

# Progress on the revision of the Chinese Mineral Resources and Mineral Reserves Reporting Standard

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## Introduction

During 2007 and 2008 a group of professionals drawn from the Ministry of Land and Resources, People's Republic of China (PRC), other Chinese Government ministries and provincial mining bodies reviewed the current Chinese Mineral Resource/Reserve Classification Standard. The group is led by Mr Li Yuwei, a member of The Research and Consulting Center, Ministry of Land and Resources, PRC. The current 1999 classification standard was based in part on the United Nations Framework Classification of Fossil Energy and Mineral Resources (UNFC), a three dimensional classification system, but particularly noting that the UNECE agreed to incorporate the CMMI<sup>1</sup> definitions for mineral reserves and resources into the UNFC in 1998. The present review was undertaken on the basis that, although largely satisfactory, the current Chinese classification system is not regarded as particularly suitable for reporting in a market economy<sup>2</sup>. The current system has been shown to have created some operational difficulties for both local companies and foreign companies operating in China. It is not readily comparable with the CRIRSCO family of Codes (which includes the Australasian JORC Code), and the UNFC was amended in 2004, removing much of the original basis (including the CMMI 'market related' definitions) for the adoption by the Chinese of a UNFC

style of classification. It is worth noting here that there is a recommendation to revise the UNFC which will be considered by the UNECE Ad Hoc Group of Experts on the Harmonisation of Fossil Energy and Mineral Resources Terminology in March this year. If adopted, the recommendations will considerably simplify the existing 2004 UNFC and result in it becoming an umbrella framework which refers to the CRIRSCO Template and to the Society of Petroleum Engineers' Petroleum Reserves Management System for detailed definitions. Under such circumstances, comparison of the present Chinese classification system with other systems is not straightforward.

## History of the Chinese reporting system

The history of mineral resource and reserve classification systems<sup>3</sup> in the PRC commenced with the adoption by the Chinese National Mineral Reserve Committee in 1954 of the Russian 'Hard Rock Mineral Reserve Classification Standards'. In 1959 the first Chinese standard of Hard Rock Mineral Reserve Classification was issued, which was an analog of the Russian system.

In 1977, new classification systems for metallic and non-metallic minerals were introduced which included four categories, A, B, C and D. In 1992 these systems were combined into one classification system for all minerals, the second Chinese standard. This second standard retained the concept of balanced (the 'reserve' was regarded as economic to some extent and was likely to be included in an approved mine production schedule) and sub-balanced (where the reserve was regarded as potentially economic) sub-divisions.

In 1999, in a move towards economic reform, the existing (the third and current) Solid Mineral Resource / Reserve Classification System was introduced. This system classifies resources / reserves on the basis of geological knowledge and interpreted continuity (UNFC geological or G axis), and also on the basis of project economics and the project (feasibility) study status, effectively a combination of the UNFC economic (E) and feasibility (F) axes. The system contains 16 categories and includes the concept of a 'Basic Reserve', which is the total quantity of in situ resource which forms the base for the Recoverable Reserve. This Basic Reserve may be thought of as equivalent to the mineral resource that is converted to the ore reserve under JORC practice.

The various Chinese categories are referenced by a three digit number, in the same EFG notation as adopted by the UNFC, Figure 1.

Fea-: feasibility study Pre-: pre-feasibility study. Figure 1 courtesy of Mr Li Yuwei and extracted from Outline of the Proposed Revision of Mineral Resource / Reserve Classification System of China Li Yuwei, Yan Tiexiong, Wang Bei, Chen Hong, paper to presented to UNECE Ad Hoc Group of Experts Annual Meeting March 2009.

The EFG notation is supplemented in the case of Marginal Economic Reserves by an 'M' after the E digit e.g. 2M11 or an 'S' after the E digit for those categorised as Sub-Marginal Economic Reserves and with the suffix 'b' for Basic Reserves e.g. 111b.

In practice the inputs to the determination of the classification and

<sup>1</sup> CMMI: Council of Mining and Metallurgical Institutions now disbanded. The CMMI reserves reporting committee became CRIRSCO.

