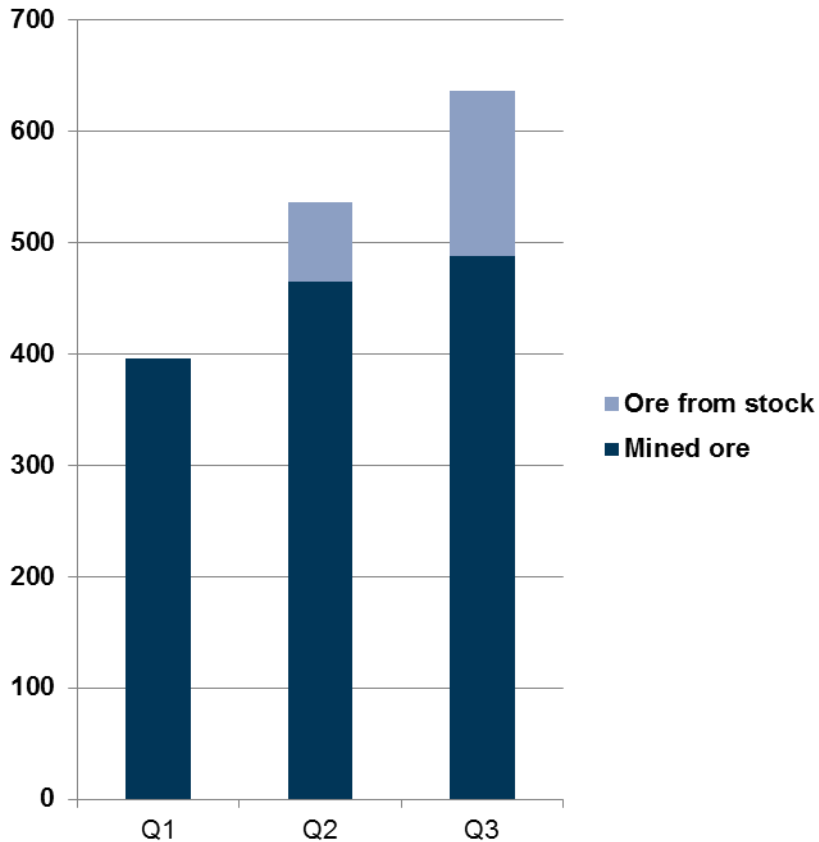
In-house project management a success factor

- General design by in-house resources
- Project management all disciplines with in-house personnel
- Suppliers used in parts of the project but no large turn-key assignments
- Standardized process - Project manual with continuous improvements from previous projects A36, BoRe, Garpen, A45.
- Key individuals assures continuity and experience sharing

