CURRENT INDIAN EVALUATION SYSTEM WITH RELATION TO AUCTIONING PROCESS, NEW REGULATION AND ROLE OF MECL

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Reporting Codes

Country	Code
Australasia	JORC
South Africa	SAMREC
Canada	CIM
USA	SME
UK, Europe & Ireland	PERC
Philippines	PMRC
Chile	CHILEAN
Peru	PERUVIAN
India	UNFC
Russia	RUSSIAN
China	CHINESE

National and international reporting codes and associations

Region	Code	Professional organisation		Comments
Australasia	JORC Code 2004 and Companies Updates	AusIMM	Australasian Institute of Mining and Metallurgy	Adopted by ASX and NZX
		AIG	Australian Institute of Geoscientists	
South Africa	SAMREC Code 2007	SAIMM	Southern African Institute of Mining and Metallurgy	Adopted by JSE
		GSSA	Geological Society of South Africa	
		SACNASP	South African Council for Natural Scientific Professions	
		ESSA	Engineering Society of South Africa	
		PLATO	South African Council for Professional Land Surveyors and Technical Surveyors	
Canada	CIM Definition Standards 2005 (with National Instrument 43-101 and best practice guidelines)	CIM	Canadian Institute of Mining and Metallurgy and Petroleum	Adopted by TSX

CRIRSCO – COMBINED RESERVES INTERNATIONAL REPORTING STANDARDS COMMITTEE

Region	Code	Professional organisation		Comments
UK, Ireland and Europe	PERC exposure draft issued 2008. (Update of The Reporting Code 2001)	IoM3	Institute of Material, Minerals and Mining	Expected to be recognised by AIM
		GSL	Geological Society of London	
		EFG	European Federation of Geologists	
		IGI	Institute of Geologists of Ireland	
Chile	Chilean Code 2004	IIMCh	Mineral Resources Committee of the Institution of Mining Engineers of Chile	Fully implemented 2008
Peru	Peruvian Code 2004	CIP	The Institute of Engineers of Peru	Adopted by Lima stock exchange
Philippines	PMRC 2007	PSEM	Philippine Society of Mining Engineers	Adopted by PSX
		GSP	Geological Society of the Philippines	
		SMEP	Society of Metallurgical Engineers of the Philippines	
USA	SME Guidelines 2007	SME	Society for Mining, Metallurgy, and Exploration	Not recognised by the SEC. Refer instead to Industry Guide 7
Russia	Classification of Reserves of Mineral Deposits and Prognostic Resources of Solid Minerals 2006			In force from Jan 2008. Protocols are in place to map to CRIRSCO template
China	Solid Mineral Reserve Classification 1999			Under revision. Proposal to map to CRIRSCO template

The following discussions on classification and reporting are generalised around the CRIRSCO based reporting codes. Individual codes should be reviewed for details of local requirements.

