

EFG/UNECE conference:
International cooperation on natural resources
9 & 10 February 2017 | Brussels

MINERALISATION BEYOND INFERRED RESOURCES

ROGER DIXON

South African Representative

Committee for Mineral Reserves
International Reporting Standards



UNECE



MINERALISATION BEYOND INFERRED RESOURCES

South African Representative,
CRIRSCO

ICMM
International Council
on Mining & Metals

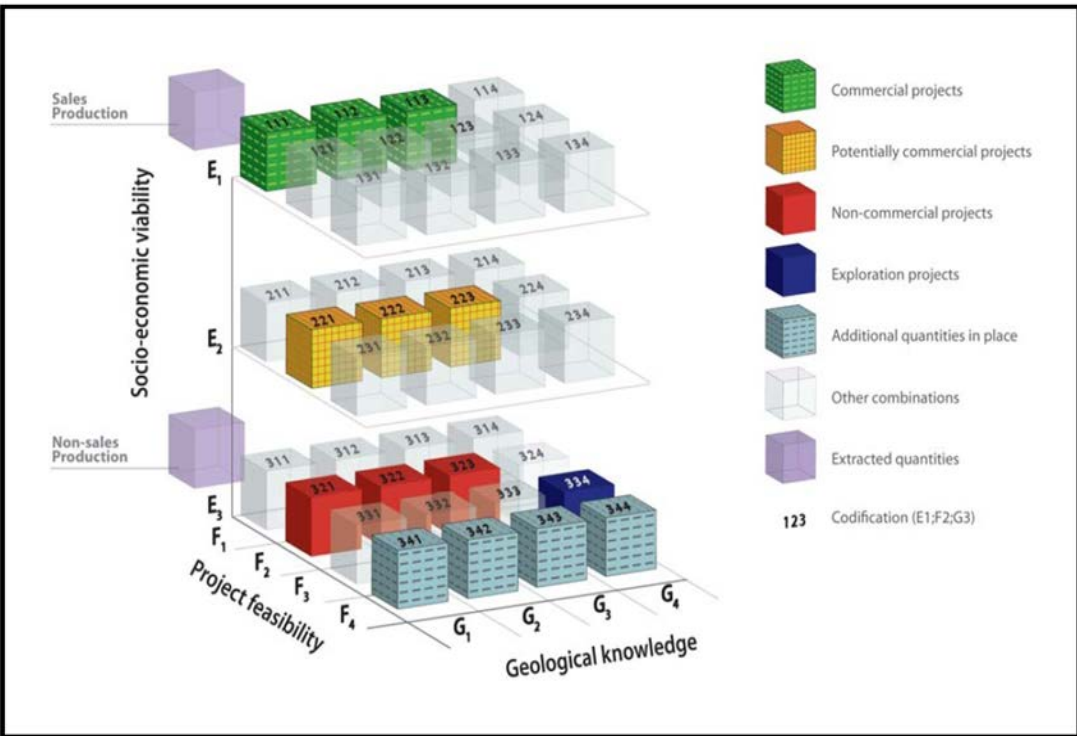


UNFC 2009

- Generic classification system applicable to Fossil Energy and Mineral Resources and Nuclear fuels
- Provides a single framework on which to build international energy and mineral studies
- Allows for non-economic mineralisation
- Soon to be applicable to renewable energy

Important tool for harmonized generic terminology at a level suitable for global communication

UNFC – 2009



Generic, Principle based

3 Axis

Economic, Social

Feasibility, Project status

Geological

Numerical code

Applied directly or as harmonizing tool

CRIRSCO - Principle Objective

To promote best practice in the international public reporting of Mineral Exploration Results, Mineral Resources and Mineral Reserves.

CRIRSCO is an international advisory body without legal authority, relying on its constituent members to ensure regulatory and disciplinary oversight at a national level.

It recognises the truly global nature of the minerals industry and the agreed need for international consensus on reporting standards.

