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# The Mineral Development and Regulation Framework in India

## Reforming the Concession Grant System

### SUMMARY

The Paper highlights the governance and regulation issues that need to be addressed as part of the reform of the mineral concession system. Also it brings out the merits of bidding and first-in-time systems in their specific contexts. The difficulties of resource estimation and valuation in bidding systems are analysed. The paper underlines the need to ensure that the mineral concession system, on one hand, promotes scientific mining within a sustainable development framework, and on the other, incentivizes exploration and induction of advanced technologies for the purpose, and also ensures that the State gets a fair value for the minerals extracted.

The Paper concludes that a first-in-time system is necessary to promote exploration in a high risk environment by providing commensurate rewards; and that given the current uncertainties in the state of knowledge of our mineral resources, a sliding-scale *ad-valorem* royalty may be better than bidding to optimize revenues while ensuring business confidence and a level playing field.

### Introduction

Entry no. 23 of List II (State List) of the Constitution provides for “Regulation of mines and mineral development subject to the provisions of List I with respect to regulation and development under the control of the Union”. Correspondingly, entry no. 54 of List I (Union List) of the Constitution provides for “Regulation of mines and mineral development to the extent to which such regulation and development under the control of the Union is declared by Parliament by law to be expedient in the public interest”. Thus, though the States are the owners of the minerals and royalty also accrues to them, Parliament has the power in the public interest to regulate the mining sector.

**The Mines and Minerals (Regulation and Development) Act, 1957** was enacted by the Parliament for the regulation of mines and development of minerals under the control of the Union. The Act has been amended in 1972, 1986, 1994, and 1999 in keeping with changes in the policy on mineral development.

The first **National Mineral Policy (NMP) for non-coal, non-fuel minerals** was enunciated by the Government in 1993 for liberalization of the mining sector. The NMP 1993, aimed at encouraging the flow of private investment and introduction of state-of-the-art technology in exploration and mining. Subsequently, in the Mid-Term Appraisal of the Tenth Five-Year Plan, it was however observed that the results of the Mineral Policy had not been encouraging. The main factors responsible for this were identified as procedural delays in the processing of applications for mineral concessions and the absence of adequate infrastructure in mining areas. To go into the whole gamut of issues relating to the development of the mineral sector and suggest measures for improving the investment climate, the Mid-Term Appraisal proposed the establishment of a High Level Committee. Accordingly, the Planning Commission constituted a Committee in September 2005 under the Chairmanship of Shri Anwarul Hoda, Member, Planning Commission.

The **Hoda Committee** studied the various reports prepared and submitted by study groups and in-house committees set up by various Ministries from time to time on the issues brought before the Committee. The Committee gave consideration to the mineral policies of the States as presented by the State Governments, especially to the differing perceptions of mineral-rich and non-mineral-rich states. The Committee also carried out a comparative analysis of the mineral policies and statutes of other major mineral producing countries in the world such as Australia, Canada, Chile, and South Africa.

The Committee made detailed recommendations on all of its terms of reference in December 2006, the main thrust of which was to the effect that:

- The NMP would have to be revised to attune it to the current realities in the world economy in which barriers to international trade and investment flows have been rapidly dismantled.
- The policy would have to provide for the mining laws and practices to evolve in order to adapt to international best practices.
- While the Geological Survey of India (GSI) would need to be strengthened to enlarge their activities using state-of-the-art techniques, much of the future investment needed for exploration and mining would have to come from the private sector.

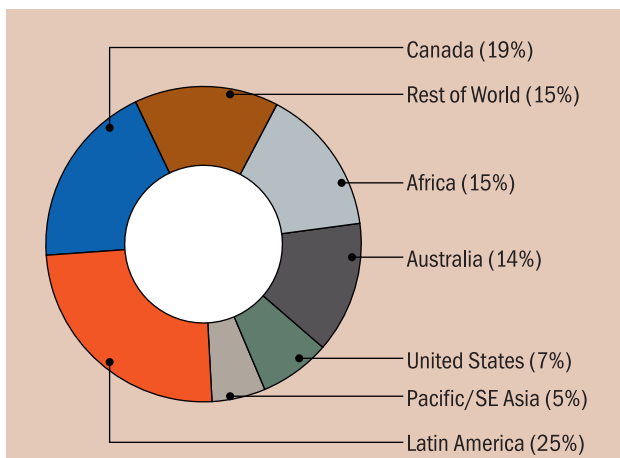


Figure 1: Exploration budgets by Region, 2004 - 2008

Source: Metals Economics Group 2009. World Exploration Trends (Metals Economics Group, Halifax)

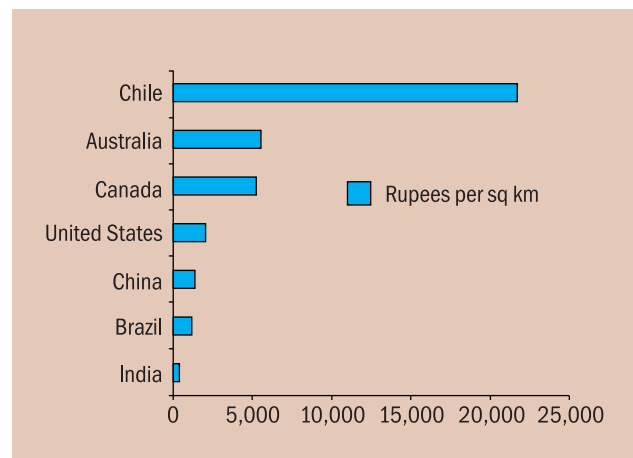


Figure 2: Investment in exploration by select countries

Source: Ministry of Mines 2011. Unlocking the Potential of the Indian Minerals Sector, Strategy paper for Ministry of Mines

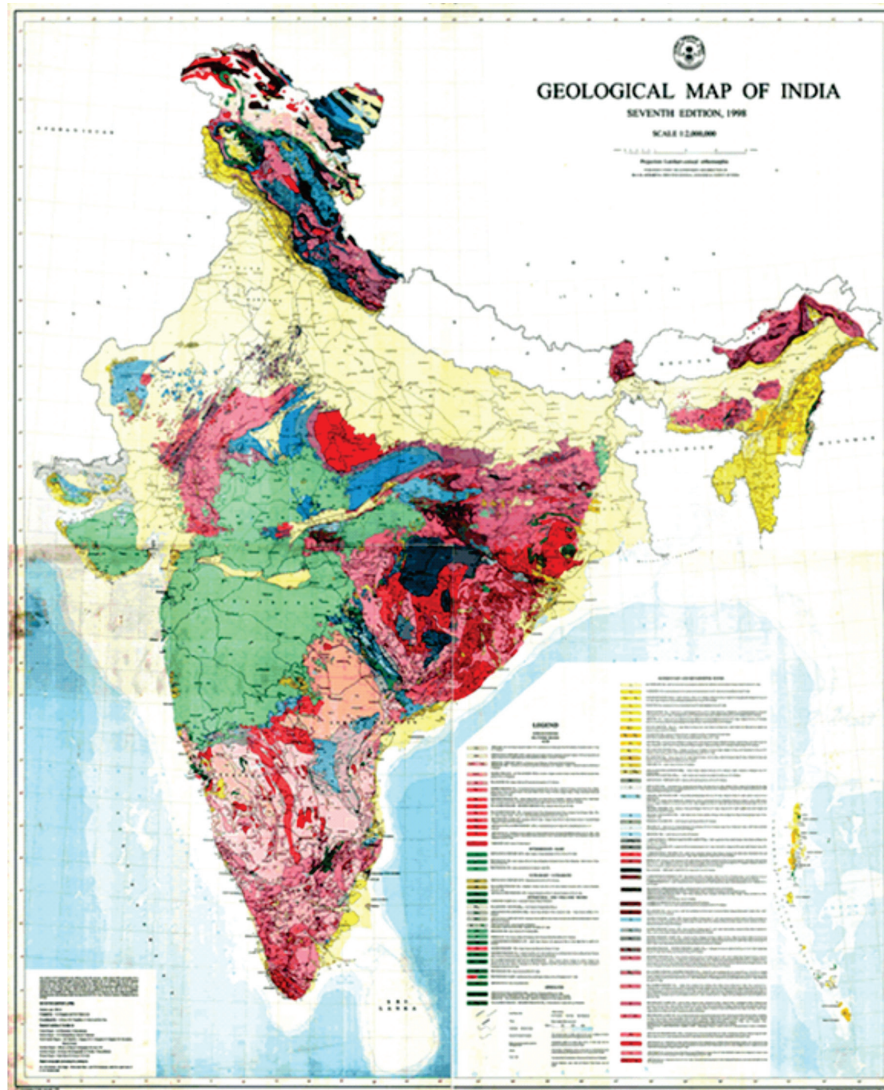
## FOREIGN DIRECT INVESTMENT IN MINING SECTOR