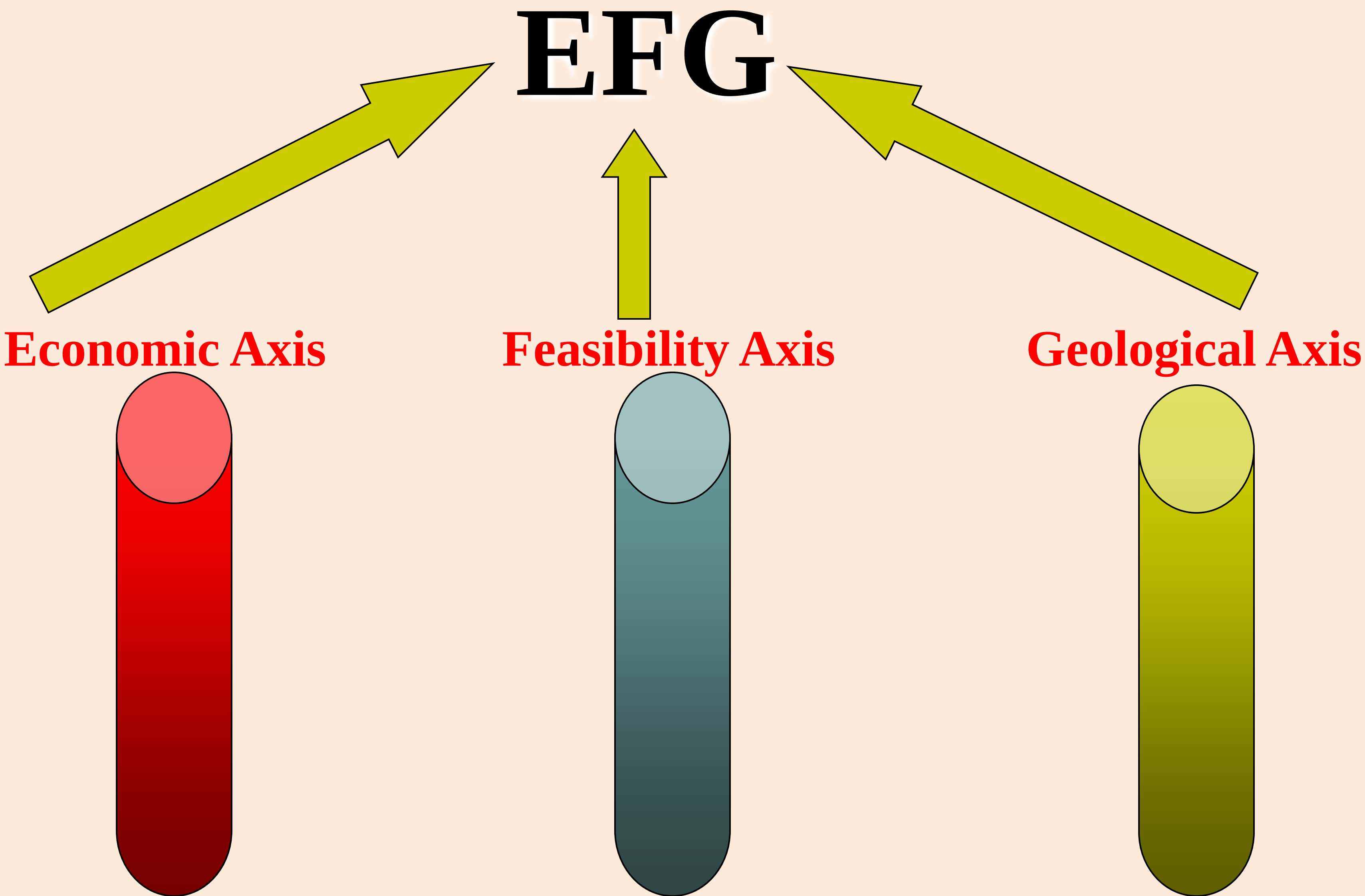
United Nations Framework Classification (UNFC)

(Government of India has adopted the UNFC in January, 2003 for Indian mineral sector)

United Nation Framework Classification (UNFC)

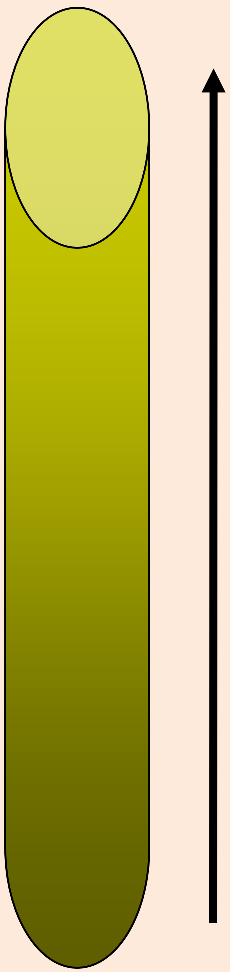
United Nation Framework Classification (UNFC) is a system classifying the estimations based on three digit codes representing Geological certainty, Feasibility, and Economic viability. It is a globally understandable system.

Three Digit Code System



Geological Assessment

FOUR CODES



G-1 DETAILED EXPLORATION (331)

G-2 GENERAL EXPLORATION (332)

G-3 PROSPECTING (333)

G-4 RECONNAISSANCE (334)

RECONNAISSANCE (G4)

- Identification of areas of enhanced mineral potential on a **regional scale**, based primarily on results of regional geological studies, regional geological mapping, airborne and indirect methods, preliminary field inspection, geological inference and extrapolation.

