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MINERAL AUCTIONS IN INDIA: WINNER'S CURSE OR OWNER'S PRIDE?

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ABBREVIATIONS AND ACRONYMS

| | |
|-----------------|---|
| CII | Confederation of Indian Industry |
| CMPDI | Central Mine Planning and Design Institute |
| CRIRSCO | Committee for Mineral Reserves International Reporting Standards |
| DRDO | Defence Research and Development Organisation |
| FDI | Foreign Direct Investment |
| GSI | Geological Survey of India |
| IBM | Indian Bureau of Mines |
| ICMM | International Council on Mining and Metals |
| KIOCL | Kudremukh Iron Ore Company Ltd |
| MCDR | Mineral Conservation and Development Rules |
| MECL | Mineral Exploration Corporation Limited |
| MERIT | Mineral Exploration Research and Innovation Trust of Andhra Pradesh |
| ML | Mining Lease |
| MMDR Act | Minerals and Mines (Development and Regulation) Act |
| MPSMC | Madhya Pradesh State Mining Corporation |
| MSME | Medium, Small and Micro Enterprises |
| NERP | Non-Exclusive Reconnaissance Permit |
| NFTDC | Non-Ferrous Technology Development Centre |
| NIT | Notice Inviting Tender |
| NMDC | National Mineral Development Corporation |
| NMEP | National Mineral Exploration Policy |
| NMET | National Mineral Exploration Trust |
| NMP | National Mineral Policy |
| NTPC | National Thermal Power Corporation |
| OMECL | Odisha Mineral Exploration Corporation |
| PL | Prospecting Licence |
| PSU | Public Sector Undertaking |
| R&D | Research and Development |
| TSMDC | Telangana State Mineral Development Corporation |
| UNFC | United Nations Framework Classification (for mineral resources) |

MINERAL AUCTIONS IN INDIA

Summary

The Mines and Minerals (Development and Regulation) Act (MMDR Act), 1957 was amended in 2015 (and Rules were notified thereunder) with the intention of removing discretion and introducing more transparency in the allocation process of mineral concessions. The Act as amended provides that mineral concessions will be granted only on the basis of bidding at an auction, for the prospecting stage or mining stage as the case may be. Mining leases shall be granted for a non-renewable period of 50 years.

To enable transit of the existing leases to the auction regime, the amendment provides that all existing leases shall be deemed to have been granted for a period of 50 years and on the expiry of the lease period, the lease shall be put up for auction. In the case of so-called 'captive' mines, where the mineral is used for captive purpose, in case the 50-year period or current lease expires before 2030, the lease will be deemed to be valid till March 31, 2030. In the case of so-called 'non-captive' mines, the validity will be till March 31, 2020 (or validity of current lease or 50 years – whichever is later).

It is estimated that 49 working mines and 285 non-working mines ('non-captive' mines; including 184 non-working mines in Goa) are such that the 50-year period is over or the current lease expires before March 31, 2020. As such, all these mines can be put to auction as per the procedure given in the MMDR Act and the Rules thereunder, and the process has already started.

The Paper analyses the mineral auctions conducted so far and finds that the present auction regime has achieved an overall 'success rate' of around 55%, with 79% success only in the case of iron ore. The failure to successfully complete the auction process in such a large proportion of cases is a matter requiring analysis to remedy shortcomings.

Analysis of the publicly available data on the auctions conducted so far indicates a number of factors at play:

- Adequacy as well as quality of exploration data and mineralization studies/geological reports is an underlying issue.

- Availability of mineral resources in terms of quantity and quality may not be adequate to attract bids in some cases.
- Mineral blocks lying within forest/eco-sensitive/disturbed areas may be seen negatively. Encroachment over the government land may also negatively impact success of an auction.
- End-use reservation condition limits eligibility to bid and may negatively impact success of an auction.

The Paper points out that in view of this and the manner in which the entire auction regime has been structured, it would seem that:

- Auction can be subjective and non-transparent in its own way.
- Mineral auctions based on market segmentation ('captive' and 'non-captive') can distort the market by interfering with demand-supply and price signals.
- Auctions are creating a non-level playing field between the private and the public sectors.
- High auction bids being received in the case of iron ore (more than 100% of the value of the mineral) may not be sustainable in the long run, and can hurt the viability of the mining as well as the downstream sector.

The Paper concludes that:

- The auction system may result in the slow demise of the micro, small and medium enterprises (MSME) sponge iron industry, which today contributes more than 25% of crude steel production through the secondary route. Effective steel scrap supply and steel recycling policies have to be put in place quickly to prevent supply disruptions going forward.
- Since the 'Make in India' initiative of the Government of India requires reliable access to raw materials, including mineral resources at globally competitive prices, a greater priority to exploration is needed to secure a steady supply of minerals of various kinds.
- Exploration, particularly for minerals located deep below the Earth's surface, is a high-risk enterprise, which needs a supporting ecosystem. The Geological

- Survey of India (GSI) needs to facilitate rather than supplant private exploration effort.
- There is a need to open up exploration for private investment; it is advisable to reserve only those areas that government wants to keep out of private sector purview, and open up the remaining area.
 - The system of Non-Exclusive Reconnaissance Permit (NERP) needs to be reworked so that permit holders are allowed to proceed to prospecting and mining seamlessly, as an incentive.
 - Specialized venture-capital based exploration companies need to be specially incentivized. Introduction of the 'Large Area Prospecting License (LAPL)' is a good way forward to encourage venture capital-funded exploration for deep-seated minerals.
 - The auction system should be used for adequately prospected deposits only, in line with recommended practice.
 - The distinction between 'captive' and 'non-captive' mining is distorting the sector by interfering with demand–supply and price signals. It is preventing the growth of a healthy market for mineral ores, segmenting the market, and creating an artificial perception of short-term scarcity in some segments. Widespread captive mining can retard growth of the sector by disincentivizing greenfield metal-making capacity creation. Lack of growth impulses in turn can reduce fresh investments in exploration.
 - All mines should be capable of producing for the market, for different grades and blends, and value-added products, so that low grades are also used and minor metals are recovered and there is optimum resource use efficiency.
 - Public sector being allocated mines may continue, but the playing field should be levelled, at least by 2030 when existing (legacy) private 'captive' mines are also auctioned.
 - The standard international practices of allowing extension and transferability of mineral concessions must be adopted for most efficient use of resources.
 - The National Mineral Exploration Trust funds must be used sparingly and with discretion, in support of exploration for minerals needed as national priorities.
 - A more robust and transparent system for exploration data reporting must be adopted. The Minerals (Evidence of Mineral Contents) Rules, 2015 is not adequate for the purpose.
 - The time has come to create independent Mining Regulatory Authorities and Tribunals to give adequate credibility to the sector.

1. Overview

Minerals occur through a variety of geological processes, and some countries are more richly endowed than others in specific minerals. Some minerals are relatively easy to locate (and extract) because they are formed or are situated relatively close to the surface of the Earth, through processes such as weathering, precipitation from solution, etc. Iron ore, bauxite, and limestone generally belong to this category. Other minerals are, by their very nature, formed at depths and at high temperatures, through volcanic-related activity such as magmatic deposits or hydrothermal deposits, and may be difficult to locate unless subsequent geological processes bring the deposits closer to the surface of the Earth. Copper and many other metals, such as gold, nickel, uranium, tin, tungsten, molybdenum, and rare earths are in this category. Locating economically mineable deposits of such metals is a costly affair, involving (generally), acquisition of geophysical and geochemical data through reconnaissance, taking samples from target locations for analysis through prospecting operations and drilling to the depth where the mineral may be located. Since minerals even if located, may not be economically mineable for a variety of reasons (e.g., low grade of the mineral; high cost of extraction, etc.), reconnaissance-prospecting-exploration ventures are quite risky.

The main objective of national mineral development strategies is generally two-fold: how to cost-effectively locate mineral deposits; and, how to get best value for the known deposits in terms of national development goals.

2. Policy and legal provisions

Minerals (including coal) within the Indian landmass are the property of the States (who are thus entitled to the

royalty), but the Constitution of India makes a special provision for the management of the minerals. The Seventh Schedule of the Constitution provides that the Parliament of India will have the power to make the law regulating mineral development in the public interest, and that the State Legislatures will have the power to frame their own law subject to any such law of the Parliament. The Parliament of India passed the Mines and Minerals (Development and Regulation) Act¹ (MMDR Act) in 1957 under this provision of the Constitution to regulate the sector. The Act mainly covers 'major minerals', and leaves 'minor minerals' to be managed by the States.

Amendment of the MMDR Act: The MMDR Act, 1957 has been subject to many amendments, including substantial amendment (to allow private sector participation in exploration and mining) in 1999 consequent to the liberalization of the Indian economy in 1991. The Act was recently amended² in 2015 (and Rules were notified thereunder) with the intention of removing discretion and introducing more transparency in the allocation process of mineral concessions. The amendments now made to the MMDR Act, 1957 provide that mineral concessions will be granted only on the basis of bidding at an auction, for the prospecting stage or mining stage as the case may be (Section 10B(2) and 11(2), respectively).³ This replaces the earlier provisions which included grant on the basis of preferential right of a 'first-in-time' application as well as on the basis of comparative merit (often called 'beauty parade') in the case of invited applications.

To enable transit of the existing leases to the auction regime, the amendment provides that all mining leases shall be granted for a period of 50 years. All existing leases shall be deemed to have been granted for a period of 50 years and on the expiry of the lease period, the lease shall

¹ Initially named as the Mines and Minerals (Regulation and Development) Act, it was renamed as the Mines and Minerals (Development and Regulation) Act in 1999. The Act applies to all metallic and non-metallic minerals including coal and lignite, but not to oil and gas.

² These amendments are mainly related to non-coal minerals. For coal, a separate legislation, Coal Mines (Special Provisions) Act, 2015, was passed laying out the process of allocation of coal mines through auction. Unlike the changes in the MMDR Act, which gave the power to the States to conduct the auctions, for coal, the Coal Mines (Special Provisions) Act, 2015 gave the power to conduct auctions to the Central Government.

³ Extracts from the MMDR Act and Rules are in Annexure 1

be put up for auction. Regarding the so-called 'captive'⁴ mines, where mineral is used for captive purpose, in case the 50-year period or current lease expires before 2030, the lease will be deemed to be valid till March 31, 2030. In the case of so-called 'non-captive' mines, the validity will be till March 31, 2020 (or validity of current lease or 50 years, whichever is later).

New Mineral Rules: The Mineral (Auction) Rules notified in 2015 under the MMDR Act specifies the auction procedures. The Minerals (Evidence of Mineral Contents) Rules, 2015 also notified under the MMDR Act spells out the technical requirements. The technical parameters to show the existence of mineral contents in the area, for purposes of bidding for the grant of mining leases and composite licences, given in the Minerals (Evidence of Mineral Contents) Rules, 2015 are based on the United Nations Framework Classification (UNFC). These standards lay down the extent to which geological, technical, and economic parameters have to be investigated, including drilling, sampling, and mineralogical analysis.⁵

Currently, Rule 9 of the Mineral (Auction) Rules, 2015 refers to 'mineral resources' as a bidding parameter and to the Geological Report as the information base for bidding for mining leases, and Rule 17 has a similar provision with respect to bidding for prospecting licence-cum-mining lease (composite licences). The requirement in the Minerals (Evidence of Mineral Contents) Rules, 2015 is that for a mining lease, at least General Exploration (G2) should have been completed to establish the Indicated Mineral Resource (332); for a composite license, the requirement is that Preliminary Exploration (G3) should have been completed to establish the Inferred Mineral Resource (333). As is clear, the E and F axes are not required under the provision to be '2' or '1', implying that beyond the Geological Report, there is no requirement for a pre-

feasibility study and estimation of potentially economic resources (much less a feasibility study).

National Mineral Policy 2019: The Government has recently issued the National Mineral Policy, 2019 (NMP 2019); the main features distinguishing it from NMP, 2008 include the following provisions:

- Mineral production should feed into the 'Make in India' initiative of the Central Government. In order to be eligible to get financial support, mining should get the status of the industry.
- States should auction mineral blocks with pre-embedded environment and forest clearances.
- The private sector should be encouraged to take up exploration. Exploration should be incentivized to attract private investments as well as state-of-the-art technology, *within the ambit of the auction regime*, through a 'Right of First Refusal' at the time of auction.
- To ensure adequate supply of minerals, which are not available locally, downstream regulations are to be aligned for their exploration and development.
- There should be seamless transition from reconnaissance permit to prospecting license to mining leases or auctioning of composite reconnaissance permit-cum-prospecting license-cum-mining lease in virgin areas on revenue sharing basis or any other appropriate incentive as per international practice.
- Efforts to be made to benchmark and harmonize royalty and all other levies and taxes with mining jurisdictions across the world to make India an attractive destination for exploration and mining.
- Inter-generational equity must be promoted, and "for assessment of inter-generational equity in respect of each mineral, a disaggregated approach shall be adopted considering aspects like reserves/resources."

⁴ The MMDR Act does not define the term 'captive', but the explanation to the proviso to Section 12A(6) states: "For the purposes of this proviso, the expression used for captive purpose shall mean the use of the entire quantity of mineral extracted from the mining lease in a manufacturing unit owned by the lessee." Rule 6(4) of the Mineral (Auction) Rules 2015 was amended in 2017 and a proviso was added: "Provided that quantity of mineral equivalent to twenty five per cent of total mineral excavated in the previous financial year, for which end use was specified can be sold in the current financial year."

⁵ See Annexure 2 for a note on the systems of classification and reporting of mineral resources, and for the definition of the system of (EFG) for categorization of resources and reserves for the purposes of the para given below.

3. The auction framework for mining leases

Auction of Mining Leases: Under the MMDR Act as amended in 2015, an area shall be put to auction for grant of a mining lease if its mineral contents are established to the standard of at least General Exploration (G2) to establish an Indicated Mineral Resource (332); and a Geological Study Report (also called Geological Report) has been prepared conforming to the requirements of the Minerals (Evidence of Mineral Contents) Rules 2015 (see Annexure 1).

The State Government is required to identify and demarcate the areas where mining leases are proposed to be granted (using total station and differential GPS) identifying forest land, land owned by the State Government, and land not owned by the State Government. The State Government shall notify the areas for grant of mining leases on terms and conditions prescribed by the Central Government. The grant will be done by e-auction, conducted in terms of procedure prescribed in the Mineral (Auction) Rules, 2015.

The State Government may reserve a mine for any particular specified end use, in which case the minerals extracted under the mining lease shall be utilized for the specified end use; this essentially constitutes 'captive' mining.⁶

A Technical Evaluation Committee (TEC) mechanism has been constituted to oversee the technical aspects of the auction process. The Ministry of Mines through its institutions, that is, Geological Survey of India (GSI), Mineral Exploration Corporation Ltd (MECL), and Indian Bureau of Mines (IBM) and institutions such as SBI Capital Markets Ltd (SBICAP), MECON Ltd, CRISIL, PWC, MSTC Ltd, etc., will provide initial handholding support to the State Governments for Transaction Advisory Services.

Bidding Parameters: The State Government shall specify in the tender document the minimum percentage of the value of mineral despatched,⁷ which shall be known as the 'reserve price'.

The bidders will be required to quote, as per the bidding parameter, a percentage of value of mineral despatched equal to or above the reserve price and the successful bidder shall pay to the State Government, an amount equal to the product of: (i) percentage so quoted; and (ii) value of mineral despatched.

Pre-bid Processes: The bidders shall be provided a fixed period, as notified by the State Government, to study the tender document (including reports like the Geological Report and the report on mineral contents and indicative list of clearances and permissions required to be obtained for commencing mining operations which form part of the tender document).

The bidders are expected to conduct their own due diligence regarding the Mineral Block⁸/Mine and related mine infrastructure and also land to be included in the mining lease and also familiarize themselves with all applicable laws relating to acquisition of rights over such land and mine infrastructure to be included in the mining lease.

During such period, the bidders may undertake site visits to the mineral block at their own cost and risk to ascertain for themselves the site conditions, location, communications, climate, availability of power, and any other matter considered relevant by them.

Bidders may seek clarifications or request further information regarding the tender document. The State Government shall publish the queries along with their response on their website. Additionally, a pre-bid conference of the bidders shall be convened on a designated date specified by the State Government.

⁶ See Section 10(B)(6) of MMDR Act and Rule 6(3)&(4) of the Mineral (Auction) Rules.

⁷ The value of the mineral despatched is equal to the product of: (i) the quantity of the mineral despatched in a month; and (ii) sale price of the mineral (grade-wise) for the State as published by the Indian Bureau of Mines.

⁸ The term 'Mineral Block' is not defined in the Auction Rules. It occurs in the National Mineral Policy as well as in the Auction Rules (Rule 2(m)). It obviously refers to the physical area for which the lease is to be granted.

Bidding Process: This shall be an ascending forward online electronic auction and shall comprise two rounds.

In the first round, the bidders shall submit:

- a. A technical bid comprising among others, documentary evidence to confirm eligibility⁹ as per the provisions of the Act and the Rules made thereunder to participate in the auction; bid security and such other documents and payments as may be specified in the tender document; and
- b. An initial price offer which shall be a percentage of the value of the mineral despatched.

Based on the first round:

- a. Those bidders (called 'technically qualified bidders') who are found to be eligible, and whose initial price offer is equal to or greater than the reserve price, shall be considered for the second round of auction;
- b. The highest initial price offer among the technically qualified bidders shall be the *floor price* for the second round of online electronic auction;
- c. The top five technically qualified bidders, or 50% of the technically qualified bidders, whichever is higher, shall go forward in the second round of electronic auction.

If the number of technically qualified bidders is *between three and five*, then all the technically qualified bidders shall be considered as qualified bidders. Where the total number of technically qualified bidders is *less than three*, the auction process shall be annulled. In such a case, the State Government can decide to either commence the auction process *de novo* or conduct a second attempt with

the same terms and conditions as the first attempt; and in the latter case, even if the total number of technically qualified bidders is less than three the auction process can be taken forward.

In the second round of auction, the qualified bidders submit their final price offer (greater than the floor price). The qualified bidder who submits the highest final price offer (i.e., percentage of value of mineral despatched) shall be declared as the 'preferred bidder' immediately on conclusion of the auction.

Grant of Mining Lease: Upon receipt of the first instalment of the upfront payment,¹⁰ the State Government shall issue a letter of intent to the preferred bidder.

The preferred bidder shall be considered to be the 'successful bidder' upon payment of the second instalment of the upfront payment, furnishing performance security,¹¹ filing of the mining plan, and satisfying other conditions specified.

The successful bidder will sign the Mine Development and Production Agreement¹² with the State Government after obtaining all consents, approvals, permits, and no-objections (including under the Forest (Conservation) Act, Environment (Protection) Act, etc.), and pay the third instalment of 80% of the upfront payment, whereupon the Mining Lease Deed shall be executed by the State Government in favour of the successful bidder.

After the grant of mining lease and commencement of production, the lessee (i.e., successful bidder) shall pay to the State Government an amount (called 'auction amount') equal to the product of: (i) the percentage quoted as the final price offer; and (ii) the value of mineral despatched. This payment is made on a monthly basis.

