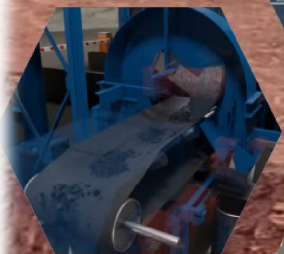# FIRST REPORT OF THE COMMITTEE CONSTITUTED BY MINISTRY OF MINES TO EXAMINE THE ISSUE OF MISCLASSIFICATION OF DIFFERENT GRADES OF IRON ORE AND OTHER MINERALS

Chaired by-
Dr. Veena Kumari Dermal
Joint Secretary, Ministry of Mines

Submitted on 11th November, 2022

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1645645/2023/Mines VI

1.0   **INTRODUCTION**

1.1   Ministry of Mines vide its order no. F.No. 16/86/2021-M.VI dated 16.07.2021, constituted a committee under the chairmanship of Dr. Veena Kumari Dermal, Joint Secretary, Ministry of Mines, having representative of State Governments of different iron ore rich States to examine the issue of mis-classification of grades of iron ore and other minerals, adversely affecting the revenue of State Governments and suggest measures for preventing mis-classification of grades of different grades of iron ore and other minerals. The committee was also entrusted to examine the adoption of latest technology in this regard.

1.2   The terms of reference of Committee were as under:

i)   To examine the issue of mis-classification of different grades of iron ore and other minerals.
ii)   To study the measures to prevent mis-classification of grades of iron ore and other minerals in existing rules of various States.
iii)   To suggest further measures to prevent mis-classification of grades.
iv)   To examine the possibility of using advanced technology viz. drones / GPS enabled vehicle etc. to ensure that ore accounting from mine to factory/port is made seamless.
v)   To propose action that can be taken against mines/trades/transporters/exporters for misclassified minerals.

1.3   In addition to the above, the Ministry vide its office O.M. bearing number 16/86/2021-M.VI dated 30.09.2021, added the following terms of reference for examination and recommendation of the Committee:

vi)   Leverage technology for better monitoring of mines and transportation operations to address malpractices with regards to gradation of ore and ensuring the right grade ore gets exported.
vii)   Set up a GPS based tracking system for monitoring of loading/unloading / transportation of metals to ensure that promised grade/quality of minerals is delivered; explore colour coding of transportation vehicles based on grades of minerals; Explore confiscation of ships including in malpractices.

1.4   The composition of committee is as under:

S.No.	Name and designation	Role in the committee
1	Dr. Veena Kumari Dermal, Joint Secretary	Chairperson

2	Shri P. N. Sharma, CCOM, IBM	Member
3	Director, Mining & Geology, Government of Odisha	Member
4	Director, Mining & Geology, Government of Karnataka	Member
5	Director, Mining & Geology, Government of Chhattisgarh	Member
6	Director, Mining & Geology, Government of Jharkhand	Member
7	Shri Abhay Agrawal, Technical Secretary(now Controller of Mines), IBM	Member
8	Shri S. K. Adhikari, CMG, IBM	Member*
9	Shri Dheeraj Kumar, Deputy Secretary, Ministryof Mines	Member Secretary**

Members added vide OM dated 07.02.2022.

**Before the said OM, Shri Abhay Agrawal, Technical Secretary (now Controller of Mines), IBM, was Member Secretary.*

1.5.   The Ministry of Mines further added following terms of reference for examination and recommendation of the Committee vide OM dated07.02.2022:

viii)   the issue of desirability of publishing ASP of ROM of iron ore as well as ways and means for the same.

Copy of orders of the Ministry of Mines regarding the constitution and composition of the Committee and its ToR is appended as **Annexure-1**.

1.6   The Committee will submit its recommendations on the above ToR in two reports. The first report, i.e., the present report, consists of examination and recommendations on Sl. No. (i) to (vii) of the above ToR, related to the issue of mis-classification of grades of iron ore and other mineral sand monitoring of transportation of minerals. Thereafter, in its second report, the Committee will submit its recommendations on Sl. No. (viii) of ToR on the issue of publishing the ASP of Run of Mine (ROM) ore.

2.0 METHODOLOGY ADOPTED BY THE COMMITTEE

2.1   The Committee adopted the process of consultations to examine the issues before it. At the outset, a presentation was made by the Indian Bureau of Mines (IBM) for understanding the importance of Average Sale Price (ASP), the issues involved regarding misclassification or misreporting of grades of mineral produced and its effects on ASP compilation and on the revenue of the State Government. Indian Bureau of Mines (IBM) also described the methodology of ASP calculation for iron ore and issues involved therein. The Committee invited presentations/suggestions from the Committee members representing State Governments of Chhattisgarh, Jharkhand, Odisha and Karnataka. It may be noted that these States are major producer of iron ore in the country. These 4 States together have around 90% of iron ore resources in the country.

State wise Reserves/resources of iron ore (Hematite) as on 01.04.2015

('000 tonnes)

State	Reserves	Remaining Resources	Total Resources	% of total resources
Andhra Pradesh	29768	311294	341062	1.52
Assam	0	12600	12600	0.06
Bihar	0	55	55	0.00
Chhattisgarh	1387437	3470687	4858124	21.60
Goa	358239	831075	1189313	5.29
Jharkhand	439372	4847045	5286417	23.51
Karnataka	550247	1916607	2466854	10.97
Madhya Pradesh	62063	267900	329963	1.47
Maharashtra	17241	276862	294103	1.31
Meghalaya	0	225	225	0.00
Odisha	2572217	4986447	7558664	33.61
Rajasthan	4658	33745	38404	0.17
Telangana	509	52673	53181	0.24
Uttar Pradesh	0	58000	58000	0.26
Total	**5421751**	**17065214**	**22486965**	**100**

Figures rounded off;   *Source: NMI as on 01.04.2015.*

State-wise details of production of iron ore in last 7 years is as follows

(In '000 tonnes)

State Name	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21(P)	2021-22(P)
Andhra Pradesh	493	485	674	654	825	360	312(0.12%)
Chhattisgarh	26717	33285	34418	34893	34728	36989	41313(16.30%)
Jharkhand	19198	21226	20169	23433	25015	21434	24728(9.76%)
Karnataka	25036	26483	28691	29823	31392	34542	40302(15.90%)
Madhya Pradesh	2447	1772	2743	2802	3343	4094	6896(2.72%)
Maharashtra	1420	1321	940	660	1131	1249	1958(0.77%)
Orissa	79856	99614	102186	113119	146637	104631	136695(53.93%)
Rajasthan	1146	1228	1320	1108	1012	1088	1235(0.49%)
Total (India)	**158107**	**194583**	**201424**	**206495**	**244083**	**204482**	**253441**

Grade-wise details of production and dispatch of iron ore in last 7 years is enclosed herewith as **Annexure-2**.

2.2   Further, the committee also invited written comments/suggestions from various industry associations, companies and other stakeholders on the specific ToRs of the Committee vide public notice dated 09.06.2021. Committee also requested IIT, Kharagpur, IIT-ISM-Dhanbad, IIT-BHU, CIMFR and Institute of Mineral & Material Technology Odisha, for suggesting / offering the technological solutions to this problem based on the present trends in the artificial intelligence and other technological innovations. However, no comments/ response was received from these institutions.

2.3 A sub-committee was formed which visited iron ore mines in Odisha to understand the issues involved in sampling and declaration of grades of iron ore and new technologies that can be adopted. The details of sub-committee's visit and observations is given para 7 of this report. Further, the committee invited M/s SGS India Pvt. Ltd. (known for auto-sampling technology) and OLM Systems and Technology (engaged in supply of online continuous analyzers) for presentation in its meeting held on 01.07.2022. The details of the same is given in para 8 of this report.

2.4   The Committee has held thirteen meetings on 07.09.2021, 20.10.2021, 28.10.2021,   14.01.2022,   27.01.2022,   08.02.2022,   15.02.2022,   22.03.2022, 23.06.2022, 01.07.2022, 15.07.2022, 10.08.2022 and 19.08.2022. Accordingly, committee is submitting its first report on the issue of mis-classification of grades of iron ore and other minerals and monitoring of transportation of minerals. Thereafter, in its second report, the Committee will submit report on the issue of publishing the ASP of Run of Mine (ROM) ore.

3.0 EXISTING PROCEDURE OF SAMPLING, DISPATCH AND TRANSPORTATION OF MINERALS AND RELATED MATTERS

3.1 Section 23C of the Mines and Minerals (Development and Regulation) Act, 1957 [MMDR Act] empowers the State Governments to make rules for preventing illegal mining, transportation and storage of minerals and for the purposes connected therewith. Accordingly, the State Governments have notified the rules in this regard, covering, *inter alia*, the following aspects:

(a) establishment of check-posts for checking of minerals under transit;

(b) establishment of weigh-bridges to measure the quantity of mineral being transported;

(c) regulation of mineral being transported from the area granted under a prospecting licence or a mining lease or a quarrying licence or a permit, in whatever name the permission to excavate minerals, has been given;

(d) inspection, checking and search of minerals at the place of excavation or storage or during transit;

(e) maintenance of registers and forms for the purposes of these rules.

3.2 As per the existing legislation, the State Governments have absolute authority for preventing illegal mining, transportation and storage of minerals, as sub-section (3) of section 23C of the MMDR Act provides that the Central Government shall have no power to revise any order passed by a State Government or any of its authorized officers or any authority under the rules made under sub-sections (1) and (2) of section 23C.

3.3 Broadly, the State Governments follow similar practice for sampling, dispatch and transportation of minerals and related matters. After excavation of ROM ore, the excavated ore is sorted in different sizes (lumps/ fines) and grades (below 55% Fe, 55% to below 58% Fe, 58% to below 60% Fe, 60% to below 62% Fe, 62% to below 65%Fe & 65% and above Fe). These sizes and grades are dispatched to various end users based on their demand. At present, in most of the States, the levy of royalty is done online. Before actual dispatch of the mineral from the lease area, the concerned lessee applies online for generation of Transit Pass for transportation of mineral by giving details of total quantity of mineral being dispatched, its grade, the truck number, name of consignee, destination etc.

3.4 The latest available ASP as published by IBM is updated in the online portal. Now depending upon the quantity and grade of the mineral as declared by the lessee,

the total amount of royalty to be charged is calculated by the system which is then paid by the lessee through digital transaction. After the completion of transaction, the online transit pass is generated which is used for transportation of the mineral to the destination. In some States, NABL laboratories have been established at the mine site by the lessees for ascertaining the grade of the mineral being dispatched. These laboratories are checked on random basis by the State Government authorities. Further, the weighment of the mineral is done at the mine site by establishment of weigh bridge in the mine site which is required as per the lease condition.

3.5 Section 21(4) of the MMDR Act provides penalties for transporting of mineral without any lawful authority as under:

> "*21.Penalties.*— ...
>
> *(4) Whenever any person raises, transports or causes to be raised or transported, without any lawful authority, any mineral from any land, and, for that purpose, uses any tool, equipment, vehicle or any other thing, such mineral tool, equipment, vehicle or any other thing shall be liable to be seized by an officer or authority specially empowered in this behalf.*
>
> *(4A) Any mineral, tool, equipment, vehicle or any other thing seized under sub-section (4), shall be liable to be confiscated by an order of the court competent to take cognizance of the offence under sub-section (1) and shall be disposed of in accordance with the directions of such court.*
>
> *...*
>
> *Explanation.—On and from the date of commencement of the Mines and Minerals (Development and Regulation) Amendment Act, 2021, the expression "raising, transporting or causing to raise or transport any mineral without any lawful authority" occurring in this section, shall mean raising, transporting or causing to raise or transport any mineral by a person without prospecting licence, mining lease or composite licence or in contravention of the rules made under section 23C."*

3.6   Section 22 of the Act empowers the Central Government and the State Government to authorise persons to make complaint of any offence punishable under the Act to the court for taking cognizance of the offence.

3.7   As per the above provision, any mineral transported in contravention of the rules made by the State Governments under Section 23C of the MMDR Act shall be 'without lawful authority' and the penalty prescribed under section 21(4) and (4A) shall be imposed against the defaulters. Thus, the rules made under section 23C of the MMDR Act should be robust enough to check any misreporting in grades of mineral and transportation of non-reported or misreported mineral.

4.0 AVERAGE SALE PRICE (ASP): ITS RELEVANCE IN REVENUE ACCRUAL TO THE STATE GOVERNMENT AND STATUTORY PROVISIONS

4.1. ASP is an important factor in calculating the revenue to the State Government payable by the lessee, particularly in the present regime of allocation of leases through auction. According to Rule 42 (3) of the Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016 [hereinafter, MCR, 2016] Average Sale Price (ASP) is 'the weighted average of the ex-mine prices of the non-captive mines, the weight being the quantity dispatched from the mining lease area'. Role of ASP in revenue calculation is detailed below:

4.1.1 For assessment of Royalty on Ad Valorem basis

(i) As per Section 9 of the MMDR Act, a holder of a mining lease shall pay royalty in respect of any mineral removed or consumed by him or by his agent, manager, employee, contractor or sub-lessee from the leased area at the rate for the time being specified in the Second Schedule in respect of that mineral.

(ii) The Second Schedule of the Act provides different methodologies for calculation of amount of royalty for different minerals, which may be categorized into 3 groups, *viz.*: (i) a specified amount on per tonne of mineral, (ii) a specified percentage of the average sale price (ASP) of mineral grade or concentrate, as published by the Indian Bureau of Mines (IBM), on ad valorem basis, (iii) a specified percentage of international exchange price, such as London Metal Exchange.

(iii) For most of the major minerals, royalty rate is prescribed as a specified percentage of the ASP of mineral grade or concentrate. Thus, ASP is important ingredient in calculation of royalty payable to the State Government.

4.1.2 For valuation of mineral blocks for the purpose of auction

(i) After the amendment of the MMDR Act in 2015, the mineral concessions are now granted through transparent process of auction through electronic bidding. For the purpose of charging of upfront payment and performance security and for determining reserve price as well as the eligibility of bidders to participate in auction based on its net-worth, as prescribed in the Mineral (Auction) Rules, 2015, the prerequisite is the valuation of the mineral block to be auctioned. As per the Mineral (Auction) Rules, 2015, value of estimated resources is calculated as product of estimated quantity of mineral resources in a block and the ASP published by IBM.

(ii) Thus, the Average Sale Price published by IBM is the key parameter for determining the value of mineral resources for which the mineral block is being

auctioned, which in turn decides the quantum of Upfront payment, Performance Security, reserve price and eligibility of bidders to participate in auction.

4.1.3 For Calculating the Bid Premium

(i) For the purpose of auction of mineral block the concerned State Government shall specify in the tender document the minimum percentage of the value of mineral dispatched, which shall be known as the "reserve price". As per Rule 8(2) of Mineral (Auction) Rules, 2015, the value of mineral dispatched shall be an amount equal to the product of, (i) mineral dispatched 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 dispatch.

(ii) The bidders shall quote, as per the bidding parameter, for the purpose of payment to the State Government, a percentage of value of mineral dispatched 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 dispatched.

(iii) Thus, the bid amount to be paid by the successful bidder to the State Government is again dependent upon the sale price of the mineral (grade-wise and State-wise) as published by Indian Bureau of Mines for such month of dispatch.

4.2   Provision for filing online returns

4.2.1   As per rule 45(5) of the Mineral Conservation and Development Rules, 2017 (MCDR, 2017), the holder of a mining lease is required to file online returns in respect of each mine to the Regional Controller or any other authorized official of the IBM. Recently, IBM has launched new Returns Management System portal as a part of MTS project for submission of returns/forms under the MCDR, 2017.

4.2.2   Rule 45(7) of the MCDR, 2017 provides the recourse that can be adopted by the State Government and the IBM in case of incomplete or wrong or false information in monthly or annual returns or failure in submission of a return within the date specified. The rule provides as follows:

> "*If it is found that the holder of a mining lease or the person or company engaged in trading or storage or end-use or export or import of minerals, as the case may be, has submitted incomplete or wrong or false information in monthly or annual returns or fails to submit a return within the date specified; then,–*

(a) *in the case of mining of minerals by the holder of a mining lease, the Regional Controller of Mines or the authorized officer of the State Government may-*

(i) *order suspension of all mining operations and dispatches in the mine and to revoke the order of suspension only after ensuring proper compliance*
(ii) *take action to initiate prosecution under these rules;*
(iii) *recommend termination of the mining lease, in case such suppression or misrepresentation of information indicates abetment or connivance of illegal mining;"*

4.3   Average Sale Price (ASP) compilation

4.3.1   The returns filed under rule 45 of MCDR, 2017 containing, *inter alia*, the ex-mine prices of the minerals and details of dispatches, are used by IBM for compilation of ASP for the minerals. The mineral wise, grade wise/concentrate wise, ASP is compiled on monthly basis, based on the procedure stated in Rule 42 to 45 of the MCR, 2016 for minerals and metals. Further, specific instructions have been issued by Ministry of Mines for compilation of ASP for certain minerals/metals *viz*., iron ore, limestone, marl, manganese, bauxite (other than metallurgical grade), tungsten concentrate, vanadium, gallium ingot and bauxite of metallurgical grade.

4.3.2   As per Rule 43 of the MCR, 2016 the ASP is to be published within 45 days from the due date of filing the monthly return under Rule 45 of MCDR 1988.For all mineral grades/concentrate, ASP is compiled based on the dispatches and ex-mine prices reported by the lease holders in the monthly return under Rule 45 of the MCDR, 1988/2017. The concept of ex-mine price is prescribed under rule 42(2) of the MCR, 2016 and rule 45 of the MCDR, 2017.As per rule 42(3) of the MCR, 2016, the ASP of any mineral grade/concentrate in respect of a month shall be the weighted average of the ex-mine prices of the non-captive mines and any merchant sale done by the captive mines, the weight being the quantity dispatched from the mining lease area of mineral grade / concentrate relevant to each ex-mine price.

5.0 IMPACT OF MISCLASSIFICATION OF DIFFERENT GRADES OF IRON ORE

5.1.   ASP of any specific mineral grade is calculated based on the ex-mine price of that specified mineral grade as declared by the lessee, in their statutory returns.