## Excerpt from Hoda Committee Report

- 1.13 The huge potential will become clear from the fact that while Australia spends an amount of about US\$ 500 million per annum (US\$637 million in 2005) on survey and exploration, Latin America spends an amount of about US\$ 700 million per annum (US\$1127 million in 2005), India which has a geological setting identical to both these regions spends only US\$5 million on promotional exploration mainly through GSI and a major part of this is on coal. As a country, Canada has witnessed the largest expenditure on exploration with 19% of the total world expenditure in 2005 followed by Australia with 13% and US with 8%. As a continent, Latin America accounted for 23% of the global exploration expenditure followed by Africa (17%). India's investment has been less than 1%. In fact, in the last 50 years the total amount spent by GSI on mineral searches is about Rs 500 crore only and even of this as much as Rs 350 crore has been spent on looking for coal deposits. Experience in other parts of the world shows that reserves can increase significantly with additional exploration and beneficiation driven by state-of-the-art technology. Australia's known iron ore resources increased hundred-fold in 40 years, from around 400 million tonnes in 1966 to over 40 billion tonnes by 2005 after having extracted over 3 billion tonnes in the interregnum. Given the fact that in India so far no major investment has taken place in prospecting (RE&DE) the potential for attracting such investment is very high.
- 1.14 Therefore, the FDI policy announced in February 2000 was taken as a great opportunity for survey and exploration by global mining companies both majors and juniors and many foreign companies put in their applications for RPs and PLs. As a result, until July 2005, 65 prospecting licenses covering an area of 90,143 sq kms. And 196 reconnaissance permits covering an area of 2,64,520 sq kms were granted mainly in the mineral rich states such as Orissa, Jharkhand, Chhattisgarh, and Karnataka but also in Andhra Pradesh, Madhya Pradesh, Rajasthan and some others. These concessions were mainly for minerals of base metals and noble metals, diamonds and precious stones, beach sand minerals and a few for iron ore. Up to the year 2000 when FIPB clearances (above 50%) were given on a case by case basis, proposals for FDI amounting to Rs 4,044 crore were reported to have been approved by the FIPB for investment in the Indian mining sector, however, only Rs 345 crore of the Rs 4044 crore approved by FIPB is reported to have actually come in before January 2000, when 100% FDI was put on the automatic route. Figures of subsequent year when 100% FDI was put on the automatic route are not readily available from RBI. What is equally significant is that hardly any of the Reconnaissance permits and Prospecting Licenses granted under the new dispensation has been converted into Mining Leases.
- 1.15 The failure of FDI to come into the mining sector even five years after liberalization of the investment regime, the lack of enthusiasm for investment in prospecting shown by the domestic private sector and the lack of resources with public sector agencies like GSI, MECL, and other state and central agencies for undertaking promotional exploration has meant that the sector is unable to contribute to the GDP growth of the country in any significant way let alone up to its potential. This lack of investment has resulted in the nation's inability (i) to delineate and extract already located mineral occurrences from the ground; and (ii) to discover the huge resources of minerals that still are possibly under the ground.

Source: Planning Commission, 2006. Report of the High Level Committee to review the National Mineral Policy and recommend possible amendments to MMDRA

- To induce investment flows, the policy environment would have to change. The procedures for grant of reconnaissance/prospecting/mining concessions would need to be made seamless whereas the holders of these permits and licenses would need to be accorded security of tenure. The policy should also envisage unbundling of reconnaissance, prospecting, and mining activities to maximize private investment.
- The policy would have to require an arm's length to be maintained between the State as a regulator and the State as a commercial entity engaged in mining activities.



Geological Map of India  
Source: Geological Survey of India

- The policy should provide for the disposal of fully prospected ore bodies through public tender/auction to the extent possible.
- Equally importantly, the Policy should provide for environmental concerns and the needs of local communities to be fully taken into account during mining operations.

Based on the recommendations of the High Level Committee, and in consultation with the State Governments, the Government replaced the National Mineral Policy 1993 with a new National Mineral Policy on the March 13, 2008. As in the case

of the 1993 Policy, the 2008 Policy was with respect to non-coal, non-fuel minerals, since the coal minerals were subject to the provisions of the Coal Mines (Nationalisation) Act 1973.

The **National Mineral Policy 2008** provided for a change in the regime of mineral concessions to incentivize private sector investment in exploration and mining and for ensuring a level playing field and transparency in the grant of concessions; and also promotion of scientific mining within a sustainable development framework so as to protect the interest of local population in mining areas. The next step was to bring the sectoral legislation in line with the Policy as

well as with the governance requirements of the sector, and also address the problems currently bedeviling the sector.

### Governance issues that need to be addressed

Despite regulatory initiatives and policy measures in the past, the Mining Sector is in some difficulty because of the following challenges:

- *Illegal Mining:* There are widespread allegations of illegal mining in many States. Much of this stems from governance failures and regulatory inadequacies. Besides loss of revenue and implications for the environment, and health and well-being of the local populations, it erodes confidence in the regulatory mechanism, thus disincentivizing investments in the sector.
- *Compliance with environmental regulation:* The Supreme Court is looking into issues of violation of environmental regulations in many States and has severely restricted mining and export of iron ore in some States. While environmental impact at mine level may be sought to be addressed under the framework of environmental laws, including the Environment Protection Act 1986, through impact assessment and management plans at mine levels, cumulative and regional impacts are inadequately understood and addressed, and issues of “regional carrying capacity” need to be incorporated into mineral concession management.
- *Private sector participation and investment:* The mining industry finds the current system of granting concessions marred by inordinate delays

Dolbear Ranking of Countries for Mining Investment (2006 and 2013)									
Rank		Country	Average Rating*		Rank		Country	Average Rating*	
2013	2006		2013	2006	2013	2006		2013	2006
1	1	Australia	56.30	59	14	-	Philippines	30.40	-
2	2	Canada	54.30	57	15	10	Argentina	29.00	35
3	4	Chile	51.00	50	16	10	China	28.70	35
4	7	Brazil	45.60	40	17	15	India	27.80	28
5	4	Mexico	43.10	50	18	22	Indonesia	27.50	17
6	3	United States	41.70	51	19	9	Mongolia	26.90	36
7	-	Colombia	40.50	-	20	19	Zambia	26.10	22
8	-	Botswana	36.80	-	21	16	South Africa	24.40	25
9	8	Ghana	36.00	38	22	19	Papua New Guinea	21.00	22
10	14	Peru	35.90	29	23	18	Kazakhstan	20.90	23
11	12	Namibia	33.60	34	24	24	D.R. Congo	17.70	13
12	-	Mozambique	32.00	-	25	19	Russia	17.10	22
13	13	Tanzania	31.90	32					

Source: Behre Dolbear, 2006 and 2013; <http://www.dolbear.com/announcements/2013-ranking-of-countries-for-mining-investment-or-where-not-to-invest>

\* Rating based on country's economic system, the country's political system, the degree of social issues affecting mining in the country, delays in receiving permits due to bureaucratic and other issues, the degree of corruption prevalent in the country, the stability of the country's currency, the competitiveness of the country's tax policy.

and arbitrariness mainly due to the large number of approvals from various sectoral authorities, with each approval process having embedded ambiguity and unclear discretion. The expected flow of Foreign Direct Investment (FDI) into exploration is not coming in because of the delays in the grant of concessions and perception of insecurity of tenure.