⁹ As per the 2017 amendment of the Rules, to be eligible to participate in the auction of a mining lease, an applicant must have a net worth requirement of 2% of the estimated value of the resources if the value is above ₹ 1000 crore and 1% if the value is between ₹ 1000 crore and ₹ 100 crore and 0.5% for small deposits valued at less than ₹ 100 crore.

¹⁰ The upfront payment is an amount equal to 0.50% of the value of the estimated resources. The upfront payment shall be payable to the State Government in three instalments of 10%, 10%, and 80% and shall be adjusted in full at the earliest against the amount to be paid as an 'auction amount'.

¹¹ The performance security will be for an amount of 0.50% of the value of estimated resources and the performance security shall be adjusted every five years so that it continues to correspond to 0.50% of the reassessed value of estimated resources.

¹² The Agreement will specify a Minimum Dispatch Requirement; violation can involve invoking of the performance guarantee.

Section 8A(4) of the MMDR Act as amended in 2015 provides for auction of leases on the expiry of the leases granted under the provisions of the MMDR Act prior to its amendment in 2015. By an amendment to Section 8A(4) in January 2020, the State Government has been empowered to take advance steps for auction of blocks before the expiry of the lease period. A new Section 8B has also been inserted in the MMDR Act, so that the successful bidders of the mining leases expiring under Section 8A(5) & 8A(6) of the MMDR Act shall be deemed to have acquired all valid rights/approvals/clearances/licenses and the like for a period of two years and can start mining operations without loss of time, from the date of commencement of the new lease.

The Ministry of Mines has constituted an Inter-Ministerial Group: the Post-Auction Mining Clearances Approval Facilitator (PAMCAF), chaired by the Secretary, Ministry of Mines and consisting of representatives of the Ministry of Environment, Forests and Climate Change, Railways, and the sectoral regulator the IBM, with location-specific representation of the State Government Departments of Revenue and Mining, State Pollution Control Board, District Administration, etc., to facilitate and expedite the various clearances and approvals involved.

Payments Under Mining Lease: The lessee shall pay, in addition to the auction amount:

- a. Royalties and dead rent to the State Government as specified in the Act and the Rules made thereunder;
- b. The prescribed amount to the National Mineral Exploration Trust (NMET); and
- c. The prescribed amount to the District Mineral Foundation (DMF).

4. Pitfalls of resource estimations¹³

Resource estimations of some minerals are notoriously difficult. While most of the major minerals currently being mined in India, namely iron ore, bauxite, and limestone

generally occur closer to the surface, over wider expanses (in 'bulk') and relatively homogeneously and in higher concentration, many metals including base metals occur in minerals deep below the surface, in thin veins, or lenses or pockets and in low concentrations. As a result, resource estimations in the case of some minerals are difficult with a high degree of certainty, and given the low concentration in which they occur, resource estimations do not give guarantee of commercial viability of a mining venture. As mentioned in Annexure 2, the United Nations Framework Classification (UNFC) system relied upon in the Minerals (Evidence of Mineral Contents) Rules, 2015 actually has three dimensions of estimation, the so-called ('EFG'): an economic axis ('E'), a feasibility axis ('F'), and a geological axis ('G'). The Rules only mention the need for detailed data ('G-2') in the third or geological axis, that is, ('332'), and as such the resource estimations included in the auction process, while fairly indicative in the case of 'bulk' minerals such as iron ore, bauxite, and limestone, will not work well in the case of copper or many other metallic minerals, which more seriously require estimation of the economically mineable portion, or the 'mineral reserve'.

The Minerals (Evidence of Mineral Contents) Rules, 2015 in its Schedule I refers to both the UNFC and the Committee for Mineral Reserves International Reporting Standards (CRIRSCO) Template regarding the definitions and codes used in Part I of the Schedule. The principles governing the operation and application of the CRIRSCO Template are *Transparency*, *Materiality*, and *Competence* in relation to 'Public Reports' to be brought out regarding the exploration results:

- Transparency requires that the reader of a Public Report is provided with sufficient information, the presentation of which is clear and unambiguous, so as to understand the report and not to be misled.
- Materiality requires that a Public Report contains all the relevant information which investors and their professional advisers would reasonably require, and reasonably expect to find in a Public Report, for

¹³ See Annexure 2 for a note on 'Mineral resource estimation and reporting'

the purpose of making a reasoned and balanced judgement regarding the exploration targets, exploration results, mineral resources, and/or mineral reserves being reported.

- Competence requires that the Public Report be based on work that is the responsibility of a suitably qualified and experienced person (referred to as a competent person) who is a member of a Professional Organization (PO) with an enforceable code of ethics and disciplinary process, which includes the powers to suspend or expel a member.

The CRIRSCO Template is a generic template; the Joint Ore Reserves Committee (JORC) code and the NI 43.101, which are respectively the Australian and Canadian reporting systems, are closely aligned with the principles contained in the template. As in the case of the UNFC, in JORC and 43.101, exploration results are translated into 'resources' based on the extent of geological knowledge and thence into 'reserves' based on modifying factors relating to mining, processing, metallurgical, infrastructure, economic, marketing, legal, environmental, social, and governmental factors, which pertain to technical and economic feasibility.

The CRIRSCO, JORC, and 43.101 frameworks are of practical importance because they provide for a *regular process of public reporting* of the exploration progress and the results by independent third-party professionals, which impart a high degree of credibility and transparency to the exploration results and the estimation of resources and reserves. The use of the CRIRSCO template and the processes embedded therein can impart a high degree of confidence to valuations for the purposes of mergers and acquisitions (M&A), and in fact is used for such purposes internationally and is recognized by the stock exchanges, financial institutions, and M&A advisors.

The Minerals (Evidence of Mineral Contents) Rules, 2015 does not provide for the public reporting of results or for the designation of 'competent persons' as third parties for independent reporting of the exploration results. The

Mineral (Auction) Rules 2015 also do not require that the valuation for purposes of auction is based on the report of a credible 'Competent Person'. The adoption of a robust and more transparent exploration reporting is thus an urgent necessity to make the auction process in India more reliable, credible, transparent, equitable, and investment friendly. This is particularly important if private agencies are engaged, as proposed under the National Mineral Exploration Policy (NMEP), to explore the prospects using the National Mineral Exploration Trust (NMET) funds, and all the more so if they are to share the revenue stream and even participate in the auction itself.

The National Mineral Policy 2019 states: "*The resource inventory will be maintained in accordance with a globally accepted public reporting standard for ensuring reliability of reporting and acceptability to financial institutions and stock exchanges showing reserves and remaining resources as well in the traditional methodology in vogue.*" Clearly, the Minerals (Evidence of Mineral Contents) Rules 2015 needs to be brought in line with the sectoral policy at the earliest. The groundwork has already been laid and needs to be officially recognized and accepted.¹⁴

5. Some direct implications of an auction system

Auction can be subjective and non-transparent in its own way: The current system of auctions of 'mineral resources' under the MMDR Act (through the 2015 amendment) based on G2-level data for mining leases and G3-level data for composite licenses (which corresponds to [332] and [333], respectively, as per the UNFC classification) has several potential problems arising out of the uncertainty of the estimations. As mentioned in paragraph 15.1 of the NMEP, the aim is to build a steady stream of auctionable prospects by funding State Governments through the NMET to produce G3- or G2-level reports. As is clear from the preceding para (read with Annexure 2 on mineral estimations and reporting), 332- and 333-level exploration is not enough to quantify

¹⁴ The National Committee for Reporting Exploration Results, Mineral Resources and Reserves in India (NACRI) became the 14th member of CRIRSCO on August 1, 2019. NACRI has developed the 'Indian Mineral Industry Code for reporting Exploration Results, Mineral Resources and Reserves' (IMIC) (http://www.crirSCO.com/docs/IMIC_July_2019.pdf) and intends to work closely with the mining industry in India to ensure the use of the IMIC alongside the other established CRIRSCO-aligned reporting codes and standards.

an economically mineable or a potentially economically mineable reserve for many minerals, and expert knowledge based on all the available evidence needs to be brought to bear to make a valuation for auction purposes, specifying the assumptions and projections. In that sense, the current system cannot be said to be totally objective and transparent in valuing the mineral resource for bidding purposes.

A more robust, transparent, and credible system of reporting of the mineral resources needs to be used than the current UNFC system. A CRIRSCO compliant standard similar to the Joint Ore Reserves Committee (JORC) code, or the NI 43.101 (which requires regular periodic reporting of exploration results and relies on independent third parties for assessments on the valuations based on feasibility) needs to be adopted for the Indian mining sector to make the auction process credible.

Mineral auctions based on market segmentation can distort the market: The MMDR Act as amended introduces the concept of 'captive' and 'non-captive' mining, which is a legacy of the coal sector where it is still prevalent because of the nationalization of coal mines. Many States may prefer to auction mines for captive purposes to promote the setting up of metal-making¹⁵ facilities by industry within the State or help the metal-making companies already located within the State. However, the newly introduced segmentation will interfere with the operation of demand–supply and price signals based on market forces and result in sub optimal use of resources, since the so-called 'captive' mines are generally restricted to mine to the extent of their own end-use capacity. In 2017, the Auction Rules were amended to allow captive mines to sell upto 25% of the production, and this may correct some of the distortion; but it is not a complete substitute for the kind of free market that can drive innovation and resource use efficiency.

Auctions for fixed periods may lead to suboptimal investments and use of minerals: The current auction regime envisages a fixed non-renewable tenure of 50 years for a lease. The international best practice, in the case of large deposits which may involve mining for

many decades, is to allow the miner to continue mining by renewal or extension of the lease.¹⁶ By precluding extension/renewal in such cases, the miner may be disincentivized from making investments in the mine or the attached metal-making unit (if there is one) towards the end of the 50-year period. Worse, the miner may 'cherry pick' and mine the better grades, leaving the lower grades, rather than blend the various grades; this will improve his profits but make the mining of the lower grades less economic in a future mining lease.

Auctions are creating a non-level playing field: The amendment to the Act also creates a non-level playing field since the Government can 'reserve' some areas for the public sector and the public sector companies are allocated mines without auction. Though the amendment allows the States to receive a premium over and above royalty in such cases, the process is unclear. The Mineral (Mining by Government Company) Rules, 2015 provides that a government company or a corporation or a joint venture, granted a mining lease, shall in each case, pay an additional amount equivalent to a percentage of the royalty as determined by the Central Government, but this does not apply to the mines that are already with the public sector from prior to 2015.

High bids for captive resources can be unsustainable and hurt the sector: Most importantly, by segmenting the market and creating a perception of resource scarcity, auctions for 'captive' mines may lead to unnaturally aggressive auction bids by the metal makers (for fear of stranded assets) with every possibility of a 'winners curse' given the volatility to which the market in this sector is subject. This in turn may increase the chance of an enterprise becoming financially unviable if metal margins remain low for extended periods of time.

The need to directly link a mine with a specific metal-producing unit appears to be superfluous as a general principle, since most minerals can only be used to make metal (or the main constituent). If the intention is to ensure that minerals are used for national development by producing metals for manufacturing and infrastructure rather than say, for direct export, clearly restrictions at

¹⁵ Strictly speaking in the case of limestone, it would be cement rather than metal that is produced.

¹⁶ See Annexure 4 for the practice in various countries.

the export end would have been a better instrument than the concept of captive mining. Captive mines do give a sense of resource security to a metal maker, but transportation and logistics costs may increase, and add to the load on an overstretched transportation system. Long-term agreement between the producers and the consuming industry covering quantities, price, and capital investments in support is the global best practice which needs to be emulated.

In their publication *'Need for a New Steel Policy'*, Dr V K Saraswat and Ripunjaya Bansal point out that the Indian royalty on iron ore at 15% is one of the highest in the world, whereas the global average is in the range of 3%–7%. Apart from this, the cost of transportation (freight costs) in India is also one of the highest in the world which further adds to the cost of delivered steel. In the publication the following royalty rates in various countries (for iron ore, but generally representative for other major minerals as well) are given:

Royalty on iron ore in different countries

| Countries | Percentage of royalty |
|---------------|-----------------------|
| Australia | 6.5–7.55% |
| Brazil | 2% |
| Canada | 2–16% |
| India | 15% |
| South Africa | 0.5–7% |
| United States | 0–5% |

Source: *'Need for a New Steel Policy'*, Dr V K Saraswat and Ripunjaya Bansal; citing: PWC report – Corporate income taxes, mining royalties & other mining taxes.

Auction bids are over and above the royalty rates¹⁷ and the aggressive bids may well prove to be the 'tipping point' into unsustainability. For example, the weighted-average auction premium in the two main States, Karnataka and Odisha, which conducted iron ore mine auctions recently, is 93% and 102%, respectively. Royalties and other levies are additional costs, and thus in both the States the cost to the miner is more than the notified sale price, clearly not a sustainable situation.

6. An analysis of the auctions held so far

It is estimated¹⁸ that 49 working mines and 285 non-working mines (including 184 non-working mines in Goa) are such that the 50-year period either gets over or the current lease expires before 31 March 2020. As such, all these mines can be put to auction as per the procedure given in the Mines and Minerals (Development and Regulation) (MMDR) 1957 Act and the Rules thereunder.

Table 1¹⁹ on the state-wise mineral-wise auction indicates that 267 mineral blocks were offered for auction through multiple Notices Inviting Tender (NITs) (60 such NITs till 31 December 2019) published by nine mineral-rich states. The number of mineral blocks offered for auction is actually 171 (first offer); the remaining 96 cases are related to those mineral blocks that could not be auctioned successfully during the first attempt and hence, were subsequently offered for auction in the second (and subsequent) attempt. In all, 95 mineral blocks out of a total of 171 blocks were successfully auctioned, which constitutes a 'success rate' of 55%. However, it must be acknowledged that where success was achieved after several attempts (including perhaps relaxation in conditions or invoking the provisions enabling the second attempt despite the number of technically qualified bids being less than three), it cannot be deemed to be an unqualified success.

¹⁷ The Indian Bureau of Mines in its monograph "Mineral Royalties"(2011) states "Royalty in law means payment made to the owner of certain types of rights by those who are permitted by the owners to exercise such rights. Levy of Royalty on minerals is an universal concept based on the premise that mineral resources are "wasting assets"... The rationale for royalty is that it is a payment to mineral rights holder from mineral producer in consideration for the extraction of valuable and non-renewable natural resource." In that sense, the auction premium, particularly when it is applied to the quantity of mineral extracted and is expressed as a percentage of the value of the mineral, in a way very similar to the notified royalty rate, must be deemed to be a part of the royalty regime.

¹⁸ See Annexure 3

¹⁹ See page 28

Bulk minerals such as iron and manganese ores, limestone, bauxite, and graphite constitute about 88% of the total number of blocks offered for auction and the remaining 12% of the mineral blocks comprise deep-seated minerals such as chromite, copper ores, gold, and diamond. The small number of such deep-seated minerals offered in auction could be an indication that the country may remain dependant on the import of these minerals in the medium term (10–15 years), since, in the absence of investments in exploration, no new prospects are likely to be discovered and consequently, no new mines are likely to come to existence to augment production.

The overall success rate (percentage of successful auction blocks with respect to actual number of mineral blocks offered for auction, as given in Table 1), for auction of iron and manganese ores is around 79%; that of bauxite is around 54%, and in the case of limestone, the success rate goes down to 37%. The success rate for deep-seated mineral deposits such as chromite, copper, tungsten, gold, and diamond is fairly random.

An 'attempt-wise' analysis of iron and manganese ores, limestone, gold, and diamond was carried out to ascertain the success rate at different auction attempts. It can be seen from Table 2²⁰ that the success rates for iron and manganese ore blocks during various attempts vary from 20% to 69%, the average being around 60%. Similarly, Table 3²¹ shows that the success rate for limestone blocks during various attempts varies from 20% to 25% with an average of 21%. Table 4²² depicts the average success rate of precious metals and stones, such as gold and diamond, which again is on the lower side, hovering around 40%. The success rate for the remaining mineral blocks (bauxite,

graphite, copper, chromite, and tungsten) is also around 32% as per the data compiled in Table 5.²³ The intervening period between different attempts of auctions for a particular mineral block varies widely from one state to another depending upon the time taken in the resolution of different technical and legal issues, and usually takes about 2–9 months.

Thus, except in the case of iron ore, the current auction regime is prone to a tendency of low success rates and requires an analysis of the reasons for lack of interest among prospective bidders. There does not seem to be any rationale behind offering the same mineral block for auction for six consecutive times without addressing the ground realities as is evident in the case of one limestone block in Odisha. The State Government and the Transaction Advisor must carry out in-depth analysis of such reasons for lukewarm response or failure of auction of a particular mineral block, and also identify whether the reasons are systemic in nature. The pre-bid conference and the responses to queries therein may also need to be made more robust to increase the confidence levels of prospective bidders. The estimation of Resources (in fact of Reserves) and the Geological Report, in particular, may also need to be much more technically sound and in line with international practices. The current auction regime uses the Geological Report as the basis for the bid, yet disclaims all responsibility for accuracy of the data in the Report (inadequate as it is in the absence of a feasibility study) and places the onus on the prospective bidder.²⁴ Reducing the number of times a deposit has to be offered before it is successfully bid-out must be a strategic goal of the mineral auction system, and increasing confidence levels is key to the process.

²⁰ See page 29

²¹ See page 30

²² See page 31

²³ See page 32

²⁴The Karnataka Model Tender Document for iron ore auctions dated 3 March 2019 for instance, states that the State Government shall have no liability to any person, including any bidder which may arise from this Tender Document including the accuracy, adequacy, correctness, completeness or reliability of the Tender Document and any assessment, assumption, statement or information contained therein or deemed to form part of this Tender Document... 'Tender Document' means this tender document including the Information Memorandum... the Information Memorandum includes... Estimated mineral resources of iron ore found in the identified Mineral Block determined pursuant to the Minerals (Evidence of Mineral Contents) Rules, 2015; and Geological study report of the Mineral Block.