5.2   Any misreporting in grade and correspondingly its ex-mine price can affect the ASP and revenue accrual of State Government. Up to the month of March, 2022 IBM published the ASP of 13 grades/categories of iron ore. From April, 2022 onwards now the IBM is publishing the ASP for 22 grades/categories of iron ore after addition of some grades in the reporting format specified in the MCDR, 2017. The ASP published for January to March, 2022 for different grades of iron ore in the State of Odisha is as follows:-

Iron ore (Lumps)	ASP for Jan., 2022(in Rs.)	ASP for Feb., 2022(in Rs.)	ASP for Mar 2022(in Rs.)	Avg. ASP for Jan-Mar. 2022 (in Rs.)
Below 55% Fe	2603	2960	3763	3109
55% to below 58% Fe	3951	5026	4389	4455
58% to below 60% Fe	5456	5541	5780	5592
60% to below 62% Fe	6168	6523	7193	6628
62% to below 65% Fe	6921	7409	8341	7557
65% Fe and above	9276	9156	8695	9042
Iron Ore (Fines)				
Below 55% Fe	2075	1753	1838	1889
55% to below 58% Fe	3908	3392	3580	3627
58% to below 60% Fe	3979	4157	3764	3967
60% to below 62% Fe	3979	4157	4523	4220
62% to below 65% Fe	4841	5388	5215	5148
65% Fe and above	5025	5388	5974	5462
Iron Ore Conc.	3395	3199	2905	3166

5.3   It may be noted from the above table that ASP increases with increase in grade/ quality, i.e., ASP for '55% to below 58% Fe' grade is higher than ASP for 'Below 55% Fe' and so on. Thus, if '62% to below 65% Fe' grade lump ore is misreported as '60% to below 62% Fe' grade lump ore, there will be difference in ASP of Rs. 929/- per tone (7557-6628=929/-). Further, ASP of lump is higher than the ASP for corresponding grade of fines. Thus, if "60% to below 62% Fe" grade lump ore is misreported as "60% to below 62% Fe" grade fine, then the difference in ASP will be Rs. 2,408 per tonne (6628-4220=2408/-).

5.4 For understanding the impact of misclassification of grades of mineral, following three cases can be considered:

If royalty rate of 15% on iron ore is taken,

Loss in royalty per tonne of ore dispatched = difference in ASP x 15% (rate of royalty)

Case I:- Miss-grading of higher grade Lump ores (62% to below 65% Fe) as lower grade lump ores (58% to below 60% Fe), [7557 - 5592 =1965/-] , would result in loss of royalty of Rs.295/- (Rs. 1965x15%)

Case II:- Miss-grading of higher grade fines (62% to below 65% Fe) as lower grade fine (58% to below 60% Fe), [5147 - 3967 = 1180/-]would result in loss of royalty of Rs. 177/- (Rs. 1180x 15%)

Case III:- Miss-grading of 62% to below 65% Fe grade Lump ores as 62% to below 65% Fe grade Fine ores, [7557-5148 = 2409/-]would result in loss of royalty of Rs. 361/- (Rs. 2409x15%)

Considering volume of dispatch in millions of tonnes in a State, the loss of revenue would be considerable even if a very small percentage of ore dispatched is mis-reported. The above example only takes in to account the royalty amount, if the amount payable for auction premium, DMF and NMET, etc. are also considered, the loss of revenue would be substantially higher.

5.5   Concerns have been raised by many State Governments that many mine owners have been replacing higher grades of iron ore in their returns submitted to IBM with lower grades. As shown above, misreporting of lumps as fines or declaring the dispatches of higher-grade material in the lower-grade slab will directly affect the generation of revenue to the Government by means of royalty, DMF, NMET, auction premium and other government levies. The issue of misreporting of the grades gains more significance in the auction regime, where the lessee is required to pay auction premium on the basis of value of mineral dispatched. Many of auctioned mines of iron ore have fetched high auction premium. Misreporting of higher-grade mineral as lower-grade mineral would lead to payment of lower auction premium.

5.6   There is another implication of misreporting or misclassification of grades by a lease holder. Such misclassification by lease holder not only lowers his own payments towards the State Government but also impacts the compilation of ASP for whole of the State. Particularly, any misrepresentation by a large lease holder having significant dispatch of ore, which in turn have large contribution on the ASP of the State, will bring down the ASP of the whole State. As royalty, DMF, NMET, auction premium, etc. are calculated on the basis of ASP, the payment of all lease holders in the State

gets affected due to misreporting by even an individual lessee. This can be understood from the following example:

Considering that in a State, the following dispatch data has been reported by the iron ore lease holders:

Grade	Mine Name	Dispatch (in tonnes)	Ex-Mine Price (in Rs.)	Sale Value (in Rs.)
below 55% Fe lumps	A	17013.62	3214.41	54688693
below 55% Fe lumps	B	998.72	4900	4893728
below 55% Fe lumps	C	13467.52	3322	44739101.44
below 55% Fe lumps	D	55487.56	2195	121795194.2
below 55% Fe lumps	E	5201.57	3193	16608613.01
below 55% Fe lumps	F	4330.14	1500	6495210
below 55% Fe lumps	G	1146.16	4312	4942241.92
58% to below 60% Fe lumps (Misreported as below 55% Fe lumps)	**X**	**49996.31**	**2200**	**109991882**
Total (without including misreported mine X)		97645.29	2602.92	254162781.6
Total (After Including misreported mines X)		147641.6	2466.48	364154663.6
Actual ASP for below 55% Fe lumps (without including misreported mine X)	2602.92 (total sale vale / total dispatches)			
Manipulated ASP for below 55% Fe lumps (after including misreported mine X)	2466.48 (total sale vale / total dispatches)			
58% to below 60% Fe lumps	H	12697.59	4487	56974086.33
58% to below 60% Fe lumps	I	0	-	0
58% to below 60% Fe lumps	J	0	-	0
58% to below 60% Fe lumps	K	10468.61	4374	45789700.14
58% to below 60% Fe lumps	L	3494.62	4184	14621490.08
58% to below 60% Fe lumps	M	1847.61	6431	11881979.91
58% to below 60% Fe lumps	N	4484.07	5102	22877725.14
58% to below 60% Fe lumps	O	241.16	5450	1314322
58% to below 60% Fe lumps	**X**	**49996.31**	**6314**	**315676701.3**
58% to below 60% Fe lumps	P	38876.85	5733	222880981.1
58% to below 60% Fe lumps	Q	3136.06	4400	13798664
58% to below 60% Fe lumps	R	2708.57	6930	18770390.1
58% to below 60% Fe lumps	S	10760.53	3000	32281590
58% to below 60% Fe lumps	T	0	-	0
Total (including mine X)		138711.98	5456.40	756867630.1

		88715.67	4973.09	441190928.8
Total (without including mine X, as same is misreported in below 55% grade slab)		88715.67	4973.09	441190928.8
Actual ASP (including mine X)	**5456.40**			
Manipulated ASP (without including mine X, as same is misreported in below 55% grade slab)	**4973.09**			

In the above example, if no misreporting is done, there are total 7 entries that are to be considered for calculation of ASP for the grade slab of 'below 55% Fe lumps'. In such case, the ASP as calculated from the data of mines 'A' to 'G' was Rs. 2602.92/ tonne. Now, if Mine X misreports the iron ore which is actually in the grade slab of '58% to below 60% Fe lumps' with ex-mine price (EMP) of Rs.6314/ tonne; as having grade slab of 'below 55% Fe lumps' at an EMP of Rs. 2200/ tonne, then the manipulated ASP for grade slab below 55% Fe lumps' becomes Rs.2466.48/ tonne. This manipulated ASP is Rs. 136.44/ tonne less than the actual ASP [2466.48-2602.92 = 136.44].

Further, due to swapping the entry of Mine X from grade slab of '58% to below 60% Fe lumps' to grade slab of 'below 55% Fe lumps' there will also be consequential impact on the ASP of grade slab of '58% to below 60% Fe lumps'. Originally if swapping/ misreporting of Mine X is not done, the ASP for grade slab '58% to below 60% Fe lumps' would be Rs. 5456.40/ tonne. But due to swapping (i.e. removing the entry from this grade slab), the manipulated ASP drops to Rs.4973 per tonne. Thus, there is drop of Rs. 483.31 per tonne in the ASP [5456.40-4973 = 483.31].

Thus, it can be noted that due to misclassification of grade there is an impact in terms of drop in ASP in both the grade slabs.

5.7   In light of the above, it becomes very essential for the State Governments to have suitable checks and balances for discovering the true grade and price of mineral corresponding to that grade, for preventing any loss to the exchequer, which is the basic objective of constituting the present committee. The State Governments are required to have a robust mechanism for sampling and declaration of grades of minerals as it directly affects their revenue.

6.0 VIEWS OF THE STATE GOVERNMENTS AND OTHER STAKEHOLDERS

6.1 Odisha

6.1.1 State Government of Odisha expressed its concern over the sharp decline in the grade of ore of mines which have been granted to the new lessees by auction after the expiry of lease period as held by previous lessee up to 31.03.2020. The continuity of operation in all these expired leases by the new lessees has been ensured by vesting with them the previously existing statutory approvals and approved schemes of mining / mining plan. As such, the new lessees are allowed to work in the same area as was allowed for operation prior to expiry on 31.03.2020. The State Government has stated that under such circumstances, sharp drop in the grade of ores produced after 31.03.2021 does not appear to be in conformity with the schemes of mining being followed by the new lessees and warrants detailed study of field operations. Grade classification is warranted not only due to occurrence of different grades, but also for trading and sale of different grades as per market demand and also in the interest of mineral conservation.

6.1.2 The representative of State Government made an elaborate presentation on the process adopted by the State for sampling and verification of grade of mineral before dispatch from the leased area. The following major points emerged from the presentation:

i) For sampling and verification of the mineral grade before its dispatch from the leased area, a lessee is required to choose from one of the two options, viz. (a) exemption option and (b) non-exemption option.

ii) If the lessee chooses **Exemption** option, no sampling and analysis of the stacks of the ore to be dispatched from the lease area is required. Under this option, the royalty and other charges for the mineral ready to be dispatched from the leases area, are to be paid at the rate prevailing for the highest grade of lumps of Iron ore.

iii) For the other leases, where Exemption has not been opted by the lessee (i.e.**Non-Exempted** mines**)**, the Government of Odisha has adopted an Information Technology based system for the stacking, sampling and chemical analysis regime. Following are the highlights of the process:
Stacking
a. Stack size limit increased from 4000 Metric tonne to 20,000 Metric tonne.
b. Stacks to be in rectangular or trapezoidal shapes of height not greater than 3m.
c. Lessee to fill in Stack details along with stack coordinates in Form-S1 and to submit it on a mobile App in Form-S1.

Sampling

a. Software based system randomly allocates a Junior Mining Officer (JMO) for inspection and sampling of stack.

b. Augmented Reality based mobile app system randomly generates sampling points and guide lessee to draw sample from the designated points, in presence of the inspecting officer.

c. Above process is recorded by the IP (internet) enabled cameras installed by the lessee.

d. Post the sample collection, representative samples are prepared and bagged in three different bags marked as primary, secondary and umpire samples which are to be tested in Government approved NABL lab, in Government labs and to be kept as standby for further reference, respectively.

e. Printable QR code, generated via mobile App, is labeled on the sample bag zip tag. Picture of the sample bag taken and uploaded on the App.

f. Report by JMO and his remarks are submitted on the App for reference.

In picture: Generation of sampling points by Augmented Reality based Mobile app.

Chemical Analysis

a. Lessee has to request for chemical analysis over i3MS software and submit the sample bags to the attached laboratory.

b. Laboratory may digitally receive sample by logging intoi3MS and scanning the QR coded zip tag.

c. Chemical analysis report is displayed online against the sample request ID. Based on grade reported, Chemical analysis report in Form-K is auto generated which is used by lessee for dispatch permit.

d. Permit in Form-L is issued once Royalty & other fees are paid by the lessee.

Cost of infrastructure: The cost of software development and the mobile handset of JMO are borne by the State Government. It is informed that State Govt. Charge Rs. 1 per tonne of mineral ore dispatched as service charge. The cost of IP enabled camera for video-graphing sample collection is borne by the lease holder.

Time involved in the process: The process of sampling and analysis take around 2-3 days.

6.2   Karnataka State:

6.2.1   DMG of State of Karnataka informed that State Government is also examining the possibility of implementing a model similar to the model adopted by the Government of Odisha for sample collection, analysis and issue of transit permit.

6.2.2   Apart from this, they suggested that the number of grade slabs for iron ore should be reduced and most favorably be just 2 i.e. (i) below 60% and (ii) above 60% and doing away with Fines and Lump classification. Royalty may be imposed on these 2 slabs based on Steel Price Index (SPI).

6.2.3 Further vide letter dated 11.08.2022, the State Government stated the following comments regarding the misclassification of iron ore grades:

(i)   to have minimum slab of grades which is more suitable for grading the iron ore.

(ii)   It would be in the order of 0 - 55%, 55 - 60%, 60 - 65% and above 65% so that only 4grades by removing Fines and Lumps differentiation.

(iii)   Therefore sampling of 4 categories can be collected from the mining leases as it would reduce the time for collection and chemical analysis.

(iv)   Sampling procedure adopted by Odisha may be adopted. The State of Karnataka is preparing the SoP for the sample analysis on the same lines with that of Odisha.

(v)   It is also suggested to have a two grade by removing Fines and Lumps differentiation i.e. below 60 and above 60 and royalty can imposed on the basis of standard steel price index like Gold.

6.3   Jharkhand State:

6.3.1   In his presentation, Dy. Director, DGM Jharkhand, informed that the system in the State is similar to that of Odisha State except unlike Odisha, Jharkhand has not opted for IT based system for non-exempted regime.

6.4   Chhattisgarh State:

6.4.1   Additional Director, DMG, Chhattisgarh raised the issue that some of the lessees are converting lumps into fines by in-pit crushing and are selling those crushed fines, which is fetching lower revenue to the State, as compared to the lumps of that grade. Thus, such practice is to be discouraged and artificial conversion of lumps into fines should be considered as lumps only, for the purpose of its gradation and computation of its ASP. They further suggested that lump and fines should be distinguished based on their natural occurrence.

On this issue, the DMG Odisha stated that in the State of Odisha wherever lumps are crushed to the fines and is sold, then royalty is collected at the rates of lumps of that grade and this principle has been upheld by the Honorable High Court of Odisha.

6.5   CMG, IBM:

6.5.1   CMG, IBM in his presentation raised the following issues:

a. Iron, despite being a metallic element, has been kept out of rule 44 of MCR, 2016, which prescribes for ASP of metals.
b. Multiple grade categories and slabs may be discouraged and instead of considering the physical form or ore as lump/fine the metal content in the ore needs to be considered for the purpose of computation of its ASP, as being done in other metals like copper, lead, zinc, bauxite (for metallurgical purpose) etc.
c. Space and time, are the major bottlenecks in grade wise stacking and sampling regime. Unless the previous stacks are cleared it becomes difficult to develop the space for accommodating the new stacks as production and dispatch are continuous process.
d. The prevailing principle of ascertaining ASP, particularly for iron ore is tedious and prone to lot of manipulation at various stages. Ex-mine price, which is basis of ASP, is a function of multiple variables that IBM has no

control upon, specifically the actual grade of mineral being dispatched and the price consideration between the buyer and the seller.

6.5.2 Followings suggestions were made by the CMG, IBM:

a. ASP of iron ore should be included in Rule 44 of the MCR, 2016 and it should be calculated on the basis of metal content in the ore.

b. Lump and fines classification should be done away with.

c. The formula for ASP can be derived based on the average steel price for the preceding 10 years i.e 2010-11 to 2020-21 which will include 5 years prior to auction regime and 5 year post auction regime which will also takes into account the entire metal cycle prices over a period of 10 years.

d. Since the normal feed grade of iron ore to steel plants is 62% Fe content, 62% Fe can be fixed as the base grade and suitable discount and premium can be decided for lower and higher grade.

e. Prior to auction of mineral deposits, reliable data on grade and resources were not available, however after commencement of auction regime most of the deposits have been explored by government agencies and have reliable data on grade and resources which can be used for calculation of ASP.

f. The apprehension of State Government regarding loss of revenue due to lower grade is based on no evidence, as grade is inversely proportional to volume i.e. lowering of grade will lead to proportionate increase in volume (quantity of ore).

g. For leases granted prior to 2015 few confirmatory bore holes can be drilled to assess the grade which will serve as the basis for ASP.

h. With changes in mode of transportation of ore such as through slurry pipelines newer methodologies maybe required to be evolved to ascertain the grade etc.

i. Use of continuous online weigh feeders and auto samplers and analysis techniques may be used avoiding human interventions.

6.6   Dy. Secretary, Ministry of Mines:

6.6.1 Following are the points presented by Shri Dheeraj Kumar, Ministry of Mines/ Member Secretary of Committee:

a. Member Secretary of the Committee presented the issues associated with the present technology. Present system of sampling and analysis adopted by many States is time and energy consuming, having lot of human intervention, creates idle inventory (waiting for laboratory report) and possibility of

fiddling with sampled stacks etc. These issues need attention in development of new system.

b. Handheld X-Ray Fluorescence (XRF) Spectrographic analyser may be used at the despatch points, in Wagons and Lorry. The XRF will be linked with software based cloud computing for data storage, access and coding, which will take sample analysis report, wagon/lorry number, weight of the carriage and any other desired data as input to generate a colour coded QR Code tags to be stud welded on carriage for transportation.

c. Cryptography of the data may be done to generate secret codes to be used to verify at the destination to detect any fiddling with the material during transportation.

d. On the XRF proposal ADM, DMG, Odisha said that State of Odisha has taken trial of hand-held XRF however, it is effective only up to a depth of 6 to 8 inches. Other members suggested that the scooped-out minerals from the stack can be spread into a layer of desired thickness which can then be analyzed through hand-held XRF for quick analysis of the stacked material.

e. Member Secretary of the Committee further suggested three different technological possibilities of grade classification, based on the exempted, non-exempted case model of Odisha with XRF for transportation and only XRF for small miners and for those who wants to avoid waiting time for laboratory results.

6.7   As stated above, written comments/suggestions were received from various industry associations, companies and other stakeholders in response to public notice dated 09.06.2021. Summaries of submissions made by stakeholders are attached at **Annexure-3**.