- The objective is to **identify mineralized areas worthy of further investigation**

- Estimates of quantities should only be made if sufficient data are available.

PROSPECTING (G3)

- Systematic process of searching mineral deposit by **narrowing down areas** of promising mineral potential.

- Outcrop identification, geological mapping and indirect methods like geophysical and geochemical studies. Limited trenching, drilling and sampling

- The objective is to identify deposit which will be the **target for further exploration.**

- Estimates of **quantities are inferred** based on interpretation of geological, geophysical and geochemical results.

333

GENERAL EXPLORATION (G2)

- Involves **initial delineation of an identified deposits**.

- Surface mapping, widely spaced sampling, trenching and drilling for preliminary evaluation of mineral quantity and quality (including mineralogical test on lab scale if required) and limited interpolation based on indirect methods of investigation.

- The objective is to establish main geo features of deposit, giving a **reasonable indication of continuity and providing initial estimate of size, shape, structure, and grade.**

- The degree of accuracy should be sufficient for deciding whether **pre-feasibility and detailed exploration are warranted**.

DETAILED EXPLORATION (G 1)

- Involves **three dimensional delineation of known deposits,**

- Closely spaced sampling from outcrops, trenches, boreholes, shafts and tunnels such that size, shape, structure, grade and other relevant characteristics of the deposit including bulk sample tests for **establishing estimates with a high degree of accuracy.**

- A decision whether to conduct a feasibility study can be made from the information provided by detailed exploration.

Generalised Comparison of Different Activities in Geological Axis

SL. NO	ACTIVITIES	G4 RECONNAISSANCE	G3 PROSPECTING	G2 GENERAL EXPLORATION	G1 DETAILED EXPLORATION
1	Geological Surveys	1:50,000	1:50,000 to 1:25,000	1:25,000 to 1:5,000	1:1,000
2	Trenching	1 or 2	To Explore bed Rock / Mineralized Zone	Deciphering the Extent of mineralisation	Spacing of 200 to 300m.
3	Pitting	Upto 5 pits / BH per 100 sq.km. area	BH in 200 to 500 sq.m. Grid	BH in 100 to 400m. Grid	Pits 2 to 5 per sq.km. Drilling closer than G2 100 to 50m Grid
4	Sampling	Regional Grab / Chip Sampling	Well defined location at Surface, Pit / Trench / BH / Existing Mine openings	Pit / Trench Sampling Core Sampling (Check Sampling 10%)	Systematic Pit /Trench Core / Sludge sampling for lab scale and Bulk sample for Pilot Plant scale beneficiation
5	Petrographic / Mineragraphic Study	Principal Rock type Determination, Mineral Assemblage identification for minerals of interest (ore & gangue minerals)	Petrographic Studies of Rocks, alternations of the Deposit and its Surroundings.	Petrographic Studies of Rocks including Grain size and Texture etc.	Refining Petrographic studies of rocks including grain size and texture, gangue and its liberation etc.
6	Geostatistical Analysis	--	--	--	BH data, thickness of ore waste encountered in holes, assay values of sample etc.

Feasibility Assessment

THREE CODES

F-1 Feasibility & Mining Report (311)

F-2 Pre Feasibility (321)

F-3 Geol. Studies & Baseline data (331)

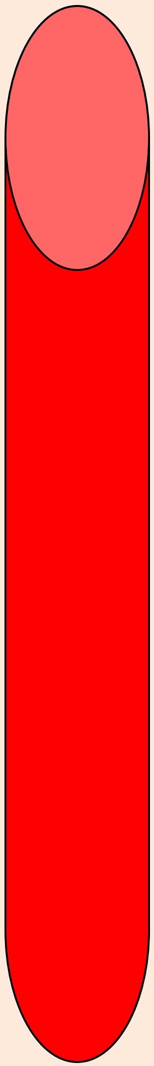
FEASIBILITY STUDY (F – AXIS)

- Assesses in detail technical soundness and economic viability of mining project.
- Serves as basis for the investment decision and as a bankable document for project financing.
- The study constitutes an audit of all geological, engineering, environmental, legal and economic information accumulated on the project.
- Cost data must be reasonably accurate (10%) and no further investigations should be necessary to make the investment decision.