There is a huge backlog of applications for mining concessions; reportedly, over 60,000 applications are pending because of inability of State Governments to decide the cases given the ambiguity and discretion in the existing system, and the lack of sectoral mechanisms to ensure that State Governments decide cases within given time limits.

- *Centre–State issues:* States see the current method of allocation of concessions as not giving the States adequate revenues, since auction/bidding is not permissible. As such, they insist on value addition within the State or Joint Ventures with State Public Sector Units (PSU) in ways which may not be in furtherance of efficient and zero-waste mining.
- *Benefit sharing with communities:* As highlighted by the Hoda Committee Report, traditionally, “the relationship between mining companies and local communities has a legacy of abuse and mistrust”. Compensation for lost land does not make project affected people beneficiaries in the project. It does not compensate for the lost livelihood opportunities, and promote much less new opportunities to share in the fruits of development, which are expected to result from mining and attendant activities. Exclusion of communities from the benefit stream has resulted in difficulties in obtaining a social licence to operate the mines.

### Legislative proposal

The existing law had to be brought in line with the NMP 2008 and the governance issues mentioned above needed to be addressed. The Mines and Minerals (Development and Regulation) Bill, i.e.,

**(MMDR Bill)**, was accordingly drafted in 2009–10 in consultation with the stakeholders and introduced in Parliament in November 2011. The MMDR Bill 2011, inter-alia, provided for the following regulatory and sectoral governance reform measures to support the reform in the concession grant system:

- Setting up a scientific regulatory system through National and State level Mining Regulatory Authorities;
- Strengthening the sectoral technical agencies, namely the Indian Bureau of Mines and the State Directorates;
- Creation of a new revenue stream to directly fund a Trust in each District, to be called the District Mineral Foundation for the purposes of creating, managing, and maintaining local socio-economic infrastructure in the mining areas and providing for recurring payments to those affected by mining-related operations; thus, providing a safety net and new opportunities for livelihood generation;
- Enabling registered co-operatives to obtain mineral concessions on small deposits in order to encourage tribals and small miners to enter into mining activities, thus enabling local communities to directly participate in the exploitation of local resources;
- Empowering the Central Government to institutionalize a statutory mechanism for ensuring sustainable mining with adequate concerns for environment and socio-economic issues in the mining areas including management of cumulative and regional impacts, through a National Sustainable Development Framework;
- Setting up of a National Mining Tribunal and State Mining Tribunals for redressal of grievances against orders of Central Government or State Government, as the case may be, and in cases of delays in grant of mineral concessions;
- Empowering the State Governments to set up Special Courts for speedy prosecution of offences relating to illegal mining, and to provide stringent



punishments for contravention of certain provisions of the proposed legislation;

- Empowering the State Governments to debar a person convicted for illegal mining from obtaining concessions in future, and to cancel existing concessions in his favour, to disincentivize illegal mining;
- Empowering the Central Government to intervene in the cases of illegal mining where the concerned State Government fails to take action against illegal mining; and importantly;
- That while applications that have acquired a vested right on account of some previous approval will be protected, all other pending applications will be extinguished, and the new procedure of the Act shall be applied uniformly in future.

The main Schema of the concession grant system proposed in the Bill was as follows:

- **Reconnaissance Licences (RL)** to locate mineralization in areas where either no

reconnaissance has been done or where earlier reconnaissance has failed to detect mineralization. Unlike the current system of Reconnaissance Permits, the RLs would be “non-exclusive” rather than on a first-come-first-served basis, for reasons well brought out in the Hoda Committee Report.

- A new Concession instrument called the **High Technology Reconnaissance cum Exploration Licence (HTREL)**, designed specifically to attract high risk venture capital to locate minerals occurring in depth and needing high-tech geophysics for their discovery. To incentivize risk takers, the licence would have to be on a first-come-first served basis, with transferability and assurance of mining rights in case of a mineral discovery.
- **Prospecting Licences**, which unlike the current system of either first-come-first-served or invitation to apply, would also be given out on a bidding basis. As in MMDR Act, 1957, a prospecting licence would include general exploration and detailed exploration.
- **Mining Leases**, which in the MMDR Bill can only be obtained through the prospecting route, unless it is put to bid on the basis of the data already available. Currently, mining leases can be directly applied for on the basis of “evidence of mineralization”, which disincentivizes scientific prospecting.

The Mines and Minerals (Development and Regulation) Bill 2011 after introduction in the Parliament in



November 2011, was referred to the Department-related Parliamentary Standing Committee which after eliciting the views of all stakeholders, submitted its Report in May 2013. The Report, while broadly endorsing the framework of the legislation also suggests certain important changes. However, the Bill itself lapsed on dissolution of the Lok Sabha.

Given the problems besetting the sector, and given also the urgent need to attract investment, particularly the FDI into the sector, a new legislative framework is urgently needed. It is important however to keep in view the issues arising from the Hoda Committee Report and the directions laid out in the National Mineral Policy 2008, and ensure that the legislation builds on the accumulated learning rather than “reinvent the wheel”. Some of these issues are discussed below. Since specific terminology is involved, a glossary of terms is given in **Appendix I**.

### The “First-in-Time” principle

The issue of “first-in-time” or “first-come-first-served” in respect of HTREL/PL was actually analysed in detail by the **Hoda Committee**, which observed the following in this regard:

*1.63 “The Committee feels that it is important to ensure strict adherence to the tried and tested and globally adopted first-in-time principle in the mining sector. In view of the fact that the Committee is recommending an ‘open sky’ policy for grant of non-exclusive RPs, which would not give the RP holders any priority in getting PLs, the only incentive offered to such RP holders would be the assurance offered by the first-in-time principle. Therefore, for the confidence of investors in such RPs, strict application of the first-in-time principle would be imperative. Not granting PL for an area to the RP holder who is the first to discover mineral occurrences in that area will discourage reconnaissance operations from being undertaken, turn away investors, and lead to areas remaining unexplored. Therefore, the first-in-time principle has to be made strictly applicable in the grant of PLs in non-exclusive RP cases and there is a need to delete discretionary*



*provisions such as Section 11(5) of the MMDR Act.”*

The fact is that competition is always in respect of an object of value. Where mineralization is known and a tangible value can be attached to it, a competitive process can be structured, having regard to technical considerations. In India, the Obvious Geological Potential (OGP) area is 570,000 sq km. There are many areas where there is no scientific and quantitative knowledge of mineralization, especially in a potentially multi-mineral situation where many of the minerals are likely to be located deep below the surface (i.e., 50–300 metres or more). Given the statutory restrictions imposed with respect to the maximum area that can be held by a person/company at a time, etc., the actual scarcity value at this stage attaches to the exploration budget and not the land or the mineral, and therefore, in essence, the parcels of pre-potential areas are competing (based on available geological data) for scarce exploration budgets!

In the context of exploration for deep-located minerals using expensive high technology, the competition is essentially for exploration budgets funded from venture capital. Such venture capital will not wait for complex and time-consuming procedures. A simple and transparent system of grant of concession in such cases is the obvious answer, and the world over, the first-in-time principle is used.