7.0 <u>CONSTITUTION OF SUB-COMMITTEE TO VISIT MINES IN ODISHA</u>

7.1   In order to understand the issues involved in sampling and declaration of grades of iron ore and new technologies that can be adopted, the chairman of the Committee decided to form a sub-committee to make a visit of members to the State of Odisha. Accordingly, the members of the committee, including the representatives of the State Governments in the committee, were requested to join the sub-committee's visit to Odisha during 31.05.2022 to 02.06.2022. The following members participated in the tour:

1) Sh. Dheeraj Kumar, Deputy Secretary (Mines)
2) Sh. S.K. Adhikari, CMG, IBM
3) Sh. Sanjay Khare, Dy. Director, Govt. of Chhattisgarh (nominated by the State Government)
4) Sh. Salil Behera, Jt. Director of Mines, Govt. of Odisha (nominated by the State Government)
5) Sh. Sambhav Jain, Sr. Manager(Legal), NALCO Ltd./ Ministry of Mines

7.2   The sub-committee visited Odisha from 31.05.2022 to 02.06.2022. On 31.05.2022, a meeting was held with Shri Debidutta Biswal, Director of Mines, Directorate of Mines, Government of Odisha and other officers in the Directorate of Mines. The representatives of State Government made an elaborate presentation on i3MS portal of the State Government and system of stacking, sampling, chemical analysis for grade determination of minerals, established under the Odisha Mineral (Prevention of Theft, Smuggling and Illegal Mining and Regulation of Possession, Storage, Trading and Transportation Rules (OMPTS Rules).

7.3   As the OMPTS Rules provides options of exemption from the process of sampling and grade analysis, the committee decided to visit two types of iron ore mines, one which has opted for exemption and another which has opted non-exemption regime. Accordingly, the State Government officials suggested to visit Joda East Iron Ore Mine of Tata Steel Ltd. which is an exempted mine and Jajang Iron Ore Mine of JSW Steel Ltd. which is non-exempted. It is pertinent to mention here that Joda East is a non-auctioned mine and Jajang is an auctioned mine. General observations of the Sub-committee is given below. A detailed visit remarks of the sub-committee on the visit is attached as **Annexure-4.**

7.4 General observations from the visit

(i) Only two options are available to the lease holders, either follow the process of stacking, sampling and analysis and pay the statutory dues on the grade determined in the process or seek exemption from the process and pay statutory dues on the highest grade of mineral.

(ii) The process of stacking, sampling and analysis has following shortcomings:

    (a) It is a cumbersome process involving various steps and processes.

    (b) It is time taking process as the whole process takes at least 7 days after processing of mineral till dispatch.

    (c) The process requires huge infrastructure investment and unnecessary material rehandling within the leased area. Additional cost of rehandling comes to around the Rs. 70-80 per tonne in a typical mine of 10-12 MTPA capacity.

    (d) Separate stacks for each grade and each type of ore (lump, fine, CLO) are required to be made. The process is area extensive and requires large flat area within the leased area, which is difficult to maintain in working mines.

    (e) Human intervention is involved in the process at crucial stages of drawing of samples and chemical analysis.

    (f) Most of the sample collection locations in a stack are predictable.

    (g) No provision for continuous monitoring of stacks creation and dispatch through CCTVs.

    (h) The process could be a roadblock and impediment in fully mechanization or automation of mining activities and enhancement of production capacities in future.

    (i) The process consequently affects the productivity and efficiency in mining.

(iii) The annual capacity of both the mines visited by the sub-committee is comparable, however the turn-around time from mining of ore till dispatch in both the categories of mines is incomparable. The turn-around time in case of non-exempted mine of JSW Steel Ltd. was around 7 days, whereas it was only around 1-3 hours in case of exempted mine of Tata Steel Ltd.

(iv) It was noted that some lease holders have opted for exemptions from the process of sampling and analysis due to above mentioned issues in the process. A critical analysis of the list of operating mines in Odisha reveals that only non-auctioned mines are opting for the exempted regime and auctioned mines are opting for non-exemption. The basic reasoning for the mines having higher production capacity going for the exempted category is to avoid the cumbersome and time consuming process of stacking and analysis which adversely impacts their productivity.

(v) Only reason for affording the cost of exemption regime appears that such mines are non-auctioned mines which are not required to pay auction premium. For the auctioned mines which have bid high auction premiums, the exemption regime is not affordable and therefore the lease holders are bound to adopt cumbersome process of sampling and analysis, causing loss of productivity and efficiency.

(ix) It was also observed that JSW Steel Ltd. has adopted advanced digitalization in almost all the process in mining and logistics, such as Safety & Compliance Management System, Digital Logistic Management System (DLMS), Smart Security & Surveillance system, Central Control & Command Centre (CCCC), etc. JSW Steel Ltd. informed that implementation of DLMS has resulted in around 81% reduction in time taken by trucks from mine entry till dispatch. Average turn-around time has improved by 3 hours by just adopting DLMS.

(x) From the above, it is observed by the sub-committee that on one hand, the lease holders are increasingly adopting state of art technology and automation in all the aspects of mining and mineral handling. However, on the other hand, the process of stacking, sampling and analysis, as highlighted above, is not keeping the pace with the technology adopted by lessees in other spheres of mining and mineral handling. Such a process of stacking, sampling and analysis is a hurdle in increasing the productivity and efficiency of the mines. The whole process of stacking, sampling and analysis need to be automated and integrated in the other automated processes of mining activities.

8.0 PRESENTATION BY THE TECHNOLOGY SUPPLIERS IN THE FIELD OF AUTO-SAMPLING AND SAMPLE ANALYSIS

8.1   To explore the use of latest technology available to facilitate the Iron Ore grading and minimize the issue of misclassification, the committee contacted some of the technology suppliers in the field of ore sampling technology and ore analysis. The committee invited M/s SGS India Pvt. Ltd. (hereinafter 'SGS'), known for auto-sampling technology and OLM Systems and Technology (hereinafter 'OLM') for presentation. The record note of the meeting held on 01.07.2022 is attached as **Annexure-5**.

8.2   SGS explained the importance of sampling and different sampling technologies available   with   SGS.   He   informed   that   the   sampling can be static wherein sample is taken from a stack of ore or sample can be taken when the ore is in movement on a conveyer belt. He informed about the various issues involved in sampling from a stacked ore. For sampling of in-movement ore, he informed that there are two technologies viz. cross-belt conveyer sampling system and auger system.

8.3   SGS informed about the various aspects of its cross-belt conveyer sampling system / mechanical sampling system including automated sample collection and delineation of non-sample from sample. It was informed that the system is in operation in Neyvelli lignite mine. It was informed that the system is more suitable for large   mines   which   already   have   a   railway   siding   facility.

8.4   SGS informed about its auger sampler which is used for sampling of ore in a contained space. They informed that auger works as a three-tier sampling system where in sample is crushed, prepared, seal packed and sent for analysis to the lab. It was also informed that this mechanism ensures sample integrity and reduces the sample size to 20kg which is easier to work with. Further, it was informed that the auger system can be integrated with an online continuous analyzer to obtain the results immediately. Integrating RFID technology with the auger system will ensure there is no human intervention.

8.5   SGS informed that the cost for the cross-belt conveyer sampling system would be approximately Rs. 1.5 crore and the cost for the auger analyzer system would be approximately Rs. 1.5 crore to 2 crore.

8.6   OLM informed that there are two types of continuous analyzers for online real-time feedback of material *viz*. Prompt Gamma Neutron Activation Analyzer (PGNA/ PGA analyzer) and laser analyzer.OLM informed that the PGNA/ PGA analyzers have

a radioactive component in the system and therefore, obtaining permissions requires time. PGNA/ PGA analyzer has good depth penetration into the ore stack/layer and is therefore more accurate.

8.7   OLM informed that the Laser analyzer is a Radioactive Radiation-free Online Elemental Analyzer and is based on plasma technology wherein the ore is heated and then emission is analyzed to assess the grade composition of the ore. The analyzer gives the moisture component in the ore as well. The analyser provides information about the composition of different elements, oxides of elements and moisture content in the minerals. It was informed that the system can also be integrated with the auger system to provide online real-time feedback of material. Further, Laser analyzer is safe as it does not contain any radiation.

8.8   It may also be mentioned that OLM had previously sent a written details regarding LASER based elemental analyzers. OLM had given comparison of LASER Based Elemental Analyzers with Traditional Laboratory Sampling Method and Radioactive/XRF based technologies was given by the company:

Qualitative Benefits:
  (i)   Brings down the sampling analysis time to zero.
  (ii)   Increase in productivity, quality and environmental safety (no radiation).
  (iii) Improved quality of the final product as a result of the rejection of the off-grade materials, reduce off-grade product penalties.
  (iv)   Reduce energy consumption due to stable raw batches after prompt ore sorting and dosage of mix components.

Quantitative Benefits: Current process consists of sample collection, sample transportation, sample preparation, sample testing. Samples are collected from the conveyor or mines directly and sent to a laboratory for preparation and testing. This entire process takes approx. 48 hours for the results to be published, in that time the material is already processed for dispatch or there is a wait till the results are received. Even after waiting for that long, these results are not representative of the entire batch and are only indicative. LASER based elemental analyzers reduce sampling time by providing real-time online analysis thereby providing real-time qualitative analysis of the ore.

Techno-Economic Quantitative Analysis

S. N.	Item	Laser Based	Radioactive/XRF based	Traditional Sampling
1	Initial Capital Cost (in lacs)	600	550	50
2	Supporting Instruments (in lacs)	0	50	0
3	Radioactive License Costs (in lacs)	0	5	5
4	Life (in years)	10	2.5	2
5	Source Disposal Cost (in lacs)	0	50	0
6	Specialized & Untrained Manpower (nos.)	0	3	30
7	Specialized Manpower Costs (in lacs)	0	15	126
8	Radiation Safety Infrastructure Setup	0	20	5
9	Maintenance Cost (in lacs)	18	24	12
Total Operation Costs for 10 years (in lacs)		708.00	1,215.00	1,645.00

Findings of the above analysis:

1. LASER technology reduces operational and maintenance costs by up to 60% over a period of 10 years in comparison to other conventional methods.
2. LASER technology provides simultaneous quantitative analysis of all elements including light elements in real time without sampling with industry highest accuracy standards.
3. LASER is safe, does not contain any radiation so absolute safety of plant personnel is ensured and requires no authority certification and period renewals.
4. LASER is independent of environmental conditions, operates 24x7 with zero downtime to ensure maximum productivity.
5. No human errors/tampering in sampling and sample preparation procedures.

8.9   While the above comparisons and findings given by the company were not factually verified by the Committee, the LASER based elemental analyzers appears to be a promising technology to resolve the issue of misclassification of grades, particularly in large mines. The State Government should obtain technical and financial advice before implementing this technology or any other new technology suggested in this report and should do cost-benefit analysis.

9.0 RECOMMENDATIONS

9.1 Under the statutory scheme provided in the MMDR Act, the legislative and administrative powers relating to transportation and storage of minerals have entirely been given to the State Governments. The revenue from the mineral production also accrues to the State Governments in the form of royalty, auction premium and other payments. Any misreporting of the grade of minerals, misrepresentation in production data and illegality in transportation directly affects the revenue of the States as detailed in part5 of this report. With the advent of auction regime, the contribution to the States' revenues from mineral production has increased many folds. Thus, the State Governments are required to implement robust mechanisms for sampling of minerals, determination of grade and monitoring of transportation to reduce any chances of leakage in its revenues. This will also ensure sustainable mining.

9.2 Section 21(4) and (4A) of the MMDR Act gives sufficient powers to the State Governments to take penal action against the transportation of the minerals without lawful authority. Any mineral transported in contravention of the rules made by the State Governments under Section 23C of the MMDR Act shall be 'without lawful authority' and attract penalty prescribed under section 21(4) and (4A) of the MMDR Act. The rules made under section 23C of the MMDR Act should be robust enough to check any misreporting in grades of mineral and transportation of non-reported or misreported mineral.

9.3. In light of the above discussions and also considering the presentations and views submitted to the committee by the members and various stakeholders, the committee makes following recommendations.

9.4 These recommendations are mainly required to be implemented by the State Governments by way of incorporating them in the rules made under section 23C of the MMDR Act and other guidelines/ SOPs. The Central Government may consider issuing necessary advice to the State Governments and facilitate their implementation to maintain uniformity in rules across the States.

9.5 RECOMMENDATIONS REGARDING THE ISSUE OF MIS-CLASSIFICATION OF DIFFERENT GRADES OF MINERALS:

9.5.1 The major iron ore producing States in the country are Odisha, Chhattisgarh, Jharkhand and Karnataka. As is cited in the tables below para 2.1 above, these 4 States have around 90% of iron ore resources and produces around 96% of iron ore in the country. These States are represented in this committee. Out of these, more than 50% of the country's production and dispatch of iron ore takes place in the State of Odisha. In its presentation, representative of Government of Odisha informed that a new Integrated Mines and Minerals Management System (i3MS) system has been

implemented in the State which is an IT enable system. Further, from the presentations made by different States it is revealed that Jharkhand and Karnataka are mostly in agreement with the procedure as adopted by the State of Odisha for IT enabled system of sampling, determination of grades and generation of transit permits. However, the visit of sub-committee to Odisha (as detailed in part 7 of this report) revealed that the existing system need further improvements to meet the changing needs of the mineral sector.

9.5.2 **The committee observed that system of mineral sampling and analysis should havethe following essential features:**

(a) An IT enabled system with no or minimal human intervention should be adopted by all the States.

(b) The system should cover all processes involved, right from mining of mineral, stacking, sampling, issuing of transportation challans, dispatch and transportation of mineral up to the factory/port.

(c) The system should reduce the time taken in sampling, analysis and declaration of grade and the process should take minimum time and space.

(d) Provision should be made for integration of internal system of the lease holder with monitoring system of the State Government at all points of interaction, allowing auto generation and transfer of data to the Government.

(e) As far as possible the system so developed should have the scalability to integrate with Internet of Things (IoT) based equipment, devices and applications.

(f) Technologies used for large and small mines can vary depending on ground situation.

(g) Random physical inspections and regular audit should be integral part of the system.

(h) System must be interoperable, scalable and technology-agnostic.

(i) States may give incentives to the miners to adopt new technologies which will in turn lead to proper monitoring and increase in revenue of the States.

9.5.3 **Accordingly, the committee recommends that system developed by State Governments should have the following technologies:**

(a) **IT-based grade information system:** State Governments can develop their own IT based grade information system, as being done in by State DGM of Odisha, for unbiased sampling. This also makes the process more secure, efficient and fast. Grade information system developed should have backward and forward integration toward sample analysis and issuing of transport permit. The system should be able to generate alert when there is significant variance in the grade

beyond the prescribed tolerance limit. Any manual interventions to be avoided in the system. IT enabled systems should also have facility of tracing and tracking of transportation of mineral from mine to factory/ port.

(b) On the spot sampling and analysis of working seam(s): State Government to conduct on the spot sampling and analysis of grade of iron ore for working seam(s) in a mine. On the spot analysis and result generation can be done by analyzers such as Pulsed Fast Thermal Neutron Activation (PFTNA) analyzers.

(c) Automated sampling and analysis: Current system of preparation of stacks and sample analysis through labs is cumbersome, time taking and prone to human interventions. Instead, automatic sample collection system and automated analysis through continuous online analyzers, as explained below, may be considered. This will reduce the chances of misclassification or misreporting of grades. The States should mandate automated sampling and analysis in large mines in a phased manner. The process of automated sampling can be achieved through following options:

(i) Continuous online analyzers mounted on cross belt conveyer: The continuous analyzer may be based on technologies such as Laser Induced Breakdown Spectroscopy (LIBS), Pulsed Fast Thermal Neutron Activation (PFTNA), Prompt gamma neutron activation analysis (PGNAA),X-Ray Fluorescence (XRF) or any such suitable advanced technology. In case of mechanized loading systems such as through belt conveyors and loading chute, high frequency laser based online analyser installed above cross-belt system can do away with the need for manual sampling and analysis. The high frequency data generation will give better chemical composition with superior accuracy. As the initial investment in this type of analysers is higher than other methods and they can only be installed in mechanized loading system, these will be suitable for large mechanized mines. Presently this is being practiced in agglomeration in steel plants for process optimization, and in Limestone mines associated with the Cement Plants. This system will be integrated with the data storage system of the States Governments.

(ii) Augur based auto-samplers integrated with continuous online analyzers mounted on cross belt conveyer: These types of samplers utilize augur to automatically collect samples from augmented realty (AR) based randomly generated locations from the trucks or other transport systems. The samples get collected into a hopper attached at the top of the augur. These samples are transferred into a chute installed above the conveyer belt. The continuous online analyzers mounted on cross belt conveyer analyze the samples and generates analysis report instantaneously. The mechanism ensures sample integrity and reduces the time of analysis.

Continuous online elemental analyzers reduce sampling time by providing real-time online analysis and provide qualitative analysis of the ore. Another benefit of continuous online elemental analyzers is that they can detect other minerals/ elements present in the ore that were not known earlier to be present in the area such as rare earth elements (REE) or other valuable minerals. In case of sizable presence of such minerals/ elements, the State Government can take measures for securing the recovery of the same.

Cost: The cost of above technology/ systems is as below:

- Cross-belt conveyer sampling system –Rs. 1.5 crore(approx.).

- Auger Sampler System –Rs. 1.5 crore to 2 crore(approx.).

- Initial cost for laser based continuous online analyzers - Rs. 6 crore(approx.) and total operation costs for 10 years - Rs. 7 crore(approx.).

Availability of technology: All these technologies, as discussed above, are available in India, except Auger Based Sampler System. The committee had discussed with a technology and equipment supplier of Auger Based Sampler System who have informed that this system can be supplied in India.

(d) Videography of sampling process: Videography of the sampling process should be mandatory and live feed of the process should be available to the State Government officers and lease holders.

(e) Random sampling and audit: Surprise sample inspections to be made in a block of 15 days where samples analysed by the continuous analyzer to be collected and analyzed in Government laboratories. For this, random sampling process must be inbuilt in the system by installing auto samplers in the extended conveyer belts after continuous online analyzers installed as per the point (b)(i)&(ii) above. Labs conducting verification of samples should be equipped with Inductively Coupled Plasma (ICP)Spectrometers for quick analysis.

9.5.4 Process for mineral sampling and grade analysis:

The committee recommends the following process for sampling and grade analysis using the above technologies:

(I) Monthly on the spot sampling and analysis of working seam(s): At the beginning of each month, the State Government officials to conduct on the spot sampling and analysis of grade of iron ore for working seam(s) in a mine. The lessee shall extract ore/ mineral only from the seam(s) which have been analyzed. In case of change of working seam or any geological interference in the analyzed seam, the

lessee shall request fresh grade analysis of the proposed seam to be conducted by the State Government. Seam analysis shall become the basis for fixing the tolerance limit. If the analysis from continuous analyzers (as described below) detects the grade below this tolerance limit, then the State Government can take corrective action such as increasing the number of samples for analysis by continuous analyzers in each batch or recalibration of analysers, etc.