METHOD OF INVESTIGATION

- Involves Geological and related studies, infrastucture, meteorology, ecology, construction services etc.
- Mining methods, technology, recovery, manpower etc.
- Study of Baseline data and impact analysis.
- Processing studies of Laboratory, Pilot Plant, Industrial Scales
- Capital & operative costs, demand supply relations, industry structure, economic viability, cash flow forecast etc..
- Study of other factors such as statutory provisions, labour, land and mining laws and taxations etc.

Economic Assessment



THREE CODES

E-1 Economic (111)

E-2 Potentially Economic (211)

E-3 Intrinsically Economic (311)

ECONOMIC VIABILITY (E – AXIS)

- Quantities of reserves are considered to be exploitable at a profit under existing socio-economic conditions and with current mining and processing technology.

- Quantities which do not meet this requirement at the time of assessment are sub- economic provided they may become economic in future.

- Resource estimates undertaken in the course of geological assessment contains preliminary evaluation of economic viability by application of meaningful cut-off values from comparable mining operations.

METHODS OF INVESTIGATION

Detailed Geological knowledge, Mining Report/Plan, Reserves as per Specific End Use Grade and Forest/ Non Forest and other land use data.

UNFC SYSTEM

Three digit Code based categories of reserve – Economic (E), Feasibility (F) and Geological (G)

ECONOMIC AXIS (E)

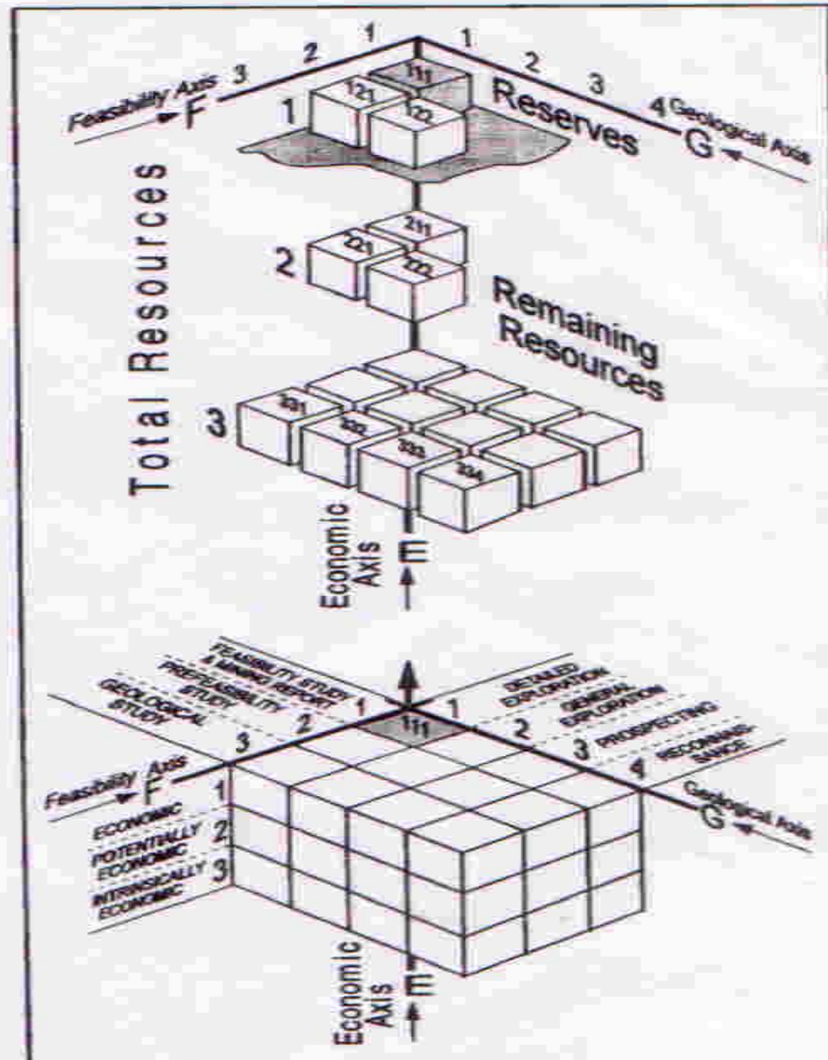
- ECONOMIC 1
- POTENTIALLY ECONOMIC 2
- INTRINSICALLY ECONOMIC 3

FEASIBILITY AXIS (F)