Some of the reasons for lack of interest in the auction of different mineral blocks are:

- *In situ*/inherent factors
 - » A Geological Study Report/mineralization study may not contain adequate information and data regarding the mineral resources within the block to a reasonable degree of certainty for bidding purposes.
 - » Availability of mineral resources in terms of quantity may not be sufficient to justify capital investment for a mining venture. In Karnataka, iron ore blocks having less than 10 million tonnes (MT) of poor quality ore (45%–55% Fe content) could not be auctioned despite being offered four times.
 - » The available quality or grade of mineral deposits within the block may not be suitable for direct consumption in the industry or may not find a ready market. The notable case is of a small limestone block with poor quality ore and presence of high magnesia band running parallel to the limestone horizon and having less than 10 MT which could not be auctioned in Odisha even after six attempts.
 - » It is an arduous task to ensure that the government land falling within a mineral block is encroachment-free. Cement-grade limestone blocks with significant resources could not be auctioned in Rajasthan despite being offered four times, probably due to encroachment issues.
 - » Mineral blocks falling within the forest/eco-sensitive/disturbed areas do not attract many prospective bidders.
 - External factors
 - » Demand–supply scenario of many mineral commodities is cyclic in nature and it can impact the spirit of the auction. The general dull market scenario for the cement industry prevailing at that point in time seems to have adversely affected the limestone block auctions.
 - Other factors
 - » End-use reservation restricts the number of prospective bidders since it may involve setting up a plant or an industry in a location which may not justify capital investment. For instance, limestone blocks with end-use reservation for setting up a cement plant in the Kutch district in Gujarat could not be auctioned despite being offered four times.
 - » In the case of auction of limestone blocks in Andhra Pradesh, 6 blocks were reserved for a cement plant out of 11 blocks which were offered initially for the auction. But only two blocks could be successfully auctioned at a bid premium of 10.6% and 10.7%, respectively, whereas the only block auctioned out of the remaining five blocks (not reserved for end use) received a bid premium of 81.12%. In the second attempt, three blocks were reserved for the cement industry out of five blocks, but only one could find a successful bidder at a premium of 13.40%, and neither of the remaining two blocks could be auctioned (refer to Table 3).
 - » In Karnataka, 22 iron ore blocks were reserved for end use out of a total of 26 blocks put up for the auction. A total of 14 blocks could be auctioned where the bid premium varied from 36.7% to 129.9%. The four non-reserved blocks could find successful bidders with the premium ranging from 67.10% to 102.70% (refer to Table 2).
 - » In Odisha, 9 iron and manganese ore blocks were reserved for end use out of a total of 26 blocks put up for auction in several rounds. In the earlier rounds, two reserved blocks could be successfully auctioned at a premium of 44.35% and 100.05%, respectively, whereas the remaining two blocks could not be auctioned due to legal issues. On the other hand, two non-reserved blocks were auctioned at a premium of 44.65% and 87.15%.
- In the recently held (February 2020) round of auctions for iron and manganese ore blocks related to mining leases, expiring on 31 March 2020, the bid premium ranged from 90.90% to

150% with reference to the five blocks reserved for end use and the bid premium scaled a new height of 154% with reference to the non-reserved blocks (refer to Table 2).

As a general case, on the one hand, it would appear from the aforementioned analysis that the end-use reservation of a particular mineral block does not necessarily provide additional benefits in terms of a higher premium. On the other hand, the removal of end-use reservation is likely to attract more prospective bidders and simplify the bidding process as well as the subsequent compliance processes.

Special analysis of the steel sector

It is noticeable that in the case of iron ore, the auction regime is apparently moving the entire sector to a situation where the highest bidders for the larger deposits are likely (in many cases) to be integrated steel plants (ISPs) since they have deeper pockets and can outbid most sponge iron producers as well as the merchant miners, who are the main suppliers in the secondary sector.²⁵ This will of course be seen as being in the interest of 'mineral security'

of the integrated steel plants on the one hand and the interest of revenue flows of the State Government on the other. However, for the MSME Sponge Iron Industry, which depends on the availability of Calibrated Lump Ore (CLO) of high iron content (65% or more), acquisition by integrated steel plants of what were earlier non-captive mines supplying the sponge iron producers, may be a loss not easily replaceable. Competition among the sponge iron makers, pelletisers, and other non-ISP miners for the remaining better quality ore-bearing mines is bound to be aggressive,²⁶ and will affect their viability. Some sections of the MSME Sponge Iron Industry may be forced to use inferior-grade ore, which may result in lower metallization and higher environmental load. A possibly unintended impact of the auction system is thus likely to be the gradual decline of the MSME sponge iron (DRI) industry, which is already under pressure on account of its relatively high negative environmental impacts and the potential availability of high-quality imported steel scrap at competitive rates as alternative feed to the electric arc furnace and induction furnace (EAF/IF) sector.

²⁵ Steel making in India is done either by the primary route or the secondary route. In the primary route, the iron ore is melted in a blast furnace (BF) to produce hot metal, and then this hot metal is used to produce steel in a basic oxygen furnace (BOF). The primary route is, therefore, also called the BF-BOF route and is the route adopted by most integrated steel plants. In the secondary route, steel is produced using sponge iron (also called Directly Reduced Iron or DRI), scrap, etc., as feed. In this route, steel is produced in an electric furnace (an electric arc furnace (EAF) or an induction furnace (IF)). Most secondary units are in the MSME sector. Whereas, in the BF-BOF route coking coal is required, sponge iron is produced using non-coking coal, which is relatively plentiful in India. The total crude steel produced in 2019 in India is around 106 MT, of which over 25% was produced by induction or arc furnaces using sponge iron or scrap.

²⁶ As per reports, (including media reports since the official data are not yet available in some cases), the bid premium for the 2020 auction of 19 iron and manganese ore blocks in Odisha varies from 90.90% to 154%. Out of five iron ore blocks reserved for end use, three large blocks have been secured by integrated steel plants (ISP), namely two blocks: Ganua (119 MT) and Narayanposhi (191 MT) by JSW Steel at a premium of 132% and 98.55%, respectively, and one large block: Thakurani (184 MT) by Arcelor-Mittal at a premium of 107.55%. The remaining two end-use reserved iron ore blocks, which are much smaller in terms of estimated resources: Jaribahal (8 MT) and Roida-II (29 MT), have been secured by non-ISP players at a premium of 90.90% and 150%, respectively.

Out of the remaining 14 unreserved (non-captive) blocks, the two bigger blocks, namely Nuagaon (793 MT) and Jajang (59 MT) have been secured by JSW Steel who has paid premiums of 95.20% and 110%, respectively, whereas the other 12 blocks have gone in favour of non-ISP miners who have paid high premiums of up to 154%. Thus, out of 1782 MT of iron ore earlier under non-captive mining in Odisha, 1345 MT or 75% has accrued to ISPs as a result of the auction; though technically, 852 MT out of this is non-captive resources.

Additionally, 18 C-category iron ore mines (earlier non-captive, with merchant miners) have been auctioned so far in Karnataka (2016 onwards), with the total resources of 365 MT. JSW Steel, the only ISP to bid, has secured nine of the iron ore mines with total resources of 216 MT (59% of resources auctioned). JSW paid a premium of 81.10%, 90.82%, 102.52%, 58.90%, 100.10%, 95.20%, 67.10%, 97.50%, and 102.70%, respectively, for the nine mines. The premium figure varies from 36.70% (Kirloskar Ferrous) to as high as 129.90% (MSPL) in the remaining cases, depending on the size and ore-grade of the mine. As per the Supreme Court order, the auction was open only to end users.

It is likely that these two State auctions will account for almost all of the iron ore auctions till the end of 2020 and a very few additional auctions are likely in the near future.

It is important to note that the National Steel Policy, 2017 states: *“India’s competitive advantage in steel production is driven, to a large extent, from the indigenous availability of high-grade iron ore and non-coking coal – the two critical inputs of steel production. In addition, it also has a vast and rapidly growing market for steel, strong MSME sector, and a relatively young work force with competitive labour costs.”*

The National Steel Policy also recognizes the strategic value of the secondary producers (who do not require coking coal), and it states: *“India over the years has developed a strong MSME sector (comprising of DRI-EAF/IF route based steel producers and rolling mills) which is unique to India. It embodies the entrepreneurial and innovative strengths of Indian steel industry which turned the unavailability of coking coal – a key input for BF-BOF route into an opportunity..... Availability of raw materials will be ensured by facilitating auction of non-coking coal exclusively for steel/sponge iron sector and increasing the iron ore availability in the domestic market.”*

Currently, over 25% of India’s steel production comes from the secondary route. Going forward, the country aims to be able to produce 300 MT of steel by 2030 with at least 35% being produced through the secondary route.²⁷ This will require the current capacity in the secondary route to be substantially increased. As demand for steel rises and the sponge iron industry’s difficulty in accessing resources increases, it is likely that EAF/IF sector will increasingly need to look to an alternative feed, namely domestic and imported steel scrap. An effective steel scrap supply and steel recycling policy is thus urgently needed if India is to

avoid the pitfalls of high coking coal imports for its steel sector.

Sustainability of the present auction regime

The sustainability of auctions as a system of transparent allocation depends on the way the auction method is constructed. A fine balance has to be struck between extracting a value for the use of a public resource by private enterprise and ensuring that private enterprise has enough incentive to take the risks associated with continuously innovating so as to remain globally competitive. A long-term view should also be taken into consideration, given the cyclic nature of the mineral commodity sectors. The analysis of the highest bids, received with reference to the conducted auctions, reveals that the striking of that balance could require some reworking of the auction method, at the very least.

In the case of limestone blocks, the bid fluctuates widely from 5.2% to 138.25%, with the all-India average being about 46% (refer to Table 3). Two limestone blocks (one each in Chhattisgarh and Maharashtra) have attracted a premium of more than 100%. The bid ranges from 12.55% to 38.25% in case of gold and diamond, whereas, it varies widely as low as 2.1% in copper to as high as 200.05% in graphite (refer to Tables 4 and 5).

In the case of iron and manganese ore blocks constituting mostly the erstwhile C-category²⁸ mines in Karnataka, the bids vary widely from 36.70% to 129.90%, whereas they fluctuate between 44.35% and 154% in Odisha. Madhya Pradesh recorded the highest premium of 275%

²⁷ The National Steel Policy 2017 projects that the BF-BOF route is expected to contribute about 60–65% of the crude steel capacity of 300 MT by 2030, with the remaining 35–40% coming through the EAF/IF route.

²⁸ The Central Empowered Committee (CEC) of the Supreme Court in its Final Report dated 3 February 2012 in the matter of WP(Civil) No 562 of 2009 (*Samaj Parivartana Samudaya & Others Vs State of Karnataka & Ors*) had categorized 166 mining leases in Karnataka into A, B, and C as per the extent of illegalities committed by them. Category-A comprised 45 mining leases wherein marginal or no illegalities were found. Category-B comprised 70 mining leases (a) wherein illegal mining by way of (i) mining pits outside the sanctioned lease area have been found to be up to 10% of the lease area and/or (ii) overburden/waste dumps outside the sanctioned lease areas have been found to be up to 15% of the lease area; and (b) leases falling on interstate boundary between Karnataka and Andhra Pradesh and for which survey sketches have not been finalized. Category-C comprised 51 mining leases wherein (a) the illegal mining by way of (i) mining pits outside the sanctioned lease area have been found to be more than 10% of the lease area and/or (ii) overburden/waste dumps outside the sanctioned lease areas have been found to be more than 15% of the lease area; and/or (b) the leases were found to be involved in flagrant violation of the Forest (Conservation) Act and/or were found to be involved in illegal mining in other lease areas.

In its order dated 18 April 2013, the Supreme Court directed the Karnataka Government to (i) cancel/determine the 51 Category-C mining leases for their involvement in illegal mining; (ii) retain the entire sale proceeds of the existing stocks of the iron ores of these leases; and (iii) implement a Relief and Rehabilitation (R&R) Plan at the cost of the lessees. Further, the Supreme Court directed the Karnataka Government to reallocate/reassign these Category-C mining leases through a transparent process of bidding to the highest bidder(s) among the end users.

for its lone auction of iron ore block (refer to Table 2). On further analysis of the compiled data, it was found that 16 blocks in Odisha, 7 blocks in Karnataka, and 1 block in Madhya Pradesh attracted a premium of more than 100%. The all-India weighted-average premium for iron and manganese ore blocks comes to 101%, which leaves no margin to recover the cost of actual production, royalty and statutory levies to be paid, etc.

No business model can be sustainable if the total cost of production is more than the sale price. It is obvious that the present auction system has a bias that can trigger unsustainably high premiums, particularly in the case of iron ore. This is likely to impact the raw material cost for the end-use industry, leading to high prices for the consumer and reduced global competitiveness.

7. Creating a steady stream of auctionable deposits

India needs many kinds of minerals: Currently, the main minerals being mined in India are iron ore (for steel), bauxite (for aluminium), and limestone (for cement). India also produces copper, lead, and zinc, but it is deficient in a large number of other minerals including manganese, nickel, phosphates (for fertilizers), and the platinum group of elements.

New and emerging technologies have now created a demand for other metals such as the rare earths and technology and energy critical metals.²⁹ The 'Make in India' push is likely to intensify the demand. Indian geological conditions are favourable for the occurrence of many of these minerals, but we have failed to locate the deposits because of inadequate exploration (or in some cases, failure to develop processing technologies for their extraction from other mineral ores). Promoting and incentivizing exploration (through reconnaissance and prospecting) is the need of the hour.

Incentives for reconnaissance must be made attractive: The amendment to the MMDR Act in January 2015 replaced the earlier processes of granting (exclusive) Reconnaissance Permits on a first-come-first-served basis with a system of non-exclusive reconnaissance permits

(NERP) (Section 10C, MMDR Act). The Mineral (Non-Exclusive Reconnaissance Permit) Rules, 2015 issued under the Act specifies the procedures. Moreover, Section 10C of the MMDR Act, which provides for the grant of the Permit, states that an NERP holder shall have no right to make a claim for a prospecting licence or a mining lease on the basis of his reconnaissance. The intention is, the data generated in an NERP will be used to conduct further exploration by the government agencies so as to auction a mineral find for the grant of mining lease. The NERP Rules, 2015 also states in Rule 4(1) that the NERP holder can submit their data and ask the government to auction the find, presumably for a composite prospecting licence-cum-mining lease, with a right of first refusal.

In January 2020, a new proviso after Sub-section 2 of Section 10C of the MMDR Act has been incorporated to allow NERP holders of deep-seated minerals or any minerals of the national interest to apply for a composite licence (prospecting license-cum-mining lease; PL-cum-ML) or mining lease, and the concession shall be put to auction on that basis. However, the uncertainties inherent in an auction process make the incentives unattractive. Moreover, the eligibility conditions under the Mineral (Auction) Rules, 2015, which require a first-stage bidder (the entity incorporated in India) to have a net worth equal to 1% (in the case of a prospecting-stage bid) of the value of the estimated resources clearly rules out the 'Juniors' (small professional exploration companies specializing in exploration and funded by venture capital) in relation to even a moderate-sized mineral find. Since the Juniors are responsible for a significant portion of the global exploration activity and they work in conditions of high risk (in the expectation of reward in the form of mining rights they can sell to mining companies), it would seem that the NERP Rules are, in fact, unlikely to attract much interest, and the evidence so far shows that to be the case.

The new exploration policy depends too much on governmental effort: A National Mineral Exploration Policy (NMEP) was brought out by the government in 2016 to give further momentum to exploration efforts. The Policy purports to:

²⁹ See Glossary in the Appendix for more details

- Permit the engagement of private agencies to carry out exploration work in identified blocks/areas with the right to a certain share in the revenue (by way of a certain percentage of royalty/premium) accruing to the State Government throughout the lease period, with transferable rights. The Policy states that this percentage/amount will be paid by the successful bidder to the exploring agency concerned and will be determined when the mineral blocks on the basis of successful exploration are put on e-auction;
- Promote revenue sharing, which could be either in the form of a percentage of royalty/premium for the concession period (of 50 years) or a lump sum amount, to be calculated on the basis of the net present value of that share of royalty/premium to be accrued during the lease period. The Policy also indicates that these exploration agencies will be allowed to participate in the e-auction when mineral blocks after successful exploration are put on auction; and
- Move towards working out normative cost of exploration for different kinds of minerals so that the exploration agencies could be compensated, in case they do not discover any mineable reserves in their respective areas. This is seen to be an added incentive for exploration agencies to mitigate their risks.

The intention of the Policy is that the preliminary work will be done by public agencies (and their private nominees) so that the data gathered can be used to auction any mineral occurrences, and thus maximize the revenues. The NMEP in paragraph 15.1 states: *“State Governments have a key role to play in building up a steady stream of auctionable mineral prospects. They will have to take up mineral exploration reports prepared by the GSI or other agencies and build on them to complete G3 or G2 level of*

exploration. States also need to build up the exploration capabilities of their staff. The Central Government will have to provide suitable incentives to expedite this process. Capacity building of States will be supported by the NMET.”

However, the fact is that exploration is best driven by the profit motive. Public agencies and their private sector nominees can show expenditure by billing on the basis of ‘samples collected’, ‘geophysical surveys’, and ‘metres drilled’, but that will not in itself lead to the discovery of deposits hidden beneath the Earth’s surface.

Public exploration funds are probably inadequate and are being used more for general surveys: The amendments made to the MMDR Act in 2015 provide for the creation of the National Mineral Exploration Trust (NMET) under Section 9C of the Act. The Trust is funded by a 2% cess on the royalty and assuming an annual royalty flow of ₹ 20,000 to ₹ 30,000 crore (including coal royalty), the funds accruing to the Trust will be of the order of ₹ 600 crore per annum (or \$100 million per annum). While this is much higher than the current exploration spend level, which is in the region of ₹ 30 crore (\$5 million) a year, and mostly on coal exploration, this is clearly a drop in the ocean compared to the exploration expenditures in countries such as Australia and Canada (US\$ 900 million each per annum) and Latin America (US \$1200 million per annum). It would appear that the Trust can cover only a small fraction of the huge expenditure that is entailed in stepping up the pace of exploration.

Currently, the NMET funds appear to be used for geoscientific surveys³⁰ (rather than exploration), and for some exploration of surficial deposits (of bulk minerals like iron ore and coal deposits), as is evident from the following table.

³⁰ ‘Geoscientific survey’ is to be distinguished from mineral exploration. The Geological Survey of India has separate missions for the two activities. However, it seems that the two concepts are being conflated, and a sense of false security is created about the level of exploration. The Glossary in the Appendix explains the difference between the two concepts.

Summary of NMET Exploration Projects (August 2016 to September 2019)

| Commodity/Minerals | Number of Projects | Expenditure (in ₹ crore) | % of Total Expenditure |
|--|--------------------|--------------------------|------------------------|
| Bulk minerals | 131 | 220 | 25% |
| Base metals and associated metals/minerals | 28 | 82 | 9% |
| Coal minerals | 7 | 216 | 24% |
| Precious stones and metals | 6 | 13 | 1% |
| Fertilizer minerals | 2 | 13 | 1% |
| Aero-geophysical surveys and studies | 14 | 347 | 39% |
| Total | 188 | 891 | 100% |

As a result, exploration for deeper deposits is likely to come to a near halt. The pace of exploration is not enough even to meet the requirement for discovery of surficial deposits needed to produce the steel, aluminium, and cement, which are essential to sustain a double-digit gross domestic product growth rate and an ambition of becoming a \$5 trillion economy.

Exploration under NMET by public agencies is taking them away from their important core mandate:

The Trust funds are currently used to fund detailed exploration activities (of Central and State PSUs) as well as geoscientific survey activities of the GSI. In fact, as the following table shows, the NMET funds are substantially used by Central agencies rather than State agencies, primarily because of lack of capacity at the State level.

There is a danger that the Trust funds may take GSI away from quickly completing its primary work of baseline surveys in geology, geophysics, and geochemistry into the quicksand of detailed exploration for minerals. To use GSI for detailed exploration of surficial deposits would be a misuse of a premier agency of international repute.

The entire strategy for exploration may actually need to be analysed further from the point of view of ensuring on the one hand, that GSI's important work of baseline data collection is not disrupted, and on the other, that funds for exploration are spent productively.

8. Conclusion

'Make in India' requires reliable access to raw materials including mineral resources: Continuous exploration to locate new mineral deposits with regularity for accretion to our reserves/resources is vital to mineral resource security and our growth prospects. That is the best way of ensuring that input prices remain globally competitive, and that 'Make in India' is an aspiration to 'Make for the world' rather than being limited to 'Make for India'. Mineral concession systems *must* start by optimizing this end of the process.