<sup>2</sup> Much of the material in this article is based on conversations with, and a paper by, Mr Li Yuwei the leader of the group examining the revision of the Chinese reporting standard, and a member of The Research and Consulting Center, Ministry of Land and Resources, PRC.

<sup>3</sup> Modified from translations of original papers by Dr Yan Tiexiong, The Research and Consulting Center, Ministry of Land and Resources, PRC.

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

Fig. 1. 1999 Chinese Mineral Resource/Reserves Classification.

the economic status are prescribed in standards applicable to that stage of project activity and the commodity in question. The concept of an individual Competent Person making these decisions as exists in the JORC Code and other CRIRSCO type codes is not part of the Chinese system.

### Proposal for revision

The review concluded that the current system has too many categories. Chinese reserves do not include an allowance for dilution and ore loss, reporting essentially in situ material and there isn't as clear a distinction between what CRIRSCO classifies as mineral resources and mineral reserves in the Chinese classification. In addition the distinction between marginally economic (Chinese UNFC equivalent code 2M11) and sub-economic (Chinese UNFC equivalent code 2S11) was noted to be potentially variable with changing conditions if market parameters were applied rather than specified cut-off conditions.

The Chinese have sought input on relevant issues from CRIRSCO, JORC, CIM and UNECE during the review process. CRIRSCO had the 2006 CRIRSCO Template translated into Chinese and this has been incorporated into the reference material for the

review. There were several translations of the JORC Code and of Canadian and UNECE documents already in existence.

Mr Li Yuwei presented the review group's recommendations regarding the possible revision of the Chinese reporting system at a workshop held at the time of China Mining 2008 in Beijing. This workshop included representatives of CRIRSCO. Essentially the review group recommended consideration of two alternative classifications, both of which are claimed to be easily correlated to the CRIRSCO Template classifications and with the UNFC.

The two options included either three economic levels (Economic, Potentially Economic and Intrinsic Economic) or two economic levels (Economic and Potentially Economic). The system needs to be designed not only to meet the requirements of a market system but to continue to provide information to the government. The retention of the concept of Basic Reserves in addition to Recoverable Reserves is proposed specifically to meet the needs of government and enterprises.

Undiscovered or reconnaissance mineral resources are included in both alternatives as the previous China

classification systems, from 1980, all included categories of undiscovered mineral resources. China has carried out several rounds of undiscovered mineral resource assessments, so, these undiscovered categories have been retained in the proposed systems. These 'undiscovered resources' do not currently have an equivalent in the CRIRSCO system, but it is acknowledged they have a place in government planning systems.

It now appears<sup>4</sup> that the proposed classification to be adopted will include the following main categories:

- Proved Reserves (Recoverable and Basic Reserve);
- Probable Reserves (Recoverable and Basic Reserve);
- Measured Resource, Indicated Resource and Inferred Resource; and
- Predicted Resource.

The proposal is being reviewed and the drafting of a new classification system will then be undertaken, at the same time it will be necessary that the accompanying codes, standards and guidelines are revised. The revision group recognises this and will make recommendations for revision of these accompanying documents. There is also a recognised need for mapping the classification system and the definitions and standards, which support the Chinese system to other international classification systems. A preliminary mapping of the Chinese system to the proposed revised UNFC<sup>5</sup> appears to indicate some difficulties in mapping the simplified system recommended for adoption to the proposed revision of the UNFC. There are also may be differences in meanings of the terms between the Chinese classification and the CRIRSCO Template despite the same terms being used. The revision group has already instituted the commencement of pilot case studies which will aid the understanding of the new system. ■

4 Mr Li Yuwei pers. comm., and Outline of the Proposed Revision of Mineral Resource/Reserve Classification System of China Li Yuwei, Yan Tiexiong, Wang Bei, Chen Hong, in prep.

5 Outline of the Proposed Revision of Mineral Resource/Reserve Classification System of China Li Yuwei, Yan Tiexiong, Wang Bei, Chen Hong, in prep.