(II) Analysis of extracted mineral by online continuous analyzers:

(A) For mines that are large and having longer operational period:

Applicability: The following process is applicable for mines with (i) dispatch capacity of 10,000 tonnes per day(TPD) or above and (ii) having remaining lease period for 10 years or more, or having remaining resources for 10 years or more as per approved mining plan:

RFID Tag for Vehicles

Generating Random Sampling Location

Auto Auger Sampling System
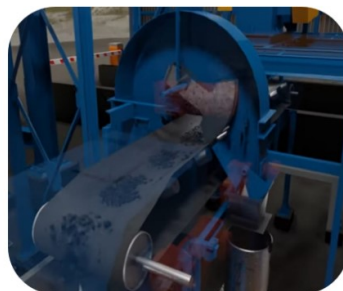
Blade Sampler on Conveyor Belt

Laser Based Continuous Analyser

In picture: Auto Sampling, Analysis and RFID based Transportation System

(i)(a)Mines with mechanized loading system-

The lease holder should be mandated to install **cross belt online continuous analyzers** at the dispatch conveyer with auto samplers in the extended conveyer belts after continuous online analyzers for audit sampling. Auto samplers will take samples for audit purposes and for calibration of the analyzer. The real-time analysis data generated would be linked with a centralized data storage and processing system of the State Government. Accordingly, dispatch/ transport permit would be automatically

generated through centralized system. Continuous online analyzers should be recalibrated as per the SOP provided by the technology supplier or a Standard can be generated by a Government agency.

(i)(b) **Mines with non-mechanized loading system-**

The lease holder should be mandated to install **augur-based auto-samplers with cross belt online continuous analyzers**. In this process, dispatch truck or railway wagon would pass through the facility where RFID scanner will scan the RFID tag and create the signature specific to the truck/ wagon. Then, the augur would automatically collect samples from augmented realty (AR) based randomly generated locations from the trucks. The samples would get collected into a hopper attached at the top of the augur. These samples would be transferred into a chute installed above the conveyer belt. The continuous online analyzers mounted on cross belt conveyer will analyze the samples and generates analysis report instantaneously which will be imparted in the RFID tag of the truck/ wagon.

Further, as mentioned in point (a) above, the real-time analysis data generated would be linked with a centralized data storage and processing system of the State Government. Accordingly, dispatch/ transport permit would be automatically generated through centralized system. Continuous online analyzers should be recalibrated as per the SOP provided by the technology supplier or a Standard can be generated by a Government agency.

These augur auto-samplers should be installed at the mine exit point. If dispatch is done through both truck and railways, the lease holder may install separate augur auto samplers for truck and wagons or an integrated augur auto sampler may be installed for both type of transport.

(ii) Analysis as provided by the cross-belt analyzers, as above, can be monitored by the Government in the similar lines as it is being done for monitoring of environmental parameters by State Pollution Control Boards.

(iii) The cross belt online continuous analyzers should be continually monitored by CCTV cameras sending real-time feed to centralized data storage system of the State Government. CCTV video to be stored for the prescribed period.

(iv) Artificial Intelligence based cameras for differentiating between fines and lumps may be installed.

(v) Surprise sample inspections to be made in a block of 30 days where samples analysed by the continuous analyzer to be collected and analyzed in Government laboratories.

(vi) This method would increase the accuracy in sampling and analysis of mineral before dispatch and increase transparency and trust in the process.

(vii) This method will help in automation of mining activities in large mines. As such many lease holders are already in the process of automating various activities in the mine, this method will integrate in their system.

(viii) The turn-around time from mining of ore till dispatch would drastically reduce from at least 7 days to 2-3 hours, thereby improving their productivity and efficiency.

(ix) The centralized system which collect and process the data for its analysis from each mine, can also be integrated with IBM's reporting system.

(B) For mines that are small and having shorter operational period:

<u>Applicability</u>: The following process is applicable for mines with dispatch capacity of less than 10,000 tonnes per day (TPD) and (ii) having remaining lease period for less than 10 years, or having remaining resources for less than 10 years as per approved mining plan:

(i) These lease holders may also be encouraged by the State Government to implement the same process as suggested for large mines having dispatch capacity of 10,000 TPD or above. However, installation of dispatch conveyer or augur auto samplers and cross belt analyzers may not be viable for small mines due to high cost of installing it.

(ii) Thus, as an alternative for such mines, the committee recommends that the State Government should establish common facility having **augur based auto-samplers with cross belt online continuous analyzers** for cluster of mines to analyse samples directly from the dispatch trucks. This facility may be installed at the **common point for cluster of mines**. The State Government already have such common facility for weighment of the dispatch trucks, where this facility of augur auto-samplers with cross belt online continuous analyzers may be installed. Each truck should also be integrated with RFID tagging system.

(iii) Every dispatch truck shall be mandated to pass through the common facility. However, sampling and analysis shall be done randomly of only 10% of the trucks dispatched from a mine in a batch of up to 20,000 tonnes or of such percentage as per the ISO norms of sampling, in the following manner. Random analysis is being recommended to avoid traffic jams and delays due to sampling of each truck.

(iv) Before entering the common facility, the RFID tag scanner/ reader based on Artificial Intelligence (AI) software shall read the information and decide to either allow to the truck further proceed on its journey or direct it to take detour to sampler and analysis facility where auto sampling and analysis shall be done before the truck

is allowed to further proceed on its journey. The AI software shall randomly select only 10% of the trucks dispatched from a mine in a batch of 20,000 tonnes or such percentage as per the ISO norms of sampling, for auto sampling and analysis.

(v) Continuous online analyzers should be recalibrated as per the SOP provided by the technology supplier or a Standard can be generated by a Government agency.

(vi) The process of augur auto-sampling and online continuous analysis should be continuously monitored by CCTV cameras sending real-time feed to centralized data storage system of the State Government. CCTV video to be stored for the prescribed period.

(vii) Artificial Intelligence based cameras for differentiating between fines and lumps may be installed.

(viii) Regular audit samples should also be collected and analyzed separately at government laboratories. Labs should be equipped with Inductively Coupled Plasma (ICP) Spectrometers for quick analysis. Robust Quality assurance and quality control (QA&QC) protocol should be developed by each State Government to ensure that the sample actually being sent to the laboratory being analyzed accurately. For this, certain percentage of the audit samples should be tested and verified from third party laboratory.

(III) Payment of royalty and other statutory payments: The committee recommends that the royalty and other statutory payments shall be charged on the analysis done by continuous analyzers as given in point (II) above for a batch of 20000 tonnes of mineral dispatched. Seam analysis shall become the basis for fixing the tolerance limit. If the analysis from continuous analyzers detects the grade below this tolerance limit, then the State Government can take corrective action such as increasing the number of samples for analysis by continuous analyzers in each batch or recalibration of analysers, etc.

9.6. ASP based on Metal content of iron ore: Regarding the issue of calculation of the ASP of iron ore based on its metal content as being done for other metallic minerals like copper, lead, zinc, bauxite, etc., it is informed to the Committee that this issue has been referred by the Ministry of Mines to another Committee constituted by the Ministry, namely, NMI Committee. Thus, this Committee has not deliberated the issue.

9.7 RECOMMENDATIONS REGARDING TRANSPORTATION OF MINERAL:

(a) **GPS enabled vehicles coupled with RFID tagging**: In mines, outbound loaded GPS enabled trucks can be issued with RFID tags (unique identification) along with records of vehicle No., time, destination, tonnage, grade, etc. All these information can be checked online at any point of time and at any location such as Govt. weighbridges, common augur auto-sampler facilities, plant location etc. RFID provides automated solutions that monitor trips made by vehicles. RFID-enabled weighbridges automate calculation of vehicle bare weight and laden weight, update databases at remote servers and transmit this data to the destination weighbridge for verification of trip made and delivered mineral quantity. RFID based Automatic boom barriers may be installed at all the entry and exit points of Mines and Railway Sidings so that only authorized vehicles/tippers can enter/exit into the mine premises which eliminate the possibility of any pilferage, illegal transportation and helps to regulate vehicle traffic and transportation routes.

(b) **Pre-registration of mineral carrying vehicles with DMG, Govt. Portals:** This enables States to collect details of mineral-carrying trucks and maintain a database of such pre-approved trucks, which can be tracked via GPS at any point of time.

(c) **Mine Monitoring System and Geo-fencing:** Live feed CCTV system may be established at the stacks, weighbridges and entry-exit points. All mine boundaries, unloading points like sidings, stocks, feeder breakers, crusher and bunker, internal transportation routes should be geo-fenced. System checks a defined region to search for any unusual activity. This will enable detection of intrusion of vehicles or transportation of mineral through unauthorized routes. For example, if any truck takes a detour from the pre-defined geo-fenced route it will cause breach of the geo-fence which will generate auto alert to the miners and authorities.

9.8 USE OF BLOCK CHAIN FOR ACCOUNTING FROM MINE TO FACTORY/ PORT

9.8.1 There are lot of manual processes and complexity involved in mineral and mining industry right from extraction to end utilization of mineral, whether it is traceability of minerals and ores, grade determination or regulatory compliances. Once

ore is extracted from the mine, it changes hands between multiple parties. It creates multiple opportunities for misreporting, because of lack of data transparency resulting in significant revenue loss to the State exchequer. Proper tracking of value chain and supply chain is required to ensure that minerals are mined responsibly and sustainably and reach its end use destination.

9.8.2 Block-chain is essentially a type of database. Transactions entered into the database are copied and distributed to all participating stakeholders on a network that have to approve the transaction, rather than held by a centralized hub that acts as the regulator. This happens in real time and so increases transparency, efficiency and security among network participants. Entries to the database are secured by encryption and agreed through consensus mechanisms so the network flags up false entries, which 'break the chain'. The longer the chain of entries (chain), the more complex the encryption sequence becomes and the harder it is to corrupt, or hack. This cements the integrity of the data.

9.8.3 Block-chain can be used for self declaration of grades, where the base data generated in the initial period can be compiled to standardize the output grades from a mine. The same standard data can be utilized for continuous self declaration of the grades thereafter. In case of any variation from the standard grades, more than a tolerable limit, an audit request can be generated automatically for any possible re-standardization of the grades.

9.8.4 Block-chain can be also used to track materials in the mining value chain from the ROM to the concentrate and upto metal production. This block-chain technology along with RFID and GPS tracking of transport vehicles can be utilized for better monitoring of mines and transportation operations to address malpractices with regards to gradation of ore and ensuring the right grade ore gets domestically utilized or exported. Block-chain may be utilized to generate colour coded QR tags.

9.8.5 Use of block-chain will not only ensure proper regulatory monitoring but also be helpful to the miners. Block-chain would lead to the automation of invoice reconciliation. Block-chain would improve traceability of reserve estimation for stock exchange reporting and the traceability of inventory into the ERP for inventory management of the resource/reserves. Block-chain can be used to validate the workflow/audit of activities and outputs used in the resource/reserve calculations. If all the mines are brought on to a single platform, it will help in minimizing the delay in compilation of ASP and a quick reconciliation of payments will be possible.

9.8.6 Accordingly, the committee recommends that block-chain technology may be adopted in mining sector. In the initial stage a pilot project can be undertaken in

respect of a high value mineral having less number of mines and end-users, such as gold, copper, zinc, etc. Learning on the outcomes of the pilot project, the model may be replicated in other mines/ minerals.

9.8.7 Committee also took the cognizance of the observations of the State Government of Odisha wherein the circumstances were discussed for sharp drop in the grade of ores produced after 31.03.2021, which does not appear to be in conformity with the schemes of mining being followed by the new lessees and warrants detailed study of field operations. Committee recommends that the concerned State Governments should refer all such cases to the Central Government. Central Government in turn, may authorize the Geological Survey of India, or such other authority or agency as it may specify in this behalf under Section 18A of the MMDR Act, to carry out such detailed investigations and obtain information with regard to any mineral available in or under any land in relation to any such mining lease.

9.9   Applicability on other ores:

The above recommendations, given mainly in the context of iron ore, may be made applicable for all other ores where royalty, auction premium and other payments to the Government are dependent of grade of the ore.

10.   VIEWS OF STATE GOVERNMENTS ON THE FINAL DRAFT OF THE REPORT:

10.1 Upon circulation of final report for signature of the members, State Governments of Chhattisgarh and Odisha submitted following views:

(i)State Government of Chhattisgarh:

The State Government sent its comments on the draft report circulated to the members for finalization and signatures vide letter dated 22.09.2022(**Annexure-6**). The State Government stated that it appreciates recommendations suggested by Ministry of Mines. The State Government agreed with the recommendations. However, the State Government stated that incorporating the same in Rules framed under Section 23 (c), shall be subject to due consultation with the stakeholders considering their quantum of working, their technical know how/skill, network connectivity in the area, and overall feasibility of the proposed system. The State Government also informed that it has successfully implemented Khanij Online system and certain measures as suggested by in the report are already in place, like online generation of transit pass, online monitoring of vehicles etc. The State Government is continuously renovating Khanij Online system with VTS, Mobile app, ICCC etc.

Further, Director, Directorate of Geology & Mining signed the report.

(ii) State Government of Karnataka:

The State Government had agreed with the final draft of the report and Director, Department of Mines and Geology signed the report.

(iii) State Government of Odisha:

The State Government vide letter dated 29.09.2022 send certain observations on the final draft of the report. A copy of the said letter is placed as **Annexure-7** of this report.

(iv) State Government of Jharkhand:

The State Government vide letter dated 07.11.2022 (sent through email dated 09.11.2022) agreed with the final draft of the report (**Annexure-8**).
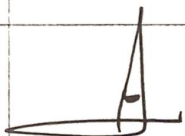
[End of the main report, signature of members and annexures follows]

SIGNATURE OF MEMBERS:

S.No.	Name and designation	Role in the committee	Signature
1	Shri Abhay Agrawal Controller of Mines, IBM	Member	
2	Shri S. K. Adhikari CMG, IBM	Member	
3	Shri P. N. Sharma CCOM, IBM	Member	
4	Shri Dheeraj Kumar Deputy Secretary M/o Mines, GoI	Member Secretary	
5	Shri J.P. Maurya (DMG, Govt. of Chhattisgarh)	Member	*
6	Shri Ameet Kumar (DMG, Govt. of Jharkhand)	Member	*
7	Shri D.S. Ramesh (DMG, Govt. of Karnataka)	Member	*
8	Shri D.D. Biswal (DMG, Govt. of Odisha)	Member	
9	Dr. Veena Kumari Dermal Joint Secretary Ministry of Mines, GoI	Chairperson	

* Separate sheet attached.

SIGNATURE OF MEMBERS:

S.No	Name and designation	Role in the committee	Signature
1	Shri Abhay Agrawal Controller of Mines. IBM	Member	
2	Shri S. K. Adhikari CMG. IBM	Member	
3	Shri P. N. Sharma CCOM. IBM	Member	
4	Shri Dheeraj Kumar Deputy Secretary M/o Mines. GoI	Member Secretary	
5	Shri J.P. Maurya (DMG. Govt. of Chhattisgarh)	Member	
6	Shri Ameet Kumar (DMG. Govt. of Jharkhand)	Member	
7	Shri D.S. Ramesh (DMG. Govt. of Karnataka)	Member	
8	Shri D.D. Biswal (DMG. Govt. of Odisha)	Member	
9	Dr. Veena Kumari Dermal Joint Secretary Ministry of Mines. GoI	Chairperson	

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SIGNATURE OF MEMBERS:

S.No.	Name and designation	Role in the committee	Signature
1	Shri Abhay Agrawal Controller of Mines, IBM	Member	
2	Shri S. K. Adhikari CMG, IBM	Member	
3	Shri P. N. Sharma CCOM, IBM	Member	
4	Shri Dheeraj Kumar Deputy Secretary M/o Mines, GoI	Member Secretary	
5	Shri J.P. Maurya (DMG, Govt. of Chhattisgarh)	Member	
6	Shri Ameet Kumar (DMG, Govt. of Jharkhand)	Member	
7	Shri D.S. Ramesh (DMG, Govt. of Karnataka)	Member	
8	Shri D.D. Biswal (DMG, Govt. of Odisha)	Member	
9	Dr. Veena Kumari Dermal Joint Secretary Ministry of Mines, GoI	Chairperson	

SIGNATURE OF MEMBERS:

S.No.	Name and designation	Role in the committee	Signature
1	Shri Abhay Agrawal Controller of Mines, IBM	Member	
2	Shri S. K. Adhikari CMG, IBM	Member	
3	Shri P. N. Sharma CCOM, IBM	Member	
4	Shri Dheeraj Kumar Deputy Secretary M/o Mines, GoI	Member Secretary	
5	Shri J.P. Maurya (DMG, Govt. of Chhattisgarh)	Member	
6	Shri Ameet Kumar (DMG, Govt. of Jharkhand)	Member	
7	Shri D.S. Ramesh (DMG, Govt. of Karnataka)	Member	
8	Shri D.D. Biswal (DMG, Govt. of Odisha)	Member	
9	Dr. Veena Kumari Dermal Joint Secretary Ministry of Mines, GoI	Chairperson	

Annexure 1

Orders of the Ministry of Mines regarding the constitution and composition of the Committee

F.No. - 16/86/2021-M.VI
भारत सरकार/Government of India
खान मंत्रालय/Ministry of Mines
***

शास्त्री भवन,डॉ राजेंद्र प्रसाद रोड,
नई दिल्ली, दिनांक : जुलाई 16, 2021

कार्यालय ज्ञापन/OFFICE MEMORANDUM

विषय:Constitution of a committee for examining the issue of misclassification of different grades of iron ore and other minerals – regarding.
****

Ministry of Mines has decided to constitute a committee having representative of iron ore rich states to examine the issues of likely mis-classification of grades of iron ore and other mineral adversely affecting the revenue to States and suggest measures for preventing mis-classification of grades of different grades of iron ore and other minerals. The committee will also examine adoption of latest technology in this regard.

2.   The composition of the Committee and Terms of Reference are as under:

Sl. No.	Name & Designation	Role in the Committee
1.	Dr. Veena Kumari Dermal, Joint Secretary	Chairperson
2.	Shri P.N. Sharma, CCOM, IBM	Member
3.	Director Mining & Geology of Odisha	Member
4.	Director Mining & Geology of Karnataka	Member
5	Director Mining & Geology of Chhattisgarh	Member
6.	Director Mining & Geology of Jharkhand	Member
7.	Shri Abhay Aggarwal, Technical Secretary, IBM	Member Secretary

3.   The Terms of Reference of the Committee will be as under:
i.   To examine the issue of mis-classification of different grades of iron ore and other minerals.

ii.   To study the measures to prevent mis-classification of grades of iron-ore and other minerals in existing rules of various States.

iii.   To suggest further measures to prevent mis-classification of grades.

iv.   To examine the possibility of using advanced technology viz. drones/GPS enabled vehicle etc. to ensure that ore accounting from mine to factory/port is made seamless.