Mining and recycling policies need to go hand-in-hand in the case of steel: The auction system may result in the slow demise of the MSME sponge iron industry, which today contributes more than 25% of crude steel

| Exploration Agencies | Number of NMET Projects | Estimated Expenditure (in ₹ crore) | Percentage |
|----------------------|-------------------------|------------------------------------|-------------|
| Central agencies* | 111 | 804 | 90% |
| State agencies# | 77 | 87 | 10% |
| Total | 188 | 891 | 100% |

* CMPDI, MECL, KIOCL, NTPC, NMDC, and GSI (GSI projects are mostly outsourced aero-geophysical surveys).

DMG of Odisha, Chattisgarh, Telangana, and Nagaland; and MPSMC, OMECL, TSMDC, and Andhra Pradesh's MERIT.

production through the secondary (DRI-IF/EA) route, and uses domestic non-coking coal rather than the imported coking coal utilized by the primary (integrated) steel producers. Effective steel scrap supply and steel recycling policies must be integrated with the changes in the mining policy to prevent supply disruptions going forward, particularly given the goal of producing 300 MT of steel by 2030.

Exploration is needed to secure a steady supply of minerals of various kinds: Though India has the potential (based on its geological evolution) for many types of minerals, so far, only the minerals near or on the Earth's surface (up to 300 m depth) have been located and mined. The GSI is conducting geophysical, geochemical, hyperspectral, and other surveys which can give clues to the existence of minerals deeper below the Earth's surface. To ensure a steady supply of all the minerals we need, there is an urgent need to make use of all the collected data to explore deeper below the Earth's surface. Finding the minerals we need is a matter of increasing our economic security and in the case of strategic minerals, improving our national security.

Exploration, particularly for deep-seated minerals, is a high-risk enterprise which needs a supporting ecosystem: Across the world, deep exploration (for non-bulk minerals) is driven by private venture capital³¹ and scarce public resources are mainly used to generate pre-competitive data in the form of geoscientific surveys (such as geological, geophysical, geochemical, hyperspectral, and geomorphological surveys) and maps. This pre-competitive data, available in the public domain, enable exploration agencies to reduce the risk of failure when deciding on areas to take up for deep exploration.

A sensible balance must be struck between GSI's survey activities and exploration so that GSI facilitates rather than supplants private exploration efforts:

Baseline data gathered by GSI in its surveys produce pre-competitive data of immense value for increasing our resource-cum-reserve base. This activity is of long-term multi-sectoral importance and GSI should not be diverted to doing exploration that the private sector can do more efficiently, and at its own cost. Around the world, the national geological surveys provide baseline data which enables the private sector to carry out exploration activities. *It is only in India that the private sector is being asked to do surveys (through NERP) to provide data to get public agencies such as GSI and MECL to do exploration to enable auction.*

Open up exploration for private investment; reserve only those areas that the government wants to keep out of the private sector purview:

To ensure that the government gets the best value for its known natural resources, the provision of 'reservation' of areas, already available in the MMDR Act, can be used to keep the areas out of the purview of the private sector that are sought to be taken up, say in the next 5–10 years for a detailed exploration with a view to auction, or allocation to the public sector. The remaining areas could be left open to exploration investment by the private sector with assured rights of mining as is the best international practice.

Allow NERP to proceed to PL and ML on a non-discretionary first-in-time basis, to incentivize the location of new mineral resources, and attract large-scale private investment for new mineral discoveries.³²

³¹ For instance, in Australia and Canada, Venture Capital Exchanges (such as the TSX Venture Exchange, Ontario) facilitate retail shares investment in 'high-risk' ventures of so-called 'Junior' specialized exploration companies. Returns on investments accrue through incomes from sale of exploration data (to other exploration companies or mining companies) in the event of promising mineral finds. Tax breaks are available to exploration companies for the purpose, including the innovative 'flow-through shares' scheme in Ontario and Quebec provinces in Canada. Flow-through shares are shares issued by a corporation (e.g., a Junior) to taxpayers pursuant to an agreement under which the issuing corporation agrees to incur exploration and development expenses in an amount up to the consideration paid by the taxpayer for the flow through shares. The exploration and development expenditures are 'renounced' by the corporation so that the taxpayer has the opportunity to deduct the expenses as if the taxpayer had directly incurred such expenditures. The advantage of the flow-through shares is that the investor can use the tax deduction to set off his other incomes. (Source PWC report – Corporate income taxes, mining royalties and other mining taxes.)

³² See Annexure 4 for the mineral concession grant principles being applied in various countries.

Introduction of Large Area Prospecting Licence (LAPL) is a way forward: LAPL can be introduced specifically for minerals other than iron ore, bauxite, limestone, etc. (bulk or surficial minerals, which can be explored using the NERP–PL–ML route) and for deep exploration, with the provision for a separate channel that allows the LAPL concessionaire to claim assured and direct mining rights (including transferability thereof). This will ensure that the private sector investments flow into exploration along with new and advanced technology to locate deep and concealed minerals vital for India's economic growth and development, and for the country's long-term mineral security.³³ 'Junior' exploration companies will definitely be incentivized by an LAPL type of concession instrument. The baseline surveys of GSI will be of utmost value here, by attracting exploration investments to the most potential locations.

Remove the artificial perception of resource scarcity for the health of the metal-making sector: The all-India weighted average auction premium comes to 101% for iron and manganese ore blocks, which leaves no margin to recover the cost of actual production, statutory levies to be paid, etc. No business model is sustainable in the long run if the total cost of production is more than the sale price. Iron ore is not a scarce commodity, but the segmentation of the market and the manner of management of the supply side is creating such a perception. Metal makers are paying highly unsustainable rates because of the perception of scarcity and for fear of stranded assets. In the long run, and even perhaps in the medium term in some weaker segments, such high auction premiums will result in serious sickness in the sector. It is therefore important to urgently conduct a supply-side reform for the all-round growth of the sector.

The distinction between 'captive' and 'non-captive' mining is creating a perception of scarcity, distorting the sector, and retarding its growth and potential: The distinction between 'captive' and 'non-captive' mining is distorting the sector by interfering with demand–supply and price signals. It is preventing the development of a healthy market for mineral ores, segmenting the market into the 'haves' and the 'have-nots' and creating an artificial perception of short-term scarcity in some segments. Widespread captive mining can retard the growth of the sector by disincentivizing greenfield capacity creation, since in the absence of an institutional mechanism for assurance of raw material (long-term supply agreement), investment in new metal-making capacity will not be forthcoming unless a new captive mine is granted. The lack of growth impulses in turn can reduce fresh investments in exploration.

All mines should be capable of producing for the market, for different grades and blends, and value-added products, so that low grades are also used and minor metals are recovered and there is optimum resource use efficiency. The 2017 amendment to the Auction Rules now allows 25% of captive production to be sold in the market. This is of significance mainly in the case of iron ore, and much will depend on whether this window is used by captive miners to get rid of unusable grades or take advantage of windfall situations or whether it is used (with the public sector in the forefront), to expand and stabilize the market and orient it towards the growth of the sector.

An open market for mineral ores will not only promote the exploration for minerals in potential demand, but also process R&D³⁴ for the extraction of some minerals not amenable to easy recovery or extraction of minor

³³ See **Mergers, acquisitions and capital raising in mining and metals — 2018 outlook (Ernst & Young):** 'With the buzz around new world critical minerals and battery technology, deals in lithium, copper, and cobalt are expected to feature high on the agenda of management teams across the industry... 'Strategies will also be influenced by geopolitical factors. President Trump's recent order to reduce reliance on imported critical minerals may spark activity by US miners to consider exploration assets both in and outside of North America, as well as upstream and downstream collaborative ventures. The desire to shift from higher to lower risk jurisdictions may also influence portfolio adjustment, particularly for precious metals. For lithium, investors in new assets are expected to prioritize South American and Australian assets, considered to be of lower political risk.'

³⁴ See Glossary in the Appendix for details.

metals, which sometimes occur in small percentages along with the main metal of interest. It will also promote use efficiency (e.g., mineral beneficiation to utilize low grades) and value addition (e.g. blending or intermediate products such as pellets in the case of iron ore) based on the market forces of supply and demand and price signals.

The auction system should be used for well-prospectured deposits only,³⁵ so that the uncertainty in the data is minimized, and the bidding process is a healthy win-win for all parties. Reducing the number of times a deposit has to be offered before it is successfully bid-out must be a strategic goal of the mineral auction system.

The policy of the public sector being allocated mines may continue, but the playing field should be levelled with respect to mineral pricing. The operative principle should be 'allocation' of a mine rather than grant of a captive resource. This will enable the public sector to sell surplus production or value-added products or non-usable grades in the open market without restriction.

The Mining by Government Companies Rules, 2015 provides for a kind of 'premium' to be levied on Government companies over and above the royalty (and other levies), with respect to the mines allocated from 2015 onwards, since Government companies are allocated mines without auction. The Central Government needs to notify a standard methodology for calculation of this premium, in a way that levels the playing field *vis-à-vis* the private sector. Several States have made the average auction percentage as a benchmark. Currently, the Rules provide that the amount shall be 'as notified by the Central Government in each case'. Another aspect of the levelling of the playing field is that, currently, the Rules provide that the premium will not apply to the public sector mines that were granted before 2015 (including extensions thereof). Since, after 2030, most private sector mines will have been auctioned, the premium should also be imposed on all the public sector mines operational in 2030.

Standard international practices of allowing extension and transferability of mineral concessions must be adopted for most efficient use of resources:

Mines (whether or not auctioned) should be allowed to be worked through extension after every 20 or 30 years till exhaustion of the economically mineable portion of the deposit. This will ensure stability of the tenure and enable the concessionaire to do long-term investment and mine planning and make the best use of the grades. Further, it will ensure final mine closure planning and execution in a credible, transparent, and accountable manner, which is not available in the current process. Alongside this principle, there needs to be the principle of 'full transferability' of a mine, in line with international practice, which encourages mergers and acquisitions so as to bring in a new technology to drive efficiency.

A more robust and transparent system for exploration data reporting must be adopted:

An internationally recognized mineral exploration results reporting system is an urgent necessity to make the auction process in India more reliable, credible, transparent, equitable, and investment friendly. The process would involve regular public reporting of exploration results, resource estimations, and valuations by 'Competent Persons', who will be independent third parties. The Indian Mineral Industry Code for reporting *Exploration Results, Mineral Resources and Reserves (IMIC)* developed by The National Committee for Reporting Exploration Results, Mineral Resources and Reserves in India (NACRI) needs to be urgently considered in this context, for adoption and enforcement.

The NMET must be used sparingly and with discretion,

only where there is a definite public interest, for example, technology metals and energy critical metals are likely as by-products. The process of deciding on investment priorities must flow from Para 11.2 of the NMEP which mandates IBM to periodically fix national priorities for exploration.

³⁵ See Annexure 5 for a World Bank expert view on the issue.

The time has come to create independent mining regulatory authorities and tribunals to address the complex and widespread nature of regulatory and governance deficit generally prevalent in the mining sector.³⁶ This can restore investor confidence and ensure that the primary regulatory mechanisms for exploration (as well as mining plans and closure plans) operate transparently and reliably in accordance with the internationally recognized technical standards. It must be recognized that it is regulatory deficit (particularly at the State level), in ensuring that the concessionaire conducts exploration and mining operations in accordance with the law and conditions of his concessions, that is primarily responsible for the perception that the sector is prone to illegality, windfall profits, and less-than-fair treatment of host populations. This has, in turn, conditioned the system to respond with processes (such as auctions) and procedures that do not necessarily promote resource efficiency, environmental sustainability, and social responsibility, but certainty serve to monetize these defects in the form of additional revenue to the State treasury.

9. A final word

There is a widespread perception that the auction system was introduced to make the allocation system more 'discretion-free', and also because this process was mandated by the Supreme Court. The Supreme Court did mandate the auction of certain iron ore mines in Karnataka that were found to be indulging in illegal practices, but it also categorically stated that this cannot be the rule in every case.

Specifically, on the larger question of the normative process for allocation, the Supreme Court in its Opinion dated 27 September 2012 on a Reference by the President of India (Special Reference No.1 of 2012 under Article 143(1) of the Constitution of India) has clarified that auction is not the only way of discharging a public trust while alienating natural resources, and stated that:

"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... besides legal logic, mandatory auction may be contrary to economic logic as well. Different resources may require different treatment. Very often, exploration and exploitation contracts are bundled together due to the requirement of heavy capital in the discovery of natural resources. A concern would risk undertaking such exploration and incur heavy costs only if it was assured utilization of the resource discovered; a prudent business venture, would not like to incur the high costs involved in exploration activities and then compete for that resource in an open auction."

It is time to strike an optimal balance between revenue generation from known mineral resources and discovery of new mineral deposits, both to fuel the engine of growth (and 'Make in India') and improve the sustainability of revenues for the longer term. Additionally, a balance must be achieved between mining and the sustainable socio-economic development of local populations. The concept of 'transparency' and 'discretion-free' decision-making must be applied in a manner that supports this balance.

³⁶ Gap analysis of existing governance needs to consider all the main stages of the life cycle of minerals and metals and of the related materials flows, including: mineral exploration and mine planning, mining, ore processing, metallurgy/refining, manufacturing, the use phase, and end of life, with a view to moving from a linear towards a more circular life cycle. Mine closure and post closure developments also need to be planned for from the beginning (UNEP: IRP 2019).

Table 1 State-wise Summary of Auction of Mineral Blocks (As on 31 December 2019)

| Minerals/ States | Iron and Manganese Ores | | Bauxite | | Limestone, etc. | | Graphite | | Chromite | | Copper Tungsten | | Gold and Diamond | | Total | |
|-----------------------------------|-------------------------------|----|--------------|----|--------------------|----------|--------------|----|-------------|----|--------------------|----------|---------------------|----------|--------------|-----|
| | N | I | N | I | N | I | N | I | N | I | N | I | N | I | N | I |
| Andhra Pradesh | 0 | 0 | 0 | 0 | 16 (04) | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 01 (01) | 01 | 17 (05) | 12 |
| Chhattisgarh | 0 | 0 | 0 | 0 | 08 (04) | 08 | 0 | 0 | 0 | 0 | 0 | 0 | 01 (01) | 01 | 09 (05) | 09 |
| Gujarat | 0 | 0 | 0 | 0 | 14 05 (03) | 07 05 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19 (03) | 12 |
| Jharkhand | 01 (01) | 01 | 02 | 02 | 04 (02) | 04 | 04 (02) | 03 | 0 | 0 | 0 | 0 | 06 (02) | 02 | 17 (07) | 12 |
| Karnataka | 38 (18) | 26 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 38 (18) | 26 |
| Madhya Pradesh | 01 (01) | 01 | 02 | 02 | 16 (03) | 08 | 02 (02) | 02 | 0 | 0 | 03 | 03 | 02 03 (02) | 02 02 | 30 (08) | 20 |
| Maharashtra | 10 (03) | 04 | 17 (06) | 07 | 11 (02) | 04 | 0 | 0 | 0 | 0 | 06 (02) 03 | 02 02 | 0 | 0 | 47 (13) | 19 |
| Odisha | 26 (23)* | 26 | 0 | 0 | 14 (02) | 06 | 02 (01) | 02 | 02 (02) | 02 | 0 | 0 | 0 | 0 | 44 (28) | 36 |
| Rajasthan | 0 | 0 | 0 | 0 | 43 (08) | 22 | 0 | 0 | 0 | 0 | 04 | 03 | 0 | 0 | 47 (08) | 25 |
| All India | 76 (46) | 58 | 21 (06) | 11 | 131 (28) | 75 | 08 (05) | 07 | 02 (02) | 02 | 16 (02) | 10 | 13 (06) | 08 | 267 (95) | 171 |
| Success rate : (s)/I % | 79.3% | | 54.5% | | 37.3% | | 71.4% | | 100% | | 20% | | 75% | | 55.5% | |

(s) – Figure in parenthesis denotes the number of successful auction blocks; I – Actual number of mineral blocks; N – Number of mineral blocks as per NIT up to 31 December 2019

*Number of successful auction blocks partly based on media reports

Table 2 Phase-wise Auction of Mineral Blocks: Iron and Manganese Ores (As on 31 December 2019)

| State | 1st Attempt | | 2nd Attempt | | 3rd Attempt | | 4th Attempt | | Total | | Bid Range (%) | | |
|----------------------------------|-------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|------------|-----------|---------------|--------|----------|
| | Offered | Auctioned | Offered | Auctioned | Offered | Auctioned | Offered | Auctioned | Offered | Auctioned | Min | Max | Average® |
| Andhra Pradesh | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | NA | NA | NA |
| Chhattisgarh | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | NA | NA | NA |
| Gujarat | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | NA | NA | NA |
| Jharkhand | 01 | 01 | 00 | 00 | 00 | 00 | 00 | 00 | 01 | 01 | 89.00 | 89.00 | 89.00 |
| Karnataka | 26 | 15 | 06 | 01 | 03 | 00 | 03 | 02 | 38 | 18 | 36.70 | 129.90 | 93.00 |
| Madhya Pradesh | 01 | 01 | 00 | 00 | 00 | 00 | 00 | 00 | 01 | 01 | 275.00 | 275.00 | 275.00 |
| Maharashtra | 04 | 00 | 04 | 01 | 02 | 02 | 00 | 00 | 10 | 03 | 55.60 | 92.10 | 83.00 |
| Odisha | 26* | 23# | 00 | 00 | 00 | 00 | 00 | 00 | 26 | 23 | 44.35 | 154.00 | 102.00 |
| Rajasthan | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | NA | NA | NA |
| All India | 58** | 40 | 10 | 02 | 05 | 02 | 03 | 02 | 76 | 46 | 36.70 | 275.00 | 101.00 |
| Attempt-wise Success Rate | 69% | | 20% | | 40% | | 66% | | 60% | | | | |

NA – Not applicable

*Auction of three iron ore blocks was deferred due to legal issues

**Iron ores – 45 blocks; Iron and Mn–8 blocks; and Mn–5 blocks

#Partly based on media reports

®Average bids are weighted averages based on the mine-level bid and the resource estimation for the mine

Table 3 Phase-wise Auction of Mineral Blocks: Limestone (As on 31 December 2019)

| State | 1st Attempt | | 2nd Attempt | | 3rd Attempt | | 4th Attempt | | Total | | Bid Range (%) | | |
|----------------------------------|-------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|------------|-----------|---------------|--------|-----------|
| | Offered | Auctioned | Offered | Auctioned | Offered | Auctioned | Offered | Auctioned | Offered | Auctioned | Min | Max | Average @ |
| Andhra Pradesh | 11 | 03 | 05 | 01 | 00 | 00 | 00 | 00 | 16 | 04 | 10.60 | 81.12 | 27 |
| Chhattisgarh | 08 | 04 | 00 | 00 | 00 | 00 | 00 | 00 | 08 | 04 | 10.15 | 138.25 | 85 |
| Gujarat | 12 | 00 | 05 | 03 | 01 | 00 | 01 | 00 | 19 | 03 | 20 | 35 | 27 |
| Jharkhand | 04 | 02 | 00 | 00 | 00 | 00 | 00 | 00 | 04 | 02 | 12 | 12 | 12 |
| Karnataka | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | NA | NA | NA |
| Madhya Pradesh | 08 | 03 | 04 | 00 | 03 | 00 | 01 | 00 | 16 | 03 | 21.05 | 77.10 | 73 |
| Maharashtra | 04 | 00 | 04 | 00 | 03 | 02 | 00 | 00 | 11 | 02 | 5.2 | 125.05 | 64 |
| Odisha | 06 | 01 | 03 | 01 | 02 | 00 | 01 | 00 | 14 | 02 | 12.05 | 25.60 | 13 |
| | | | | | | | 01(5th) | 00 | | | | | |
| | | | | | | | 01(6th) | 00 | | | | | |
| Rajasthan | 22 | 02 | 16 | 04 | 03 | 01 | 02 | 01 | 43 | 08 | 10.40 | 67.94 | 43 |
| All India | 75 | 17 | 37 | 09 | 12 | 03 | 05 | 01 | 131 | 28 | 5.2 | 138.25 | 46 |
| | | | | | | | 01(5th) | 00 | | | | | |
| | | | | | | | 01(6th) | 00 | | | | | |
| Attempt-wise Success Rate | 23% | | 24% | | 25% | | 20% | | 21% | | | | |