The issue on the best mode of disposal of natural resources was taken to the Supreme Court in a Special Reference [Special Reference No. 1 of 2012; {(2012) 10 SCC 1}] and the Constitution Bench in that case had held that the alienation of natural resources is a policy decision and the means adopted for the same are, thus, executive prerogatives. This Judgement has been cited *in extenso* in the Judgement dated August 25, 2014 in the Coal Mines Allocation case [WP {Crl.} No. 120 of 2012], where *inter-alia* it is stated, in Para 99, that, “*in the light of the above legal position, the argument that auction is the best way to select private parties as per Article 39(b) does not merit acceptance.*” The relevant extract is in **Appendix 2**.

### Resource estimation and valuation for bidding at prospecting stage

In general, competitive processes for mineral concessions at prospecting stage can face several difficulties depending on the nature of the minerals likely to be involved:

- **Fully prospected ore bodies or substantially prospected bulk minerals like iron ore, bauxite, limestone, beach sand minerals, etc.:** At prospecting stage, resource estimations and valuations are generally uncertain, and the justification for resorting to bidding is not as clear as in the case of mining. On the one hand, at this stage, the extent of public funds spent on exploration is relatively less. On the other hand, the risk associated with prospecting still remains and needs to be shouldered by the concessionaire. As such, it may be preferable to retain the provision for bidding only to “fully prospected ore bodies” (for mining lease), as recommended by the Hoda Committee. If in any other case, competitive process is to be retained at all for prospecting stage, for instance in the case of bulk minerals where the mineral is well spread out and the nature of the mineral deposit is relatively more uniform and predictable, and where substantial work may have been done by State Agency, the resource estimation has to conform to standards applicable for commercial purposes.

There are a number of internationally well-established standards, the best known of which is the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (prepared by the Joint Ore Reserves Committee of the Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists, and Mineral Council of Australia and hence commonly called ‘**the JORC Code**’), which is a professional code of practice that sets minimum standards for Public Reporting of Exploration Results, Mineral Resources, and Ore Reserves. The JORC Code provides a mandatory system for the classification of mineral exploration results, mineral resources and reserves according to the levels of confidence in the geological knowledge and technical and economic considerations. An area at a level of exploration qualifying to be put to bid for prospecting would generally be classified as an “advanced exploration area”.

Independent valuation will also need to be done to ensure effective bidding. There are a number of internationally accepted practices for the purpose, the best known of which perhaps is the Code for the Technical Assessment and Valuation of Mineral and Petroleum Assets and Securities for Independent Expert Reports called the VALMIN Code (2005). The Code has been prepared by a Joint Committee of the



Australasian Institute of Mining and Metallurgy, the Australian Institute of Geoscientists, and the Mineral Industry Consultants Association with the participation of the Australian Securities and Investment Commission, the Australian Stock Exchange, the Securities Association of Australia, etc. The Code endeavours, as any valuation procedure must, to ensure materiality, competence, independence, and transparency in the valuation process. It lays down guidelines for the valuation methodology to ensure that it is suitable for the mineral asset under consideration and that the valuer conducts suitable checks, enquiries, analysis, and verification of the data used for valuation. The Code also requires a sensitivity analysis showing the effect of changing the most significant assumptions in the valuation.

All this needs strong technical support at the operational level to verify that the “enhanced mineralization” and the valuation conforms to an adequate standard, which commands the confidence of the industry. Perhaps the Indian Bureau of Mines (IBM), or a National Mining Regulatory Authority to be created, should be capacitated and tasked with appropriate aspects of this process.

- **Partly prospected bulk minerals:** Some of the parameters generally used while calling for bids relate to value addition and end use, etc., which may involve a trade off with the financial bid. In the case of partly prospected deposits, the technical and economic feasibility is highly uncertain. In such cases, rather than an attempt to unsuccessfully ride two horses, it may be useful in fact to continue with the notification process for specified parameters, but without a financial bid, to cover cases of enhanced mineralization in areas covered by reconnaissance/prospecting, but where the resource estimation to an adequate standard is not possible or where valuations are not practicable or advantageous. Such a notification would in fact then be fairly similar to the process currently covered by Section 11(3) MMDR Act 1957 read with rule

35 MC Rules 1960, except that it would more objectively rank the applicants.

- **Deep-located minerals like base metals, noble metals, etc.:** The State may be unable, given its limited technical resources, to actually identify and notify areas of enhanced mineralization (much less make a resource estimation and valuation) because of the large extent of areas involved, the specialized nature of the technical and human resources required, and the difficulties in justifying public outlays on ventures with such uncertain outcomes. Instead the State may depend on private parties to make an application under the first-in-time provision. Ideally, a first-in-time procedure would be the best incentive for private parties to invest in exploration in such high-risk high-reward ventures. Bidding is clearly not an option at this stage since there is nothing of value to bid for. The State may, if it chooses, notify areas and invite competitive applications for HTREL type concessions, based on exploratory spends proposed by the applicants. Obviously as a consequence, there needs to be a seamless transition to a mining lease. Given the high technology involved, and the nature of the data generated and its likely use in future and the need to monitor the “Exploration Plan” closely in such cases, the GSI and the IBM would need to be closely involved.

Given the nature of the costs, risks, and the rewards, it goes without saying that “first-in-time” is by far the better principle to apply here for grant of concessions. The notification route should at best be an option available to ensure due attention to exploration spends. As such, it should be taken recourse to only if the proposed spend seems exceptionally low given the current state of data, or where the applicant seems to possess inadequate resources to achieve the proposed exploration spend.

### Transferability of concessions

Another major change under consideration, based primarily on the Hoda Committee Report (and Para 3.3 of the National Mineral Policy 2008) is to make

concession instruments (reconnaissance licenses, prospecting license, and mining leases) transferable. The world over, it has been the consistent experience that facilitating quick and easy transfer is the key to increasing turnover rate for exploration area, which is crucial to improving the chances of discovery of mineral deposits by one or the other concessionaires. Mining lease transfers will also help develop better resource estimation and knowledge on valuation methodologies for mineral resources, which is a grey area in the country, and help create a well regulated market and a Mergers and Acquisitions industry, which will drive efficiency in mining operations, including beneficiation of low grades and recovery of minor metals.

On transfer, the rights and liabilities including rights to the data are also transferred to the transferee. This has two advantages. First, it allows a highly specialized or less risk-taking company or a specific mineral-oriented company to take over a promising area as a 'late stage' exploration enterprise, thus incentivizing efficiency. Second, it also allows a specialized high risk-taking exploration company (perhaps with little expertise in mining) to sell the mining rights to a mining company, and move on to other exploratory ventures. This in fact is the model of Junior Exploration Companies (Juniors), which is responsible for most mineral discoveries in Canada in the last two decades and has been approvingly cited by the Hoda Committee in its Report.

### Private sector and exploration

The key prescriptions in the National Mineral Policy 2008 regarding incentivizing of private sector to undertake exploration are as follows:

- Para 5.2: *“While the Government agencies will continue to perform the tasks assigned to them for exploration and survey, the private sector will be the main source of investment in reconnaissance and exploration and government agencies will expend public funds primarily in areas where private sector investments are not forthcoming despite the desirability of programmes due to reasons such as high uncertainties. To expedite completion of reconnaissance as early as possible, an open sky policy*

*of non-exclusivity for reconnaissance work will be adopted. At the same time to attract large investment and high technology, a new instrument to be known as Large Area Prospecting License will be introduced ...”*

- Para 7.8: *“... Prospecting being a high risk venture, access to 'risk funds' from capital markets and venture funds will be facilitated. Early stage exploration and mining companies will be encouraged ... Induction of foreign technology and foreign participation in exploration and mining for high value and scarce minerals will be pursued. Foreign equity investment in joint ventures for exploration and mining promoted by Indian Companies will be encouraged.”*
- Para 8: *“... A long-term export policy would provide stability and prove to be an incentive for investing in large-scale commercial mining activity. To develop mining as a modern stand alone industry, substantial investment is required. Assurance on export of minerals will be a key factor for investment decisions particularly on FDI in the sector....”*

Clearly, the mineral concession system must be oriented towards facilitating the private sector in general and FDI in particular.

