



**Polymetal**

***Risks and Opportunities  
in  
Russian Mining Projects***

***Mr. Vitaly Nesis, Polymetal CEO***

***SRK Conference Minex 2005  
10/06/2005  
Moscow***

Exploration

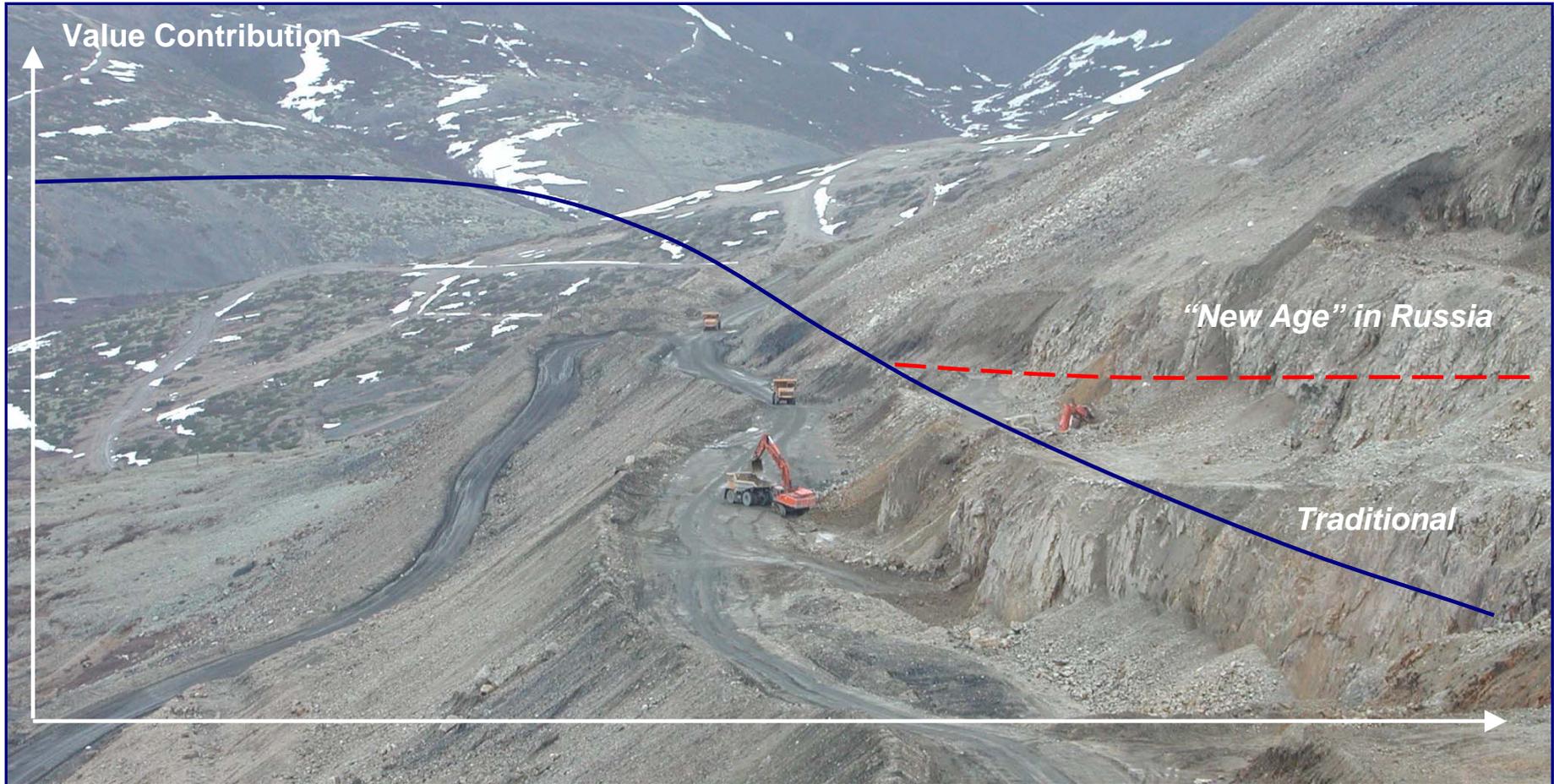
Feasibility &  
Engineering

Procurement &  
Construction

Training &  
Commissioning

Operation &  
Expansion

# Life Cycle of a Mining Project



## Key Issues

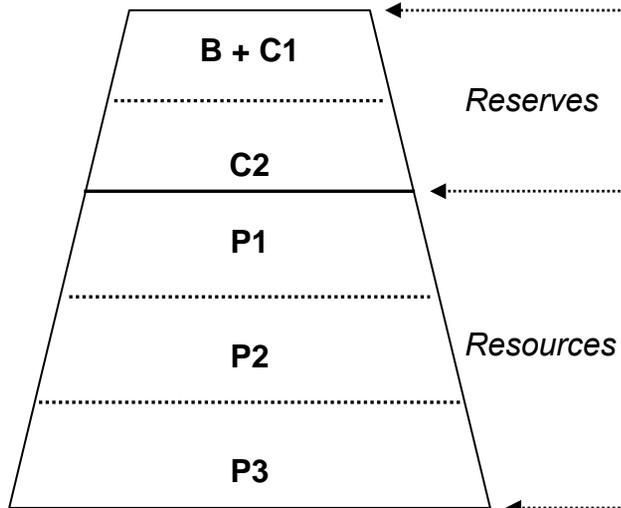