@ Average bids are weighted averages based on the mine-level bid and the resource estimation for the mine

Table 4 Phase-wise Auction of Mineral Blocks: Gold and Diamond (As on 31 December 2019)

| State | 1st Attempt | | 2nd Attempt | | 3rd Attempt | | 4th Attempt | | Total | | Bid Range (%) | | |
|----------------------------------|-------------|---------------|-------------|----------------|-------------|-----------|-------------|------------|---------------|-----------|---------------|----------|----------------------|
| | Offered | Auctioned | Offered | Auctioned | Offered | Auctioned | Offered | Auctioned | Offered | Auctioned | Min | Max | Average [®] |
| Andhra Pradesh | 01 | 01 | 00 | 00 | 00 | 00 | 00 | 00 | 01 | 01 | 38.25 | 38.25 | 38 |
| Chhattisgarh | 01 | 01 | 00 | 00 | 00 | 00 | 00 | 00 | 01 | 01 | 12.55 | 12.55 | 13 |
| Gujarat | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | NA | NA | NA |
| Jharkhand | 02 | 00 | 02 | 00 | 02 | 02 | 00 | 00 | 06 | 02 | 17 | 28.10 | 18 |
| Karnataka | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | NA | NA | NA |
| Madhya Pradesh | 02 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 02 | 00 | 22.31(D) | 30.05(D) | 30(D) |
| | 02(D) | 01 | 01(D) | 01(D) | | | | | 03(D) | 02(D) | | | |
| Maharashtra | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | NA | NA | NA |
| Odisha | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| Rajasthan | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| All India | 06 | 02 | 02 | 00 | 02 | 02 | 00 | 00 | 10 | 04 | 12.55 | 38.25 | 18 |
| | 02(D) | 01(D) | 01(D) | 01(D) | | | | | 03(D) | 02(D) | 22.31(D) | 30.05(D) | 30(D) |
| Attempt-wise Success Rate | 33% | 50%(D) | 0 | 100%(D) | 100% | 0 | 0 | 40% | 67%(D) | | | | |

D – Diamond; NA – Not Applicable

[®]Average bids are weighted averages based on the mine-level bid and the resource estimation for the mine

Table 5 Phase-wise Auction of Mineral Blocks: Others (Bauxite, Graphite, Chromite, Copper, and Tungsten) (As on 31 December 2019)

| State | 1st Attempt | | 2nd Attempt | | 3rd Attempt | | 4th Attempt | | Total | | | Bid Range (%) | | | |
|----------------------------------|---|---|---|---|---|---|---|---|---|---|--|--|---|--|--|
| | Offered | Auctioned | Offered | Auctioned | Offered | Auctioned | Offered | Auctioned | Offered | Auctioned | Min | Max | Average @ | | |
| Andhra Pradesh | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | NA | NA | NA | | |
| Chhattisgarh | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | NA | NA | NA | | |
| Gujarat | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | NA | NA | NA | | |
| Jharkhand | 02(Bx) 03(Gr) | 00(Bx) 01(Gr) | 01(Gr) | 01(Gr) | 00 | 00 | 00 | 00 | 02(Bx) 04(Gr) | 00(Bx) 02(Gr) | 75(Gr) | 149.20(Gr) | 126(Gr) | | |
| Karnataka | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | NA | NA | NA | | |
| Madhya Pradesh | 02(Bx) 02(Gr) 03(Cu) | 00(Bx) 02(Gr) 00(Cu) | 00 | 00 | 00 | 00 | 00 | 00 | 02(Bx) 02(Gr) 03(Cu) | 00(Bx) 02(Gr) 00(Cu) | 97.55(Gr) | 200.05(Gr) | 156(Gr) | | |
| Maharashtra | 07(Bx) 02(Cu) 02(W) | 01(Bx) 00(Cu) 00(W) | 05(Bx) 02(Cu) 01(W) | 02(Bx) 01(Cu) 00(W) | 03(Bx) 01(Cu) 00(W) | 01(Bx) 00(Cu) 00(W) | 02(Bx) 01(Cu) 00(W) | 02(Bx) 01(Cu) 00(W) | 17(Bx) 06(Cu) 03(W) | 06(Bx) 02(Cu) 00(W) | 25.10(Bx) 2.10(Cu) NA(W) | 115.20(Bx) 3.60(Cu) NA(W) | 51(Bx) 3(Cu) NA(W) | | |
| Odisha | 02(Gr) 02(Cr) | 01(Gr) 02(Cr) | 00 | 00 | 00 | 00 | 00 | 00 | 02(Gr) 02(Cr) | 01(Gr) 02(Cr) | 63.55(Gr) 88.50(Cr) | 63.55(Gr) 96.80(Cr) | 64(Gr) 90(Cr) | | |
| Rajasthan | 03(Cu) | 00(Cu) | 01(Cu) | 00(Cu) | 00 | 00 | 00 | 00 | 04(Cu) | 00(Cu) | NA | NA | NA | | |
| All India | 11(Bx) 07(Gr) 02(Cr) 08(Cu) 02(W) | 01(Bx) 04(Gr) 02(Gr) 00(Cu) 00(W) | 05(Bx) 01(Gr) 00(Gr) 03(Cu) 01(W) | 02(Bx) 01(Gr) 00(Gr) 01(Cu) 00(W) | 03(Bx) 00(Gr) 00(Gr) 01(Cu) 00(W) | 01(Bx) 00(Gr) 00(Gr) 00(Cu) 00(W) | 02(Bx) 00(Gr) 00(Gr) 01(Cu) 00(W) | 02(Bx) 00(Gr) 00(Gr) 01(Cu) 00(W) | 21(Bx) 08(Gr) 02(Gr) 13(Cu) 03(W) | 06(Bx) 05(Gr) 02(Gr) 02(Cu) 00(W) | 25.10(Bx) 63.55(Gr) 88.50(Cr) 2.10(Cu) NA(W) | 115.20(Bx) 200.05(Gr) 96.80(Cr) 3.60(Cu) NA(W) | 51(Bx) 145(Gr) 90(Gr) 3(Cu) NA(W) | | |
| Total | 30 | 07 | 10 | 04 | 04 | 01 | 03 | 03 | 47 | 15 | | | | | |
| Attempt-wise Success Rate | 23% | | | 40% | | | 25% | | | 100% | | | 32% | | |

Bx – Bauxite; Cr – Chromite; Cu – Copper; Gr – Graphite; NA – Not Applicable; W – Tungsten (Wolfram)
 @ Average bids are weighted averages based on the mine-level bid and the resource estimation for the mine

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Department of Steel & Mines, Odisha

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Directorate of Geology and Mining, Maharashtra

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Department of Mines & Geology, Jharkhand

Details available at <http://jharkhandminerals.gov.in/>

Department of Mines & Geology, Rajasthan

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Indian Bureau of Mines

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Mineral Resources Department, Chhattisgarh

Details available at <http://chhattisgarhmines.gov.in>

Mineral Resources Department, Madhya Pradesh

Details available at <https://ekhanij.mp.gov.in/AppPrevious/HomePage.aspx>

Ministry of Mines

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MSTC

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ANNEXURE 1

Extracts from MMDR Act and Rules Thereunder Mines and Minerals (Development and Regulation) Act 1957

(as amended in 2015, 2016 and 2020)

Maximum area for which a prospecting licence or mining lease may be granted.

6. (1) No person shall acquire in respect of any mineral or prescribed group of associated minerals in a State

(a) one or more prospecting licences covering a total area of more than twenty-five square kilometres; or

(aa) one or more reconnaissance permit covering a total area of ten thousand square kilometres: Provided that the area granted under a single reconnaissance permit shall not exceed five thousand square kilometres; or

(b) one or more mining leases covering a total area of more than ten square kilometres; Provided that if the Central Government is of the opinion that in the interest of the development of any mineral or industry, it is necessary so to do, it may, for reasons to be recorded in writing, increase the aforesaid area limits in respect of prospecting licence or mining lease, in so far as it pertains to any particular mineral, or to any specified category of deposits of such mineral, or to any particular mineral located in any particular area;

Periods of grant of a mining lease for minerals other than coal, lignite and atomic minerals

8A. (1) The provisions of this section shall apply to minerals other than those specified in Part A and Part B of the First Schedule.

(2) On and from the date of the commencement of the Mines and Minerals (Development and Regulation) Amendment Act, 2015, all mining leases shall be granted for the period of fifty years.

(3) All mining leases granted before the commencement of the Mines and Minerals (Development and Regulation) Amendment Act, 2015 shall be deemed to have been granted for a period of fifty years.

(4) On the expiry of the lease period, the lease shall be put up for auction as per the procedure specified in this Act.³⁷

(5) Notwithstanding anything contained in sub-sections (2), (3) and sub-section (4), the period of lease granted before the date of commencement of the Mines and Minerals (Development and Regulation) Amendment Act, 2015, where mineral is used for captive purpose, shall be extended and be deemed to have been extended up to a period ending on 31st March, 2030 with effect from the date of expiry of the period of renewal last made or till the completion of renewal period, if any, or a period of fifty years from the date of grant of such lease, whichever is later, subject to the condition that all the terms and conditions of the lease have been complied with

(6) Notwithstanding anything contained in sub-sections (2), (3) and sub-section (4), the period of lease granted before the date of commencement of the Mines and Minerals (Development and Regulation) Amendment Act, 2015, where mineral is used for other than captive purpose, shall be extended and be deemed to have been extended up to a period ending on 31st March, 2020 with effect from the date of expiry of the period of renewal last made or till the completion of renewal period, if any, or a period of fifty years from the date of grant of such lease, whichever is later, subject to the condition that all the terms and conditions of the lease have been complied with.

³⁷ By an Ordinance in 2020, a proviso was inserted empowering the State Government to take advance action for auction of the mining lease before expiry of the lease period.

(7) Any holder of a lease granted, where mineral is used for captive purpose, shall have the right of first refusal at the time of auction held for such lease after the expiry of the lease period.

(8) Notwithstanding anything contained in this section, the period of mining leases, including existing mining leases, of Government companies or corporations shall be such as may be prescribed by the Central Government

National Mineral Exploration Trust

9C. (1) The Central Government shall, by notification, establish a Trust, as a non-profit body, to be called the National Mineral Exploration Trust.

(2) The object of the Trust shall be to use the funds accrued to the Trust for the purposes of regional and detailed exploration in such manner as may be prescribed by the Central Government.

(3) The composition and functions of the Trust shall be such as may be prescribed by the Central Government.

(4) The holder of a mining lease or a prospecting licence-cum-mining lease shall pay to the Trust, a sum equivalent to two per cent of the royalty paid in terms of the Second Schedule, in such manner as may be prescribed by the Central Government.

Grant of Mining Lease in respect of Notified Minerals through Auction.

10B. (1) The provisions of this section shall not be applicable to cases covered by section 10A or section 17A or to minerals specified in Part A or Part B of the First Schedule³⁸ or to land in respect of which the minerals do not vest in the Government.

(2) Where there is inadequate evidence to show the existence of mineral contents of any notified mineral in respect of any area, a State Government may, after obtaining the previous approval of the Central Government, grant a prospecting licence-cum-mining lease for the said notified mineral in such area in accordance with the procedure laid down in section 11.

(3) In areas where the existence of mineral contents of any notified mineral is established in the manner prescribed by the Central Government, the State Government shall notify such areas for grant of mining leases for such notified mineral, the terms and conditions subject to which such mining leases shall be granted, and any other relevant conditions, in such manner as may be prescribed by the Central Government.

(4) For the purpose of granting a mining lease in respect of any notified mineral in such notified area, the State Government shall select, through auction by a method of competitive bidding, including e-auction, an applicant who fulfils the eligibility conditions as specified in this Act.

(5) The Central Government shall prescribe the terms and conditions, and procedure, subject to which the auction shall be conducted, including the bidding parameters for the selection, which may include a share in the production of the mineral, or any payment linked to the royalty payable, or any other relevant parameter, or any combination or modification of them.

³⁸ "Part A" minerals are Coal and Lignite. "Part B" minerals are the so-called Atomic minerals. Other metallic and non-metallic minerals, namely asbestos, bauxite, limestone, iron ore, manganese, chrome ore, copper, gold, lead, zinc and precious stones (including diamond) are included in "Part C" of the First Schedule.

(6) Without prejudice to the generality of sub-section (5), the Central Government shall, if it is of the opinion that it is necessary and expedient to do so, prescribe terms and conditions, procedure and bidding parameters in respect of categories of minerals, size and area of mineral deposits and a State or States, subject to which the auction shall be conducted: Provided that the terms and conditions may include the reservation of any particular mine or mines for a particular end use³⁹ and subject to such condition which allow only such eligible end users to participate in the auction.

(7) The State Government shall grant a mining lease to an applicant selected in accordance with the procedure laid down in this section in respect of such notified mineral in any notified area.

Grant of Non-Exclusive Reconnaissance Permits

10C. (1) Non-exclusive reconnaissance permits may be granted in respect of any notified mineral or non-notified mineral or a group of specified minerals, other than minerals specified in Part A or Part B of the First Schedule, subject to such terms and conditions as may be prescribed by the Central Government.

(2) The holder of such non-exclusive reconnaissance permit shall not be entitled to make any claim for the grant of any prospecting licence-cum-mining lease or a mining lease.⁴⁰

Grant of Prospecting Licence-cum-mining lease through Auction in respect of minerals other than notified minerals

11. (1) The provisions of this section shall not be applicable to cases covered by section 10A or section 17A or to minerals specified in Part A or Part B of the First Schedule or to land in respect of which minerals do not vest in the Government.

(2) In areas where there is evidence to show the existence of mineral contents as required by clause (a) of sub-section (2) of section 5, the State Government shall grant a mining lease for minerals other than notified minerals following the procedure laid down in section 10B.

(3) In areas where there is inadequate evidence to show the existence of mineral contents as required under clause (a) of sub-section (2) of section 5, the State Government shall grant a prospecting licence-cum-mining lease for minerals other than notified minerals in accordance with the procedure laid down in this section.

(4) The State Government shall notify the areas in which prospecting licence-cum-mining leases shall be granted for any minerals other than notified minerals, the terms and conditions subject to which such prospecting licence-cum-mining leases shall be granted, and any other relevant conditions, in such manner as may be prescribed by the Central Government.

(5) For the purpose of granting prospecting licence-cum-mining leases, the State Government shall select, through auction by method of competitive bidding, including e-auction, an applicant who fulfils the eligibility conditions as specified in this Act.

(6) The Central Government shall prescribe the terms and conditions, and procedure, subject to which the auction shall be conducted, including the bidding parameters for the selection, which may include a share in the production of the mineral, or any payment linked to the royalty payable, or any other relevant parameter, or any combination or modification of them.

³⁹ Read along with Rule 6(3) and (4) of the Mineral (Auction) Rules, this provides for auction for , inter-alia, "captive" mining by Alumina producers, Integrated Steel Plants and Cement manufacturers etc.

⁴⁰ By the Ordinance of 2020, the holder of an NERP was allowed to submit an application for grant of PL-cum-ML or ML as per procedure of Section 11 or Section 10B of the Act.

(7) Without prejudice to the generality of sub-section (6), the Central Government shall, if it is of the opinion that it is necessary and expedient to do so, prescribe terms and conditions, procedure and bidding parameters in respect of categories of minerals, size and area of mineral deposits and a State or States, subject to which the auction shall be conducted.

(8) The State Government shall grant a prospecting licence-cum-mining lease to an applicant selected in accordance with the procedure laid down in this section.

(9) The holder of a prospecting licence-cum-mining lease shall be required to complete, within the period laid down in section 7, the prospecting operations satisfactorily as specified in the notice inviting applications.

(10) A holder of a prospecting licence-cum-mining lease, who completes the prospecting operation as laid down in sub-section (9) and establishes the existence of mineral contents in the area in conformity with such parameters as may be prescribed for this purpose by the Central Government, shall be required to apply for a mining lease for such area and shall have the right to get the mining lease and thereafter undertake mining operations in accordance with the provisions of this Act.

Minerals (Evidence of Mineral Contents) Rules, 2015.

5. Existence of mineral contents for auction of mining lease under sub-section (3) of section 10B and sub-section (2) of section 11 of the Act. - An area shall be considered to be having existence of mineral contents under sub-section (3) of section 10B or sub-section (2) of section 11 of the Act, if, in respect of such area, - (a) at least General Exploration (G2) has been completed to establish Indicated Mineral Resource (332); and (b) a geological study report has been prepared conforming to Part IV of the Schedule.

6. Grant of a mining lease through auction in respect of mining leases after expiry of the mining lease period and of leases which have been surrendered, determined or lapsed. - Before notifying any area for grant of mining lease through auction, in respect of - (a) mining lease after expiry of the lease period; and (b) mining lease which has been surrendered, determined or lapsed, a detailed reassessment of resources, in the area proposed to be auctioned shall be carried out in accordance with rule 5.

7. Existence of mineral contents for grant of composite licence. - (1) An area may be notified for auction to grant a composite licence under sub-section (2) of section 10B or sub-section (3) of section 11 of the Act, if, in respect of such area, - (a) Preliminary Exploration (G3) has been completed to establish Inferred Mineral Resource (333); and (b) a geological study report has been prepared conforming to Part-IVA and Part IV-B of the Schedule.

(2) An area shall be considered to be having existence of mineral contents under sub-section (10) of section 11 of the Act, if, in respect of such area, - (a) at least General Exploration (G2) has been completed to establish Indicated Mineral Resource (332); and (b) at least a Pre-Feasibility Study (F2) report has been prepared to establish Probable Mineral Reserve (121 and 122) conforming to Part V of the Schedule, to plan mining operation for a period of five years from the date of commencement of mining lease and such report has been submitted to the State Government.

8. Relaxation. - Depending upon the local geological setup, mode of occurrence and nature of mineralisation, the State Government may, with the previous approval of the Central Government, relax the exploration norms as specified in Part III of the Schedule, in whole or in part for any mineral or any area.

Mineral (Auction) Rules, 2015.