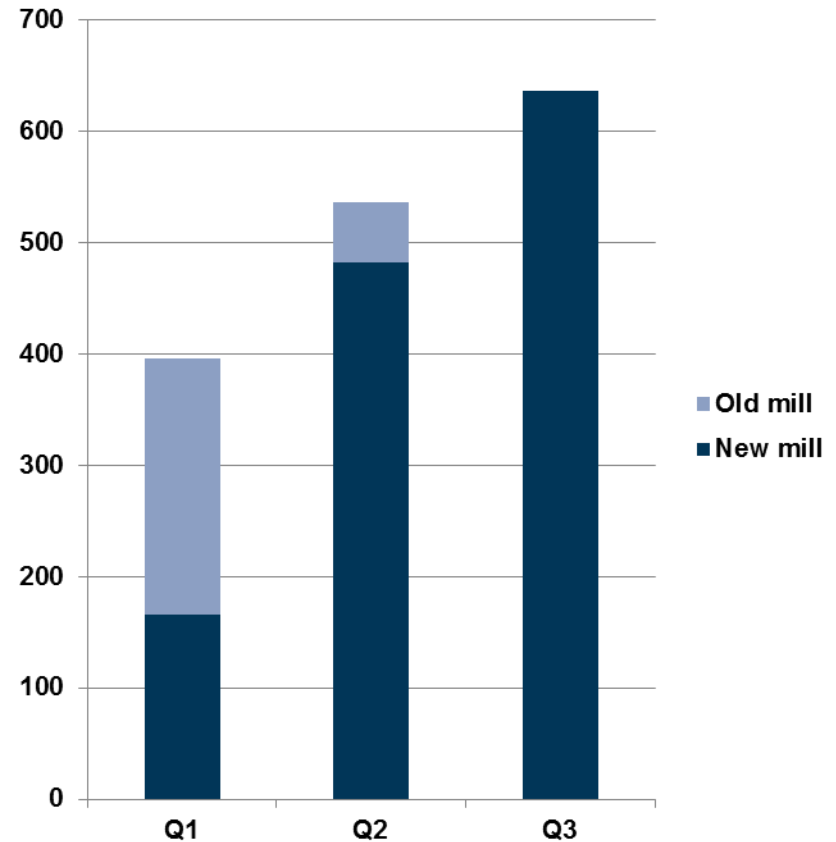


Garpenberg – Set for 2.5 Mtonnes

Mine production



Mill production

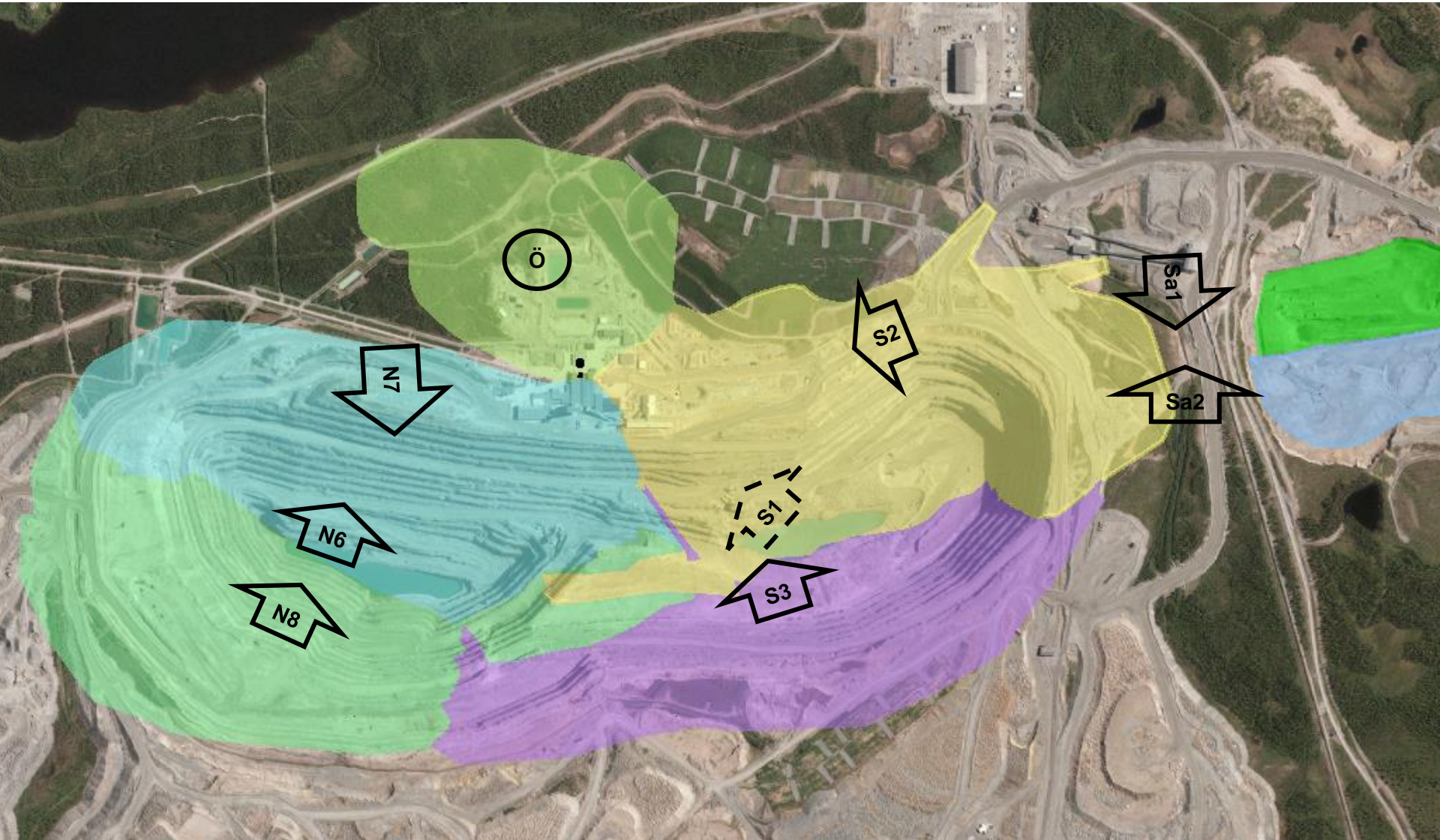


Aitik45

- 45 (38) mton annually, +20%
- Reserve grade 0.22 (0.24)
 - Reserves 1 085 (633) mtonnes
 - Life of mine 2040 (2030) years
 - Copper life of mine 2 348 (1 471) ktonnes
- Capex
 - New crushers with improved reliability
 - Lower stripping, approx. 0.5
 - TMF
- -10% costs per ton of ore
 - Economies of scales