- FEASIBILITY STUDY AND MINING REPORT 1
- PRE-FEASIBILITY STUDY 2
- GEOLOGICAL STUDY 3

GEOLOGICAL AXIS (G)

- DETAILED EXPLORATION 1
- GENERAL EXPLORATION 2
- PROSPECTING 3
- RECONNAISSANCE 4



REVISED EDITION OF UNFC
IS
UNFC-2009

MAJOR CHANGES IN UNFC, 2009

THE 3 AXES HAVE NOW BECOME

E ECONOMIC AND SOCIAL VIABILITY (E1,E2,E3)

F FIELD PROJECT STATUS AND FEASIBILITY (F1,F2,F3,F4)

G GEOLOGICAL KNOWLEDGE (G1,G2,G3,G4)

UNFC, 2009 APPLIES TO

FOSSIL ENERGY

MINERAL RESERVES AND RESOURCES

LOCATED ON OR BELOW THE EARTH

SURFACE INCLUDING

OIL & GAS,

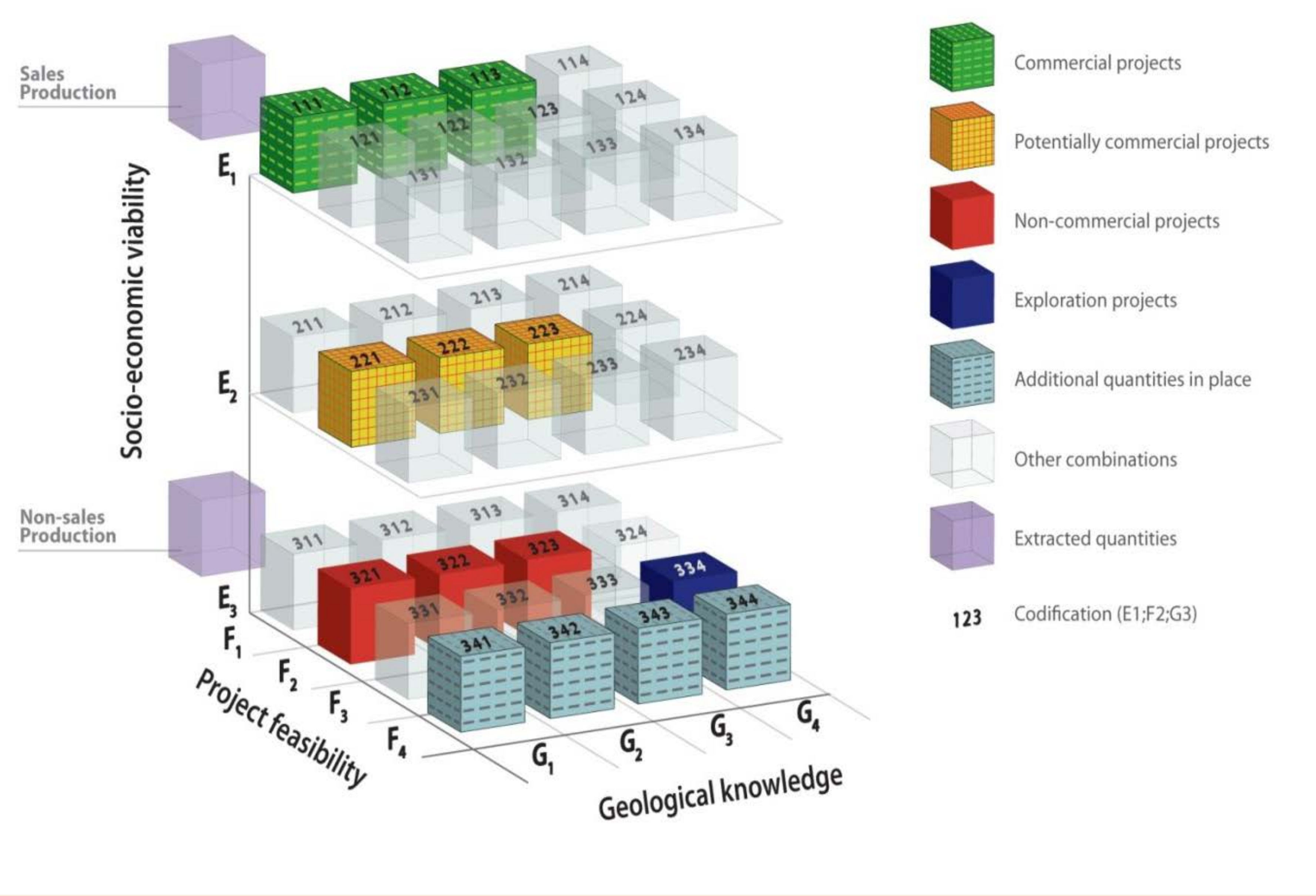
ATOMIC ENERGY MINERALS

GEOTHERMAL ENERGY

NON CONVENTIONAL ENERGY

RESOURCES

UNFC-2009



Sales
Production
Non-sales
Production
Socio-economic viability
E1
E2
E3
F1
F2
F3
F4
Project feasibility
G1
G2
G3
G4
Geological knowledge
111 112 113 114
121 122 123 124
131 132 133 134
211 212 213 214
221 222 223 224
231 232 233 234
311 312 313 314
321 322 323 324
331 332 333 334
341 342 343 344
Commercial projects
Potentially commercial projects
Non-commercial projects
Exploration projects
Additional quantities in place
Other combinations
Extracted quantities
123
Codification (E1;F2;G3)

TYPE OF PROJECTS