2. Definitions: (1) In these rules, unless the context otherwise requires, -

(a) xxx

(l) xxx

(m) “value of estimated resources” means an amount equal to the product of -

(i) the estimated quantity of mineral resources for which the mineral block is being auctioned, expressed in metric tonne; and

[(ii) the average price per metric tonne of such mineral as published by Indian Bureau of Mines for the relevant State for a period of twelve months immediately preceding the month of computation of the Value of Estimated Resources:

Provided that if for any mineral or mineral grade, the average sale price in respect of the relevant State for any month is not published by Indian Bureau of Mines, the all India average sale price published by Indian Bureau of Mines for such mineral or mineral grade for that month shall be used]⁴¹;

(n) “value of mineral despatched” shall have the meaning specified in sub-rule (2) of rule 8.

3. xxx

4. xxx

5. Prerequisites for auction of Mining Lease.- (1) The State Government may initiate an auction process for grant of a mining lease with respect to an area within the State if the mineral contents in such area has been established in accordance with the provisions of the Minerals (Evidence of Mineral Contents) Rules, 2015.

(2) The State Government shall, prior to issuance of the notice inviting tender with respect to mineral auction, identify and demarcate the area where a mining lease is proposed to be granted through auction by using total station and differential global positioning system and the area so demarcated shall be classified into forests land, land owned by the State Government and land not owned by the State Government.

(3) The extent of area so demarcated shall include area required for all the activities falling under the definition of ‘mine’ as defined in clause (j) of sub-section (1) of section 2 of the Mines Act 1952 (35 of 1952).

6. Eligibility for Mining Lease.- (1) For the purpose of participating in the auction of mining lease, an applicant shall meet the requirements as specified in section 5 and the terms and conditions of eligibility as specified in Schedule I.

(2) The State Government may having regard to article 244 and the Fifth Schedule and Sixth Schedule to the Constitution, the provisions of the Panchayats (Extension to the Scheduled Areas) Act, 1996 (40 of 1996); and the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (2 of 2007), make such amendments to Schedule I as it may deem necessary.

(3) The powers of Central Government under the proviso to sub-section (6) of section 10B shall be exercised by the State Government for reservation of particular mine or mines for any particular end use including the end use as specified in Schedule II⁴² and the State Government may earmark certain percentage of mines for end use.

⁴¹ As amended in 2017

⁴² Schedule II to the Rules gives an Indicative List of end-uses , namely: i) For Bauxite: Alumina Refinery; ii) For Iron ore: Integrated steel plants; and iii) For Limestone: Cement Plant. Sub-rule(4) essentially provides for “captive” mining for these minerals , in case an end use is specified.

(4) Where the State Government reserves a mine or mines for any particular specified end use, the minerals extracted under the mining lease shall, - (i) be utilised solely for the specified end use; and (ii) not be sold or transferred or otherwise disposed of, either directly or indirectly.

[Provided that quantity of mineral equivalent to twenty five per cent. of total mineral excavated in the previous financial year, for which end use was specified can be sold in the current financial year.]⁴³

(5) The eligibility for participating in the auction shall be determined as per the terms and conditions of eligibility for participating in the auction and the Successful Bidder shall be decided solely on the basis of financial bids submitted by the eligible bidders.

7. Electronic Auction.- (1) An auction shall be conducted only through an online electronic auction platform.

(2) The State Government may utilise any online electronic auction platform which meets the minimum technical and security requirements as specified in the Guidelines for compliance to Quality requirements of eProcurement Systems issued by the Standardisation Testing and Quality Certification Directorate, Department of Information Technology, Ministry of Communications and Information Technology, Government of India.

8. Bidding parameters.- (1) The State Government shall specify in the tender document the minimum percentage of the value of mineral despatched, which shall be known as the “reserve price”.

(2) The value of mineral despatched shall be an amount equal to the product of,- (i) mineral despatched in a month; and (ii) sale price of the mineral (grade-wise and State-wise) as published by Indian Bureau of Mines for such month of despatch.

(3) The bidders shall quote, as per the bidding parameter, for the purpose of payment to the State Government, a percentage of value of mineral despatched equal to or above the reserve price and the successful bidder shall pay to the State Government, an amount equal to the product of,- (i) percentage so quoted; and (ii) value of mineral despatched.

(4) Where an area is being auctioned for more than one mineral, the percentage of value of mineral despatched as quoted by the successful bidder under sub-rule (3) shall be applicable for the purpose of payment to the State Government in respect of each such mineral.

(5) If subsequent to grant of a mining lease, one or more new minerals are discovered, the percentage of value of mineral despatched as quoted by the successful bidder under sub-rule (3) shall be applicable for the purpose of payment to the State Government in respect of each such mineral.

9. Bidding Process.- (1) Subject to the provisions of rule 5, the State Government shall issue a notice inviting tender, including on their website, to commence the auction process and such notice shall contain brief particulars regarding the area under auction, including,- (a) particulars of the area identified and demarcated using total station and differential global positioning system divided into forest land, land owned by the State Government, and land not owned by the State Government; and (b) estimated mineral resources and brief particulars regarding evidence of mineral contents with respect to all minerals discovered in the area during exploration in accordance with the provisions of the Minerals (Evidence of Mineral Contents) Rules, 2015.

(2) The tender document issued by the State Government shall contain,- (a) geological report pursuant to the Minerals (Evidence of Mineral Contents) Rules, 2015 specifying particulars and estimated quantities of all minerals discovered

⁴³ As amended in 2017

in the area; and (b) revenue survey details of the area identified and demarcated using total station and differential global positioning system divided into forest land, land owned by the State Government, and land not owned by the State Government.

(3) The bidders shall be provided a fixed period, as notified by the State Government, to study the tender document and such reports and the bidding process shall commence only on expiry of such period.

[(4) The auction shall be an ascending forward online electronic auction and shall comprise of attempts of auction with each attempt of auction consisting of a first round of auction and a second round of auction.

(5) In the first round of auction, the bidders shall submit, –

(A) a technical bid comprising amongst others, documentary evidence to confirm eligibility as per the provisions of the Act and the rules made thereunder to participate in the auction, bid security and such other documents and payments as may be specified in the tender document; and

(B) an initial price offer which shall be a percentage of value of mineral despatched.

(6) Only those bidders who are found to be eligible in accordance with the terms and conditions of eligibility specified in rule 6 and whose initial price offer is equal to or greater than the reserve price, referred to as “technically qualified bidders”, shall be considered for the second round of auction.

(7) The highest initial price offer amongst the technically qualified bidders shall be the floor price for the second round of online electronic auction.

(8) The technically qualified bidders shall be ranked on the basis of the descending initial price offer submitted by them and the technically qualified bidders holding the first fifty per cent. of the ranks (with any fraction rounded off to higher integer) or the top five technically qualified bidders, whichever is higher, shall qualify as qualified bidders for participating in the second round of electronic auction:

Provided that if the number of technically qualified bidders is between three and five, then all the technically qualified bidders shall be considered as qualified bidders:

Provided further that in the event of identical initial price offers being submitted by two or more technically qualified bidders, all such technically qualified bidders shall be assigned the same rank for the purposes of determination of qualified bidders and in such case, the aforementioned fifty per cent. shall stand enhanced to the extent of tie occurring within the first fifty per cent.

Illustration

In the event there are a total of ten technically qualified bidders, and each technically qualified bidder submits different initial price offer, then the technically qualified bidders holding the first fifty per cent. of ranks shall be considered to be qualified bidders. If three such technically qualified bidders submit the same initial price offer and are ranked in first fifty per cent. of the total number of ranks, then, all the three technically qualified bidders shall be considered to be qualified bidders and the total number of qualified bidders shall stand increased by two.

(9) Where the total number of technically qualified bidders is three or more, the auction process shall proceed to the second round of auction which shall be held in the following manner, namely:-

(i) the qualified bidders may submit their final price offer which shall be a percentage of value of mineral despatched and greater than the floor price: Provided that the final price offer may be revised till the conclusion of the auction as per the technical specifications of the auction platform;

(ii) The auction process shall be annulled if none of the qualified bidders submits a final price offer on the online electronic auction platform;

(iii) the qualified bidder who submits the highest final price offer shall be declared as the “preferred bidder” immediately on conclusion of the auction.

(10) Where the total number of technically qualified bidders is less than three, then no technically qualified bidder shall be considered to be qualified bidder and the first attempt of auction shall be annulled.

(11) On annulment of the first attempt of auction, the State Government may decide to—

(a) commence the auction process de novo with a separate set of terms and conditions and reserve price as it may deem fit and necessary; or

(b) conduct the second attempt of auction.

(12) In case the State Government decides to conduct the second attempt of auction as per clause (b) of sub-rule (11), the terms and conditions of the second attempt of auction shall remain the same as in the first annulled attempt of auction: Provided that the highest initial price offer of the technically qualified bidders if any in the first annulled attempt shall be the reserve price in first round of the second attempt: Provided further that the bidding shall continue to the second round even in case the number of technically qualified bidders is less than three.]⁴⁴

10. Grant of Mining Lease.- (1) The preferred bidder shall submit the first instalment being ten per cent. of the upfront payment as per rule 11.

(2) Upon receipt of the first instalment of the upfront payment, the State Government shall issue a letter of intent to the preferred bidder.

(3) The preferred bidder shall be considered to be the “successful bidder” upon,- (a) continuing to be in compliance with all the terms and conditions of eligibility; (b) payment of the second instalment being ten per cent. of the upfront payment; (c) furnishing performance security as specified in rule 12; (d) satisfying the conditions specified in clause (b) of sub-section (2) of section 5 with respect to a mining plan; and (e) satisfying such other conditions as may be specified by the State Government with the prior approval of the Central Government.

⁴⁴ As amended in 2017

(4) The successful bidder shall sign the Mine Development and Production Agreement with the State Government upon obtaining all consents, approvals, permits, no-objections and the like as may be required under applicable laws for commencement of mining operations.

(5) The successful bidder shall pay the third instalment being eighty per cent of the upfront payment subsequent to execution of the Mine Development and Production Agreement, and upon such payment the State Government shall grant a mining lease to the successful bidder.

(6) The Mining Lease Deed shall be executed by the State Government within thirty days of the date of completion of the conditions specified in sub-rule (5) and shall be subject to the provisions of the Act and the rules made thereunder.

(7) The mining lease shall be for minerals found in the area pursuant to exploration prior to the auction: Provided that where, subsequent to the auction, any new mineral is discovered, then the holder of mining lease shall follow the provisions of the Mineral Concession Rules, 1960 for inclusion of such new mineral in the Mining Lease Deed.

(8) Where, prior to the auction or subsequent to the auction, presence of minor mineral is established or discovered, such minor minerals shall be dealt in accordance with such rules made by the State Government under section 15.

(9) The date on which a duly executed Mining Lease Deed is registered shall be the date of commencement of the mining lease.

11. Upfront payment for mining lease.- (1) An amount equal to 0.50% of the value of estimated resources shall be the upfront payment. (2) The upfront payment shall be payable to the State Government in three instalments of ten per cent; ten per cent; and eighty per cent. as specified in the tender document and shall be adjusted in full against the amount paid under sub-rule (3) of rule 8 within the first five years of commencement of production of mineral as specified in the tender document.

12. Performance security for mining lease.—(1) The successful bidder shall provide a performance security of an amount of 0.50% of the value of estimated resources and the performance security shall be adjusted every five years so that it continues to correspond to 0.50% of the reassessed value of estimated resources. (2) The performance security provided through bank guarantee in the format as specified in Schedule III or through security deposit, may be invoked as per the provisions of – (i) the Mine Development and Production Agreement; and (ii) the Mining Lease Deed.

13. Payments under mining lease.—(1) The lessee shall pay royalties and dead rent to the State Government as specified in the Act and the rules made thereunder.

(2) The lessee shall pay the applicable amount quoted under rule 8 to the State Government on a monthly basis.

(3) The lessee shall contribute such amounts as may be required under the Act to - (a) the designated account of the National Mineral Exploration Trust; and (b) the designated account of the District Mineral Foundation.

(4) The lessee shall also pay such other amounts as may be required under any law for the time being in force to the concerned authorities.

14. Payment of Interest.—The State Government shall charge simple interest at the rate of twenty four per cent. per annum on any payment due to State Government under these rules the payment of which is delayed beyond sixty days from the due date thereof.

15. Time Period.—The time period for compliance of rules 10 to 14 shall be as specified in the tender document.

16. Prerequisites for auction of Composite Licence.—(1) The State Government may initiate an auction process for grant of a Composite Licence with respect to an area within the State in accordance with the provisions of the Act and

this Chapter subject to the condition that the requirements of rule 7 of the Minerals (Evidence of Mineral Contents) Rules, 2015 have been satisfied: Provided that in case of an auction with respect to a notified mineral, prior approval of the Central Government shall be required.

(2) The State Government shall, prior to issuance of the notice inviting tender with respect to auction, identify and demarcate the area where a Composite Licence is proposed to be granted through auction using total station and differential global positioning system and the area so demarcated shall be classified into forests land, land owned by the State Government, and land not owned by the State Government.

17. Auction for Composite Licence.—(1) The auction process as specified in rules 6 to 9 shall be applicable for conduct of auction for grant of a Composite Licence subject to the following, namely:—

(a) the State Government shall not make any reservation on the basis of end use;

(b) the State Government shall subject to compliance of rule 16, issue a notice inviting tender, including on their website, to commence the auction process and such notice shall contain brief particulars regarding the area under auction, including,-

(i) particulars of the area identified and demarcated using total station and differential global positioning system divided into forest land, land owned by the State Government, and land not owned by the State Government; and

(ii) estimated mineral resources with respect to all minerals discovered in the area and brief particulars regarding satisfaction of the requirements specified in rule 7 of the Minerals (Evidence of Mineral Contents) Rules, 2015;

(c) the tender document issued by the State Government, shall contain,—

(i) geological report specifying particulars and estimated quantities of all minerals discovered in the area during exploration pursuant to Minerals (Evidence of Mineral Contents) Rules, 2015;

and (ii) revenue survey details of the area identified, demarcated using total station and differential global positioning system divided into forest land, land owned by the State Government, and land not owned by the State Government;

(d) the bidders shall be provided a fixed period, as prescribed by the State Government, to study the Tender Document and such reports and the bidding process shall commence only on expiry of such period.

18. Grant of Composite Licence.—(1) Upon completion of the auction process, the preferred bidder shall submit a performance security in the manner specified in sub-rule (1) of rule 19 and upon receipt of such performance security, the State Government shall issue a letter of intent to the preferred bidder.

(2) On receipt of the letter of intent the preferred bidder shall be considered to be the successful bidder upon fulfilment of the following conditions, namely:— (a) compliance with all the terms and conditions of eligibility; (b) obtaining all consents, approvals, permits, no-objections and the like as may be required under applicable laws for commencement of prospecting operations; and (c) submitting the Scheme of prospecting.

(3) Upon fulfilment of the conditions specified in sub-rule (2), the State Government shall grant a Composite Licence to the successful bidder and such Composite Licence shall be subject to the provisions of the Act and the rules made thereunder, as applicable to a prospecting licence and mining lease.

(4) The minimum area for grant of a Composite Licence shall not be less than the minimum area for which a mining lease may be granted in accordance with the provisions of the Mineral Concession Rules, 1960 and the maximum area shall be in accordance with section 6 as applicable to a prospecting licence.

(5) The holder of a Composite Licence shall conduct geological exploration of the area under the Composite Licence so as to ascertain evidence of mineral contents and shall submit periodic reports in accordance with the Act and rules made thereunder, as applicable to a prospecting licence and all reports, studies and other documentation related to the geological exploration of the area under the Composite Licence shall be submitted to the State Government and Indian Bureau of Mines.

(6) If a holder of a Composite Licence,— (a) fails to complete prospecting operations in accordance with sub-section (9) of section 11 or fails to establish the existence of mineral contents in accordance with sub-section (10) of section 11, and the Minerals (Evidence of Mineral Contents) Rules, 2015, such holder shall not be eligible to receive a mining lease and the Composite Licence shall be terminated; (b) completes prospecting operations in accordance with sub-section (9) of section 11 resulting in determination of evidence of mineral contents conforming to the Minerals (Evidence of Mineral Contents) Rules, 2015, such holder shall make an application to the State Government for grant of a mining lease accompanied with the first instalment, being ten per cent. of the upfront payment: Provided that the mining lease shall be granted only with respect to the area for which evidence of mineral contents has been found and shall not be for an area larger than the maximum area for which a mining lease may be granted under the Act: Provided further that any excess area shall be deemed to be surrendered by the holder of Composite Licence after completing its reclamation.

(7) Upon receipt of the duly completed mining lease application and the first instalment of the upfront payment as specified in clause (b) of sub-rule (6), the State Government shall issue a letter of intent for mining lease.

(8) A Mine Development and Production Agreement shall be executed between the State Government and the holder of Composite Licence if the holder of a Composite Licence— (a) continues to comply with the terms and conditions of eligibility; (b) pays the second instalment being ten per cent. of the upfront payment; (c) furnishes the enhanced performance security as specified in sub-rule (2) of rule 19; (d) satisfies the conditions specified in clause (b) of sub-section (2) of section 5 with respect to a mining plan; (e) obtains all consents, approvals, permits, no-objections and the like as may be required under applicable laws for commencement of mining operations; and (f) satisfies such other conditions as may be specified by the State Government with the prior approval of the Central Government.

(9) The holder of the Composite Licence shall pay the third instalment being eighty per cent. of the upfront payment, subsequent to execution of the Mine Development and Production Agreement, and upon such payment, the State Government shall execute a Mining Lease Deed with the holder of the Composite Licence within thirty days of the date of completion of all the conditions specified in sub-rule (8).

(10) The mining lease shall be subject to the provisions of the Act and the rules made thereunder.

(11) The mining lease shall be for minerals found in the area pursuant to exploration prior to the auction: Provided that where subsequent to the auction, any new mineral is discovered, then the holder of the mining lease shall follow the provisions of the Mineral Concession Rules, 1960 for inclusion of such new mineral in the Mining Lease Deed.

(12) Where prior to the auction or subsequent to the auction, presence of minor mineral is established or discovered, such minor minerals shall be dealt in accordance with such rules as may be made by the State Government under section 15. (13) The date on which a duly executed Mining Lease Deed is registered shall be the date of commencement of the mining lease.

19. Performance Security for Composite Licence.—(1) An amount of 0.25% of the value of estimated resources shall be payable by the preferred bidder as performance security prior to the issuance of the Composite Licence.

(2) The amount of performance security shall be revised, prior to the issuance of the mining lease, to an amount of 0.50% of the value of estimated resources.

(3) The performance security provided under sub-rule (2) shall be adjusted every five years so that it continues to correspond to 0.50% of the reassessed value of estimated resources.

(4) The performance security may be invoked as per provisions of,- (i) the Mine Development and Production Agreement; and (ii) the Mining Lease Deed.