.........2

= 2 =

v. To propose action that can be taken against the mines/trades/transporters exporters for misclassified minerals.

4. The Committee shall submit its report within six weeks of its formation.

5. This issues with approval of Competent Authority.

16/7/2021

(Abhishek Kumar Upadhyaya)
Under Secretary to the Government of India
Tel: 011-23384743
Email: ak.upadhyaya@nic.in

To

1. Dr. Veena Kumari Dermal, Joint Secretary, Ministry of Mines
2. The Director Mining & Geology of Odisha.
3. The Director Mining & Geology of Karnataka
4. The Director Mining & Geology of Chhattisgarh
5. The Director Mining & Geology of Jharkhand
6. Shri P.N. Sharma, CCoM, IBM, Nagpur through CG, IBM
7. Shri Abhay Aggarwal, Technical Secretary, IBM through CG, IBM

Copy for information to:

All Principal Secretary, Odisha, Karnataka, Chhattisgarh & Jharkhand.

No-16/86/2021-M.VI
Government of India
Ministry of Mines
****

Shastri Bhawan, New Delhi
Dated, the 30th September, 2021

OFFICE MEMORANDUM

Subject: Misclassification of different grades of iron ore

49/58

M.VI-16/86/2021-Mines VI is directed to inform you that competent authority in the Ministry has decided that following issues will also be examined by the committee constituted vide order dated 16.07.2021 under the chairmanship of Joint Secretary (Policy & Legislation), Ministry of Mines for examining the issue of misclassification of different grades of iron ore and other minerals:

(i) Leverage technology for better monitoring of mines and transportation operations to address malpractices with regards to gradation of ore and ensuring the right grade ore gets exported.

(ii) Set up a GPS based tracking system for monitoring of loading / unloading / transportation of metals to ensure that promised grade/ quality of minerals is delivered; explore colour coding of transportation vehicles based on grades of minerals; Explore confiscation of ships including in malpractices.

2. This issue with the approval of Competent Authority.

(Abhishek Kumar Upadhyaya)
Under Secretary to the Govt. of India
Tel: 23384743
ak.upadhyaya@nic.in

To

Shri Abhay Aggarwal, Member Secretary/Technical Secretary, IBM

Copy for information to:

(i)   Joint Secretary(VKD), Ministry of Mines & Chairperson.
(ii)   US(CDN), Ministry of Mines

Signed by Abhishek Kumar
Upadhyaya
Date: 30-09-2021 16:00:27
Reason: Approved

No. 16/86/2021-M.VI
Government of India
Ministry of Mines
*****

Shastri Bhawan, New Delhi
Dated: 07th February, 2022

OFFICE MEMORANDUM

Subject: Constitution of a committee for examining the issue of misclassification of different grades of iron ore and other minerals-regarding

The undersigned is directed to refer to this Ministry's OMs of even number dated 16.07.2021 and 12.01.2022 wherein a Committee was constituted on the subject mentioned above. In partial modification of this Ministry's aforesaid OMs, the composition of the Committee is amended as under:

S. No.	Name & Designation	Role in the Committee
1	Dr. Veena Kumari Dermal, Joint Secretary	Chairperson
2	Shri P.N. Sharma, CCOM, IBM	Member
3	Director Mining & Geology of Odisha	Member
4	Director Mining & Geology of Karnataka	Member
5	Director Mining & Geology of Chhattisgarh	Member
6	Director Mining & Geology of Jharkhand	Member
7	Shri Abhay Aggarwal, Technical Secretary, IBM	Member
8	Shri S. K. Adhikari, CMG, IBM	Member
9	Shri Dheeraj Kumar, Deputy Secretary, Ministry of Mines	Member Secretary

2.   Further, in addition to the earlier Terms of Reference, the issue of desirability of publishing ASP of ROM of iron ore as well as ways and means for the same, may also be examined by the Committee.

3.   This issues with the approval of the Competent Authority.

(Abhishek Kumar Upadhyaya)
Under Secretary to the Government of India
011-23384743 / 9718387394
Email: ak.upadhyaya@nic.in

To

1. Dr. Veena Kumari Dermal, Joint Secretary, Ministry of Mines
2. Shri P.N. Sharma, CCOM, IBM
3. Director Mining & Geology of Odisha
4. Director Mining & Geology of Karnataka
5. Director Mining & Geology of Chhattisgarh
6. Director Mining & Geology of Jharkhand
7. Shri Abhay Aggarwal, Technical Secretary, IBM
8. Shri S. K. Adhikari, CMG, IBM
9. Shri Dheeraj Kumar, Deputy Secretary, Ministry of Mines

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Grade-wise details of production and dispatch of iron ore in last 7 years

(quantity in Tonne)

State Name	Grade Name	2015-16		2016-17		2017-18		2018-19		2019-20		2020-21(P)		2021-22(P)	
		Production	Despatch	Production	Despatch	Production	Despatch	Production	Despatch	Production	Despatch	Production	Despatch	Production	Despatch
ANDHRA PRADESH	Below 55% Fe Lumps	312070	261182	301964	267303	395145	344789	361723	516107	507734	444045	218910	173822	189486	173988
ANDHRA PRADESH	55% to below 58% Fe Lumps					6553	850	0	0	506	366	0	0	0	0
ANDHRA PRADESH	58% to below 60% Fe Lumps	0	3174												
ANDHRA PRADESH	60% to below 62% Fe Lumps							0	0	0	0	0	0	0	0
ANDHRA PRADESH	Below 55% Fe Fines	181394	146483	183476	155509	271803	129054	292759	58885	316283	124625	141104	107347	122529	112282
ANDHRA PRADESH	60% to below 62% Fe Fines							0	0	0	0	0	0	0	0
CHHATTISGARH	Below 55% Fe Lumps	216327	232671	181041	194551	310080	305847	125800	129715	191370	164600	185701	163930	351557	401694
CHHATTISGARH	55% to below 58% Fe Lumps	94345	91413	95570	91085	144681	155012	304008	285675	287018	283078	376709	369593	255750	262625
CHHATTISGARH	58% to below 60% Fe Lumps	82284	80387	16859	20303	33678	36856	96078	63496	126434	79593	132865	135606	277923	247702
CHHATTISGARH	60% to below 62% Fe Lumps	483846	476718	764742	765583	752249	763153	653775	651218	582179	576854	707903	711613	724803	717068
CHHATTISGARH	62% to below 65% Fe Lumps	3629756	3313792	3671160	2658344	2764319	2320722	2273198	2246545	2538349	2773245	2580938	2596337	3393578	3381710
CHHATTISGARH	65% Fe and above Lumps	5707591	5432129	7366297	7489023	8216659	7386176	8204361	8627933	8465277	8529304	8702298	8447512	9541017	9383898
CHHATTISGARH	Below 55% Fe Fines	208926	141241	164212	135384	393126	327971	790906	757976	965117	1106490	745132	784017	1174399	1213532
CHHATTISGARH	55% to below 58% Fe Fines	19192	18344	187267	164833	437286	446667	417802	435657	427452	414278	649983	701952	1453451	1231679
CHHATTISGARH	58% to below 60% Fe Fines	90876	94403	276408	297131	349006	311528	442012	445453	625820	624592	716584	710227	780954	861468
CHHATTISGARH	60% to below 62% Fe Fines	3000146	3060828	4335872	3554265	3438209	3440051	3290265	3219459	3387270	3339441	3844076	3386888	4181899	4388481
CHHATTISGARH	62% to below 65% Fe Fines	8135751	7549478	8771494	9047523	9529837	10104303	9765155	9332519	9515021	9364997	11445048	11145950	14043914	13656548
CHHATTISGARH	65% Fe and above Fines	5048465	5108960	7454248	7657813	8048586	7016928	8529504	7722284	7616818	7047333	6901846	6297429	5133924	4811689

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State	Category														
GOA	Below 55% Fe Lumps	143479	31364	822045	624859	413816	327304	0	4998	0	55002	13436	16117	0	0
GOA	55% to below 58% Fe Lumps	67854	66280	802035	596646	1309030	1322695	0	0	0	20442	17416	9577	0	0
GOA	58% to below 60% Fe Lumps	4376	0	292202	232963	132015	157946	0	0	0	13204	0	0	0	0
GOA	60% to below 62% Fe Lumps	43493	39966	100035	100373	184355	187408	0	0	0	0	0	0	0	0
GOA	62% to below 65% Fe Lumps	1010	1010	27910	27910	36203	48619	0	0	0	0	0	0	0	0
GOA	Below 55% Fe Fines	393553	310118	2126882	1998331	1723736	1373185	0	33791	0	246725	34755	22098	0	0
GOA	55% to below 58% Fe Fines	613116	539928	3668690	3270895	3164601	3257276	0	94052	0	46083	28055	28055	0	0
GOA	58% to below 60% Fe Fines	331167	318629	844638	727489	1894719	2030685	0	0	0	0	0	0	0	0
GOA	60% to below 62% Fe Fines	148915	142773	333479	245025	691387	683353	0	0	0	0	0	4378	0	0
GOA	62% to below 65% Fe Fines	46803	45568	101258	102493	659418	799145	0	0	0	0	0	0	0	0
GOA	Concentrates	0	0	50663	38974	69502	65022	0	0	0	0	0	0	0	0
JHARKHAND	Below 55% Fe Lumps	180563	161119	20763	34317	24956	30605	3701	1252	67279	72346	6519	5247	35140	28824
JHARKHAND	55% to below 58% Fe Lumps	26745	37372	35271	15260	311863	192534	237421	248353	359355	434872	5424	1461	86822	54860
JHARKHAND	58% to below 60% Fe Lumps	841674	830651	1025046	986787	1274578	1233307	936183	973383	616023	620295	466401	426909	896633	910717
JHARKHAND	60% to below 62% Fe Lumps	1434937	1457803	480151	455240	1175726	971654	1320600	1366726	1272749	1272841	1559974	1491209	2264215	2304933
JHARKHAND	62% to below 65% Fe Lumps	2840053	2900216	2446474	2357687	2193681	2159524	2083813	2073525	3294920	3241985	2108746	2129259	848566	830131
JHARKHAND	65% Fe and above Lumps	829867	634298	1931052	1935310	1109064	1274702	1690584	1699142	1343475	1209721	680343	785842	1548142	1613165
JHARKHAND	Below 55% Fe Fines	86740	321378	5975	19807	13315	60583	108910	18667	181680	16796	106464	89454	76943	82223
JHARKHAND	55% to below 58% Fe Fines	1355877	1106538	1542438	520488	1501361	781962	1013985	691863	852372	731901	503398	45856	787963	189378
JHARKHAND	58% to below 60% Fe Fines	43559	44917	52765	47464	1383062	1211158	1120419	1146423	807690	566683	652147	390534	1678353	1217229
JHARKHAND	60% to below 62% Fe Fines	3485743	3296266	1958369	1830963	3479806	3239332	2281496	2464025	2848117	2594207	5797316	5621210	5631072	5729334

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State	Category														
JHARKHAND	62% to below 65% Fe Fines	5123694	5560708	5122372	4848509	2879341	2773441	5610188	4884418	12476950	12670094	6887486	6914504	2365845	2453647
JHARKHAND	65% Fe and above Fines	2948384	2660117	6605311	6560272	4821962	4722437	7025608	6862394	894669	1256873	2659791	2781180	8508539	8501345
KARNATAKA	Below 55% Fe Lumps	109505	158879	309147	233553	327868	376260	452883	1033550	699925	686218	1390834	1211843	2348297	1753491
KARNATAKA	55% to below 58% Fe Lumps	320548	299625	496082	628753	665046	690835	1121186	917851	1670367	1845964	924274	920787	793177	714194
KARNATAKA	58% to below 60% Fe Lumps	477462	517397	608795	756721	688878	617556	1093586	1112782	1173838	1162231	1707948	1429455	2247196	2199722
KARNATAKA	60% to below 62% Fe Lumps	2066648	1886119	2272460	2648115	1589466	1687464	1815238	1641050	1782066	1866206	1465799	1600606	2519479	2260201
KARNATAKA	62% to below 65% Fe Lumps	4544202	4720454	4883188	6037234	5566090	5469939	4428311	4374908	3575148	3707643	4336504	4092581	3377044	3428221
KARNATAKA	65% Fe and above Lumps	472080	508595	320967	362685	590080	539273	263621	266816	346699	378463	311392	294324	419360	314037
KARNATAKA	Below 55% Fe Fines	481984	608684	649179	429321	987158	947059	1320178	1184144	2283103	1474708	3291358	3381049	4867991	4525798
KARNATAKA	55% to below 58% Fe Fines	2805789	2975640	2548749	2615245	1859384	1793879	1772703	1579526	3623202	3543237	5023267	4837932	7830946	7951795
KARNATAKA	58% to below 60% Fe Fines	2488316	3062352	3494063	3740298	4631070	4425341	6215149	4303930	6559857	8291905	6451652	6449841	5848074	6007426
KARNATAKA	60% to below 62% Fe Fines	7298897	7351227	4560643	5089307	4012487	4172880	2066331	1947209	1851117	2203274	3254361	3069946	3804752	3668484
KARNATAKA	62% to below 65% Fe Fines	3822307	4218688	6294229	5842965	7553283	7036016	8910323	8923759	7207903	7653839	5677495	5740149	5284616	5075840
KARNATAKA	65% Fe and above Fines	148599	83863	45142	105638	220000	235940	363824	328076	618859	633108	707385	715848	961232	885328
KARNATAKA	Concentrates	0	0												
MADHYA PRADESH	Below 55% Fe Lumps	260792	247705	101140	113146	319278	252188	523436	513531	1463999	1355190	840978	1043809	1135881	1193304
MADHYA PRADESH	55% to below 58% Fe Lumps	142	1700	5000	0	24020	5534	11340	28535	1997	3888	17700	16564	0	41
MADHYA PRADESH	58% to below 60% Fe Lumps	7265	7265	12000	0	15526	9096	0	2990	934	6732	0	122	0	74
MADHYA PRADESH	60% to below 62% Fe Lumps			18238	0	408	1520	0	0	0	265	0	157	0	0
MADHYA PRADESH	Below 55% Fe Fines	2152780	1709344	1628874	1604061	2368463	2752125	2266489	2476407	1876166	1649526	3125923	3365314	5611764	5264786
MADHYA PRADESH	55% to below 58% Fe Fines	13745	33196	0	0	12161	12161	0	0			109800	105003	139395	122195

State	Grade														
MADHYA PRADESH	58% to below 60% Fe Fines	11896	11896	4200	0	2598	2517	950	824	0	12	0	0	0	0
MADHYA PRADESH	60% to below 62% Fe Fines					92	92							9200	7806
MADHYA PRADESH	Concentrates			2200	1911	0	0	0	0	0	0	0	0	0	0
MAHARASHTRA	Below 55% Fe Lumps	91579	39141	51304	41772	71370	34353	142549	171807	41760	70977	51725	61431	65936	22890
MAHARASHTRA	55% to below 58% Fe Lumps	62005	61728	33715	31270	52931	37430	28133	9063	0	27980	17470	22241	53198	31498
MAHARASHTRA	58% to below 60% Fe Lumps	4340	11223	87103	87072	175397	175428	95521	95521	38783	38783	44223	34737	54646	51039
MAHARASHTRA	60% to below 62% Fe Lumps	39612	46746	44739	65155	23043	18969	16872	20260	12381	12381	0	0	22400	4985
MAHARASHTRA	62% to below 65% Fe Lumps	0	0	13813	13984	0	0	0	0	0	0	0	0	555120	391056
MAHARASHTRA	Below 55% Fe Fines	847357	854313	844214	705681	293168	218101	65016	286696	597549	544641	807313	772500	559672	217259
MAHARASHTRA	55% to below 58% Fe Fines	92832	96770	0	0	237928	191283	87725	72210	118091	96733	91165	113109	181089	176158
MAHARASHTRA	58% to below 60% Fe Fines	274099	262021	245903	257786	85809	80899	224151	226217	322254	315694	237067	240998	126242	118273
MAHARASHTRA	60% to below 62% Fe Fines	8000	11041											264300	103972
MAHARASHTRA	62% to below 65% Fe Fines													75630	19165
ORISSA	Below 55% Fe Lumps	291637	149258	158894	96229	243742	271939	594637	314593	382537	350745	700271	878051	1587777	848034
ORISSA	55% to below 58% Fe Lumps	456979	470260	590644	806308	477646	585436	720982	730241	679463	611646	580992	991815	1620459	1264540
ORISSA	58% to below 60% Fe Lumps	1672426	1435015	2424552	2497939	2472658	2557008	2703507	2413988	3251111	3052942	3672187	3582307	5737905	3538113
ORISSA	60% to below 62% Fe Lumps	2546382	2363797	4258667	4304431	3028970	2820436	2785591	2829642	6862844	5837072	5565976	5541936	5175859	4317413
ORISSA	62% to below 65% Fe Lumps	18926104	18874755	21027650	20796642	21503626	21816838	23191371	20759231	25668349	21004929	15732470	18663275	18810874	17397561
ORISSA	65% Fe and above Lumps	5209702	5079878	7104961	7092781	6670867	6853493	8242169	7954173	8518953	8644493	6409309	6456463	5727002	5721528
ORISSA	Below 55% Fe Fines	293900	136475	426580	531703	207508	603555	1160531	191198	1572820	1911332	2896813	8262209	6456587	4979349
ORISSA	55% to below 58% Fe Fines	3316783	1197317	7388724	3679157	4171689	925518	1609482	650496	10161275	12898245	11485711	13691966	14614512	14492936

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State	Category														
ORISSA	58% to below 60% Fe Fines	3451867	2747215	3590640	2615790	2746123	2379683	2700970	2341423	2647368	3533366	4798959	5046853	11056696	10613314
ORISSA	60% to below 62% Fe Fines	8934774	5601359	6648662	6487964	9022976	7937420	13847447	12548578	20256828	19550093	17297935	22036373	30226846	27338707
ORISSA	62% to below 65% Fe Fines	28054064	25354277	38413627	37253978	43137933	45495708	46429971	46603331	56748051	41996036	24937074	27440141	26370323	26243252
ORISSA	65% Fe and above Fines	6643020	6830037	7579944	7728588	8218138	8377543	8625366	8582460	9529006	9402400	10393642	11154058	9014365	9878801
ORISSA	Concentrates	58844	76262			284260	99976	506760	366703	358470	315603	159870	230474	296210	523151
RAJASTHAN	Below 55% Fe Lumps	110625	109950	121708	70280	126297	110807	155457	102955	188201	9816	53777	30669	129726	61215
RAJASTHAN	55% to below 58% Fe Lumps									143	138	2911	2913	5013	4988
RAJASTHAN	65% Fe and above Lumps			445	498										
RAJASTHAN	Below 55% Fe Fines	3009	6094	189	0	3638	134	297	0	60	0	874	0	2631	726
RAJASTHAN	Concentrates	1031933	1030770	1105920	1106745	1189702	1153548	952508	951740	823301	853778	1030912	1042376	1097685	1097548
TELANGANA	Below 55% Fe Lumps	0		0	0	4018	4037	2000	0	0	0	0	0	0	0
TELANGANA	55% to below 58% Fe Lumps	0		0											
TELANGANA	Below 55% Fe Fines	0				2000	2000								
	Total (India)	158107400	147766553	194583327	186557417	201423502	195773001	206494815	195914353	244082705	227485144	204482085	221067337	253440529	239590362

Source: MCDR Returns

(P): Provisional data

**Summary of Suggestions made by Stakeholders on the issue of Misclassification of
different Grades of Iron Ore & Other Minerals**

(1) Comments by Sh. Anurag Diwan, Joint Director, State Government of Chhattisgarh

S.No.	Suggestions
1	Iron ore grade Slab range should be of 1% up to 65% and thereafter of 0.5% up to 70% so that higher grade may have higher prices and higher royalty collection.
2	As done in Bauxite Pricing formula, similar grade declaration should be adopted for iron ore. This will do away the need for slabs/ range of minerals etc.
3	Lumps and Fines as mentioned in the Mining Plan or as to be assessed by IBM every 5 years in mine should be applicable for royalty/ auction premium for the applicable 5 years period irrespective of actual ratio. Rules may be modified accordingly.
4	State wise/ Area wise Lumps and Fines ratio needs to be notified by IBM to assess the ratio.
5	Some accounting system/ SOP from mine to steel plant is needed.