### Ensuring Resource Security: Exploration is the key

Most attention with regard to exploitation of natural resources tends to focus on mining activities, since the revenue generation and issues of environmental degradation are manifested there. The exploration process is rarely given the importance it deserves, not least on the simplistic logic that incentivizing exploration may only increase the extent of unsustainable mining. In actual fact, scientific exploration enables better understanding of the potential availability of resources and their geographical spread, enabling informed choice of locations for mining with least adverse impacts in the context of the requirements of resource and energy security.

In the Indian context, where the industry is still mainly engaged in picking the low-hanging fruit

(i.e., mineral deposits close to the surface, and bulk minerals like iron ore, bauxite, limestone, etc., amenable to exploitation by well-known technologies), exploration is particularly important from the viewpoint of improving our resource and energy security as part of the larger strategy of poverty reduction and inclusive growth. It is generally acknowledged, based on the geological evolution of the Indian subcontinent, that in addition to the surficial deposits of bauxite, limestone, and iron ore, there are likely to be extensive mineral deposits of many minerals including ferrous metals, base metals, noble metals, diamonds, and rare earths, some of them of world class, at deeper depths (i.e., 50 metres and more below the surface). In the absence of systematic exploration, there has in fact been no major mineral discovery in India in the last 40 years, which may have long-term adverse consequences for our mineral resource security, particularly some Technology Metals, Energy Critical Metals, and Rare Earths, which are essential for manufacturing of almost all modern devices and machinery, particularly those facilitating more efficient energy use.

As brought out in the Planning Commission's **National Manufacturing Plan 2011**: "Availability of high quality raw material and production inputs is essential for ensuring sustained growth of the manufacturing sector. Significant impetus is required towards developing production capacities in the following sectors:

- Steel
- Cement
- Fertilizers
- Exploration and development of minerals ...

... India is blessed with ample resources of a number of minerals and has the geological environment for many others. The metals and minerals sector has a direct bearing on the growth, development, depth, and sustainability of the manufacturing and infrastructure sectors. Minerals are a valuable natural resource since they are the vital raw materials for industries like capital goods, steel, etc. As a major resource for development,

*the extraction and management of minerals has to be integrated into the overall strategy for the country's development."*

The National Mineral Policy 2008 in Para 5.4 states: "Particular attention will be given to the survey and exploration of minerals in which the country has a poor resource-cum-reserve base despite having the geological potential for large resources."... "Minerals for which there is demand within the country ...will be prioritized"... "Exploration for lower grade hematite, magnetite, base metals, noble metals, diamonds and high grade Ilmenite will be put in the fast track."

The 12th Plan Working Group on the Minerals Sector similarly states, "...the strategy for development of any mineral should naturally keep in view its ultimate end uses in terms of demand and supply in the short, medium, and long term. The guiding principle in the strategy of development of any mineral or mineral deposit at any location shall ordinarily be the economic cost of recovery, i.e., extraction cost relative to market price and will hence be determined by the market. To maximize gains from the comparative advantage which the country enjoys, intra-se mineral development should be prioritized in terms of import substitution, value addition and export, in that order. However, a disaggregated approach in respect of each mineral will need to be adopted and a mineral specific strategy will need to be developed and while doing so, the need for appropriate investments in process R&D to be able to extract Technology Metals and Energy Critical Metals, etc., for long-term raw materials security for the manufacturing industry has to be supported with appropriate funding and incentives."

The Report also states: "As the country develops and industry grows, assured availability and proximity of mineral resources will play an important role in giving a competitive edge to Indian industry in general and manufacturing in particular. The multiplier effect of minerals processed into metals on downstream industrialization cannot be overemphasized. Value addition must, therefore, be actively encouraged to the extent appropriate with the long-term development of the mineral sector. However, such value addition will need to go hand in hand with the growth of the mineral sector as a standalone industrial activity. While

appropriate linkages between exploitation of minerals and their end use including the development of industry based on the minerals should be established wherever feasible, a downward curve in an industrial sector using a particular mineral within the country need not be allowed to effect the growth of mining activity for that mineral. Hence employment and tertiary sector spinoffs from both value addition as well as from mining will need to be encouraged so as to maximize the contribution of the mineral sector to the country's gross domestic product. In particular emphasis needs to be given to co-production of by-product metals from base metal ores through process R&D so that the country's needs of so-called Technology Metals and Energy Critical Metals are effectively met, and provide raw material security on the one hand and competitive edge on the other, for the country's manufacturing sector. For the purpose, the Non-Ferrous Technology Development Centre (NFTDC), Hyderabad and Jawaharlal Nehru Aluminum Research Development and Design Centre (JNARDDC), Nagpur will need to be suitably reoriented so as to focus more on process R&D for Technology and Energy Critical Metals."

The Center for Study of Science, Technology and Policy (CSTEP) in its publication *Rare Earth Elements and Energy Critical Elements: A Roadmap and Strategy for India* July, 2012, jointly published with the Ministry of Mines has stated as follows: "Rare Earth Elements



(REEs) and Energy Critical Elements (ECEs) are extensively used in clean energy applications like wind energy turbines, hybrid car batteries/electric motors, solar energy collectors, thin film technologies and in defense-related systems. There is a need for development of an appropriate strategy for their indigenous production, based on the analysis of availability, identification, exploration and discovery of economically extractable deposits. It is critical to develop processes for their recovery in usable forms in order to ensure long-term national raw materials security. In view of the increased demand of REE and near monopoly of supply from China, there is a need to develop national policies and implementation strategies for ensuring indigenous supply of REE. ... We believe that REEs and ECEs are going to play a major role in renewable energy applications and information technology products. If India is to be self-reliant in these products—which it must, if it is to minimize Green House Gas emissions—then it must adopt novel routes that do not emphasise only economic viability but also self-reliance (Foreword). ... The recent imposition of restrictions on export of rare earths by China has created a scare in the developed countries to look for alternatives. Along with REs, these countries have also focused their attention on other energy critical elements, particularly in the context of clean energy technologies (Chapter 5: The Way Forward)."

In sum, the concession grant system must incentivize world-class exploration for the discovery, and world-class mineral processing technologies for the exploitation, of all those minerals which are essential or likely to be essential for our food, energy and national security. A short-term approach which maximizes revenues based only on current perceptions of our partly-developed mineral industries may be detrimental to the long-term national interest. Needless to say, national interest also requires a systematic approach to acquiring mineral assets in other geographies, particularly for those strategic minerals where our geological potential is low.

The National Mineral Policy 2008 rather prophetically states in Para 11: "... The need for a well-planned programme of survey and exploration, management of

*resources which have been discovered and those that are in the process of discovery and their optimal, economical and timely use are matters of national importance. The success of the second national mineral policy will depend largely on a national consensus to fulfill its underlying principles and objectives.”*

### **Exploration and environmental concerns**

Systematic and continuing exploration using more and more sophisticated technologies enables the location of hidden mineral deposits of metals in short supply or which are likely to form part of the resource base of the future. Not only must the exploration grant regime be quick and simple, but issues of environmental clearance for exploration must be handled quite differently from those relating to mining. Facilitating exploration improves choice when it comes to selection of a mineral deposit for mining, and it is at this stage that environmental impacts among the potential areas need to be analysed in depth for comparative as well as specific impacts. At exploration stage, environmental clearances should obviously be denied for “no-go” or “inviolate” areas, but in areas where the issue is mainly one of minimizing the damage to the environment from invasive activities like pitting, trenching, collection of stream sediments and of course drilling, the focus needs to be on preparation and enforcement of a proper environmental management plan to reduce the impacts, rather than delay, or artificially reduce the scale or scope of the activity to suboptimal levels. A sustainable development framework must therefore address issues from the exploration stage onwards, rather than at the mining stage, and the legislation must provide accordingly.

