UNITED
NATIONS

E

Economic and Social
Council

Distr.
GENERAL

ENERGY/1999/8/Add.5
30 July 1999

Original: ENGLISH

ECONOMIC COMMISSION FOR EUROPE

COMMITTEE ON SUSTAINABLE ENERGY
Ninth session, 9-11 November 1999
Item 4(a) of the provisional agenda

PRACTICAL APPLICATION OF THE UNITED NATIONS FRAMEWORK CLASSIFICATION FOR RESERVES/RESOURCES

Suitability to Malaysian Energy and Mineral Sectors

(Submitted by the Government of Malaysia) */

1. UN Framework Classification

(a) The UN Framework Classification has no provision for the classification and reporting of the reserves/resources of certain non-metallic mineral deposits such as construction sand and gravels, clays, rock aggregates etc. For their classification/reporting, the following factors need to be considered:

(i) In most developing countries, the mining of these types of deposits is usually on a small scale and as such, the required capital investment is characteristically low.

(ii) Very often, only minimal geological investigation, perhaps up to the "prospecting stage" is carried out prior to mining.

---

*/ Prepared by the Geological Survey Department, Malaysia

GE.99- 32285

(ii) No comprehensive feasibility or prefeasibility studies are carried out prior to mining. Economic viability is often established based on a simple "prefeasibility study" consisting of only cost/profit estimates.

In order to cater for these types of non-metallic mineral deposits and taking into consideration the above factors, it is necessary to extend the UN Framework Classification by the reserve/resource classes (123) - Probable Mineral Reserve and (223)- Prefeasibility Mineral Resource (see tables 3 and 4, Geological Survey Department Malaysia's Reserve/Resource Classification).

Consequent to the inclusion of reserve/resource classes (123) and (223), it is necessary to redefine the terms "Prefeasibility Study", "Probable Mineral Reserve" and "Prefeasibility Mineral Resource". The redefinitions are as in: Definitions of Mineral Reserve/Resource Terms, Geological Survey Department Malaysia's Reserve/Resource Classification.

(b) In the UN Framework Classification, the economic viability categories "1-2" (economic to potentially economic, i.e. intrinsically economic) and "?" (economic viability undetermined) are not consistent with the codings for the various mineral resource classes identified under Geological Study. It is considered more appropriate to replace "1-2" and "?" with economic viability category "3" (intrinsically economic: meaning economic to potentially economic) (see table 3, Geological Survey Department Malaysia's Reserve/Resource Classification).

(c) In the UN Framework Classification, the term "Uneconomic Occurrence" is best replaced by "Uneconomic Deposit" as a mineral occurrence cannot have any economic connotation.

2. Trial Application: UN Framework Classification

(a) The Geological Survey Department Malaysia (GSD) has compiled some metallic, industrial and energy mineral reserves/resources using the UN Framework Classification (UNFC).

(b) Hitherto no problem has been encountered in so far as the classification and emplacement of the mineral reserves/resources into the various classes as outlined in the UNFC. The UNFC appears to have sufficient provisions to accommodate the exploration activities and reporting procedures as adopted by the GSD and most mining companies. It is pertinent to add that the extension of the UNFC by the classes (123) and (223) so as to cater for certain industrial mineral deposits would be ideal.

(c) Problems in compilation arise when there is insufficient information, as for example some reserve/resource figures provided by private mining companies. This is not totally unexpected as such information is largely proprietary in nature. Similar problems arise when producers of certain industrial minerals are uncertain as to the actual amount of reserves which are available in their leases. However, it should be noted that problems of this nature have no bearing whatsoever on the suitability or otherwise of the UNFC.

Table 3: Geological Survey Department Malaysia
Reserve/Resource Classification

	Detailed Exploration	General Exploration	Prospecting	Reconnaissance
Feasibility Study and/or Mining Report	1 Proved mineral reserve (111) 2 Feasibility mineral resource (211)			
Prefeasibility Study	(121) 1 Probable mineral reserve + (122) + (123) (221) 2 Prefeasibility mineral resource + (222) + (223)			
Geological Study	3 Measured mineral resource (331)	3 Indicated mineral resource (332)	3 Inferred mineral resource (333)	3 Reconnaissance mineral resource (334)

Note:

(a) Economic viability categories:
1 = economic 2 = potentially economic
3 = intrinsically economic = (1-2) (economic to potentially economic)

(b) Codified reserve/resource classes (123) and (223) are for non-metallic minerals such as construction sand and gravel, clays, etc. which require low mining investment. The economic viability of such deposits can often be established with minimal investigation and simple cost-benefit estimates during the "prefeasibility study" stage. In such cases, comprehensive prefeasibility studies are not necessary.