- New environmental permit
 - In all, in according to our application



Managing pushbacks to optimize financial performance



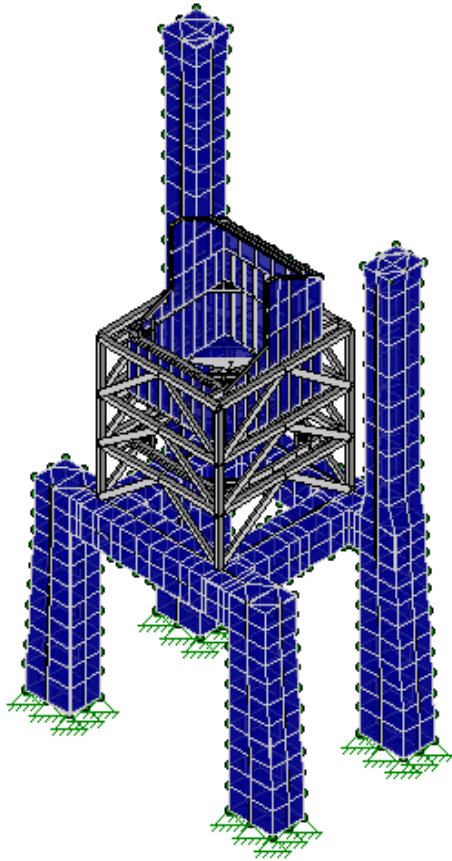
Adjusted mine plan Aitik

- New environmental permit fall 2014
- 45 Mton 2017
- Production 2015, 40 Mton
- Life of mine Cu grade unchanged 0.22%
- Cu grade 2015 and 2016 0.21%
- 2017-2019 over average grade

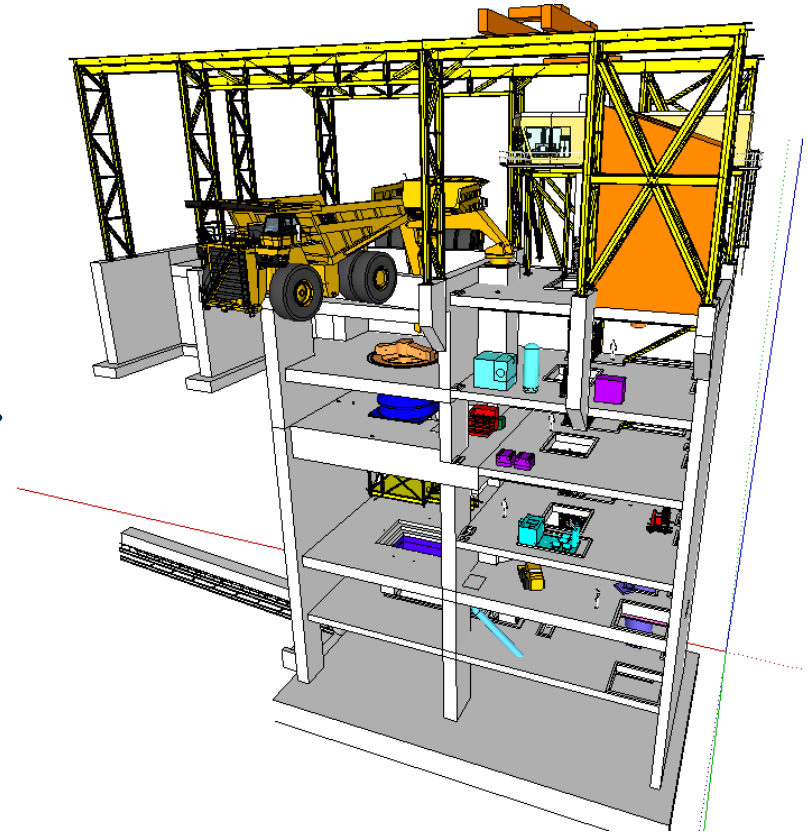
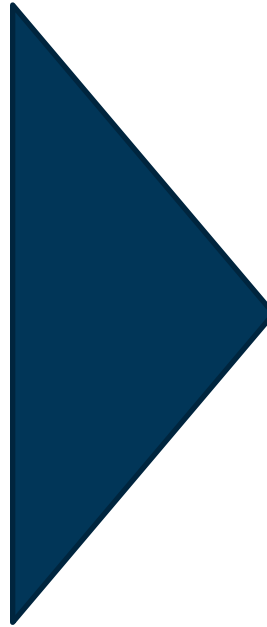