1. COMMERCIAL PROJECTS (111,112,113)
2. POTENTIALLY COMMERCIAL PROJECTS (221,222,223)
3. NON COMMERCIAL PROJECTS (321,322,323)
4. EXPLORATION PROJECTS (334)
5. ADDITIONAL QUANTITIES IN PLACE (341,342,343)
6. OTHER COMBINATIONS
7. EXTRACTED QUANTITIES

Salient Features -MMDR Amendment, Act 2015

- Mineral Concessions through Action
- Exploration made mandatory
- Fourth Schedule of “Notified Minerals” (Bauxite, Iron Ore, Limestone, Manganese Ore) inserted.
- “National Mineral Exploration Trust” (NMET) created
- Creation of “District Mineral Foundation” (DMF)
- Increase in time of Lease from 30 to 50 years
- Creation of “Composite Licence” (Prospecting Licence-cum-Mining Lease)

Impact-MMDR Amendment Act, 2015

Legislative Changes

- MMDR, Amendment Act, 2015
- **Minerals (Evidence of Mineral Contents) Rules,2015**
- **Minerals (Auction) Rules, 2015**
- **NMET Rules, 2015 for funding exploration projects**
- District Mineral Foundation for development.

Minerals (Evidence of Mineral Contents) Rules, 2015

Notification of the area for auction of Grant of Composite Licence

- Preliminary Exploration(G-3)completed
- Inferred Mineral Resources Established (333)
- Geological Report Prepared