- ◆ Responsible & conservative approach to resource and reserve estimates
- ◆ Careful staging of exploration efforts to optimize capital spending
- ◆ Designing target parameters and economic models at earlier stages
- ◆ Concentrating efforts

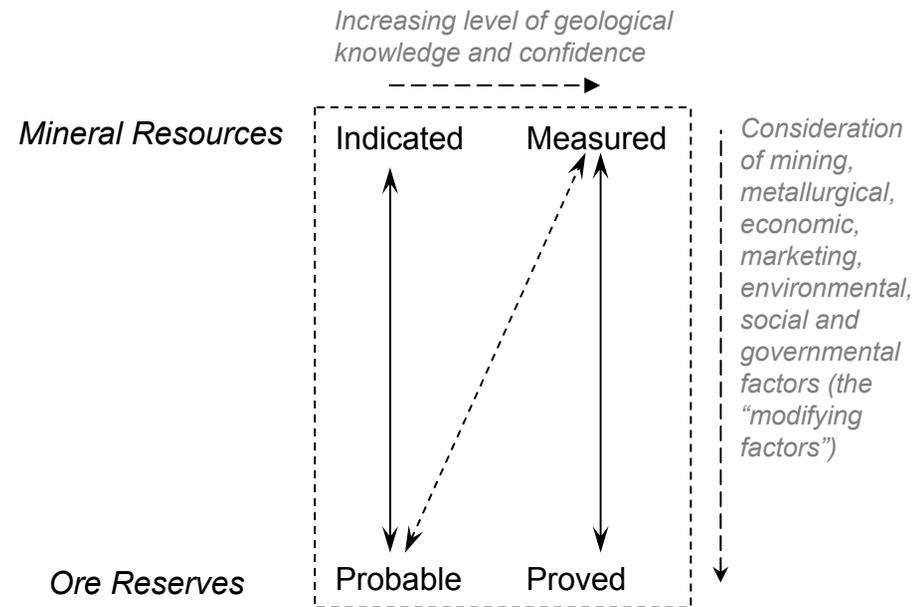
# Case Study: Approaches to Reserve/Resource Definition