**(2) Comments by Indian Steel Association (Dr. Bhaskar Chatterjee, Secretary
General and Executive Head)**

S.No.	Suggestions
1	In case of mechanized loading systems such as through railways or belt conveyors, **automatic sample collecting system, cross-belt sampling system can be installed** to do away with the need for manual sampling. This will be possible only for large mechanized mines.
2	The present system of calculating the actual grade based on preparation of stacks is cumbersome and time taking, instead **Ministry along with States should develop and approve a system for the calculation of actual grade of ore based on technology deployment** at the mine/loading site. This is bound to automatically avoid misclassification.
3	The issue should not be visualized from the point of fall in revenue collection to the State exchequer from payment of royalty. Nonetheless the loss is insignificant when compared with the premium collected. The **objective should be to encourage the utilization of low-grade ore which is possible only when the lessee dispatch low grade ore**.
4	Exported iron ore value should not be mingled with the domestic ore value, to

	artificially inflate the ASP. This is Irrational imposition of uniformly imposing royalty.
5	In case any States Government apprehends misreporting by any lesser, so the **system of reporting of the selling price of iron ore by miners for the calculation of ASP should be strengthened**.
6	Instead of calculating the ASP from the selling price reported by the miners in the returns submitted grade wise, **system can be developed to mandate the mention of selling price of the ore along with the grade and quantity (already mentioned) in the Transit Permit (TP) and linking the State Mineral Reporting systems (like i3ms in Odisha, JIMMS in Jharkhand etc) with IBM to automatically calculate the ASP**.

(3) Comments by Sh. Ashish Das

S.No.	Suggestions
1	Iron ore produced in mines is classified by IBM into 13 grades (6 for lumps, 6 for fines, 1 for iron ore concentrate).
2	Presently, the major iron-ore producing States (Odisha, Jharkhand, Karnataka, etc.) have a robust mechanism to ensure that the grade of ore declared by a miner is same as that despatched. Based on the grade, royalty is paid to the State on ad valorem basis as per IBM published Average Sale Price (ASP) which is a true reflection of the iron ore transactions in the country done at arm's length basis.
3	There are multiple checks and balances by the State Government which helps to prevent any misclassification of iron ore grades.
4	The classification of iron-ore grade is done by a Govt. lab. **In addition, various measures are also taken to prevent any grade tampering / misclassification of the ore such, as mentioned below**: **Mining Plan:** First of all, excavation areas during any year are determined as per the Mine Plan duly approved by IBM, which already identifies the grade available in these excavation areas during exploration. This gives a fair amount of indication regarding the grade expected when mining is done from such excavation areas **Blasthole drilling:** Since productivity of customers (steel, pellets, beneficiation plants etc.) is very much dependent on quality of feed (ore grade), miners also undertake samples during drilling of blastholes.This is done so as to meet the customer requirement and do necessary blending.

	Videography of stack sampling: In some States like Odisha, on-pilot basis, sampling process at the stack is videographed to keep a check that appropriate sampling methodology is followed. However, this is subject to adequate infrastructure for the same, such as availability of HD camera, its positioning, internet, technician, impact by monsoon & weather events.
	Umpire sample: In case of any discrepancy of grade declared by Govt. lab, the umpire sample kept with DMG is analysed to settle any dispute.
	Sampling at Plant Gate: Since customers pays for the material, they also do rigorous grade analysis when material reaches their stockyard, so as to ensure that they are paying for the right material grade & tonnage.
	Surprise field-visit by Govt. officials: At times, there are surprise field-visit by senior mining officials to check that the grades at stacks are correctly declared.
	IT-based grade information system: Most States have a complete digital platform for stack application by miner, field-visit by DMG and grade declaration by Govt. lab, which also make it more secure.
5	With all these number of measures and tools, there is hardly any scope for grade misclassification for iron ore. We believe similar methodology is being practiced by the States for other minerals also.
6	However, in case of mechanized loading systems such as through railways or belt conveyors, **automatic sample collecting system, cross-belt sampling system can be installed to do away with the need for manual sampling.** This will be possible only for large mechanized mines.

(4) Comments by CMDC Limited, Chhattisgarh

S.No.	Suggestions
1	IBM publish the average sale price of Iron Ore (mainly for hematite) on the basis of various grade and size. There is **no bifurcation between hematite and magnetite.** Therefore CMDC has to pay the royalty and other taxes on the basis of average sale price of Iron Ore published by IBM which is mainly relates to hematite.
2	The use of magnetite is limited and there is a huge price difference between hematite and magnetite in the open market.

3	In the light of above facts it is humbly requested to look into the matter sympathetically and kindly **arrange to publish the average sale price of hematite and magnetite separately through IBM.**

(5) Comments of Ghanshyam Mishra & Sons (P) Ltd. and GM Iron and Steel Company Ltd.

S.No.	Suggestions
1	Grade classification is warranted not only due to occurrence of different grades, but also for trading and sale of different grades as per market demand.
2	**The present classification falls short of mechanism to capture and discover prices of low grade ore, say below the threshold value 45% Fe, which has huge potential for present and future market through beneficiation.**
3	Envisaged **NMPs' objectives of mineral conservation, can only be achieved through use of more and more low grade ore by beneficiation and for that more and more classification would be necessary**, contrary to the misconception of saying the present classification as "**Misclassification**".
4	Therefore, from economic perspective, **the present ad-valorem royalty regime demands as much classification as possible, so as to trade all naturally occurring grades,as per market force**, adding to the revenue of state government and should not be termed as misclassification.
5	It would not be out of place to mention that the **MTS system with several modules, including a dedicated return module, for mineral administration, that was commenced for implementation in 2015-16 has failed, resulting in prolonged delay in calculation and publication of ASP** or publication of correct ASP by IBM, resulting in loss to the state government revenue.
6	**The loss of state government revenue is** not because of the so called misclassification of different grades of ore; it is actually **due to failure of IBM in computerisation of the online return filing system** as per the rule in force, MCDR,2017, having direct linkage, as base for the calculation of ASP, and correct and timely publication of the same.
7	The royalty and taxes are charged ad-valorem of the ASP. It is the weighted average of Ex-Mine-Price (EMP) of despatched quantity of a particular grade of iron ore. The EMP is driven by the market forces /commerce of iron ore trade. It is the that price which is most important and crucial to tax the leaseholder for royalty, etc.

	The EMPs along with several other data on mining are submitted to the IBM and other agencies by the mining leaseholders on monthly basis. This information is used by IBM to calculate the ASP. **Unfortunately, the information is not captured in complete, properly & correctly in time, resulting incomplete & improper calculation of ASP by IBM.**
8	**To maximize govt revenue, the ASP is skewed upwards.** For example, if the derived ASP of higher grade ore (say 60% Fe) is less than the ASP of lower grade ore (say 58% Fe), which is typically a fact when export of low grade ore is in demand, the low ASP for higher grade ore is substituted with the high ASP of lower grade ore. Hence, **classification of ore or the so called misclassification of different grades of iron ore has no connection with the revenue**; rather, by this process, the revenue is increased and when the actual ASP of high grade ore is revealed in subsequent months it is actually found less and the revenue is lessened. **Such situation arises due to failure in capturing and collection of price data for all grades of ore being traded or tradable in the market**. On the global platform, the price fixation to some extent, is an automated statistical process; but in India it is abysmally at zero level. **Proper mechanism may be put in place.**
9	**Application of statistical and mathematical tools and modern methods is starkly absent in the price fixation of such complex commodity** with its widely varying composition and grades of quality which is traded second highest, globally.
10	**Failure in implementation of appropriate computerised return filing, data handling and analysis system in IBM might be the cause of loss to the state government revenue; not the grade classification**
11	IBM, who is entrusted with the noble cause of mineral conservation, should do more and more classification to facilitate trade and promote use of low grade minerals, the revenue of state government is bound to go up. As it is already argued in foregoing paragraphs, the use of low grade iron ore, even below the threshold value is the only available option to conserve the high grade ore.
12	It is suggested that instead of declassifying the misconceived "Misclassification", to augment state government revenue, the present classification be replaced with actual market driven and more fine tuned classification as below; a) Below 45% Fe b) 45% to below 51% Fe c) 51% to below 55% Fe d) 55% to below 58% Fe

	e) 58% to below 60% Fe
	f) 60% to below 62% Fe
	g) 62% to below 65% Fe and
	h) 65% and above.

(6) Comments of FIMI

S.No.	Suggestions
1	Iron ore produced in mines is classified by IBM into 13 grades (6 for lumps, 6 for fines, 1 for iron ore concentrate).
2	Presently, the major iron-ore producing States (Odisha, Jharkhand, Karnataka, etc.) have a robust mechanism to ensure that the grade of ore declared by a miner is same as that despatched. Based on the grade, royalty is paid to the State on ad valorem basis as per IBM published Average Sale Price (ASP) which is a true reflection of the iron ore transactions in the country done at arm's length basis
3	There are multiple checks and balances by the State Government which helps to prevent any misclassification of iron ore grades.
4	However, it is suggested to classify iron ore into three categories as – i). Haematitic Ore (minimum 45%Fe); ii) Haematitic Siliceous Ore (minimum 35% Fe); and iii) Magnetite Ore (minimum 15% Fe) for the purpose of royalty administration in line with Gazette Notification dated 25thApril, 2018 on Threshold Value of Minerals.
5	Tentative scheme as followed in the State of Odisha for sampling of grades and stocks can be followed in other States as well which will hardly leave any scope for grade misclassification for iron ore.

(7) Comments of Jindal Saw Ltd.

S.No.	Suggestions
1	As per UNFC and Iron & Steel Vision 2020 published by Indian Bureau of Mines, total resource of iron ore is about 28 billion Mt. Out of which 17.5 billion Mt is Hematite and about 10.5 billion Mt is Magnetite.

2	The existing classification of different grades of Iron Ore is based on Hematite Ore only and there is no consideration of Magnetite Ore.
3	As per Gazette Notification of 25th April 2018, Magnetite Iron Ore with 15% Fe has been categorised in Iron Ore category.
4	Existing cumbersome classification appears to be difficult for exact determination and computation of grades of Iron Ore
5	Categorization of Haematite Ore should be as,

Hematite Ore/ Hematitic Siliceous Ore

Lumps	Fines	Concentrate produced from Hematite Ore
-60% Fe	-60% Fe	
60-62% Fe	60-62% Fe	
+62% Fe	+62% Fe	

6	Categorization of magnetite ore should be as,

Lumps	Concentrate produced from Hematite Ore
15-40% Fe	
+40% Fe	

(8) Comments of P.M.Granite Exports Private Ltd.

S.No.	Suggestions
1	Manganese as a mineral is classified into the following grades as per the ASP (Average Sale Price) publishing by IBM: 1. Dioxide Ore 2. Below 25% Mn 3. 25% to Below 35% Mn 4. 35% to Below 46% Mn 5. 46% Mn and Above.
2	Now high grades are slowly depleting and many mines in the coming days may have to operate on selling of lower grade ores (Below 25% Mn).
3	From 25% to 50% Mn grades there are 3 categories that are available to i.e. 1. 25% to Below 35% Mn. 2. 35% to Below 46% Mn.

	3. 46% Mn and above... 4.above 50% Mn grade can be considered under Dioxide category.
4	It may not be correct to keep below 25% Mn ores only in one single category.
5	IBM is considering cut of percentage for Manganese is 10%, from this 10% to 25%, at least 2 to 3 categories should be provided and ASP should be published to all the 2 to 3 categories of below 25% Mn grade. The following three categories may be provided: a. 10% to 15 % of Mn. b. 15 to 20% of Mn. c. 20 to 25 % of Mn.
6	Unlike Iron ore, even for Manganese ore the ASP is not separately considered for Lumps and Fines. Because of that most of the fines that are getting produced along with the lumps, are remaining in mines as stock only.
7	we request you to make another 2 to 3 categories for the below 25% Mn ores and also provide different ASP for Lumps and Fines of Manganese Ore. This may improve the Quantum of Manganese sales domestically and also export possibilities will increase for low grade ores. By doing the necessary corrections the Government will get more revenue from the Manganese Ore.

(9) Comments of Megasoft Systems

S.No.	Suggestions
1	Possibility of using advanced Technology viz Drones/GPS enabled vehicles etc to ensure that ore accounting from mine to factory/Port is made seamless.
2	Company singed a MOU No. 01/444/2012-Mines/2119 dated 22/09/2017 with respect to Operations and GIS based Logistics for transportation in tune with The Goa (Prevention of Illegal Mining, Storage and Transportation of Minerals) Rules, 2013, signed between MEGASOFT SYSTEMS and the Department of Mines and Geology, Panaji-Goa, approved in the XXXII Cabinet Meeting of Council of Ministers of the Goa Government dated 03/06/2016.
3	KHANIJ, the Ore Accounting System (OAS) which was designed, developed and implemented on the SaaS model, free of cost for the Government of Goa; is a GIS-GPS solution which panned from Production, Filing of Returns, an online Financial Accounting (namely Royalty, NMET, DMF and GIOPF (specific to Goa)), Mineral

	Realization &Utilization, Permits covering Domestic, Interstate and Exports.
4	A GIS-GPS logistic solution which configured the weighbridges at every Source and destination and implemented the Rules mandated by notifications or circulars of the Government of Goa on Mineral transportation considering Lease boundaries, Plots, Factories, Jetties and the Port. Route Mapping and Route capacity connected to auto shutting of weighbridges to avoid road congestion, and automatic debarring of mineral carrying vehicles violating speed controls.
5	The system is a cloud based online system, which considers the requirement of the Government, the Mining Industry, the Port, the Traders and the Transport industry. It is a total reconciliation of Royalty, Permits, Trip Sheets, Domestic Sales and International Exports with no loss to the Government or the Mining industry. It bifurcates local produced cargo and international imports of captive cargo as well as e-auction cargo.
6	It inter-relates with Link departments like the Transport Department as well as the Pollution Control Board to ensure that transportation is conducted only with relevant documentation like PUC, Insurance and Road Fitness as well as data is shared with the Pollution Board to intervene if routes cross the permissible levels of air quality.
7	This OAS model is self-sustainable as the revenue requirement came from the operating mining vehicle owners on a monthly subscription as set by the Govt. This ensured that no funds from the public exchequer is utilized, thereby saving on precious Govt. expenditure. It is a time-tested application, which stood the test of the Courts with its accurate data.
8	We would be pleased if you could consider our software either through Central Implementation or the IBM. we can provide the same solution or the same terms with all the necessary upgrades and modifications or even to the extent the software free of Cost and charge only a monthly fee of Maintenance and operational charges.
9	It is a transparent system which covers both Major and Minor Minerals and it would be a pleasure to be associated with you.

<u>**Annexure-4**</u>

<u>**Remarks on Visit to Odisha of the Sub-committee of the Committee Constituted by Ministry of Mines to Examine the Issue of Misclassification of Different Grades of Iron Ore and Other Minerals to understand the process of sampling of the Iorn Ore and the issues thereof.**</u>

1.0   <u>INTRODUCTION</u>

1.1   Ministry of Mines vide its order no. F.No. 16/86/2021-M.VI dated 16/07/2021, constituted a committee under the chairmanship of Dr. Veena Kumari Dermal, Joint Secretary, Ministry of Mines, having representative of State Governments of different iron ore rich States to examine the issue of mis-classification of grades of iron ore and other minerals adversely affecting the revenue to States and suggest measures for preventing mis-classification of grades of different grades of iron ore and other minerals. The committee was also entrusted to examine the adoption of latest technology in this regard.

1.2   In order to understand the issues involved in sampling and declaration of grades of iron ore and new technologies that can be adopted, the chairman of the Committee decided to form a sub-committee to make a visit of members to the State of Odisha. Accordingly, the members of the committee, including the representatives of the State Governments in the committee, were requested to join the sub-committee's visit to Odisha during 31.05.2022 to 02.06.2022. The following members participated in the tour:

6) Sh. Dheeraj Kumar, Deputy Secretary (Mines)
7) Sh. S.K. Adhikari, CMG, IBM
8) Sh. Sanjay Khare, Dy. Director, Govt. of Chhattisgarh (nominated by the State Government)
9) Sh. Salil Behera, Jt. Director of Mines, Govt. of Odisha(nominated by the State Government)
10) Sh. Sambhav Jain, Sr. Manager(Legal), NALCO Ltd./ Ministry of Mines

1.3   The sub-committee acknowledges with gratitude the facilitation of the visit by the Department of Steel and Mines, State Government of Odisha and Indian Bureau of Mines Regional Office at Bhubaneswar. The sub-committee also appreciate the assistance provided by Tata Steel Ltd. and JSW Steel Ltd. during the mines visit.

