The Proposed Revision of Mineral Resource/Reserve Classification System of China

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I greatly appreciate Mr. Frederic Roming on behalf of the Executive Secretary of UNECE and Mr. Sigurd Heiberg to invite me attending the session.

I am honorable to be dispatched by MOLR here to exchange the idea with the experts from all of the country.

Many thanks to Mr. Li Yuwei and Mr. Yan Tiexiong who prepared the originals of the material used in this presentation.

For convenience,

The Proposed Revision of Mineral Resource/Reserve Classification System of China

will be

The Proposed Revision of MRRCC

in my presentation.

Our works in recent

- MOLA started a project in 2007, aimed at making decision for revising of the mineral resource/reserve classification system.

- A Task Team was formed for the project. Its core consists of the experts from Research and Consulting Center, and Department of Mineral Resources/Reserves of MOLR.

- The team visited and discussed with experts from geological units, mining companies, minerals and mining consultants, administrations and evaluated the situation on application of the existing classification system.

- Recommendations of revising the classification system are made and a proposed revision is provided by the team.

The Existing System

- Issued in 1999.
- The state standard.
- Developed based on UNFC 1997.
- Three axes are used. E for economic categories, F for feasibility study situation and G for geological phases.
- There are 16 categories in total.

The Existing Mineral Resource/Reserve Classification System of China

		Discovered			Undiscovered	
		Measured	Indicated	Inferred	Predicted	
Economic	Fea-	111 111b				Reserve Basic Reserve
	Pre-	121 121b	122 122b			Marginally Basic Reserve Sub-Economic Resource
Marginally Economic		2M11 2M21	2M22			Intrinsic Resource Predicted Resource
Sub-Economic		2S11 2S21	2S22			
Intrinsic Economic		331	332	333	334?	

Fea-: feasibility study Pre-: pre-feasibility study

There are 8 phases from exploration to mining in China:

1. prospecting
2. general exploration
3. pre-feasibility study
4. detailed exploration
5. feasibility study
6. mine design
7. mine development
8. production

The Existing System

- It is noted that pre-feasibility study is based on the data from general exploration, and feasibility study is based on the data from detailed exploration.

The Existing System

Prospecting and exploration are conducted by geological units, while feasibility studies and mine design are conducted by mine design institutes. As activities of these two major phases used to be administrated by different governmental departments separately, the relationship between exploration and feasibility studies should be strengthened.

The problems of the existing system

- Too many categories;
- The term “feasibility study” seems somewhat ambiguous, for converting resources to reserves, terms “feasibility study”, “pre-feasibility study”, “modification” and “technical-economic evaluation” have been used by different standards.
- In practice, hard to identify marginally economic and sub-economic categories, and so forth.

The evaluation From the Task Team

- In general, The three axes classification framework seems acceptable, and could be retained.
- The feasibility study phases should be defined clearly and develop guidelines for practice.
- It needs to be simplified.

The results of the standard revision

- The implementation of applications of the existing standards is evaluated.
- The major problems of revision are studied.
- The principles of revision are set up.
- A draft of revised classification system is formulated.

The proposed Classification framework

G / E		Discovered			Undiscovered
		Measured	Indicated	Inferred	Predicted
Economic	F1	111 111b			
	F2	121 121b	122 122b		
Intrinsic Economic	F3	231	232	233	234

The principles of the revised system

1. Categories are defined by 3D axes.

2. Refer to the proposed change of UNFC-2009 Definitions.

3. Assign both a name in natural language and a numeric code to a category. The numeric code of a category, may not have the same meaning as that in the existing Chinese system

The principles of the revised system

4. Retain the terms of “Resource” and “Reserve”, in which Resource means the total quantity of minerals in situ ,while Reserve means the recoverable parts of the corresponding resources.
5. Pre-feasibility study is still retained. F1 of UNFC-2009 means Feasibility Study plus Pre-feasibility Study of China Revised System.
6. The exploration phases are still retained but not directly used for category definition.