### **Mining lease**

The provision in the MMDR Act 1957 of allowing direct applications for mining leases for major minerals on a first-in-time basis is clearly flawed for the reason that it is not enough to just suspect or even to know that there is some mineralization in order to mine. The nature and disposition of the ore body must be ascertained to the best extent possible

through prospecting before it is possible to decide on mining. A proper mining plan requires knowledge of the quality and extractability of the various minerals present in the ore, so that the methodology for extraction and beneficiation of the ore (and recovery of minor metals) can be worked out scientifically, and the useful life of the mine can also be estimated. All this has implications for estimating the requirement of financial and technical resources for the mining operations and reducing the adverse impacts of mining and reducing waste, and of course to ensure that a proper mine closure plan is developed and implementation commenced well in time.

The idea of inviting bids for grant of mining leases seems on the face of it, logical and attractive. However, bids can be invited only for areas where prospecting has been conducted and enhanced mineralization has been found as per prospecting report and feasibility study [conforming to a United Nations Framework Classification for Fossil Energy and Mineral Resources (UNFC) standard of “fully prospected ore body”]. Bids will need to give separate weightage to techno-economic and financial criteria, so as to enable State Governments to give preference for experience or value addition, etc., or for increasing revenues, as the State Governments may prefer as per their policies, and the nature and location of deposits. In actual practice, the estimation of mineral resources and reserves will need to conform to standards accepted for financial and investment purposes, such as JORC. JORC would probably classify such an area as being at “pre-development” or “development” stage. The valuation too will need to conform to credible standards such as VALMIN.

The provision for a techno-economic-cum financial bid and an almost guaranteed extension till extraction of a fully prospected ore body can optimize value realization for the State Government in more ways than one. In particular, it addresses, through a transparent process, the issue of value addition within a State, which hitherto was being done through a variety of measures including reservation of areas for State PSUs, joint ventures, Memorandums of Understanding (MoU), etc. Many State Governments

insist on value addition (mineral, metal, or product making) within the State, with the expectation that this will provide employment, income, and revenues. While normally, (particularly, for bulk minerals like iron ore, bauxite, placer minerals, and limestone), the cost of mineral transportation favours setting up of the value addition plant fairly close to the mine or well connected to it, issues of other inputs such as coal, power, water, and land availability, infrastructure, and other considerations favouring better investment returns and more investment security also determine decisions on siting of the value adding unit. The bid amount is intended to reflect the cost on this account, and the State will obviously need to endeavour to mitigate these costs to obtain higher bid values.

In passing, it may be noticed that unlike reconnaissance and prospecting licenses, where only intimation may need to be given to the State Government, transfer of mining leases will clearly need prior approval of the State Government. The reason is that an exploration concession instrument is in the nature of a temporary permission to enter an area and conduct specified non-invasive or invasive scientific operations for a limited period on payment of compensation; the mining lease, on the other hand, is a binding document delivering physical possession of the land and creating long-term rights and liabilities between the parties, and thus the transfer of the lease by one party needs the clear approval of the other party specifying the extent of the land so transferred.

### Renewal and extension of leases

Perhaps partly as a result of the recommendation for disposal of mining leases through bidding based on a valuation of the “fully prospected” ore body, the Hoda Committee recommended “extension” of a lease on the expiry of its term till economic exhaustion of the ore body. The 1957 Act provides for “renewal”, which in legal terms often means a fresh lease with all the attendant issues of statutory approvals. However, since in a bidding situation for a mining lease, the bid ought to be for the entire extractable ore body, in the interest of equity (and also efficient and scientific mining) it is clearly necessary to extend the lease on

the existing terms and conditions, rather than leave it for an open-ended decision of renewal, however, favourably structured towards the lessee. Logically, it is necessary to provide for extension of leases as long as a mineable deposit is available, rather than renewal.

### *Mining revenues, bidding processes, and royalties*

Given the fact that mining in India is a mix of small as well as large mines; public sector as well as private sector, there is a perception that:

- Minerals are scarce and non-renewable public resources and the State should receive adequate compensation for their appropriation for private profit;
- The State is expending public funds for the exploration of minerals and as such should receive a market-based value for the mines (or rather mineral deposits which are potentially mineable) that the exploration uncovers;
- Large mines actually retain a high surplus due in substantial part to the economy of scale, captive use of resources or locational advantages, as well as to market fluctuations giving “windfall gains”, and that some of the surplus ought legitimately to constitute revenues of the States for developmental purposes;
- Minerals that occur within a State should contribute towards the industrial development of the State, and mining should lead to “value addition” through metal making and other



downstream industrial activities that will bring jobs, revenues, and economic growth to the State; and

- Mineral resources occur in areas occupied by local communities who have a legitimate claim to ownership of the resource in some form, and so mining for private profit must ensure that the local communities are not adversely affected and in fact benefit from the opportunity.

The MMDR Act 1957 was conceived at a time when the Public Sector was at the commanding heights of the economy. Minerals were required mainly for production of metals by the public sector giants like SAIL and NALCO (TATA Steel was an exception), and captive mining was the only kind of mining. After liberalization in 1991, the MMDR Act was amended to provide for private companies and non-captive mining (also called merchant mining) commenced, to an extent that today the areas under private mines exceeds that with the public sector. Most of the PLs applied for were based on geoscientific surveys of the GSI or State agencies, and most of the direct lease applications were either based on visual indications (in the case of small deposits), or work of public agencies. Royalty was seen as the consideration (value) that the State legitimately received for the minerals extracted by the mining companies, and in most cases the royalty was computed as specific or unit-based royalty on the basis of weight or volume, without regard to current value. However, with the entry of private mining enterprises, mining royalties were seen as important sources of revenue, and a system of *ad-valorem* royalty [as a percentage of the pit mouth value of the mineral or a standard value for the metal, such as the London Metal Exchange (LME) price] was introduced.

The Hoda Committee recommended that the royalty system move strongly in favour of the *ad-valorem* system from the earlier unit-based (or specific) system and royalty rates were notified accordingly in 2009 and again recently in 2014. At the same time, the Committee also recommended that fully prospected ore bodies should be put to bid, in order to capture some residual value.

In passing, it may be stated that valuing a mine through bidding or other processes is, strictly speaking, different in concept from royalty. The royalty is payable to the owner of the mineral. The bid for the mine or the prospect is payable to the owner of the mineral concession, and is similar to the concept of payment for transfer of a mine or a mineral concession between any two parties. It is perhaps akin to payment for a right of access, factoring in the legal and technical and intellectual property considerations and the sector-costs of exploration. It may be counterproductive in the long run to attempt to include elements of royalty into such a process as it would create a non-level playing field between mines based on bidding and those which came in through a non-bidding route.

There is one more aspect, which goes to the heart of the mining concession system. Any sensible system must reward extraction efficiency. If a mine is able to recover low grades or minor metals, based on R&D at the risk and cost of the entrepreneur, it should be a “win-win” situation for the lessor and lessee. There is a real danger that bidding systems, since they are not compatible with risk-reward paradigms, may not be able to adequately incentivize R&D for resource extraction efficiency beyond that already specified in the bidding document and resource estimations.