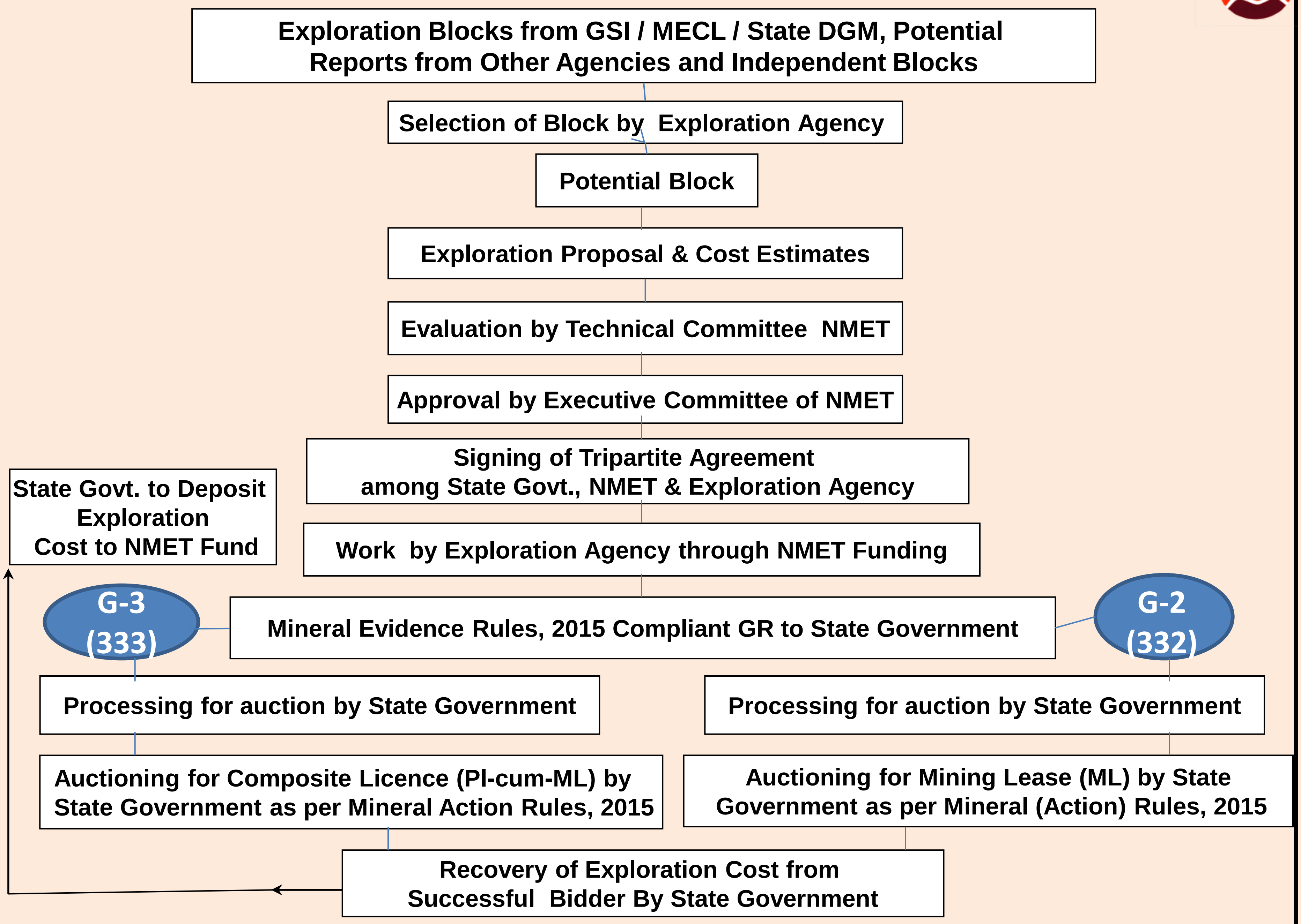
Notification of the area for auction of Grant of Mining Lease

- General Exploration(G-2)completed
- Indicated Mineral Resources Established (332)
- Pre-Feasibility Report has been prepared to Establish Probable Mineral Reserves to plan mining operations for 5 years from the date of commencement of Mining Lease.
- This Report has to be submitted to the State Government.

National Mineral Exploration Trust (NMET) Rules, 2015

- Created for speeding up mineral exploration
- Miners to give 2 % of the royalty towards NMET
- Corpus for exploration and related activities
- Technical Committee examines the projects
- Executive Committee approves the projects
- EC to be headed by Secretary (Mines)
- Governing Body to be headed by Minister Mines
- A Tripartite Agreement has to be signed before taking up the project for recovery of exploration cost.

SCHEMATIC FLOW CHART FOR EXPLORATION THROUGH NMET FUND



National Mineral Exploration Trust (NMET) Rules, 2015

- MECL has been designated as Nodal Exploration Agency
- 30 blocks from 100 identified by GSI are allotted to MECL
- 16 blocks in operation and 29 are approved for taking up by MECL through NMET funding
- Tripartite Agreement signed between State Government, NMET and MECL before taking up exploration work.
- After completion of the exploration the report will be handed over to the State Government for auctioning.