9 CRIRSCO Members

Australasia:	JORC
Brazil:	CBRR Guide
Canada:	CIM
Chile:	COMISIÓN MINERA DE CHILE
Europe :	PERC
Kazakhstan	KAZRC
Mongolia	MRC
Russia	NAEN
South Africa:	SAMREC
United States:	SME Guide

CRIRSCO Engagement

- United Nations Economic Commission for Europe (UNECE) -1999
- Society of Petroleum Engineers (SPE) -2004
- International Accounting Standards Board (IASB)
- International Atomic Energy Agency (IAEA)

Mineral Resource

A Mineral Resource is a concentration or occurrence of solid material of economic interest in or on the Earth's crust in **such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction.**

The location, quantity, grade or quality, continuity and other geological characteristics of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling.

Mineralised Inventory

- Strategic planning at country or global level
- Corporate mineral inventory management
 - exploration target definition
 - development options
 - purchase price accounting
 - capital allocation

Figure 1(a) General Relationship between Exploration Results, Mineral Resources and Mineral Reserves as Represented in the CRIRSCO Template

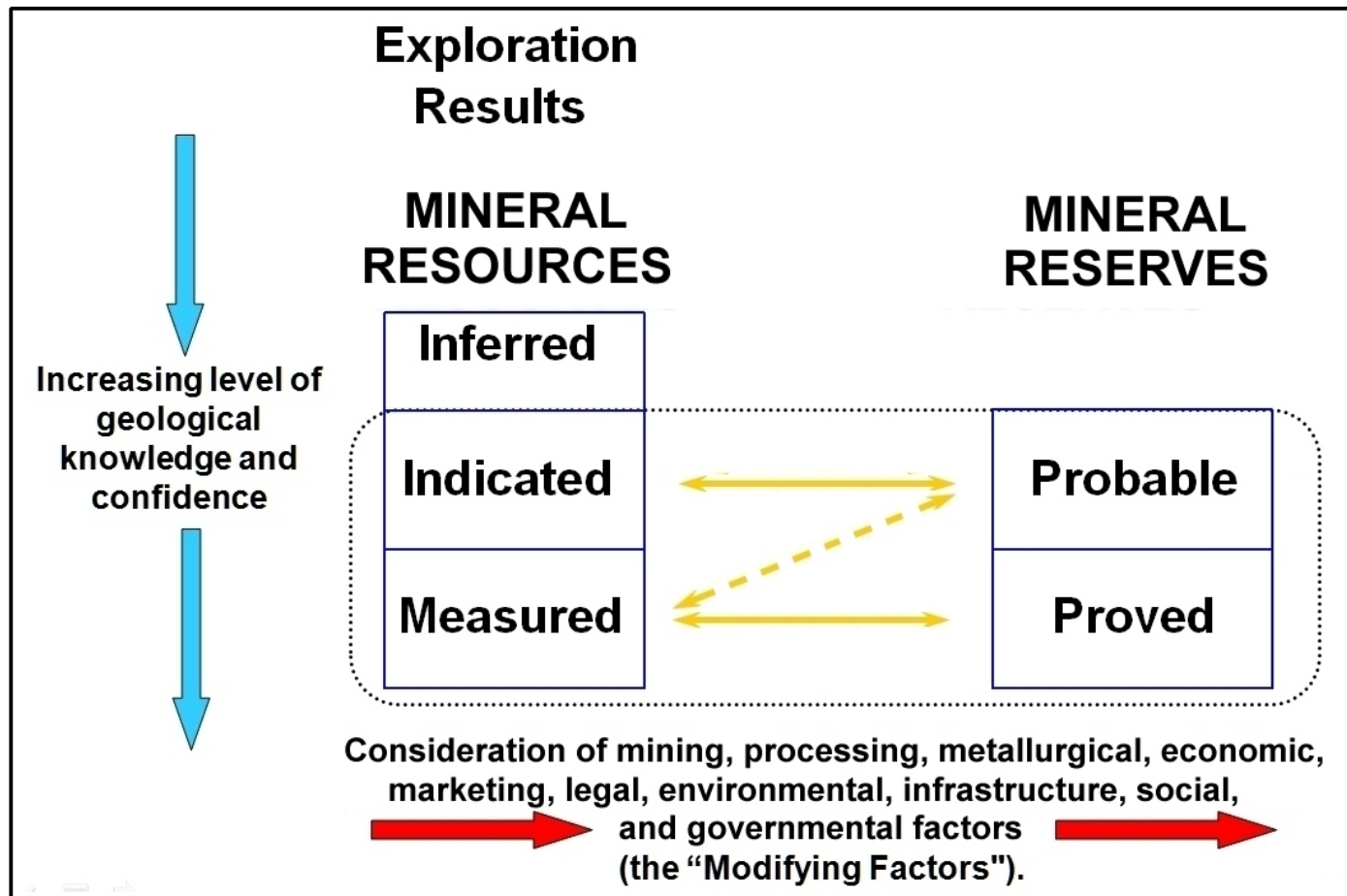
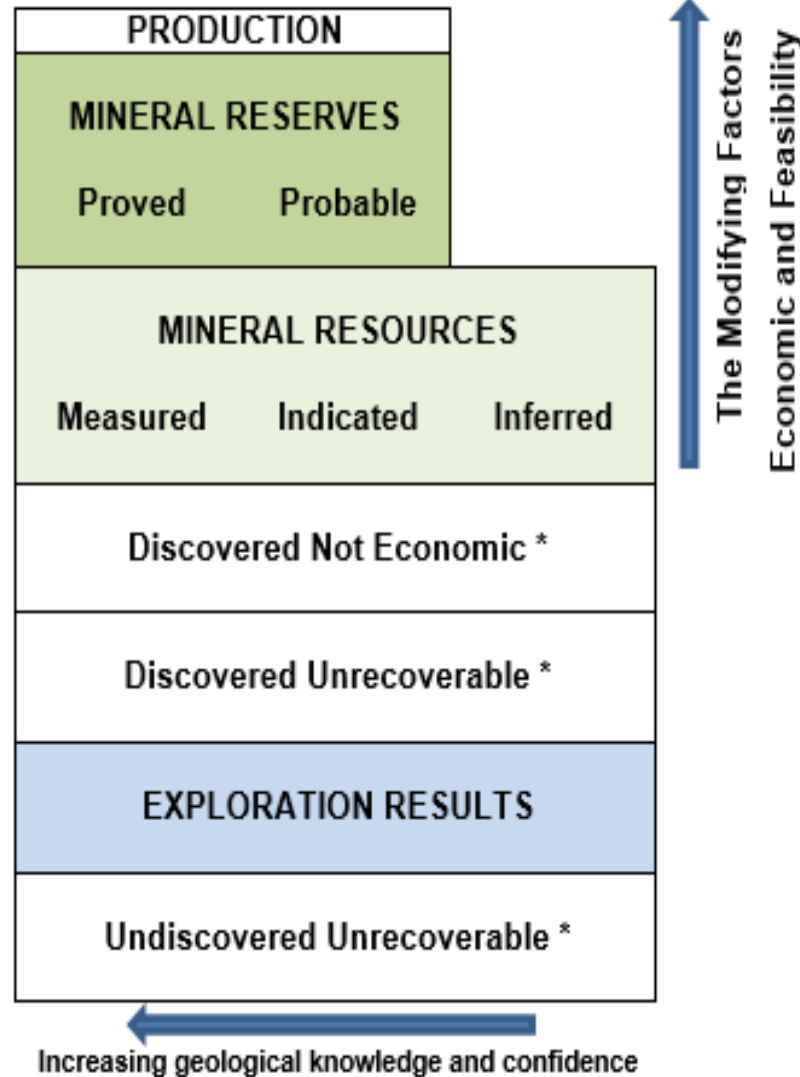