The ruling constraint today is that in most cases, the exploration for prospects to be given out as concessions does not conform to a “fully prospected ore body” under UNFC, much less as a “pre-development” stage under JORC. As such, for the purposes of realizing better value for the minerals extracted, particularly where it is felt that the current royalty system does not fully capture resource rents, instead of putting in place complex systems prone to errors and uncertainties, and perhaps in the process creating a non-level playing field with negative consequences for the sector, it may in fact be preferable, for the medium term at least, to generally move further along the path of *ad-valorem* royalty, to a “sliding scale” *ad-valorem* royalty which factors in the volume of production, and thus captures the economies of scale. Theoretically, it is possible to move to an income or profit-based system which also



captures the locational and downstream advantages, but it is administratively difficult and few countries have been able to implement it successfully at present. Sliding scale *ad-valorem* royalty is used in several countries and has the advantage of being easier than income or profit-based royalties.

In any framework where there is likely to be a mix of “allocated” mines (to PSUs), mines acquired through prospecting, as well as mines acquired through bidding, the sliding scale royalty acts to reduce the extent of the “non-level” playing field, and thus promotes efficiency.

Needless to say, operationalizing bidding systems, to whatever extent they are retained, would also need much higher levels of regulation and governance both at the Central and State levels, not least with regard to resource estimations and valuations, and it would in fact be prudent to also focus on governance reform and regulation and technical strengthening first.

### Ensuring environmental sustainability and zero-waste mining

The failure to address sustainable development concerns is at the heart of the current problems of the mining sector. The Ministry of Mines has worked out a sustainable development framework, but clearly it needs legislative backing and regulatory teeth. The following four features are particularly noteworthy in this regard:

- To ensure resource use efficiency, it is necessary that the entire deposit is properly delineated and economically extracted through a technically sound **Mining Plan**. Development of capability within the sector to prepare technically appropriate Mining Plans which maximizes mineral extraction (including beneficiation of low grade ores) and minimize environmental damage is key to this process. Equally important is the need to develop capacity to approve and enforce such Mining Plans.
- The Mining Plan needs to ensure commercial extraction of secondary or minor metals which often occur in association with the major metal in the mineral. The issue is far more important than is commonly realized. Many strategically

important metals can be extracted in this way, such as Molybdenum and Selenium from Copper ore, Cadmium and Germanium from Zinc ore and as is well known, Gallium and Vanadium from Bauxite. The concession grant system must strongly disincentivize resource use inefficiency, and equally strongly incentivize investments in process R&D. The fact that currently there is no extraction of Nickel from the Chromite overburden, and we are importing all our Nickel underscores the nature of the diseconomies in the present system. The 12th Plan Working Group on the Minerals Sector has observed as follows in this regard: “... attention needs be given to beneficiation and agglomeration techniques to bring lower grades and finer particle size material into use. ... The issue of promoting process R&D (including beneficiation) needs to be considered in depth. While at one level CSIR Labs and IBM can do ‘public good’ process R&D based on regional samples, deposit-specific process R&D needs to be done by the concessionaire on a commercial basis (though CSIR Labs and IBM can do such work for the concessionaire on a job basis). In intermediate R&D space, where the feasibility of the deposit is the question, process R&D to conduct feasibility studies constitutes a high-risk high-reward situation. IBM or CSIR Labs cannot take up this work and creation of a venture-capital funded process R&D setup (on the analogy perhaps, of the pharma industry and as obtained in advanced mining jurisdictions) is clearly required if the concept of zero waste mining is to be taken to its logical conclusion. Incentives, fiscal as well as non-fiscal, need to be structured based on a detailed study of how the system works in countries such as Australia and Canada, in particular Australia’s CSIRO and CRC mechanisms.”

- A scientifically and technically appropriate **Mine Closure Plan** based on the plan of mining is essential to be able to close a mine as the deposit gets exhausted. Development and implementation of Progressive and Final Mine Closure Plan is thus dependent on adoption of the entire framework of scientific exploration and technically sound mining. However, the

development, implementation, and enforcement of both the Mining Plan and the Closure Plan require full alignment with the Environment Management Plan (EMP) developed for the purpose of the Environment Protection Act 1986. It also requires full compliance with the mine level requirements under the Sustainable Development Framework. While the latter is ensured by the regulatory processes of the sector, the interlocking of the EMP and the Mining Plan and Closure Plan is impeded by the fact that they are under separate legislations and in different sectoral silos. Empowering and capacitating the mining regulatory mechanisms as the *first line of implementation* of the EMP is crucial to overcoming the environmental problems currently facing the sector.

- It is often said that a Closure Plan must be ready before the mine is opened. This is of course important to ensure that progressive closure takes place quickly and economically as an area gets mined out. It is also necessary to know the costs of closure as they are a part of project costs and must be properly budgeted. A system of obtaining adequate financial assurances for the progressive and final mines closure has to be interwoven into the legislation if mines are to be scientifically closed at the end of their useful life. In case the system of almost guaranteed extension of lease till exhaustion of the deposit is not the norm, actual financial contributions will need to be obtained from the lessees over the course of the lease periods and held in a separate account to ensure proper apportionment of the closure costs among the various succeeding lessees when actual closure is done by the final lessee.

As well brought out in the Ministry of Mines' Strategy paper *Unlocking the Potential of the Indian Minerals Sector*, there is a need to "enforce critical components of sustainability through regulatory changes, e.g., increase financial commitment for mine closure and link it to post-closure rehabilitation cost (e.g., financial guarantee in Quebec is 70 per cent of post-closure cost)."

#### TERI PROJECTS ON MINING AND MINERALS

- Responsible Sovereignty' and Energy Resources (2010–2012)
- Critical Minerals for India (2009–2010)
- A sustainable development framework for mineral sector, Gujarat (2007–2008)
- Economic Analysis for Strategic Petroleum Reserves (SPR) in India (2010)
- Developing action and monitoring plan for reclamation of mine-degraded lands and addressing socio-economic and livelihood issues of fringe populations of Vastan Lignite Mine of GIPCL, Mangrol, Surat (2005–2007)
- Compensation to resource bearing states: Minerals and coal (2006–2007)
- Responsible mining—A multi-stakeholder perspective (2005–2006)
- Accounting for unsustainable mining in Madhya Pradesh and West Bengal (2003–2005)
- Planning for sustainable regeneration in mining areas (2002–2005)
- Environmental/Social performance indicators (ESPIs) and sustainability markers in minerals development (1998–99, 2000–2002, 2003–2006)
- EPA models to predict short-term pollution levels due to individual mines (2001–2002)
- Review of regulatory framework in coal industry in India (1998–2000)
- Designing a Minerals Foundation for Goa (2000)
- Study of Environmental Issues in Coal Mining and Associated Costs (1991)

### Conclusions

Clearly then, a new legislative framework is urgently required, and mere amendment of the concession grant provisions will not solve the deep and serious problems that prevent mining from becoming a driver for the growth of the economy. The need is to not merely address the issues of methodologies of grant of concessions and recovering a fair value for a national resource, but also to attract investment and advanced technologies for exploration and mining, ensure adequate mining regulation, and importantly, incorporate the concerns of the local communities adversely affected by mining-related activities.

This is an opportunity to look at the legislative canvas and design a framework that is not only acceptable to all stakeholders, but also ensures that mining in India helps drive the economic growth engine of the country. The key lies in the following:

- Facilitating full and continuing exploration with best available international technologies, through FDI where necessary;
- Ensuring national resource security by unlocking the full mineral potential of the country, particularly deeper deposits yet to be discovered;
- Ensuring scientific and zero-waste mining based on scientific exploration and ore-process research;
- Implementing technically sound Mining Plans and Mine Closure Plans to increase mineral extraction while minimizing environmental damage to within sustainable limits; and
- Developing adequate capacity in the sectoral regulators for the purpose and ensuring full interlocking between the sectoral regulator and the environmental regulatory mechanisms.