20. Power to rectify apparent mistakes.—xxxx

21. Special provisions relating to minerals specified in Part B of the First Schedule to the Act.—(1) Notwithstanding anything contained in these rules— (a) if the holder of a Composite Licence or mining lease discovers any mineral specified in Part B of the First Schedule to the Act and not specified in such licence or lease, in the area granted under such licence or lease, the discovery of such mineral shall be reported to the Director, Atomic Minerals Directorate for Exploration and Research, Hyderabad within sixty days from the date of discovery of such mineral; (b) the licensee or lessee shall not win or dispose of any mineral specified in Part B of the First Schedule to the Act unless such mineral is included in the licence or lease or a separate licence or lease for the purpose has been obtained; (c) the quantities of any mineral specified in Part B of the First Schedule to the Act recovered incidental to such prospecting or mining operations shall be collected and stacked separately and a report to that effect shall be sent to the Director, Atomic Minerals Directorate for Exploration and Research, Hyderabad every month for such further action by the licensee or lessee as may be directed by the Atomic Minerals Directorate for Exploration and Research.

(2) The licensee or lessee referred to in sub-rule (1) shall, within sixty days from the date of discovery of any mineral specified in Part B of the First Schedule to the Act, apply to the Secretary, Department of Atomic Energy, Mumbai, through the State Government, for grant of a licence to handle such minerals under the provisions of the Atomic Energy Act, 1962 (33 of 1962) and the rules made thereunder and the Department of Atomic Energy shall intimate to the State Government regarding issue of the licence in this regard.

22. Exploration Obligation.—The holder of a mining lease shall complete detailed exploration (G1 level exploration) and prepare a detailed feasibility study report conforming to Part IV and V of the Minerals (Evidence of Mineral Contents) Rules, 2015 over the entire area under the mining lease, within a period of five years from the date of commencement of such mining lease.

SCHEDULE I ⁴⁵

Terms and conditions of eligibility

[See rules 6(1) and 6(2)]

1. The following net worth requirements shall be applicable for an auction of mining lease depending on the Value of Estimated Resources, namely:—

(a) If the Value of Estimated Resources is equal to or more than one thousand crore rupees, the applicant, including an individual, shall have a net worth more than 2 per cent. of Value of Estimated Resources.

(b) If the Value of Estimated Resources is less than one thousand crore rupees but more than one hundred crore rupees, the applicant, including an individual, shall have a net worth more than 1 per cent. of Value of Estimated Resources.

⁴⁵ As amended in 2017

(c) If the Value of Estimated Resources is less than or equal to one hundred crore rupees, the applicant, including an individual, shall have a net worth more than 0.5 per cent. of Value of Estimated Resources.

2. In case of auction of Composite Licence, the applicant shall have a net worth of more than 1 per cent. of the Value of Estimated Resources and where the value of Estimated Resources is equal or less than one hundred crore rupees, the applicant must have a net worth more than 0.5 per cent. of Value of Estimated Resources.

Explanation.–

(1) In case an applicant is a subsidiary of another company incorporated in India, the net worth of such holding company may also be considered:

Provided that, in such case, the applicant shall continue to be a subsidiary of such holding company until such time the applicant meets the aforementioned net worth threshold.

(2) In case of a company, the net worth shall be the sum of paid up share capital and the free reserves as per the audited balance sheet of the financial year ended immediately preceding the date of issuance of notice inviting tender.

(3) In case the notice inviting tender is issued between 1st April to 30th September (both days inclusive) of a year, the audited balance sheet of the financial year before the immediately preceding financial year, from the date of issuance of notice inviting tender, may be submitted by the bidder, if the audited balance sheet of the immediately preceding financial year is not available.

(4) In case of an individual, the net worth shall be the closing cash balance on the last date for submission of application, and such amount may include amount in savings bank accounts in Scheduled Bank or Post Office, free and un-encumbered fixed deposits in Scheduled Banks, Post Office, Listed Companies or Government organisation or Public Sector Undertakings of a State and the Central Government, Kisan Vikas Patra, National Saving certificate, Bonds, Shares of Listed Companies, Listed Mutual Funds, Unit Linked Insurance Plan, Public Provident Fund, Surrender Value of Life Insurance policies, and un-encumbered immovable property in the name of Applicant.

Mineral (Non-Exclusive Reconnaissance Permit) Rules 2015

3. Grant of non-exclusive reconnaissance permit – (1) The State Government may grant a non-exclusive reconnaissance permit in respect of any mineral other than a mineral notified as a minor mineral as defined in clause (e) of section 3 and minerals specified in Part A and Part B of the First Schedule to the Act, subject to such terms and conditions specified in these rules.

(2) The State Government shall establish an online system for receipt of applications and grant of a non-exclusive reconnaissance permit.

(3) An application may be made to a State Government in the format specified in Schedule I annexed to these rules for grant of a non-exclusive reconnaissance permit over any area,-

(i) which is not held under a reconnaissance permit, prospecting licence, a prospecting licence-cum-mining lease, a mining lease; or

(ii) where the State Government has not initiated auction process for grant of a prospecting licence-cum-mining lease or mining lease.

(4) The State Government may grant more than one non-exclusive reconnaissance permit over any area.

(5) An applicant for grant of non-exclusive reconnaissance permit shall meet the eligibility conditions specified in section 5 of the Act for grant of a reconnaissance permit and shall submit an online application for grant of non-exclusive reconnaissance permit as per the format specified in Schedule I along with an online payment of a fee calculated at the rate of one thousand rupees per square kilometre.

(6) An online acknowledgment shall be provided to the applicant on submission of an application under the provisions of sub-rule (5).

(7) The State Government shall dispose of the application made under the provisions of sub-rule (5) within a period of thirty days from the date of receipt of a duly completed online application and may either issue a non-exclusive reconnaissance permit or reject the application for reasons to be recorded in writing and the letter to grant or reject the non-exclusive reconnaissance permit shall be posted online which shall be available for download by the applicant.

Provided that in case an application is rejected, the fee made under sub-rule (5) shall be refunded to the applicant after deduction of an amount of ten per cent of such fee.

(8) The non-exclusive reconnaissance permit shall be issued in the format specified in Schedule II and shall be subject to the terms and conditions specified therein.

(9) The maximum area for grant of non-exclusive reconnaissance permit shall not exceed the maximum area for reconnaissance permit specified in section 6 of the Act and the period for grant of non-exclusive reconnaissance permit shall be as specified in sub-section (1) of section 7 of the Act for reconnaissance permit.

(10) The State Government shall allow the Indian Bureau of Mines to access the online system for grant of a non-exclusive reconnaissance permit and shall also communicate in writing to the Indian Bureau of Mines the grant or rejection of the non-exclusive reconnaissance permit made under sub-rule (7).

(11) The grant of a non-exclusive reconnaissance permit over any area shall not prohibit the State Government from notifying all or any part of such area for grant of a mining lease or a prospecting licence-cum-mining lease and upon such notification the validity of all non-exclusive reconnaissance permits over such notified area will stand automatically terminated.

Provided that the State Government shall communicate in writing such automatic termination to every holder of non-exclusive reconnaissance permit over such notified area.

4. Findings of a non-exclusive reconnaissance permit - (1) The holder of a non-exclusive reconnaissance permit may choose to submit its findings to the State Government and may request the State Government to conduct auction for grant of a prospecting licence-cum-mining lease or a mining lease based on such findings.

(2) Upon receipt of a request for auction under sub-rule (1), the State Government shall have the right to seek further information including documents regarding such findings and the State Government may decide to conduct auction for grant of a prospecting licence-cum-mining lease or a mining lease based on such findings.

(3) The State Government upon being satisfied regarding,

(a) the existence of evidence of mineral contents as specified in the Minerals (Evidence of Mineral Contents), Rules 2015 may conduct an auction for grant of mining lease; or

(b) the requirements specified in rule 7 of the Minerals (Evidence of Mineral Contents) Rules, 2015 may conduct an auction for grant of a prospecting licence-cum-mining lease.

Mineral (Mining by Government Company) Rules, 2015

3. Period of mining lease granted to Government companies or corporations before 12th January, 2015.—(1)

All mining leases for minerals granted to a Government company or corporation before the date of commencement of the Mines and Minerals (Development and Regulation) Amendment Act, 2015 (10 of 2015), namely, the 12th January, 2015 shall be deemed to have been granted for a period of fifty years.

(2) The State Government, upon an application made to it in this behalf by the Government company or corporation at least twelve months prior to the expiry of the mining lease, may⁴⁶, for reasons to be recorded in writing, extend the period of the mining lease for further periods of upto twenty years at a time.

(3) Subject to sub-rule (1), all applications made by a Government company or corporation for renewal of mining leases and which were pending as on the date of commencement of the Mines and Minerals (Development and Regulation) Amendment Act, 2015 (10 of 2015) shall be deemed to be applications for extension of the period of the mining lease and shall be disposed of in accordance with the provisions of sub-rule (2).

4. Period of mining lease granted to Government companies or corporations on or after 12th January, 2015.—

(1) All mining leases granted to a Government company or corporation for minerals shall be for a period of fifty years.

(2) A mining lease granted to a Government company or corporation in accordance with the provisions of section 10B and section 11 of the Act shall expire at the end of the period of fifty years and shall not be extended.

⁴⁶ Vide Mineral (Mining by Government Companies) (Amendment) Rules, 2019, "may, for reasons to be recorded" in rule 3, in sub-rule (2) and rule 4, in sub-rule (3) has been substituted with shall, for reasons to be recorded.

(3) The State Government, upon an application made to it in this behalf by the Government company or corporation granted a mining lease in accordance with the provisions of sub-sections (2A) and (2B) of section 17A of the Act, at least twelve months prior to the expiry of the mining lease, may⁴⁷, for reasons to be recorded in writing, extend the period of the mining lease for further periods of up to twenty years at a time.

5. Payments by a Government company or corporation under sub-section (2C) of section 17A of the Act.—(1) A Government company or corporation or a joint venture, granted a mining lease in accordance with the provisions of subsections (2A) and (2B) of section 17A of the Act, shall pay an amount equivalent to a percentage of the royalty paid in terms of the Second Schedule to the Act, as notified by the Central Government in each case.

(2) A Government company or corporation shall make payments to the State Government as specified under sub-rule (1).

(3) A Government company or corporation shall also pay such other amounts as may be required under any law for the time being in force to the concerned authorities, including,- (i) royalty or dead rent to the State Government; (ii) payment to the National Mineral Exploration Trust; and (iii) payment to the District Mineral Foundation.

⁴⁷ ibid

ANNEXURE 2

Mineral resource estimation and reporting

1. United Nations Framework Classification (UNFC)

The classification system used in the Minerals (Evidence of Mineral Contents) Rules, 2015 (and also described therein) is the United Nations Framework Classification (UNFC), which classifies mineral finds on a 3-digit code (E, F,G) where E is the *Economic* axis; F is the *Feasibility* axis, and G is the *Geological* axis. The exploration for any mineral deposit involves four stages on the geology axis, namely, Reconnaissance Survey (G4), Preliminary Exploration (G3), General Exploration (G2), and Detailed Exploration (G1). These stages of exploration lead to four resource categories, namely, Reconnaissance Mineral Resource, Inferred Mineral Resource, Indicated Mineral Resource, and Measured Mineral Resource, respectively reflecting the degree of geological assurance. An Intrinsically economic (E3) and feasible (F3) rating is available through a Geological Study.

Depending on the extent of exploration, and based on a geological study, a mineral find would be classified in a three-digit code, (3,3,4), (3,3,3), (3,3,2), or (3,3,1) as the case may be (the change from “4” to “3” to “2” and to “1” in the third digit reflecting the increased exploration).Prefeasibility (F2) or feasibility (F1) study must be conducted to establish potentially economic (E2) and economic (E1) quantities and convert the relevant portions of the “Mineral Resources” to “Mineral Reserves” which is the economically mineable part of the Mineral Resource. This conversion through modifying factors include issues relating to mining, processing, end use, cut off grade, threshold value, metallurgical, infrastructure, economic, marketing, legal, environmental, social, and governmental factors.

[Note: The three digit code (E, F, G) may also be expressed without the commas, as (EFG);for example “(3,3,2)” as “(332)”.]

When adequate exploration has been done (that is, at least general exploration or (G2) and some feasibility study has been conducted to estimate the economic or potentially economic nature of the find and its practical extractability, the resource (or reserve in case economics of extraction have been established), the mineral find can be classified into one of the following:

- *Probable Mineral Reserve* (121 and 122) is the economically mineable part of an Indicated, and in some circumstances, a measured mineral resource. The confidence in the modifying factors applying to a probable mineral reserve is lower than that applying to a proved mineral reserve. (The *modifying factors* relate to mining, processing, metallurgical, infrastructure, economic, marketing, legal, environmental, social, and governmental factors, which impact technical and economic feasibility.)
- *Proved Mineral Reserve* (111) is the economically mineable part of a measured mineral resource. A proved mineral reserve implies a high degree of confidence in the modifying factors.
- *Feasibility Mineral Resource* (211) A ‘feasibility mineral resource’ is that part of a measured mineral resource which is not economically mineable as defined by studies at the feasibility level. This material is identified as being possibly economically viable subject to changes in technological, economic, and environmental and/or other relevant conditions.

Pre-Feasibility Mineral Resource (221 and 222) A ‘prefeasibility mineral resource’ is that part of an Indicated, and in some circumstances, measured mineral resource, that has been found by studies at the pre-feasibility level, as not economically viable. This material is identified as being possibly economically viable subject to changes in technological, economic, and environmental and/or other relevant conditions.

2. CRIRSCO Template, the JORC Code and the National Instrument (NI) 43.101 Code

Unlike the UNFC system which is a system for only *resource estimation*, the JORC code (or its counterpart the Canadian National Instrument 43.101 or the ICMM's CRIRSCO template) is a *Code for reporting* of exploration results, mineral resources and ore reserves. It is a professional code of practice that sets minimum standards for public reporting and provides a mandatory system for the classification of mineral exploration results, mineral resources and ore reserves according to the levels of confidence in geological knowledge and technical and economic considerations and for their reporting in Public Reports. Public Reports prepared in accordance with the JORC Code are for the purpose of informing investors or potential investors and their advisors. They include annual and quarterly company reports, press releases, information memoranda, technical papers, website postings, and public presentations of Exploration Results, Mineral Resources and Ore Reserves estimates. The Australian Securities Exchange and the New Zealand Stock Exchange both require publication of reports in accordance with the JORC Code for all solid minerals, including diamonds, other gemstones, industrial minerals, and coal. The NI 43.101 Code has a similar status in Canada.

In these Codes, a Public Report is the responsibility of the company acting through its Board of Directors. Documentation must be prepared by, or under the direction of, and signed by a Competent Person. Under the JORC Code, a 'Competent Person' is a minerals industry professional who is a Member or Fellow of The Australasian Institute of Mining and Metallurgy, or of the Australian Institute of Geoscientists, or of a 'Recognized Professional Organization' (RPO). A Competent Person must have a minimum of five years relevant experience in the style of mineralization or type of deposit under consideration and in the activity which that person is undertaking. If the competent person is preparing documentation on exploration results, the relevant experience must be in exploration. If the competent person is estimating, or supervising the estimation of mineral resources, the relevant experience must be in the estimation, assessment, and evaluation of mineral resources. If the competent person is estimating, or supervising the estimation of ore reserves, the relevant experience must be in the estimation, assessment, evaluation, and economic extraction of ore reserves. NI 43.101 has similar provisions in respect of Canadian systems. The CRIRSCO Template which is generic in nature, similarly states: 'A Competent Person' is a minerals industry professional, who is a [National Reporting Organisation (NRO) to insert appropriate membership class and name of Professional Organisation (PO)] or other Recognised Professional Organisations (RPOs) with enforceable disciplinary processes including the powers to suspend or expel a member. A Competent Person must have a minimum of five years relevant experience in the style of mineralisation or type of deposit under consideration and in the activity which that person is undertaking. The definition of 'Competent Person' is subject to any additional restrictions or conditions that may be required by any relevant regulatory authority, NRO, PO, or RPO.

The Reporting Codes have a checklist or reference for use by those preparing public reports on exploration results, mineral resources, and ore reserves. It is the responsibility of the Competent Person to consider the criteria listed in the checklist and any additional criteria that should apply to the study of a particular project or operation.

3. The Indian Mineral Industry Code for reporting Exploration Results, Mineral Resources and Reserves (IMIC)

The Indian Mineral Industry Code for reporting Exploration Results, Mineral Resources and Reserves (IMIC) has been developed in July 2019 by The National Committee for Reporting Exploration Results, Mineral Resources and Reserves in India (NACRI), which is a member of CRIRSCO. The Code conforms to the CRIRSCO template. The Code defines 'A Registered Competent Person' as a minerals industry professional who is a Member of a professional organisation headquartered in India and approved by NACRI or a Member of a 'Recognised Professional Organisation' (RPO), as included in a list of similar bodies headquartered outside India available on the NACRI websites. A Registered Competent Person must have a minimum of ten years professional experience, which includes five years relevant experience in the style of mineralisation or type of deposit under consideration and in the activity, which that person is undertaking. The Code is however yet to be adopted by the Government and incorporated into the Rules.

ANNEXURE 3

State-wise leases which are due to expire by 2020⁴⁸

| S. No | State | Working Mines | Non-Working Mines | Total Mines | Total Auctionable Mines |
|--------------|------------------|---------------|-------------------|-------------|-------------------------|
| 1 | Andhra Pradesh | 3 | 6 | 9 | 9 |
| 2 | Goa | 0 | 184 | 184 | NA |
| 3 | Gujarat | 5 | 6 | 11 | 7 |
| 4 | Himachal Pradesh | 1 | 1 | 2 | 2 |
| 5 | Jharkhand | 5 | 16 | 21 | 18 |
| 6 | Karnataka | 8 | 42 | 50 | 33 |
| 7 | Madhya Pradesh | 1 | 12 | 13 | 2 |
| 8 | Maharashtra | 0 | 9 | 9 | NA |
| 9 | Odisha | 24 | 7 | 31 | 31 |
| 10 | Rajasthan | 2 | 2 | 4 | 2 |
| Total | | 49 | 285 | 334 | 104 |

⁴⁸ Source: Government of India (Ministry of Mines). 2018. Central Coordination-cum-Empowered Committee (CCEC) meeting of 21 major mineral rich States to be held under the chairmanship of Secretary (Mines) on 12th October, 2018 in Gujarat. Details available at <https://mines.gov.in/writereaddata/UploadFile/ccec01102018.pdf>, last accessed on 3 March 2020

ANNEXURE 4

Mode of Grant of Mineral Concessions in Various Jurisdictions⁴⁹

| S.No | Country | Mode of Grant | Initial Mining Lease Tenure | Renewal Provision |
|------|-----------------|---|---|--|
| 1 | Argentina | FCFS | Till Mineral Exhaustion | — |
| 2 | Bolivia | FCFS | 30 years | 30 years |
| 3 | Botswana | FCFS | 25 years | 25 years |
| 4 | Brazil | FCFS | Till Mineral Exhaustion | — |
| 5 | Canada | FCFS | 20 years | 10 years |
| 6 | Chile | FCFS | Till Mineral Exhaustion | — |
| 7 | Columbia | FCFS | 30 years | 30 years |
| 8 | Ghana | FCFS | 30 years | 30 years |
| 9 | Mexico | FCFS | 50 years | 50 years |
| 10 | Namibia | FCFS | 25 years | 15 years |
| 11 | Peru | FCFS | 30 years | Extension on request |
| 12 | USA | FCFS | Till Mineral Exhaustion | — |
| 13 | South Africa | FCFS | 30 years | 30 years |
| 14 | South Australia | FCFS | 21 years | 21 years |
| 15 | West Australia | FCFS | 21 years | 21 years |
| 16 | Mongolia | FCFS | 30 years | 20 years for two successive periods |
| 17 | Mauritania | FCFS | 30 years | Not available |
| 18 | Morocco | FCFS | 10 years | 10 years |
| 19 | Mozambique | FCFS | 25 years | 25 years |
| 20 | China | –FCFS for unexplored areas and Auction for already explored areas | – 30/20/10 years for large / medium/small mines | Extension on request |
| 21 | Indonesia | Auction | – 20/10 years for metallic/ non-metallic minerals | Renewal tenure varies for different minerals |
| 22 | Russia | Auction | 25 years | Extension on request |
| 23 | India | Auction | 50 years | No renewal |

⁴⁹ Source: FIMI

ANNEXURE 5

World Bank: Extractive Industries for Development Series #22(Sept 2011);

Mineral Resource Tenders and Mining Infrastructure Development

Michael Stanley and Ekaterina Mikhaylova*

Chapter 2: Award of Mineral Rights

Extracts

The award of mineral rights for exploration and/or exploitation follows one of two principal processes: open mineral access (first-come, first-served principle) and competitive resource tenders... The process selected will depend on the type of mineral commodity, the level of information available for the resource and deposit type (strata-bound deposits versus those placed in varying host stratigraphy), and the amount of potential investor interest at the time of award...