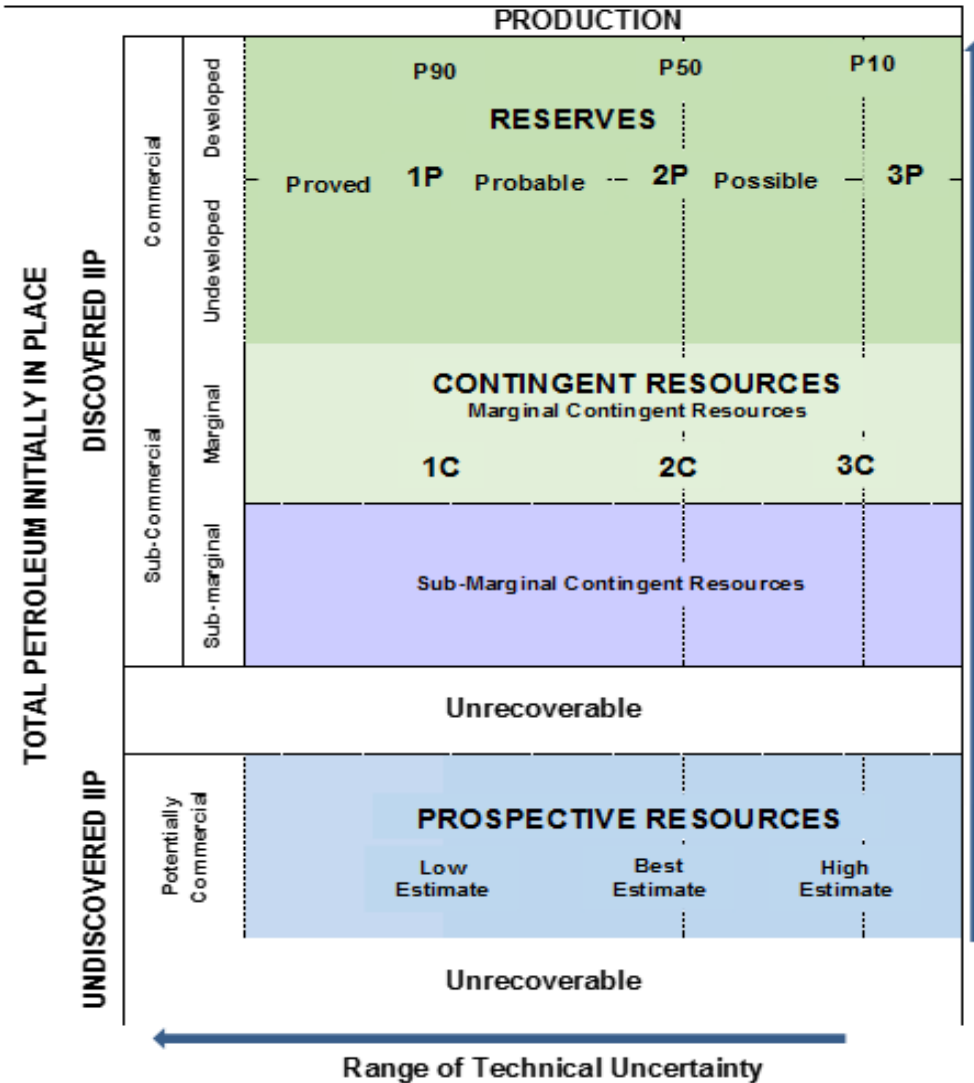
Figure 1(b) Re-Oriented Figure Showing the CRIRSCO Categories (Shaded) and Additional Categories in Other Systems



*Not part of the Template but may be used for internal project management

Figure 2 Comparison of the Petroleum Resource Management System (PRMS) and the CRIRSCO Template

Petroleum (SPE/WPOC/AAPG/SPEE 2007)



Minerals (CRIRSCO 2013)