2.0 PROGRAMME OF THE SUB-COMMITTEE

2.1   The sub-committee arrived at Bhubaneswar on 31.05.2022 and had a meeting with Shri Debidutta Biswal, Director of Mines, Directorate of Mines, Government of Odisha and other officers in the Directorate of Mines. The representatives of State Government of Odisha made an elaborate presentation on i3MS portal of the State Government and system of stacking, sampling, chemical analysis for grade determination of minerals established under the Odisha Mineral (Prevention of Theft, Smuggling and Illegal Mining and Regulation of Possession, Storage, Trading and Transportation Rules (OMPTS Rules).

2.2.   As the OMPTS Rules provides options of Exemption and non-exemption, the committee decided to visit two types of iron ore mines, one which has opted for exemption and another which has opted non-exemption regime. Accordingly, the State Government officials suggested to visit Joda East Iron Ore Mine of Tata Steel Ltd. which is an exempted mine and Jajang Iron Ore Mine of JSW Steel Ltd. which is non-exempted. It is pertinent to mention here that Joda East is a non-auctioned mine and Jajang is an auctioned mine.

2.3   On 01.06.2022, the sub-committee members first visited Joda East Iron Ore Mine of Tata Steel Ltd. Lease holder of Joda East mine has taken exemption from sampling and chemical analysis of mineral under the OMPTS Rules for payment of royalty and thus pay the royalty on the highest grade of iron ore lumps, i.e., on grade '65% and above' Fe. The officials of Tata Steel Ltd. made a brief presentation regarding the activities of the company, mining operations in Joda East Mine and other iron ore mines of the company and processing of minerals after mining till dispatch of mineral to the plant. Thereafter, sub-committee members visited the mine area and observed various process right from drilling and blasting to processing of mineral in the mine area (which includes sizing of ores, blending of fine ore, etc.), transportation by belt conveyers, internal grade sampling and dispatch of mineral by mechanized rail loading system and finally dispatch through railway wagons. It is worth mentioning that even though Tata Steel Ltd. has taken exemption from sampling and analysis of mineral for the purpose of payment of statutory dues, the company undertakes sampling and chemical analysis for its internal purpose as the same is required for maintaining the efficiency of its end use plants. For this the lease holder has installed autosamplers at conveyer belts and has its own NABL accredited laboratory near the mine. During the visit, the members also observed the workings of autosamplers installed in rake loading conveyor belts.

2.4 Joda East mine of Tata Steel Ltd. has a production capacity of 12 million tons per annum. The entire production from the mine is consumed internally by the steel plants of the company. The quality control of the ore to be dispatched starts from sampling of the drill holes to be blasted. Blast hole chips are sampled for each blast holes, logged and analyzed subsequently. The blast hole analysis results forms the basis of grade control and monitoring of feed quality to processing plants. In the iron ore processing plants, ROM ore is upgraded through primary and secondary crushing followed by screening and oversize crushing and re-screening, washing and sizing, scrubbing, classification, hydro

cyclone etc. Samples are collected for all critical products and tailings in the process plants. Final sampling and analysis is done during loading into the wagons before dispatch. Autosamplers (Cross belt rotary scoop types) are engaged for collection of samples. Sample preparation and analysis are then done in state-of-the-art mechanized facilities.

2.5 The processed ore fines are online blended in conveyor belts and stacked mechanically by a stacker over a length of approximately 300mt. The stacker continuously spreads the processed material over the entire length at a speed of 2200 tph. The continuous to and fro movement of the stacker creates a homogenized pile of material longitudinally. This created pile is reclaimed by a reclaimer which has buckets fitted in it and the material is then fed to a surge bin. During the movement of the material from the stockpile to the surge bin through a conveyer belt, the material is regularly sampled at an interval of 3 minutes by an autosampler (cross belt rotary scoop types) fitted on the conveyor belt before loading into the wagons. From the surge bin the material comes to the weigh feeder bin where the weighment of the dispatch quantity is done and then loaded onto the wagons. The samples collected from the autosamplers are then processed and analysed in the laboratory for quality control purposes. It was informed to the sub-committee that in Noamundi mine of the same company there is a bedding & blending facility to blend low grade ore with high grade one and deliver a consistent and homogenous product.

2.6 Thereafter the sub-committee members visited Jajang Iron Ore mine of JSW Steels Ltd. This mine has a production capacity of 12.8 million tons per annum. The Run-Off-Mine (ROM) produced from the mine is subjected to screening and crushing to produce two types of products namely -10 mm fines and 10-30 mm lumps. The mine produces various grades of ore which are consumed both internally as well as sold as merchant sales. The lease holder of Jajang Iron Ore mine has not taken exemption from sampling and follow the procedure of stacking, sampling, chemical analysis for grade determination of iron ore as per the OMPTS Rules. In Jajang Iron Ore mine, the sub-committee members observed the process of stacking and sampling of iron ore assisted by IT enabled system developed by the Government of Odisha. The officials of JSW Steel Ltd. thereafter made a presentation on the various digital initiatives taken by the company for mines safety, compliance, logistic management system, track & trace for inbound & outbound trucks, digitalized stack verification system, etc.

2.7 On the third day, i.e., 02.06.2022, the sub-committee members visited NABL accredited chemical laboratory of Tata Steel Ltd. which the company uses for internal sample analysis of the iron ore dispatched from the mine to the plant. Elemental analysis is performed by Inductively Coupled Plasma (ICP) spectrometers also known as ICP-AES or ICP-OES spectrometer. Thereafter, the sub-committee members returned *via* Bhubaneswar.

3.0 OBSERVATIONS OF THE SUB-COMMITTEE

3.1 Stacking, sampling and chemical analysis process adopted by the State Government of Odisha

3.1.1 For sampling and verification of the mineral grade before its dispatch from the leased area, the OMPTS Rules of Odisha requires a lessee to choose from one of the two options, viz. (a) exemption option and (b) non-exemption option.

3.1.2 The sub-committee members observed the following Information Technology based system of the stacking, sampling and chemical analysis process for non-exempted mines:

(i) Stacking

d. Stack size allowed from 4000 Metric tonne to 20,000 Metric tonne (area required is around 60m x 40m).

e. Stacks to be in rectangular or trapezoidal shapes of height not greater than 3m.

f. Lessee to fill in Stack details along with stack coordinates in Form-S1 and to submit it on a mobile App in Form-S1.

(ii) Sampling

g. Software based system randomly allocates a Junior Mining Officer (JMO) for inspection and sampling of stack.

h. Augmented Reality based mobile app system randomly generates sampling points and guide lessee to draw sample from the designated points, in presence of the inspecting officer. In a stack size of around 60x40 meters, around 18 sampling locations are generated on the sides of the stack and 5 sample locations were generated on the top. Out of these sample locations, one is at the center of the top of the stack and other locations are generated randomly.

i. Above process is recorded by the IP (internet) enabled cameras installed by the lessee.

j. Post the sample collection, representative samples are prepared and bagged in three different bags marked as primary, secondary and umpire samples which are to be tested in Government approved NABL lab, in Government labs and to be kept as standby for further reference, respectively.

k. Printable QR code, generated via mobile App, is labeled on the sample bag zip tag. Picture of the sample bag taken and uploaded on the App.

l. Report by JMO and his remarks are submitted on the App for reference.

(iii) Chemical Analysis

e. Lessee has to request for chemical analysis over i3MS software and submit the sample bags to the attached laboratory.

f. Laboratory may digitally receive sample by logging in to i3MS and scanning the QR coded zip tag.

g. Chemical analysis report is displayed online against the sample request ID.

Based on grade reported, Chemical analysis report in Form-K is auto generated which is used by lessee for dispatch permit.

h. Permit in Form-L is issued once Royalty & other fees are paid by the lessee.

3.1.3   The sub-committee noted that Government of Odisha has implemented the IT Based mineral administration through a robust software application named Integrated Mines and Mineral Management System or "i3MS". It is a comprehensive Information Technology based e-Governance initiative which has been underway in multiple stages and phases since early 2010. It has successfully met key objectives for which it was set up and elicited wide scale appreciation from various stakeholders including the mining and mineral based industries. The system has been designed to automate all processes as per the Central Acts and State Rules, it also shares data in real time with Ports, Railways, Commercial Tax, Income tax, Treasury & Surface transport database etc. Also, the system facilitates multiple departments to play their respective part in updating valuable information that helps in curbing down any illegality/irregularity.

3.1.4   The process of stacking, sampling and chemical analysis under the OMPTS Rules are also integrated by the State Government in the i3MS system. Also, the issue of Transit Permits is also a part of the i3MS system. The sub-committee observed that the i3MS portal and mobile based application is very advanced and forward looking. However, some further improvements can be integrated in the system as discussed below in this report.

3.2 Issues observed regarding the process of stacking, sampling and analysis in non-exempted mines:

(i) **Inherent issue with stacking:** Although large-size stacks of upto 20,000 tonneshas now been allowed by the State Government, but large sized stacks require correspondingly large flat space and large-scale material re-handling infrastructure. It is worth mentioning that mineral stacks cannot be created outside the leased area. Thus, stacks occupy flat area within the leased area, which is generally available in limited amount in the mines. Further, in-process inventory is also large. It takes at least 3 days to create a stack of required shape and size of around 20,000 tonnes. Further, 3-4 days are required for sampling and analysis of grade and dispatch. Thus, total time required in the process is at least 6-7 days. The rules also require that new stack cannot be created at same location of old stack till there is less than 30 tonnes of ore left for dispatch. Consequently, it creates possibilities of large in-process inventories.

For a mine having a capacity of 10MTPA, would require an average dispatch of 2 stacks of 20,000 tonnes each per day. For reduction in turn-around time, the lease holder would be required to maintain at least 14 stacks in the process of creation, analysis and dispatch. Such a large space is not available in most of the mines, particularly the new mines. For maintaining at least 14 stacks approx. 45,000 sq. meters flat area is required which makes the process area extensive.

Since the stacks are created by dumping ore with the help of dumpers which are normally of 20 to 30 ton capacity, to create a stack of approximately 20000 MT around 150-200

trips of material are required to be dumped and leveled. In this process, maintaining the homogeneity of the stack appears difficult as the material are sourced from different locations of the mine and the nature of the ore is likely to vary to a great extent from place to place. With the increase in quantity of the stack, the error in sampling is likely to increase.

It was observed that for a stack of approximately 20000 tons, 18 to 20 sub-samples are generated of which 5 sub-samples are drawn from top of the stack by auger drilling and rest of the samples by drawing channels of approximately 6-inch depth along the slopes of the stacks. These sub-samples are then mixed and reduced by coning and quartering to draw three nos. of sample which is kept in three bags. Following issues were observed in this process:

a) In normal circumstances samples should be drawn either during making of the stack or during breaking of the stack, but in case of non-exempted category of mines samples are being drawn from a stationary stack which may not be homogeneous or there is no process to check whether the stack is homogeneous.

b) As per the guidelines, the material available in the spiral of the auger after drilling the entire column of the stack is to be used for sampling. It was observed that the final material available in the spiral consisted only of the bottom part of the stack along with some loose material from the sides.

c) The sample locations located on the slopes of the stack represents only around 6-7 inch of the thickness of the stack.

d) 5 sub-samples are drawn on the top of the stack. These sub-samples penetrate the entire thickness of the stack whereas from the slopes the rest 12-16 sample are collected depending upon the length and breadth of the stack which represents only 6-7 inch of the slope thickness of the stack.

e) Though the software and videography take care of the sampling at the site but there is no methodology prescribed to ensure that the same sample that has been sent to the laboratory has been analysed.

f) With increasing number of mines opting for the second option that is non-exempted category, it may pose serious challenges on the part of the State government to manage the sampling and analysis procedure on a sustainable basis to cater to the requirements of the industry on time.

(ii) **Human intervention involved in the process:** The members of the sub-committee observed that in some parts of the process of sampling and analysis human intervention is involved. Thus, creating scope for error and distortion. For example, the Junior Mining Officers (JMOs) are required to be physically present during the sampling process. The system randomly allocates JMOs for sampling of each stack. Thus, the areas having multiple mines required several JMOs. As the production and dispatch from the mines is a 24x7 process, to minimize the delay in dispatch, multiple JMOs are also required in a single mine. 2to 3 JMOs would have to be stationed in a mine only to ensure continuous dispatch. To match the total requirement whole State, the availability of JMOs may be an issue. Another example where human intervention is involved in the system is lab

analysis. The chemical process utilised in grade analysis is manual process. It is based on human skill. If numbers of samples for analysis are more, the chances of error increase.

(iii) **Sample Collection:** Although the generation of sampling location is based on augmented reality and random sampling locations are generated, but it is noted from sampling process demonstrated in the mines of JSW Steel Ltd. that out of 23 locations generated, 19 were highly predictable locations, i.e., 1 out of 5 sample locations on the top of the stack is always at the center and 18 samples were collected from the sides of the stack. The depth from which the samples were collected from the sides was around 7-8 inches. Thus, most of the sample locations were predictable leaving a scope of manipulation with the process.

(iv) **Camera recording of the process:** Only the sample collection process is recorded. Recording is done by temporarily installed cameras. Other processes, such as creating of stacks and dispatch from the stacks is not monitored on cameras, leaving scope for manipulation.

3.3 Issues observed regarding the exempted mines:

(i) It was noted from the visit to the exempted mine (Joda East) that the capacity of mine was 12MTPA and daily dispatch of around 8 rakes per day of 4000 tonnes capacity. For such a large quantity of dispatch per day, each rake is required to be loaded in at least 3 hours. To cater to these requirements, Tata Steel Ltd. uses highly mechanized ore processing and dispatch system. In such an automated and mechanized system, the lease holder cannot afford to follow a slow process of stacking, sampling and analysis. Therefore, the lease holders such as Tata Steel Ltd. have sought for exemption from the stacking, sampling and analysis process although these lease holders end up paying royalty at highest grade of iron ore.

(ii) It was also noted that Tata Steel Ltd. has made provision for sample collection through Autosamplers installed in rake loading conveyors. The lessee also regularly analyzes the core obtained from the bore holes made for blasting. The sample collected are analyzed in their own NABL accredited laboratory. Elemental analysis of sample is performed by Inductively Coupled Plasma (ICP) spectrometers and human intervention in handling and analysis of sample was minimal. Such sampling and analysis are invariable part of their internal process for maintaining quality control in the mineral used in their plant.

(iii) Though there is no requirement of government mandated sampling and analysis of the ore dispatched, the company for its internal quality control purposes is maintaining a standard protocol for sampling and analysis of the ore at all stages of mining and processing including dispatch of ore from its mine.

(iv) There is further scope for improvement in the system by including automatic sampling and analysis procedures by installing continuous online cross-belt analysers to eliminate or minimize human interference.

3.4 General observations from the visit

(i) Only two options are available to the lease holders, either follow the process of stacking, sampling and analysis and pay the statutory dues on the grade determined in the process or seek exemption from the process and pay statutory dues on the highest grade of mineral.

(ii) The process of stacking, sampling and analysis has following shortcomings:

    (j) It is a cumbersome process involving various steps and processes.

    (k) It is time taking process as the whole process takes at least 7 days after processing of mineral till dispatch.

    (l) The process requires huge infrastructure investment and unnecessary material rehandling within the leased area. Additional cost of rehandling comes to around the Rs. 70-80 per tonne in a typical mine of 10-12 MTPA capacity.

    (m)Separate stacks for each grade and each type of ore (lump, fine, CLO) are required to be made. The process is area extensive and requires large flat area within the leased area, which is difficult to maintain in working mines.

    (n) Human intervention is involved in the process at crucial stages of drawing of samples and chemical analysis.

    (o) Most of the sample collection locations in a stack are predictable.

    (p) No provision for continuous monitoring of stacks creation and dispatch through CCTVs.

    (q) The process could be a roadblock and impediment in fully mechanization or automation of mining activities and enhancement of production capacities in future.

    (r) The process consequently affects the productivity and efficiency in mining.

(iii) The annual capacity of both the mines visited by the sub-committee is comparable, however the turn-around time from mining of ore till dispatch in both the categories of mines is incomparable. The turn-around time in case of non-exempted mine of JSW Steel Ltd. was around 7 days, whereas it was only around 1-3 hours in case of exempted mine of Tata Steel Ltd.

(iv) It was noted that some lease holders have opted for exemptions from the process of sampling and analysis due to above mentioned issues in the process. A critical analysis of the list of operating mines in Odisha reveals that out of 42 mines of the pre- auction stage, 11 mines are under exempted category of which 7 have more than 8-million-ton annual production capacity. Of the rest 31 non-exempted mines, most of them have less than 1 million ton production capacity. Similarly, out of the 18 auctioned mines which are operational all are under non-exempted category. This clearly reveals that most of the mines which are under non-exempted category are of pre-auction era and have small production capacity, whereas all the auctioned mines have opted for non-exemption category. The basic reasoning for the mines having higher production capacity going for

the exempted category is to avoid the cumbersome and time consuming process of stacking and analysis which adversely impacts their productivity. Paying royalty even at the highest rate was viable for the pre-auction mines. For the auctioned mines, it is not viable to pay royalty at the highest rate therefore they are compelled to adopt the non-exempted category even if it is not an efficient and full proof method of sampling and analysis. A detailed table of the operating mines is annexed for reference at **Annexure-X**. From this it is imperative that in future all the mines to be auctioned will opt for the non-exempted category which may put a huge burden on the state machinery. It is also important to understand even a 0.1 percent lowering of grade by any means has significant financial impact on the revenue of the State Government.

(v) Only reason for affording the cost of exemption regime appears that such mines are non-auctioned mines which are not required to pay auction premium. For the auctioned mines which have bid high auction premiums, the exemption regime is not affordable and therefore the lease holders are bound to adopt cumbersome process of sampling and analysis, causing loss of productivity and efficiency.

(ix) It was also observed that JSW Steel Ltd. has adopted advanced digitalization in almost all the process in mining and logistics, such as Safety & Compliance Management System, Digital Logistic Management System (DLMS), Smart Security & Surveillance system, Central Control & Command Centre (CCCC), etc. JSW Steel Ltd. informed that implementation of DLMS has resulted in around 81% reduction in time taken by trucks from mine entry till dispatch. Average turn-around time has improved by 3 hours by just adopting DLMS.