Increased production with new crusher

Improved reliability – proven design



Existing with
reinforcements

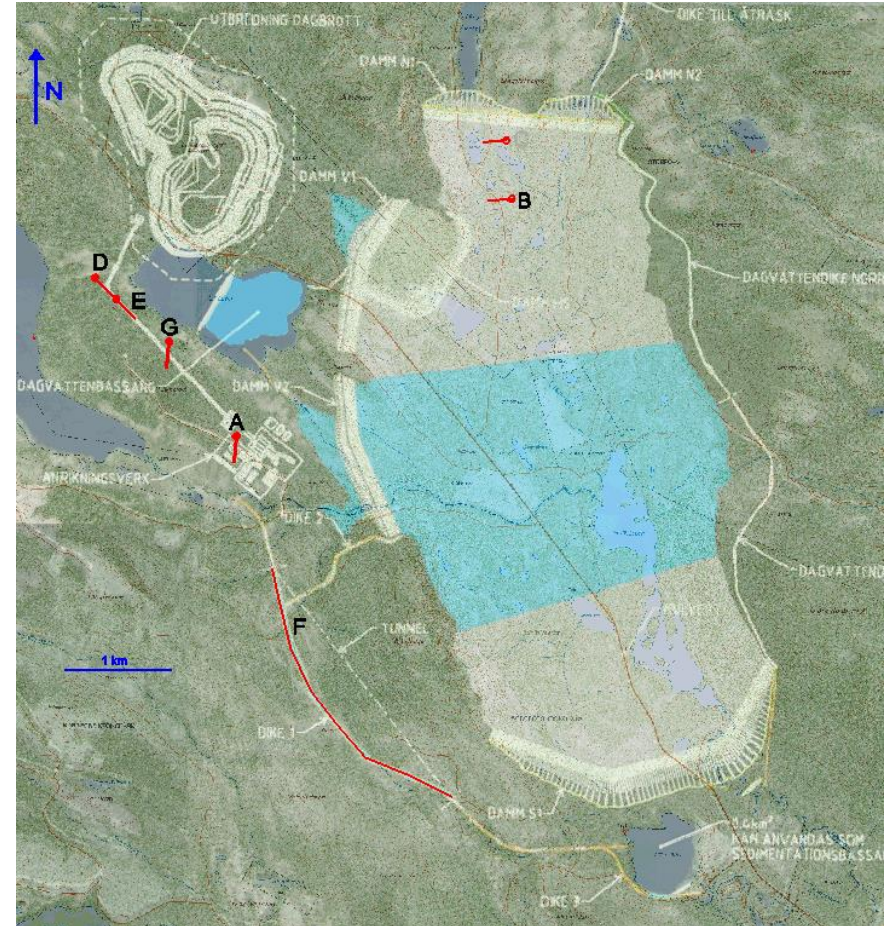


New

Further growth options

- Kylylahti
 - Near mine
 - Depth
 - Satelites
 - Outokumpu Field
- Laver
 - Application for mine concession Q3 2014
 - Next step, pre feasibility

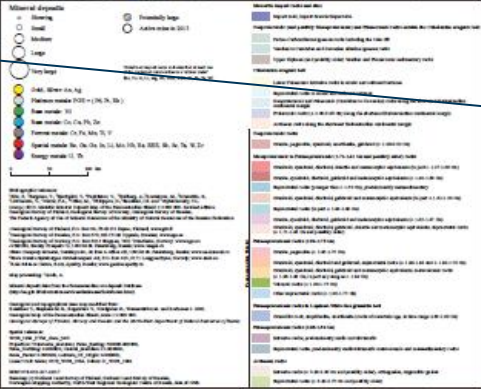
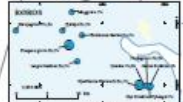
Laver