## Annual Report: Company Z



## Excerpt from JORC



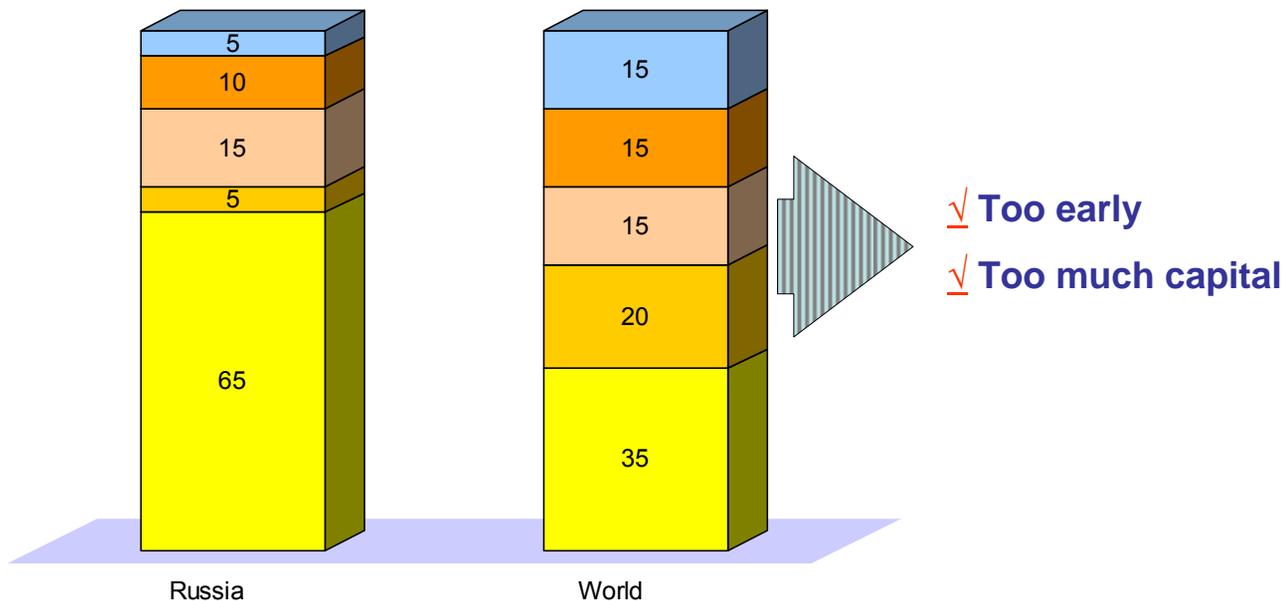
Note:

- P1, P2, P3 are usually not resources in JORC terms
- C1 & C2 are not necessarily reserves in JORC terms