The Axis definition of the revised system

E_C: E_C1 Economic;
E_C2 Intrinsic Economic

F_C: F_C1 Feasibility Study;
F_C2 Pre-feasibility Study
F_C3 Preliminary Study

G_C:
G_C1 Measured;
G_C2 Indicated;
G_C3 Inferred
G_C4 Predicted

Suffix "C" denotes Chinese definition of three axes.

The categories of the Proposed Revision of MRRCC

1. Proved Reserve (111)
   associated with Proved Basic Reserve (111b)
2. Probable Reserve (121+122)
   associated with Probable Basic Reserve (121b+122b)
3. Measured Resource (231)
4. Indicated Resource (232)
5. Inferred Resource (233)
6. Predicted Resource (234)

The categories of the Proposed Revision of MRRCC

Several points:

- ‘Reserve’ means the economically recoverable part of quantity, while ‘Basic Reserve’ means the total in situ quantity of minerals within which the reserve is estimated.

That is, Basic Reserve is inclusive of Reserve.

The categories of the Proposed Revision of MRRCC

- ‘Resource’ means the total in situ quantity of minerals associated with a discovered deposit for which a preliminary study has been carried out . In some circumstances, recoverable and non-recoverable quantity of resources in foreseeable future would be identified by mining companies.

The corresponding relationship between the Proposed Revision of MRRCC and UNFC-2009

- Proved Basic Reserve ≈ (E1F1G1) + (E3F4G1)
- Proved Reserve ≈ (E1F1G1)
- Probable Basic Reserve ≈ (E1F1G2) + (E3F4G2)
- Probable Reserve ≈ (E1F1G2)
- Measured resource ≈ (E2.1F2G1) + (E2.2F2G1) + (E3F4G1)
- Indicated Resource ≈ (E2.1F2G2) + (E2.2F2G2) + (E3F4G2)
- Inferred Resource ≈ (E2.1F2G3) + (E2.2F2G3) + (E3F4G3)
- Predicted Resource ≈ (E3F3G4) + (E3F4G4)

Fundamental Characterization	Solid Mineral Classes	UNFC E axis	UNFC F axis	UNFC G Axes		
				Proved	Probable	NA
Discovered And Economically Extractable at Present	Reserves Economically Extractable	1	1	1	2	
	Remaining In situ Quantities	3	4	1	2	
				Measured	Indicated	Inferred
Discovered but Not Economically Extractable at Present	Resources Potential Economically Extractable	2.1	2	1	2	3
	Resources Not Economocally Extractable	2.2	2	1	2	3
	Remaining In situ Quantities	3	4	1	2	3
				Predicted		
Undiscovered	Undiscovered Resources	3	3	4		
	Undiscovered Remaining In situ Quantities	3	4	4		

Proposed China System

UNFC recoverable

UNFC Not recoverable

Concerning the UNFC-2009

We assent the umbrella system, simplifying definitions for three axes, canceling the unified numeric code, and emphasizing the commercial meaning of categories in the UNFC-2009.

- Developing an umbrella system would be more easy to be mapped by other state system and to make harmonization between systems.

Concerning the UNFC-2009

- Simplifying definitions for three axes makes the umbrella system more powerful in correlation between systems and may benefit the international statistics of mineral resources.

- Canceling the unified numeric code may avoid confusion in mapping and contrasting the classification between UNFC and other state systems.

- Stressing the commercial meaning in the definition of categories may be more acceptable by mining companies, investors and administrators.

Thanks for the UNECE Ad Hoc Group of Experts pay high attention to Chinese Mineral Resource/Reserve Classification.

Be grateful for Australian, Canadian, American experts and friends offering their valuable recommendations to us.

We’d like to make regular contact with the UNECE Ad Hoc Group of Experts on the issue of mineral resource/reserve classification.

We would like to make intercommunion with experts from all of the country.

Thanks for attention!