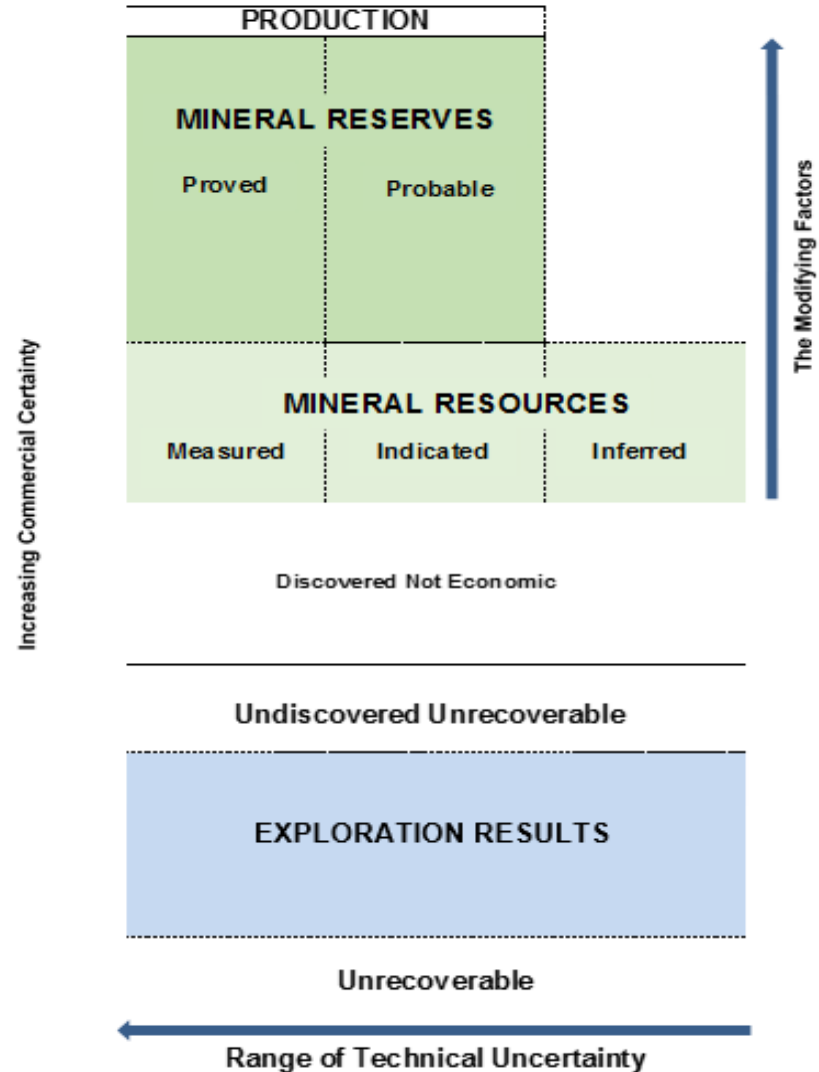


Figure 3 High Level Comparison Between UNFC (2009) and the CRIRSCO Template

Total commodity initially in place	Production	Sales Production			
		Non – Sales Production			
		Class	Categories		
			E	F	G
	Future recovery by commercial development projects of mining operations	Mineral Reserves	1	1	1,2
	Potential future recovery by contingent development projects or mining operations	Mineral Resources	2	2	1,2,3
		Discovered Not Economic	3	2	1,2,3
	Discovered Unrecoverable		3	4	1,2,3
	Potential future recovery by successful exploration activities	Exploration Results	3	3	4
	Undiscovered Unrecoverable		3	4	4

Discovered not Economic

- Economic ✘
- Feasibility/Technical ✔
- Geological Confidence ✔

UNFC 2009; 321, 322, 323

Discovered Unrecoverable

- Economic ✘
- Feasibility/Technical ✘
- Geological ✔

UNFC 2009; 341 342 or 343

Exploration Results

- Include data and information generated by mineral exploration programmes
- Examples - discovery outcrops, single drill hole intercepts or the results of geophysical surveys

Inappropriate to use such information for deriving estimates of tonnage and grade:

UNFC 2009; 334

Exploration Target

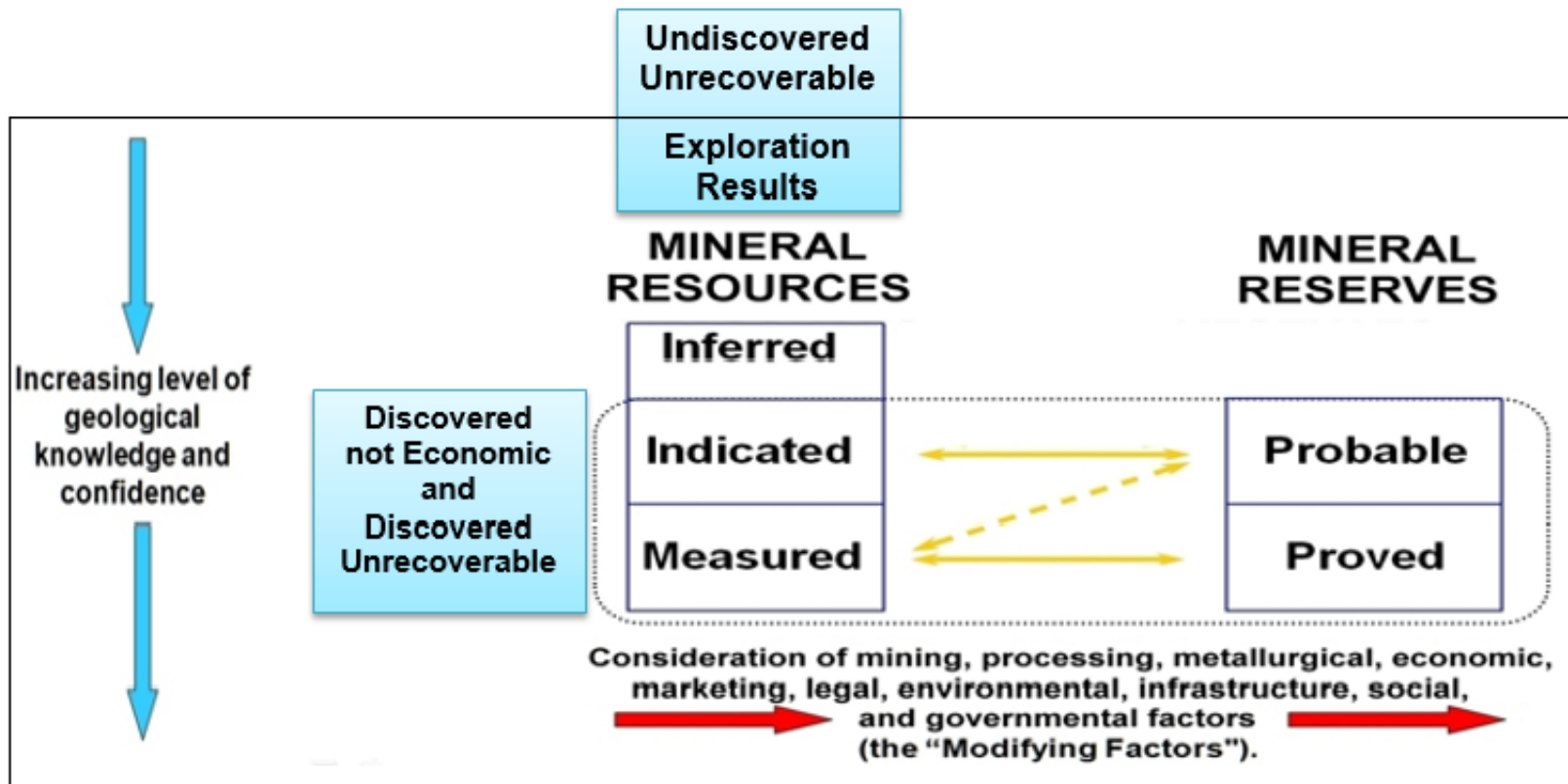
- A statement or estimate of the exploration potential
- Quoted as a range of tonnes and grade or quality
- **Insufficient exploration** to estimate Mineral Resources

Undiscovered Unrecoverable

- Statistical probability of extension to known resources
- Statistical probability on a regional basis

UNFC 2009; 344

Figure 4 Categories of Mineralisation Beyond Inferred



Conclusion

- Need for management of inventory
 - Company level
 - Country level
 - Global level
- Definitions must be consistent

Acknowledgements



ALL SLIDES

www.CRIRSCO.com