# Staging of Exploration Efforts



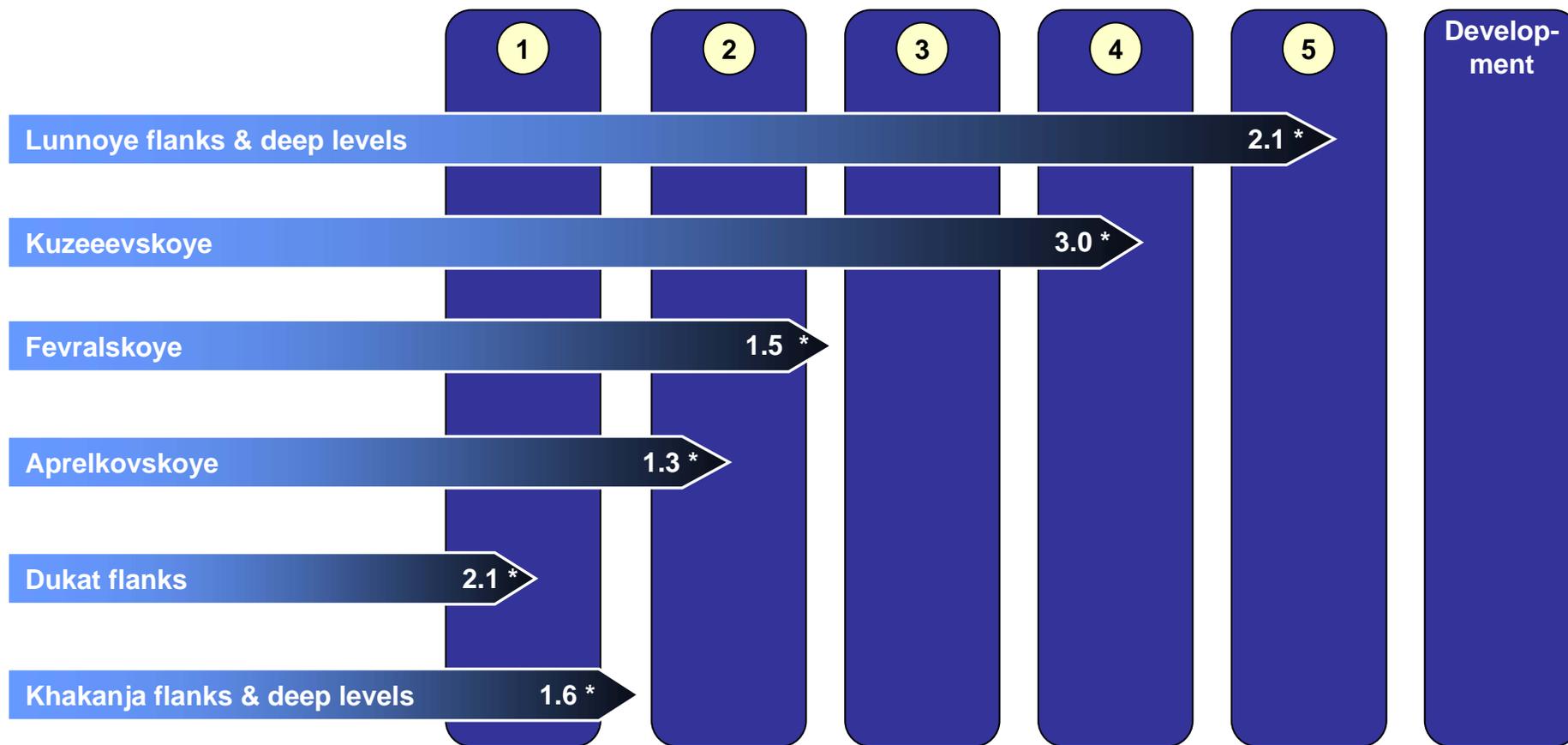
Share of exploration expenditures, %



Source: Mining Magazine, Annual Reports, Polymetal's estimates

- 1 Search routes / study materials / map & model
- 2 Geophysics / geochemistry / some earthworks
- 3 Scoping/trenching / technological sampling/ some drilling
- 4 Pre-feasibility studies
- 5 Definition drilling

# Case Study: 2005-06 Polymetal's Exploration Projects



\* 2005-06 exploration expenditures, USD mln.

## Key Issues



- ◆ Reliable reserve estimation & definition
- ◆ Careful, project-specific process & equipment selection double-checked by the operator
- ◆ Thorough consideration of infrastructure, environmental & downstream aspects
- ◆ Balanced approach to CapEx: not too tight-fisted or too extravagant

# Case Studies: Pitfalls and Failures



Project	Mistake	Consequence	Ultimate Result
Barun-Kholba (2003) *	<ul style="list-style-type: none"> <li>Underestimated dilution and ore discontinuity</li> </ul>	<ul style="list-style-type: none"> <li>Dilution &gt;100%, head grade much lower than predicted</li> </ul>	<ul style="list-style-type: none"> <li>Placed on care &amp; maintenance</li> </ul>
Deposit X (2003/04) *	<ul style="list-style-type: none"> <li>Used “gold equivalent” grade on polymetallic resource</li> <li>Failed to investigate downstream options</li> </ul>	<ul style="list-style-type: none"> <li>Reserve Economics flawed</li> <li>No adequate planning for product off-take</li> </ul>	<ul style="list-style-type: none"> <li>Deadlines missed</li> <li>Likely to be postponed indefinitely</li> </ul>
Deposit Y (2004) *	<ul style="list-style-type: none"> <li>Used off-the-shelf design and untested new equipment configuration</li> </ul>	<ul style="list-style-type: none"> <li>50% reduction in mill throughput significantly reduced recovery</li> </ul>	<ul style="list-style-type: none"> <li>Operating at total costs above commodity price</li> </ul>
Deposit Z (2003) *	<ul style="list-style-type: none"> <li>Stuck with Soviet-era technology and processing circuit</li> </ul>	<ul style="list-style-type: none"> <li>No off-take for product</li> <li>Economics substantially worse than planned</li> </ul>	<ul style="list-style-type: none"> <li>Placed on care &amp; maintenance</li> </ul>
Deposit W (2005) *	<ul style="list-style-type: none"> <li>Inappropriate mining method selected</li> <li>Environmental issues not addressed in full</li> </ul>	<ul style="list-style-type: none"> <li>Banks refused financing on the basis of DFS</li> </ul>	<ul style="list-style-type: none"> <li>Postponed; re-engineering in process</li> </ul>
Deposit V (2005) *	<ul style="list-style-type: none"> <li>Seasonal milling in Far North selected to lower capital costs</li> </ul>	<ul style="list-style-type: none"> <li>Operating season substantially shorter than planned</li> <li>Costly and protracted restart after winter</li> </ul>	<ul style="list-style-type: none"> <li>Output substantially below plan</li> <li>Winter results to be seen in 2006</li> </ul>