Mineral (Auction) Rules, 2015

- Evidence of mineral content established (part IV A&B)
- Area to be demarcated by DGPS & Total Station
- Land to be marked as
  - ✓ Forest Land
  - ✓ Land owned by State Govt.
  - ✓ Land not owned by State Govt.
- Post Auction Obligations
  - ✓ The holder of ML has to complete
  - ✓ G-1 level Detailed Exploration
  - ✓ Prepare Detailed Feasibility Report over an entire area of lease
  - ✓ In 5 years from date of commencement of lease

Hand Holding for States

- MMDR Amendment Act, 2015 required auctioning of mineral blocks.
- GSI, MECL and State Government GRs
- GRs required block boundaries demarcation by DGPS and Total Station.
- Digitisation of GRs
- GSI, MECL, MECON etc. Helped in survey and digitisation.
- Identifying the land into Forest, State Govt. and Non State Govt. IBM played a major role.
- Auctioning of 1st 2 limestone blocks by Jharkhand. Although Gujarat first issued Tender Notification for aution.
- As on date 17 mineral blocks auctioned.

Mineral Blocks Auctioned as on 31.10.2016

Sl. No	State	Block	District	Commodity	Lease	Successful Bidder
1.	Odisha	Ghorhaburhani-Sagasahi	Sundergarh	Iron Ore	M. L.	Essar Steel
2.	Chhattisgarh	Baghmara	Balodabazar-Bhatapara	Gold	Pl-cum-ML	Vedanta Limited
3.		Karhi Chandi	Balodabazar-Bhatapara	Limestone	M. L.	Shree Cement Century Textiles & Industries Limited
4.		Kesla	Raipur	Limestone	M. L.	Century Textiles & Industries Limited Unit Century Cements
5.	Jharkhand	Harharpur Lem-Bicha Block I	Ramgarh	Limestone	Pl-cum-ML	Burnpur Cement Limited
6.		Harharpur Lem-Bicha Block II	Ramgarh	Limestone	Pl-cum-ML	Burnpur Cement Limited
7.		Pahardia	West Singhbhum	Gold	PL cum ML	Maithan Ispat Nigam Ltd.

Mineral Blocks Auctioned as on 31.10.2016

Sl. No.	State	Block	District	Commodity	Lease	Successful Bidder
8.	Andhra Pradesh	Gudipadu	Ananthpuramu	Limestone	M.L.	Shree Penna Cement Industries Ltd.
9.	Karnataka	Kartikeya Manganese (ML No. 2559) Swamimalai Range	Bellary	Iron Ore	M. L.	MSPL Ltd
10.		Lakshminarayanan Mining Company (ML No. 2487)	Bellary	Iron Ore	M. L.	MSPL Ltd
11.		Hothur Traders (ML No. 2313) Malgolla.	Bellary	Iron Ore	M. L.	JSW Steel Ltd.
12.		Rama Rao Paol (ML No. 2621) Ramgad	Bellary	Iron Ore	M. L.	JSW Steel Ltd.

Mineral Blocks Auctioned as on 31.10.2016

Sl. No.	State	Block	District	Commodity	Lease	Successful Bidder
13.	Karnataka	Tungabhadra Minerals Pvt.Ltd. (ML No. 2365) Ittanahalli	Bellary	Iron Ore	M. L.	JSW Steel Ltd.
14.		Tungabhadra Minerals Pvt.Ltd. (ML No. 2366) Ittanahalli	Bellary	Iron Ore	M. L.	JSW Steel Ltd.
15		V.S.Lad & Sons (ML No. 2290) Sandur	Bellary	Iron Ore	M. L.	JSW Steel Ltd.
16.	Madhya Pradesh	Hatupur, Brijpur	Panna	Diamond	PL cum ML	Bansal Construction Works
17	Rajasthan	Block No. 3B1-(b)n/v Deh	Nagaur	Limestone	M. L.	Emami Cement Ltd.

THANK YOU