Exploration, an unique opportunity

1:2 000 000

Updated 1 January 2013



"Malmfältet"

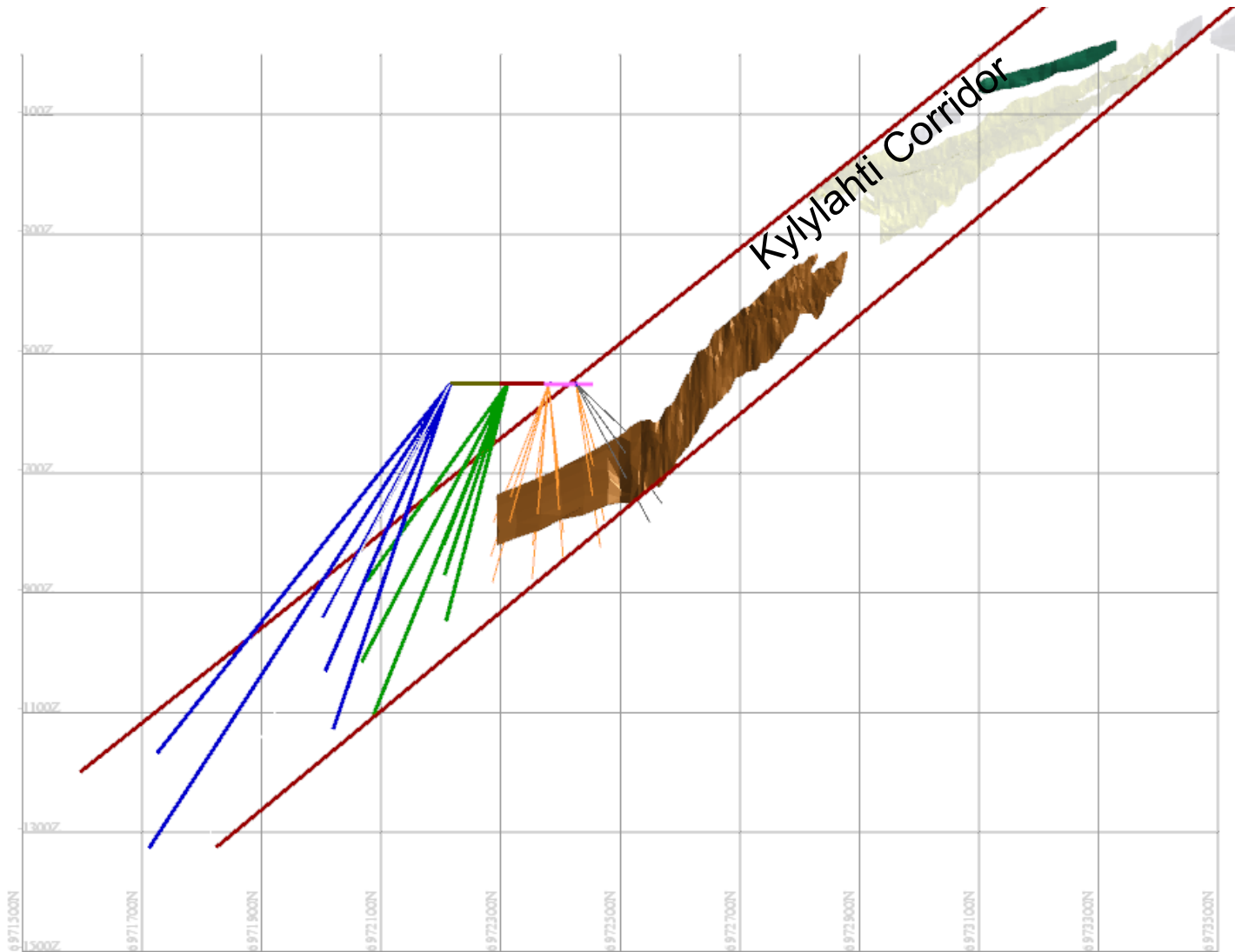
Skellefte field

Outokumpu field

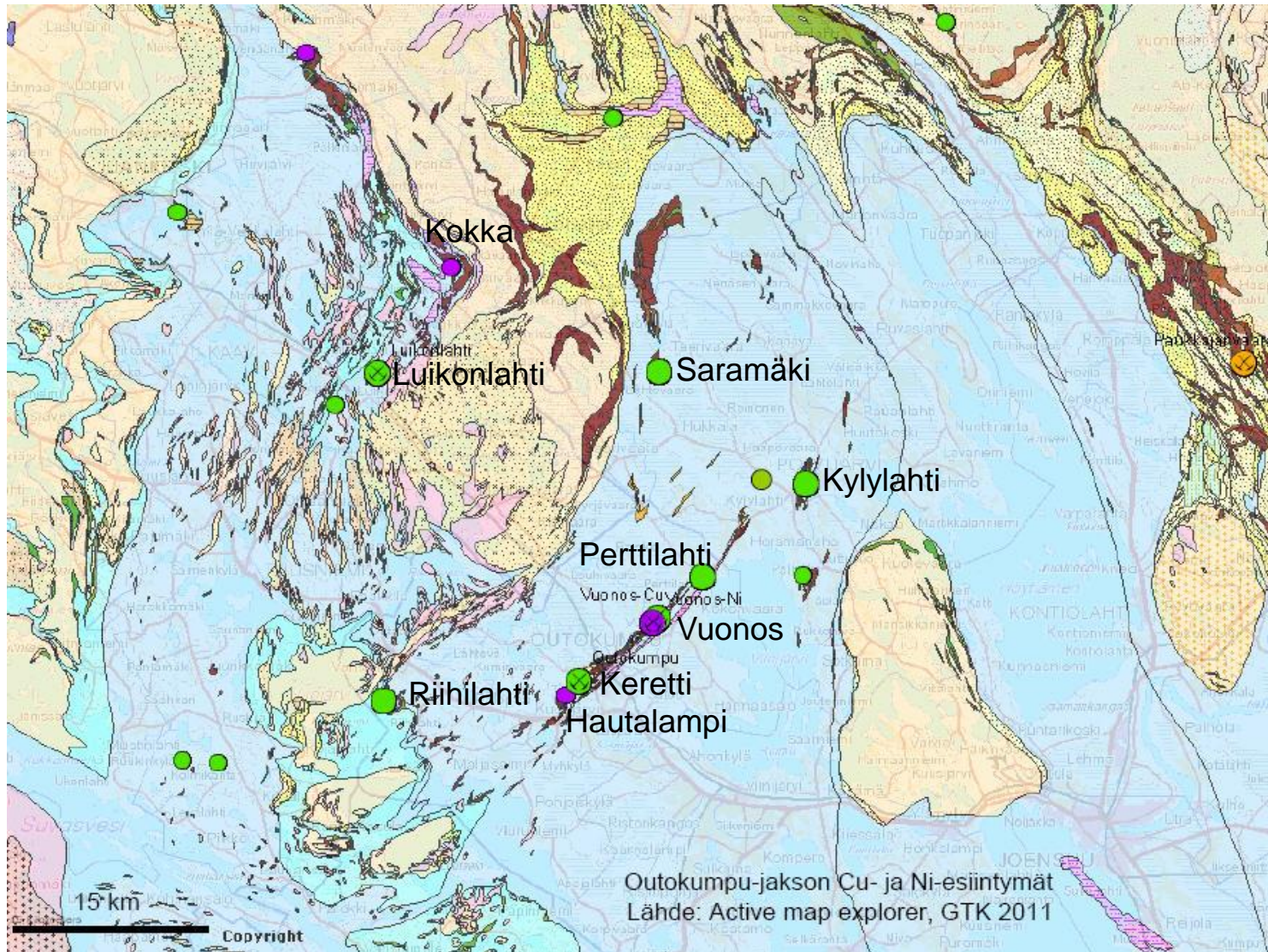
Bergslagen



Kylylahti – near mine exploration



Outokumpu Area – Copper and Nickel Deposits



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A person in a plaid shirt is seen from behind, looking at two computer monitors. The left monitor displays a network graph with red nodes and white lines, and the right monitor displays a network graph with blue and red nodes and white lines. The background is dark and blurry, suggesting an office or data center environment.

Capital Markets Day

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