\* launch date

# Case Studies: Lessons from Polymetal's deposits



Factor	Dukat	Khakanja	Vorontsovskoye
Downstream & environmental considerations	<ul style="list-style-type: none"> <li>Switched from outside tolling to processing at Lunnoye</li> </ul>	<ul style="list-style-type: none"> <li>Saved capital by not building a smelter, but using Lunnoye smelter and Kraskoyarsk refinery</li> </ul>	<ul style="list-style-type: none"> <li>Chose dry tailings storage to minimize environmental impact</li> </ul>
Process & equipment selection	<ul style="list-style-type: none"> <li>Gravity circuit excluded; grinding circuit optimized for maximum throughput &amp; recovery</li> </ul>	<ul style="list-style-type: none"> <li>Used roll mills without concrete foundation for prevention of permafrost destruction</li> </ul>	<ul style="list-style-type: none"> <li>Chose dragline re-excavation to extend the use of leach pads</li> </ul>
Reserve definition	<ul style="list-style-type: none"> <li>Chose combined open-pit &amp; underground options to accelerate the ramp-up</li> </ul>	<ul style="list-style-type: none"> <li>Took into account variable Ag recovery from different ore bodies to optimize the pit</li> </ul>	<ul style="list-style-type: none"> <li>Carefully studied technological ore properties to break down reserves into heap leach and CIP sections</li> </ul>
Capital discipline	<ul style="list-style-type: none"> <li>Dismantled used and bought new equipment, not bound to the previous process</li> </ul>	<ul style="list-style-type: none"> <li>Left space for the 3<sup>rd</sup> ball mill and delayed purchase until certainty in grinding parameters;</li> <li>Delayed tailings disposal decision</li> </ul>	<ul style="list-style-type: none"> <li>Chose three-stage crushing over SAG milling to optimize capital costs and throughput</li> </ul>

## Key Issues



- ◆ Well-organized and documented choice of new vs. used and Russian vs. foreign equipment
- ◆ Thorough and systematic, centered on contractor management cost and quality control
- ◆ Integrated strategic approach to logistics in remote locations
- ◆ Effective design/construction feedback loop with an ability to incorporate design revisions and corrections

# Case Study: Khakanja



Issues	Steps taken
Choice of equipment	<ul style="list-style-type: none"> <li>• Emphasis on reliable, low-maintenance and foolproof equipment</li> </ul>
Contactor management	<ul style="list-style-type: none"> <li>• Detailed breakdown of work contracts (25 for Khakanja, 15 for Vorontsovskoye)</li> <li>• Permanent presence of people from head office on-site</li> </ul>
Logistics management	<ul style="list-style-type: none"> <li>• Dedicated team in Khabarovsk focused on planning and communication</li> <li>• All cargo handling/shipping done by contractors</li> </ul>
Design/construct feedback loop	<p>On-site project adjustment:</p> <ul style="list-style-type: none"> <li>• Adaptation of dry tail stacking instead of tailing impoundment</li> <li>• Insertion of ore washing circuit in the primary screening area</li> </ul>

## Key Issues



- ◆ Key personnel carefully selected and sent on-site well before construction is completed
- ◆ Operators trained at other mines in groups and subsequently actively involved in commissioning
- ◆ Dedicated start-up/ramp-up teams with sufficient resources & easy access to senior management, authority to allocate

## Key Issues



- ◆ Human capital development a top priority
- ◆ Continuous improvement
- ◆ Capital discipline
- ◆ Focus on health, safety and environmental protection
- ◆ Stringent cost control & accounting

# The Final Point



## Key recommendations to investors

“Everything that can go wrong will go wrong.”  
*Murphy's Law*

**Conservatism**

“Everything comes in time to those who are willing to wait.”  
*H. Balzac*

**Patience**

“Personnel decides everything.”  
*J.V. Stalin*

**People**

## Key recommendations to operators

“You can fool all of the people some of the time. You can fool some of the people all of the time. But, you can't fool all of the people all of the time.”  
*Abraham Lincoln*

**Honesty**

“The one who doesn't know where to go will never get wind in his sails.”  
*J.W. Goethe*

**Sense of direction**