Table 4 : Reserve/Resource Classes and their Codification

ECONOMIC VIABILITY	FEASIBILITY ASSESSMENT	GEOLOGICAL ASSESSMENT	CODE	RESERVE/RESOURCE CLASSES
Economic	Feasib. St. & Min. Rep.	Detailed Exploration	111	Proved Mineral Reserve
Economic	Prefeasibility Study	Detailed Exploration	121	Probable Mineral Reserve
Economic	Prefeasibility Study	General Exploration	122	
Economic	Prefeasibility Study	Prospecting	123	
Potentially Economic	Feasib. St. & Min. Rep.	Detailed Exploration	211	Feasibility Mineral Resource
Potentially Economic	Prefeasibility Study	Detailed Exploration	221	Prefeasibility Mineral Resource
Potentially Economic	Prefeasibility Study	General Exploration	222	
Potentially Economic	Prefeasibility Study	Prospecting	223	
Intrinsically Economic	Geological Study	Detailed Exploration	331	Measured Mineral Resource
Intrinsically Economic	Geological Study	General Exploration	332	Indicated Mineral Resource
Intrinsically Economic	Geological Study	Prospecting	333	Inferred Mineral Resource
Intrinsically Economic	Geological Study	Reconnaissance	334	Reconnaissance Mineral Resource

Geological Survey Department Malaysia Reserve/Resource
Reporting Form

STATE : SABAH

MINERAL COMMODITY : GOLD / SILVER

Deposit/ Mine	Feasibility Study and/or Mining Report		Prefeasibility Study						Geological Study			
	Economic	Potentially Economic	Economic			Potentially Economic			Detailed Exploration	General Exploration	Prospecting	Reconnaissance
	(111)	(211)	(121)	(122)	(123)	(221)	(222)	(223)	(331)	(332)	(333)	(334)
BUKIT MANTRI TAWAU	857,928 t Ore (205,000 oz Au, 201,000 oz Ag, 3,260 tonnes Cu)											

Limiting Factor

1) Grade: 7.43 g/t Au, 7.30 g/t Ag and 0.38% Cu
2) Cut off garde: 2.0 g/t Au
3) Open pit mining: down to 400 m level
   Pit Slope- 40- 45 deg.
   Bench Slope - 55-59 deg.
4) Underground mining to start at 400 m level down to 250m level
5) Processing using Carbon-in-pulp (CIP) method

Note

Code : (123)
Unit :

Compiled by : Alexander S. W. Yan

Date : September 1997

Geological Survey Department Malaysia Reserve/Resource Reporting Form

STATE : Kelantan

Mineral Commodity : Ball Clay

Deposit/Mine	Feasibility Study and/or Mining Report		Prefeasibility Study						Geological Study			
	Economic	Potentially Economic	Economic			Potentially Economic			Detailed Exploration	General Exploration	Prospecting	Reconnaissance
	(111)	(211)	(121)	(122)	(123)	(221)	(222)	(223)	(331)	(332)	(333)	(334)
Kg. Cheker										0.79		
Kg. Geretak Tiga										1.80		
Kg. Bangka										3.00		
Kg. B. Kecil										2.40		
Cherang Hangus										10.30		
Bt. Pak Junus										4.60		
Lubuk Kuin										6.80		

Limiting Factor

1. Plastic Clay, clean firing white to near white
2. Clay horizon > 1 m thick
3. Overburden : clay ratio < 2 : 1

Note

Code : (123)

Unit : Million tonne

Compiled by : Loh. C.H.

Date : August 1997

Geological Survey Department Malaysia Reserve/Resource Reporting Form

STATE : Pahang

Mineral Commodity : Gold

Deposit/Mine	Feasibility Study and/or Mining Report		Prefeasibility Study						Geological Study			
	Economic	Potentially Economic	Economic			Potentially Economic			Detailed Exploration	General Exploration	Prospecting	Reconnaissance
	(111)	(211)	(121)	(122)	(123)	(221)	(222)	(223)	(331)	(332)	(333)	(334)
Penjom gold mine	377,000								123,000			

Limiting Factor

1. Cut off value 0.8 g/t gold
2. Open pit mining down to 200m depth
3. Processing using CIL

Note

Code : (123)

Unit : Oz

Compiled by : Loh C.H.

Date : August 1997

Geological Survey Department Malaysia Reserve/Resource Reporting Form

STATE : Sarawak

Mineral Commodity : Coal

Deposit/Mine	Feasibility Study and/or Mining Report		Prefeasibility Study						Geological Study			
	Economic	Potentially Economic	Economic			Potentially Economic			Detailed Exploration	General Exploration	Prospecting	Reconnaissance
	(111)	(211)	(121)	(122)	(123)	(221)	(222)	(223)	(331)	(332)	(333)	(334)
Merit-Pila coalfield	12.236	12.301							143.33	111.37	107.84	
Silantek coalfield	7.25.	10.60									32.40	
Balingian Formation											120.00	
Liang Formation									43.60	8.30	98.10	
Bintulu Area									6.00		14.00	

Limiting Factor

Thickness ≥ 0.6 m
Ash ≤ 50%
Depth ≤ 400m below msl
Net calorific Value ≥ 11,000 kJ/Kg
Sulphur ≤ 3%

Note

Code : (123)

Unit : 10^6 tonnes

Compiled by : Dorani Johori

Date : 20.10.1997