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## Appendix 1: Glossary of terms

**Beneficiation:** Beneficiation is the processing of minerals or ores for the purpose of—(i) regulating the size of a desired mineral produce; (ii) removing unwanted constituents; and (iii) improving quality, purity, or assay grade of the desired mineral produce. (MCDR)

### Exploration:

- **General Exploration** involves the initial delineation of an identified mineral deposit. Methods used include surface mapping, widely spaced sampling, trenching, and drilling for preliminary evaluation of mineral quantity and quality (including mineralogical tests on laboratory scale if required), and limited interpolation based on indirect methods of investigation. The objective is to establish the main geological features of a deposit, giving a reasonable indication of continuity and providing an initial estimate of size, shape, structure, and grade. The degree of accuracy should be sufficient for deciding whether a Prefeasibility Study and Detailed Exploration are warranted. (UNFC)
- **Detailed Exploration** involves the detailed three-dimensional delineation of a known mineral deposit through sampling, such as from outcrops, trenches, boreholes, shafts, and tunnels. Sampling grids for drilling are closely spaced such that size, shape, structure, grade, and other relevant characteristics of the deposit are established with a high degree of accuracy. Processing tests involving bulk sampling may be required. (UNFC)

**Mineral:** A mineral is a naturally occurring substance that is solid and inorganic and representable by a chemical formula, and has an ordered atomic structure. It is different from a rock, which can be an aggregate of minerals or non-minerals and does not have a specific chemical composition. Most but not all minerals are crystalline. Most but not all minerals have one or more metals as part of the substance.

**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. (International Council on Mining and Metals, i.e., ICMM)

**Mineral reserve (or Ore Reserve):** A mineral reserve or an ore reserve is the economically mineable part of a mineral resource. (ICMM)

**Mineral ore:** An ore is a type of rock or rocky material that contains sufficient minerals with important elements including metals that can be economically extracted from the rock through mining operations. An ore body is the assemblage of such rocky material.

**Mineralization:** Mineralization is the process of formation of a mineral out of unmineralized material or concentration of the mineral above its normal abundance due to geological processes involving heat, pressure, chemical action, sedimentation, etc.

**Mineral occurrence:** An indication of mineralization, that is worthy of further investigation. The term mineral occurrence only indicates presence of one or more minerals but does not imply any measure of volume or tonnage, grade or quality and is thus not yet part of a mineral resource. (UNFC)

**Mineral deposit:** A mineral occurrence of relatively higher concentration.

**Mining operation:** A mining operation is any operation undertaken for the purpose of winning (i.e., recovering) any mineral. It generally includes extracting the ore and then processing it to recover the minerals in the ore (MMDR Act 1957).

**Mining lease:** A lease granted for the purpose of undertaking mining operations, and includes a sub-lease. (MMDR Act 1957)

**Prospecting:** It means any operation undertaken for the purpose of exploring, locating, or proving mineral deposit, including geochemical and geophysical surveys, and drilling. (MMDR Act 1957)

Prospecting is the systematic process of searching for a mineral deposit by narrowing down areas of promising enhanced mineral potential. The methods utilized are outcrop identification, geological mapping, and indirect methods such as geophysical and geochemical studies. Limited trenching, drilling,

and sampling may be carried out. The objective is to identify a deposit which will be the target for further exploration. Estimates of quantities are inferred, based on interpretation of geological, geophysical, and geochemical results. (UNFC)

*Note:* A prospecting licence granted under the MMDR Act permits general exploration as well as detailed exploration.

**Reconnaissance:** Any operations undertaken for preliminary prospecting of a mineral through regional, aerial, geophysical, or geochemical surveys and geological mapping, but does not include pitting,

trenching, drilling, or sub-surface excavation. (MMDR Act 1957)

A reconnaissance study identifies areas of enhanced mineralization on a regional scale based primarily on results of regional geological studies, regional geological mapping, airborne and indirect methods, preliminary field inspection, as well as geological inference and extrapolation. The objective is to identify mineralized areas worthy of further investigation towards mineral deposit identification. Estimates of quantities should only be made if sufficient data are available. (UNFC)

## Appendix 2: Excerpt from Supreme Court Judgment dated August 25, 2014 in Writ Petition (Crl.) No. 120 of 2012

98. In *Natural Resources Allocation Reference*, the Constitution Bench said that reading auction as a constitutional mandate would be impermissible because such an approach may distort another constitutional principle embodied in Article 39(b). In the main judgment, with reference to Article 39(b), the Court stated as follows:

113 "...The disposal of natural resources is a facet of the use and distribution of such resources. Article 39(b) mandates that the ownership and control of natural resources should be so distributed so as to best subserve the common good. Article 37 provides that the provisions of Part IV shall not be enforceable by any court, but the principles laid down therein are nevertheless fundamental in the governance of the country and it shall be the duty of the State to apply these principles in making laws. Therefore, this Article, in a sense, is a restriction on "distribution" built into the Constitution. But the restriction is imposed on the object and not the means. The overarching and underlying principle governing "distribution" is furtherance of common good. But for the achievement of that objective, the Constitution uses the generic word "distribution". Distribution has broad contours and cannot be limited to meaning only one method, i.e., auction. It envisages all such methods available for distribution/allocation of natural resources which ultimately subserve the 'common good.'

115. It can thus be seen from the aforequoted paragraphs that the term "distribute" undoubtedly, has wide amplitude and encompasses all manners and methods of distribution, which would include classes, industries, regions, private and public

sections, etc. Having regard to the basic nature of Article 39(b), a narrower concept of equality under Article 14 than that discussed above, may frustrate the broader concept of distribution, as conceived in Article 39(b). There cannot, therefore, be a cavil that "common good" and "larger public interests" have to be regarded as constitutional reality deserving actualisation.

119. The norm of "common good" has to be understood and appreciated in a holistic manner. It is obvious that the manner in which the common good is best subserved is not a matter that can be measured by any constitutional yardstick—it would depend on the economic and political philosophy of the Government. Revenue maximization is not the only way in which the common good can be subserved. Where revenue maximization is the object of a policy, being considered qua that resource at that point of time to be the best way to subserve the common good, auction would be one of the preferable methods, though not the only method. Where revenue maximization is not the object of a policy of distribution, the question of auction would not arise. Revenue considerations may assume secondary consideration to developmental considerations.

120. Therefore, in conclusion, the submission that the mandate of Article 14 is that any disposal of a natural resource for commercial use must be for revenue maximization, and thus by auction, is based neither on law nor on logic. There is no constitutional imperative in the matter of economic policies—Article 14 does not predefine any economic policy as a constitutional mandate. Even the mandate of Article 39(b) imposes no restrictions on the means adopted to subserve the public good and uses the broad term "distribution", suggesting that the methodology of distribution is not fixed. Economic logic establishes that alienation/allocation of

natural resources to the highest bidder may not necessarily be the only way to subserve the common good, and at times, may run counter to public good. Hence, it needs little emphasis that disposal of all natural resources through auctions is clearly not a constitutional mandate.

99. In light of the above legal position, the argument that auction is a best way to select private parties as per Article 39(b) does not merit acceptance. The emphasis on the word “best” in Article 39(b) by the learned senior counsel for the intervener does not deserve further discussion in light of the legal position expounded by the Constitution Bench in *Natural*

*Resources Allocation Reference* [*Natural Resources Allocation, In re*, Special Reference No.1 of 2012; {(2012) 10 SCC 1}] with reference to Article 39(b). We are fortified in our view by a recent decision of this Court (3-Judge Bench) in *Goa Foundation v. Union of India and Others*; [(2014) 6 SCC 590}] wherein following *Natural Resources Allocation Reference*, it is stated, “...it is for the State Government to decide as a matter of policy in what manner the leases of these mineral resources would be granted, but this decision has to be taken in accordance with the provisions of the MMDR Act and the Rules made thereunder and in consonance with the constitutional provisions...”.

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