Open Mineral Access

When relatively little is known about the resource endowment⁵⁰ and there is no competition for the deposit, many successful mining countries—such as Australia, the United States, various Latin American nations, and now quite a few African countries—employ the open mineral access (first-come, first-served) process. Under this approach, license holders have time-bound access to license areas. Award provisions encourage the turnaround of exploration properties. For example, binding work programs, mandatory surrender of part of the licensed area, and/or increased land rental fees over time ensure that companies expedite exploration work and surrender those areas they do not find suitable so as to enable other companies to obtain the exploration data and express their interest in the area or deposit.

Open mineral access has been successful in attracting prospecting over large search areas and has ultimately led to exploration holdings(licenses) over smaller areas of more prospective ground.

Competitive Tender

The second approach—the competitive tender—largely presumes a greater knowledge of the mineral potential (either from earlier exploration or mining activities, or the recognition that some minerals are likely to be found in particular geologic formations) and an increased demand for rights as evidenced by the existence of several companies interested in applying for the same license area.

The rights to many bulk commodity minerals (such as iron ore), coal, industrial minerals (such as phosphate), and construction minerals are sometimes assigned through resource tenders or concession leases. This has much to do with the strata-bound nature of the deposits. Once the presence of a deposit is verified on a mineral holding, there is, by geological extrapolation, a higher probability of discovery for adjoining resources should they occur within the same stratigraphy and with similar geological characteristics. A competitive licensing process or systematic leasing of concessions sets the requirements and standards higher to limit license applications to more technically and financially qualified investors rather than leave the door open to any individual or company that could have obtained such licenses through open access.

⁵⁰This may be the case for 'hidden deposits'. Metallic minerals, both precious and base metals, are generally considered to be hidden deposits in that they occur at depth and are less likely to have a surface expression. Thus, without the aid of expensive sensing technologies, little is known about the underlying resource potential. *(The footnote is part of the original text).*

* Source: *The World Bank: Extractive Industries for Development Series #22 (Sept 2011)*. Details available at <http://siteresources.worldbank.org/INTOGMC/Resources/EITI-22weboc17.pdf>, last accessed on 3 March 2020

In some cases, an open mineral access license granted for a particular mineral prospect (a hidden deposit) is relinquished or revoked through regulatory action. A government might then want to take the opportunity to shift to a resource tender to competitively reassign the mineral right.

This shift is possible when previous exploration efforts have yielded sufficient information about the quantity and quality of the resource asset that a subsequent investor will enjoy appreciably reduced discovery risk. When this situation arises, the government may obtain a share of the resource rent up front in exchange for the information provided along with the mineral rights.

APPENDIX

Glossary of Technical Terms

Aero-EM: Airborne electromagnetic (EM) surveying is an active method to measure the electrical conductivity of the rocks. This gives a better idea of the Earth's structure and the arrangement of deposits at depth. The survey requires a source of EM field, which is generated using a large transmitter coil, fixed onto a helicopter or a light fixed-wing aircraft. There is also a "receiver" on board, which measures the EM response. During the survey, the aircraft needs to fly as close to the ground as possible to get more signal back from the Earth, although regulatory and safety issues come into play here when it comes to the practicality of what is permitted and what is not. The survey is carried out by flying in parallel lines as it helps with the processing of the data.

Aero-magnetic survey: In an aero magnetic survey, an onboard magnetometer measures and records the total intensity of the magnetic field at the sensor. The resulting aeromagnetic map shows the spatial distribution and relative abundance of magnetic minerals (most commonly the iron oxide mineral magnetite) in the upper levels of the Earth's crust. Because the rock types differ in their content of magnetic minerals, the magnetic map allows a visualization of the geological structure of the upper crust in the subsurface, particularly the spatial geometry of bodies of rock and the presence of faults and folds. Aeromagnetic data are commonly expressed as thematic (coloured) and shaded computer-generated pseudo-topography images. The apparent hills, ridges, and valleys are referred to as aeromagnetic anomalies. A geophysicist can use mathematical modelling to infer the shape, depth, and properties of the rock bodies responsible for the anomalies.

Aero-radiometric survey: The radiometric, or gamma-ray spectrometric method is a geophysical process used to estimate concentrations of potassium, uranium, and thorium by measuring the gamma-rays which the radioactive isotopes of these elements emit during radioactive decay. Airborne gamma-ray spectrometric surveys estimate the concentrations of the elements at the Earth's surface by measuring the gamma radiation above the ground from low-flying aircraft or helicopters.

Airborne gravity survey: Gravity gradiometry is used effectively by oil and mineral prospectors to measure the density of the subsurface, effectively by measuring the rate of change of gravitational acceleration due to underlying rock properties. From this information it is possible to build a picture of subsurface anomalies which can then be used to more accurately target oil, gas, and mineral deposits. It is also used for determining water depth. The gravity gradiometer is mounted on an aircraft and flown over the survey area to obtain the gravity gradient measurements. The survey is typically flown at an altitude of 80 m or greater with a line spacing dependent on the target of investigation. The signature from buried sources (such as ore bodies) is maximized closer to the Earth's surface and a low-flying altitude is desirable.

Aerogeophysical surveys: These surveys are conducted using geophysical sensors installed in an aircraft (fixed wing/helicopter). The primary sensors include some or all of the following: electromagnetic, gravity, magnetic, radiometric, and spectrometric.

Basement rock: Basement rock is the thick foundation of ancient metamorphic and igneous rocks often in the form of granite that forms the underlying layer of continents.

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.

'Bulk' and near-surface minerals: Minerals occur through a variety of processes. Some minerals are formed by sedimentary processes and are deposited in basins which occur at the Earth's surface. These include limestone and some kinds of iron ore deposits. Some minerals such as bauxite are formed by weathering processes. Such minerals generally occupy large surface areas and are often called 'bulk' minerals. Very often they are available at or near the surface.

Chalcophile elements: Those elements which have a strong affinity for sulphur; such elements concentrate in sulphides and are typical of the Earth's mantle rather than its core. Typical chalcophile elements are Cu, Zn, Pb, As, and Sb. In contrast, lithophile elements are those with a strong affinity for oxygen. They occur as oxides, and especially in the silicate minerals which make up 99% of the crust. Examples of lithophile elements are Al, Ti, Ba, Na, K, Mn, Fe, Ca, and Mg.

Concealed, deep-seated, or deep-located deposits: Mineralization often occurs at depth, with no apparent surface shows. In other cases, mineralization, even if extensive, is hidden by subsequent sedimentary layers ('cover sediments'), or concealed by lava flows as in the case of the Deccan Trap areas. Deep-seated minerals are formed under high pressure and temperature, and in many cases, through the chemical action of hot mineralizing fluids (hydrothermal action) associated with volcanism or tectonism. These minerals, including base metals such as copper, and noble metals such as gold, and special cases such as diamonds can occur at considerable depths. The MMDR Act in the explanation below proviso to Section 10C (2), defines "deep seated minerals" as minerals which occur at a depth of more than three hundred metres from the surface of land with poor surface manifestations.

Co-production of minor metals: Minor metals (including the so-called Energy Critical Metals) are not naturally found in concentration high enough to be profitably mined for their own sake. Many of them also occur in association with other metals which can be commercially mined (primary or major metals, such as lead-zinc-copper or gold or aluminium). Such associated minor metals can be recovered as by-products from the, 'waste', generated during the extraction of the major metals. Many minor metals are finding applications in renewable energy or electronics and though used in small quantities, can be quite critical. 'Major' minors include tungsten, cobalt, titanium, magnesium, where several hundred thousand tonnes are produced annually. Their production requires, 'process research', so as to put in place an ore-specific combination of physical and chemical processes to separate them from other material. There can be substantial risks and technical- and economic-feasibility questions associated with process research.

Crust: The continental crust is the layer of, igneous sedimentary, and metamorphic rocks that forms the continents and the adjoining areas of shallow seabed known as continental shelves.

Cratons: They are the old and stable parts of the crust (and the uppermost mantle), which having survived cycles of merging and rifting of continents, are distinct formations composed of ancient basement rock, often covered by younger sedimentary rocks. The Indian Craton is made up of the Aravalli Craton, Bundelkand Craton (granite-gneissic complex), Dharwar Craton, Singhbhum Craton, and the Bastar Craton.

Deccan trap: The Deccan traps are a large igneous province located on the Deccan Plateau of west-central India. They are one of the largest volcanic features on Earth. They consist of multiple layers of solidified flood basalt that together are more than 2000 m thick, covering an area of 500,000 km². The bulk of the volcanic eruption occurred at the Western Ghats some 66 million years ago. This series of eruptions may have lasted fewer than 30,000 years.

Exploration: Exploration (mineral exploration) is the scientific process of searching and locating minerals concentrated by natural geological processes. The search processes and tools used in exploration are dependent on the minerals being targeted for exploration. Exploration generally takes place in two stages in order to economize on the effort.

General Exploration: This involves the initial delineation of an identified mineral occurrence warranting further studies. 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, thereby 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 a Detailed Exploration are warranted (UNFC).

Detailed Exploration: This involves the detailed three-dimensional delineation of a known mineral deposit through sampling 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).

Geoscientific survey and mapping: This must be distinguished from 'mineral exploration'; while the latter is specifically aimed at finding minerals, geoscientific surveys have a multitude of applications including subsurface water resource location and estimation; identifying potential geo-hazards such as landslides; the nature of rocks and soils; and understanding the topography and climate of the distant past. Very often, mineral exploration ventures use geoscientific surveys as a starting point for the identification of a target area for exploration.

Hydrothermal mineral deposit: This is any concentration of metallic minerals formed by the precipitation of solids from hot mineral-laden water (hydrothermal solution). The solutions are thought to arise in most cases from the action of deeply circulating water heated by magma. Hydrothermal mineral deposits are further classified as hypothermal, mesothermal, epithermal, and telethermal according to the temperature of formation, which roughly correlates with particular mineralizing fluids, mineral associations, and structural styles.

Intrusive or plutonic igneous: These rocks form when magma cools slowly below the Earth's surface. They are called intrusive igneous rocks if the magma has intruded into pre-existing rock layers. Most intrusive rocks have large, well-formed crystals. Examples include granite, gabbro, diorite, and dunite. Igneous rocks are generally granites or basalts. The difference between granites and basalts is in their silica content (a basalt is about 53% SiO₂, whereas granite is 73%), and in their rates of cooling.

IOCG: Iron oxide-hosted copper gold deposits

Laterite: A rock type rich in iron and aluminium; commonly considered to have formed in hot and wet tropical areas by intensive and prolonged weathering.

Leaching: This is the loss or extraction of certain materials from a carrier into a liquid (usually, but not always a solvent).

Low-grade ores: The grade of the ore generally refers to the concentration of the mineral of interest in the mineral ore. As the grade drops, the economic viability of a mining enterprise also drops. When the grade of the ore is such that the economic viability is a significant risk, the ore is generally said to be of 'low grade'.

Mafic: A rock that is rich in magnesium and iron (Ferric). Ultramafic rocks are igneous and meta-igneous rocks with a very low silica content (less than 45%), generally greater than 18% MgO, high FeO, low potassium, and are composed of usually greater than 90% mafic minerals (dark coloured, high magnesium and iron content). The Earth's mantle is composed of ultramafic rocks.

Magma: It is molten rock stored inside the Earth's crust. Lava is magma that reaches the surface of the Earth through a volcano vent.

Magnetotellurics (MT): This is an electromagnetic geophysical method for inferring the Earth's subsurface electrical conductivity from measurements of natural geomagnetic and geoelectric field variation at the Earth's surface. Investigation depth ranges from 300 m below ground by recording higher frequencies down to 10,000 m or deeper. MT is used for various base metals (e.g., nickel) and precious metals exploration, as well as for kimberlite mapping. Audio-magnetotellurics (AMT) is a higher-frequency magnetotelluric technique for shallower investigations.

Metalliferous: This is *metallifer*-yielding metal, from *metallum* metal + *ferre* to bear (Latin).

Metallogeny: This is the study of the genesis and distribution of mineral deposits.

Metasomatism: This is the chemical alteration of a rock by hydrothermal and other fluids.

Mineral: A mineral is a naturally occurring substance (generally inorganic, though coal is an organic mineral) that is solid and is representable by a chemical formula. It 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; also, most but not all minerals have one or more metals as constituents.

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 (the International Council on Mining and Metals, that is, 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 a rocky material.

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

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

Mineral deposit: A mineral occurrence of relatively higher concentration, of economic value.

Mining operation: A mining operation is any operation undertaken for the purpose of winning (that is, 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 over a limited area for the purpose of undertaking mining operations.

Mining Tenement System: Such a system depicts the location, extent, nature, and status of current mineral concessions ('tenements'), and often allows for applications to be made for the grant of mineral concessions in areas not already covered. Sometimes the system also shows pending applications as well. The system may also show land ownership ('cadastre') and other legal information, such as officially notified forests or ecologically sensitive areas, for the benefit of intending applicants.

Orogen: An orogen or orogenic belt develops when a continental plate crumples and is pushed upwards to form one or more mountain ranges; this involves a series of geological processes collectively called orogenesis or orogeny. Orogeny is the primary mechanism by which mountains are built on continents. The Himalayas, which stretch over 2400 km, are the result of an ongoing orogeny (the Himalayan Orogeny) – the result of a collision of the continental crust of two tectonic plates: the Indian and the Eurasian continental plates.

Placer deposit or placer: This is an accumulation of heavier minerals by gravity separation from a specific source rock during sedimentary processes, for example, river or sea wave action. The name is from the Spanish word *placer*, meaning ‘alluvial sand’.

Paleo-placers: Placer deposits caused by ancient (paleo) processes no more in operation, for example, geologically ancient river or sea no longer in existence.

Pegmatite: This is an igneous rock, formed underground, with large interlocking crystals. Most pegmatites are composed of quartz, feldspar, and mica.

Petrology: This is the branch of geology that studies rocks and the conditions under which they form.

Porphyry: This is a textural term for an igneous rock consisting of large-grained crystals such as feldspar or quartz. Porphyry deposits are formed when a column of rising magma is cooled in two stages. In the first stage, the magma is cooled slowly deep in the crust, creating the large crystal grains. In the second and final stage, the magma is cooled rapidly at relatively shallow depth or as it erupts from a volcano.

Process R&D: This is the development of processes that enable extraction of a greater proportion of the minerals of interest from the ore, or co-extraction of minerals that occur in small concentrations along with the main minerals of interest. The processes may be a combination of various physical, mechanical and/or chemical processes. If the objective is to increase the concentration (grade) of the minerals of interest in the ore, the process is called ‘beneficiation’. Often there may be more than one mineral of interest, or there may be a mineral whose presence may be undesirable, and process R&D enables the operationalization of processes at scale to achieve the concentration of minerals of interest and removal of undesirable minerals. In deposits of base metals, etc. (which may contain so called Technology Metals and Energy Critical Metals as minor metals), crucial aspects of process R&D may need to be deposit-specific, based on the deposit’s mineralogical characteristics. It is by no means certain that processes can be developed for successful extraction of the minerals of interest, and it is even less certain that the process, if one is developed, can be scaled up commercially. Like exploration for deeper deposits, process R&D in such cases often uses venture capital, since it is of high risk with high reward.

Prospecting: It means any operation undertaken for the purpose of exploring, locating, or proving a 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 the 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.]

Proterozoic: This is a geological eon spanning the time from the appearance of oxygen in Earth’s atmosphere to just before the proliferation of complex life (such as trilobites or corals) on the Earth. The Proterozoic Eon extended from 2500 mya (million years ago) to 541 mya.

Prospectivity for minerals: This is a general assessment of the likelihood of finding minerals, based on the geological evolutionary history and geological set up (lithological, structural, and geomorphological) and geophysical, aeromagnetic, gravity, and radiometric imagery data-sets.

Rare earth elements: These form a group of 17 chemical elements that occur together in the periodic table. The group consists of yttrium and the 15 lanthanide elements: lanthanum, cerium, praseodymium, neodymium, promethium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, and lutetium. Scandium is found in most rare earth element deposits and is therefore also classified as a rare earth element.

Reconnaissance: Any operations undertaken for the 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 the quantities should only be made if sufficient data are available (UNFC).

Shield: A shield is a cratonic area where the basement rocks are exposed. It is a relatively flat region since mountain building, faulting, and other tectonic processes are greatly diminished. The age of these rocks is greater than 570 million years and sometimes dates back to 2000 to 3500 million years. The Indian shield consists of the Dharwar craton, the Southern Granulite Terrain (SGT) of Tamil Nadu–Kerala, the Eastern Ghat Mobile Belt (EGMB) along the east coast; and the intra cratonic 'Purana' basins.

Stratigraphy: This is the study of rock layers (strata) and layering (stratification). It is primarily used in the study of sedimentary and layered rocks, primarily to estimate the age of the various layers.

Supergene enrichment: This is a process that occurs relatively near the surface (as opposed to deep hypogene processes). Supergene processes include the predominance of meteoric water (e.g., rainwater) circulation with concomitant oxidation and chemical weathering.

Technology metals and energy critical metals: These include Cadmium (Cd), Gallium (Ga), Germanium (Ge), Indium (In), Molybdenum (Mo), Rhenium (Re), Scandium (Sc), Selenium (Se), Tellurium (Te), and Vanadium (V).

Unconformity: An unconformity is a *surface of hiatus* between successive strata representing a missing interval in the geologic record of time, produced either by an interruption in deposition or by the erosion (by wind or water). An unconformity is a type of discontinuity due to an intervening period of geological activity for which the strata have no direct record.

Volcanogenic massive sulphide deposits: Also known as VMS deposits, these are a type of metal sulphide ore deposit, mainly copper–zinc which are created by volcanic-associated hydrothermal events in submarine environments.

Winner's curse: The winner's curse is a phenomenon that may occur in 'highest bid' auctions in conditions of incomplete information. In such an auction, the winner will tend to overpay as he is after all paying what his competitors felt was not worth it since they stopped at a lower bid.

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