(x) From the above, it is observed by the sub-committee that on one hand, the lease holders are increasingly adopting state of art technology and automation in all the aspects of mining and mineral handling. However, on the other hand, the process of stacking, sampling and analysis, as highlighted above, is not keeping the pace with the technology adopted by lessees in other spheres of mining and mineral handling. Such a process of stacking, sampling and analysis is a hurdle in increasing the productivity and efficiency of the mines. The whole process of stacking, sampling and analysis need to be automated and integrated in the other automated processes of mining activities.

[End of the sub-committee report, annexure follows]

List of Iron ore operating Mines with Production(2021-22)/Annual Capacity/Status of exemption or Non-exemption category as per OMPTS Rules

S N	District	Primary Mineral	Other/Associated Mineral(s)	Name of Mine	Name of Lessee	Total Lease Area in Ha	Ownership (Private / PSU)	Captive/Non-Captive	Mode of ML Grant_Auction /Pre-Auction/Pre-Auction	Annual Capacity (max.) as per approved MP (Figure in Million tones)	Production during 21-22(Figure in Million tones)	Status of exemption/ Non-exemption category as per OMPTS Rules	Remarks
1	Jajpur	Iron Ore	Not Applicable	Daitari	O.M.C. Ltd.	1812.9900	SPSU	Non-captive	Pre Auction	6.25	4.25	Exemption	
2	Keonjhar	Iron Ore	Not Applicable	Gandhamardan -B	O.M.C. Ltd.	1590.8670	SPSU	Non-captive	Pre Auction	9.12	7.278	Non-exemption	
3	Keonjhar	Iron Ore	Manganese	Khandbandh	TATA Steel Ltd.	978.0000	Pvt	Captive	Pre Auction	12	4.110168	Exemption	
4	Keonjhar	Iron Ore	Not Applicable	Katamati	TATA Steel Ltd.	403.3240	Pvt	Captive	Pre Auction	13.5	3.853128	Exemption	
5	Keonjhar	Iron Ore	Manganese	Dalpahar& Baitarani R.F.	R.B. Das	4.8400	Pvt	Non-captive	Pre Auction	0.014	0.00707	Non-exemption	
6	Keonjhar	Iron Ore	Manganese	Unchabali	Indrani Patnaik	106.1130	Pvt	Non-captive	Pre Auction	3.99	2.32116	Non-exemption	
7	Keonjhar	Iron Ore	Manganese	Naibega&Katupali	Tarini Prasad Mohanty	47.2190	Pvt	Non-captive	Pre Auction	0.6	0.54653	Non-exemption	

8	Keonjhar	Iron Ore	Not Applicable	Joda East	TATA Steel Ltd.	671.0930	Pvt	Captive	Pre Auction	17.6	11.3881	Exemption	
9	Sundargarh	Iron Ore	Manganese	Patabeda	M.G. Mohanty	19.4250	Pvt	Non-captive	Pre Auction	0.195	0.16958	Exemption	
10	Sundargarh	Iron Ore	Not Applicable	Tantra, Raikela, Bandhal (TRB)	Jindal Steel & Power Ltd	207.1130	Pvt	Non-captive	Pre Auction	3.1	2.85435	Non-exemption	
11	Sundargarh	Iron Ore	Not Applicable	Tantra	Korp Resources (P) Ltd.	72.5600	Pvt	Non-captive	Pre Auction	0.52	0.0867	Non-exemption	
12	Sundargarh	Iron Ore	Not Applicable	Patabeda	M.G. Mohanty	14.0000	Pvt	Non-captive	Pre Auction	0.1	0.09029	Exemption	
13	Sundargarh	Iron Ore	Not Applicable	Patabeda	MGM Minerals Ltd.	28.3970	Pvt	Non-captive	Pre Auction	1.49	1.19275	Exemption	
14	Sundargarh	Iron Ore	Not Applicable	Raikela	National Enterprises	45.9320	Pvt	Non-captive	Pre Auction	1	0.42705	Non-exemption	
15	Sundargarh	Iron Ore	Not Applicable	KurmitarPahar	O.M.C. Ltd.	1212.4700	Pvt	Non-captive	Pre Auction	6.97	4.2037	Non-exemption	
16	Sundargarh	Iron Ore	Not Applicable	Raikela	Penguin Trading & Agencies (P) Ltd.	49.3720	Pvt	Non-captive	Pre Auction	1.08	1.079202	Non-exemption	
17	Sundargarh	Iron Ore	Not Applicable	Oraghat	Rungta Sons (p) Ltd.	82.9660	Pvt	Non-captive	Pre Auction	8.35	6.687704	Exemption	
18	Sundargarh	Iron Ore	Bauxite ore	Sanindupur	Rungta Sons (P) Ltd.	147.1000	Pvt	Non-captive	Pre Auction	8.06	7.43567	Exemption	
19	Sundargarh	Iron ore	Bauxite ore	Jaldihi, (K.J.S.T)	Prabodh Mohanty Legal hair of S.N. Mohanty	188.2680	Pvt	Non-captive	Pre Auction	2	1.97035	Non-exemption	

20	Keonjhar	Iron Ore	Manganese	Roida - C	O.M.C. Ltd.	192.8100	SPSU	Non-captive	Pre Auction	0.459	0.406838	Non-exemption	
21	Keonjhar	Iron Ore	Not Applicable	Bolani	SAIL	1321.45000	CPSU	Captive	Pre Auction	11.9	7.452725	Exemption	
22	Keonjhar	Iron Ore	Not Applicable	Nayagarh	K.C. Pradhan	24.5700	Pvt	Non-captive	Pre Auction	0.112	0.08024	Non-exemption	
23	Keonjhar	Iron Ore	Manganese	Khandabandh& Baitarani R.F.	Shree Metaliks Ltd.	35.7740	Pvt	Captive	Pre Auction	1.5	0.701383	Non-exemption	
24	Keonjhar	Iron Ore	Not Applicable	Deojhar	Tarini Minerals (P) Ltd.	34.3650	Pvt	Non-captive	Pre Auction	1.45	0.0722	Non-exemption	
25	Sundargarh	Iron Ore	Not Applicable	Bhanjapali	J.N. Patnaik	18.0000	Pvt	Non-captive	Pre Auction	0.26	0.26	Non-exemption	
26	Sundargarh	Iron Ore	Not Applicable	Raikela	Geetarani Mohanty	67.5860	Pvt	Non-captive	Pre Auction	4.5	2.944	Non-exemption	
27	Keonjhar	Iron Ore	Not Applicable	Gandhamardan-A	O.M.C. Ltd.	618.5760	SPSU	Non-captive	Pre Auction	0.35	0.1558	Non-exemption	
28	Keonjhar	Iron Ore	Not Applicable	Murgabeda	D.R. Patnaik	15.3780	Pvt	Non-captive	Pre Auction	2	1.21899	Non-exemption	
29	Keonjhar	Iron Ore	Manganese	Sirkagutta	Prakash Industries Ltd.	19.5320	Pvt	Captive	Pre Auction	0.85	0.81294	Non-exemption	
30	Sundargarh	Iron Ore	Not Applicable	Adaghat	National Enterprises	15.0740	Pvt	Non-captive	Pre Auction	0.7	0.300192	Non-exemption	
31	Mayurbhanj	Iron Ore	Not Applicable	Suleipat	B.C. Dagara	618.0000	Pvt	Non-captive	Pre Auction	1.19	0.05509	Non-exemption	

32	Keonjhar	Iron Ore	Not Applicable	Thakurani	Arcelor Mittal India Pvt Ltd	228.0400	Pvt	Captive	Auction	7.99	5.497887	Non-exemption	
33	Sundargarh	Iron Ore	Manganese	Narayanpasi	JSW Steel Ltd	349.2540	Pvt	Captive	Auction	10	5.794096	Non-exemption	
34	Keonjhar	Iron Ore	Manganese	Jajang	JSW Steel Ltd	666.1500	Pvt	Non-captive	Auction	12.5	12.199333	Non-exemption	
35	Sundargarh	Iron Ore	Manganese	Gonua	JSW Steel Ltd	88.5160	Pvt	Captive	Auction	2.99	0.991045	Non-exemption	
36	Keonjhar	Iron Ore	Not Applicable	Nuagaon	JSW Steel Ltd	776.9690	Pvt	Non-captive	Auction	20	6.330787	Non-exemption	
37	Keonjhar	Iron Ore	Not Applicable	Jururi	Jagat Janani Services Pvt Ltd	73.2280	Pvt	Non-captive	Auction	1	0.21865	Non-exemption	
38	Keonjhar	Iron Ore	Not Applicable	Balda	Serajuddin& Co.	335.8400	Pvt	Non-captive	Auction	10.63	4.31441	Non-exemption	
39	Keonjhar	Iron Ore	Not Applicable	Jaribahal	KashviInternaltional Pvt. Ltd.	106.5340	Pvt	Captive	Auction	1.2	1.011324	Non-exemption	
40	Mayurbhanj	Iron Ore	Not Applicable	Badampahar	GM Iron & Steel Company Ltd.	129.6090	Pvt	Non-captive	Auction	1.15	1.1334	Non-exemption	
41	Keonjhar	Iron Ore	Not Applicable	Tanto, Roida - II	Narbherm Power and Steel Private Ltd.	74.7020	Pvt	Captive	Auction	3.49	2.360172	Non-exemption	
42	Mayurbhanj	Iron Ore	Not Applicable	Gorumahishani	G.S. Mishra & Sons	349.5000	Pvt	Non-captive	Auction	0.75	0.443368	Non-exemption	
43	Keonjhar	Iron Ore	Not Applicable	Jilling- Langalota	O.M.C. Ltd.	456.0370	SPSU	Non-captive	17A(2)	10	4.378	Exemption	

44	Keonjhar	Iron Ore	Not Applicable	Guali	O.M.C. Ltd.	365.0260	SPSU	Non-captive	17A(2)	30	5.7	Exemption	
45	Keonjhar	Iron Ore	Manganese	Tiringpahar	O.M.C. Ltd.	79.3000	SPSU	Non-captive	Pre Auction	0.328	0.328	Non-exemption	
46	Sundargarh	Iron Ore	Not Applicable	Neelachal Iron Ore Mine	NilachalaIspat Nigam Ltd.	874.2900	SPSU	Non-captive	Pre Auction	2.195	0.046969	Non-exemption	
47	Sundargarh	Iron Ore	Manganese	Sanindupur	National Enterprises	70.9170	Pvt	Non-captive	Pre Auction	3.00013	0.386075	Non-exemption	
48	Sundargarh	Iron Ore	Not Applicable	GhoraburhaniSagasahi Iron Ore Mines	Arcelor Mittal Nippon Steel India Limited.	139.1650	Pvt	Captive	Auction	7.162128	2.249463	Non-exemption	
49	Sundargarh	Iron Ore	Not Applicable	Barsuan/Kalta/Taldihi	SAIL	2486.3820	CPSU	Captive	Pre Auction	11.9	7.549114	Exemption	
50	Keonjhar	Iron Ore	Not Applicable	Khandbandh	O.M.C. Ltd.	366.3110	SPSU	Non-Captive	Pre Auction	1.02	0	Non-exemption	Mine re-open on 16.05.2022
51	Keonjhar	Iron Ore	Not Applicable	Banspani	O.M.C. Ltd.	380.4000	SPSU	Non-Captive	Pre Auction	0.993	0	Non-exemption	Mine re-open on 16.05.2022
52	Sundargarh	Iron Ore	Manganese	Nadidih Iron and Manganese Ore Mines	ESL Steel Limited	117.2060	Pvt	Non-captive	Auction	3.480765	0.226014	Non-exemption	
53	Sundargarh	Iron Ore	Not Applicable	Nadidih Iron ore Mines	ESL Steel Limited	74.5000	Pvt	Non-captive	Auction	3.615876	0.209736	Non-exemption	

54	Sundargarh	Iron Ore	Dolomite	Kasia Iron and Dolomite Mines	Jindal Steel and Power	194.1900	Pvt	Non-captive	Auction	7.499495	1.620254	Non-exemption	
55	Keonjhar	Iron Ore	Not Applicable	Unchabali, Balda, Nayagarh	O.M.C. Ltd.	68	SPSU	Non-captive	Pre Auction	1	0	Non-exemption	Mine re-open on 16.05.2022
56	Keonjhar	Manganese Ore	Iron ore	Joda West	TATA Steel Ltd.	1437.7190	Pvt	Captive	Pre Auction	0	0	Non-exemption	
57	Keonjhar	Manganese Ore	Iron ore	Bamebari	TATA Steel Ltd.	464.0000	Pvt	Captive	Pre Auction	0	0	Non-exemption	
58	Keonjhar	Manganese Ore	Iron ore	Guruda&Tringpahar	TATA Steel Ltd.	169.0000	Pvt	Captive	Pre Auction	0	0	Non-exemption	
59	Sundargarh	Manganese Ore	Iron ore	Nuagaon	Prabodh Mohanty	29.2570	Pvt	Non-captive	Pre Auction	0.4	0.073	Non-exemption	
60	Keonjhar	Manganese Ore	Iron Ore	Siljora-Kalimati	Debabrata Behera	715.6390	Pvt	Non-captive	Auction	0.136	0	Non-exemption	
61	Sundargarh	Manganese Ore	Iron Ore	Mahulsukha	Patnaik Minerals Pvt. Ltd.	390.3170	Pvt	Non-captive	Auction	1	0	Non-exemption	
62	Sundargarh	Manganese Ore	Iron	Kolmong	Yazdani Steel and Power Limited.	218.5300	Pvt	Non-captive	Auction	0.3	0	Non-exemption	

<p align="right">**Annexure-5**</p>

Record note of the meeting held on 01.07.2022 on misclassification of different grades of iron ore and other minerals

1.   A meeting of the committee constituted by this Ministry vide order dated 16.07.2021 for examining the issues of 'Misclassification of different grades of iron ore and other minerals' was held on 01.07.2022 under the chairpersonship of Dr. Veena Kumari Dermal, Joint Secretary, Ministry of Mines. The list of participants is at Annexure.

2.   The chairperson welcomed all participants. Shri P. N. Sharma, CCOM (IBM) informed that in order to understand the various technologies involved in sampling and analysis of ore, two companies have been invited to make presentations viz. M/s SGS India Pvt Ltd with respect to sampling technologies and M/s OLM Systems and Technologies with respect to technologies for analysis of ore.

3.   The chairperson requested M/s SGS India Pvt. Ltd to make a presentation on sampling of ore. Representatives from SGS thanked the chairperson and explained why sampling is important and different process of sampling. He informed that the sampling can be static wherein sample is taken from a stack of ore or sample can be taken when the ore is in movement on a conveyer belt. He informed about the various issues involved in sampling from a stacked ore. For sampling of in-movement ore, he informed that there are two technologies viz. cross-belt conveyer sampling system and auger system.

4.   SGS informed about the various aspects of its cross-belt conveyer sampling system / mechanical sampling system including automated sample collection and delineation of non-sample from sample. It was informed that the system is in operation in Neyvelli lignite mine. It was informed that the system is more suitable for large mines which already have a railway siding facility.

5.   SGS informed about its auger sampler which is used for sampling of ore in a contained space. They informed that auger works as a three-tier sampling system wherein sample is crushed, prepared, seal packed and sent for analysis to the lab. It was also informed that this mechanism ensures sample integrity and reduces the sample size to 20 kg which is easier to work with. Further, it was informed that the auger system can be integrated with an online continuous analyzer to obtain the results immediately. Integrating RFID technology with the auger system will ensure there is no human intervention.

6.   Shri Dheeraj Kumar, Deputy Secretary (Mines) asked SGS about the cost of complete set of its two technologies. SGS informed that the cost for the cross-belt conveyer sampling system would be approximately Rs. 1.5 crore and the cost for the auger analyzer system would be approximately Rs. 1.5 crore to 2 crore.

7.   The chairperson then requested M/s OLM Systems and Technologies to make a presentation on technologies for continuous analysis of ore to determine its grade. Representative from OLM thanked the chairperson and informed that there are two types of continuous analyzers for online real-time feedback of material viz. PGA analyzer and Laser analyzer.

8.   OLM informed that the PGA analyzers have a radioactive component in the system and therefore, obtaining permissions requires time.PGA analyzer has good depth penetration into the ore stack/layer and is therefore more accurate.

9.   OLM informed that the Laser analyzer is a Radioactive Radiation-free Online Elemental Analyzer and is based on plasma technology wherein the ore is heated and then emission is analyzed to assess the grade composition of the ore. The analyzer gives the moisture component in the ore as well. The analyser provides information about the composition of different elements, oxides of elements and moisture content in the minerals. It was informed that the system can also be integrated with the auger system to provide online real-time feedback of material. Further, Laser analyzer is safe as it does not contain any radiation.

10.   Shri Dheeraj Kumar, Deputy Secretary (Mines) asked OLM about the cost of Laser analyzer. OLM informed that the build, operate & installation cost would be between Rs. 4 crore to 5 crore. OLM informed that the maintenance cost of the system is low compared to other conventional methods. OLM also informed that the analyser may be integrated with the government server for data storage and analysis.

11.   The chairperson thanked the representatives of both the companies for making the presentations. She stated that wherever conveyer belt is already in operation in the mine, such mines can use the cross-belt conveyer sampling system and choose from the two continuous online analyzer technologies. For smaller mines, States could consider using any combination of the sampling and continuous online analyzer technologies suggested as per the requirement.

12.   The chairperson sought the views of other members on the proposed solution. The members agreed with the observations of the chairperson. The chairperson stated that the report of the committee may be finalized within two weeks' time.

*****

Annexure

List of participants in the meeting held on 01.07.2022 on misclassification of different grades of iron ore and other minerals

S. No.	Name and Designation	Ministry or Department
1	Dr. Veena Kumari Dermal, Joint Secretary	Ministry of Mines
2	Shri Dheeraj Kumar, Deputy Secretary	Ministry of Mines
3	Shri Sambhav Jain, Manager (Legal)	Ministry of Mines
4	Shri P. N. Sharma, CCOM	IBM
5	S. K. Adhikari, CMG	IBM
6	Abhay Agrawal, COM (CZ)	IBM
7	Shri R.P. Manohar, Director	DMG, Karnataka
8	Shri Anurag Diwan, Joint Director	DMG, Chhattisgarh

Annexure -6

DIRECTORATE OF GEOLOGY AND MINING, CHHATTISGARH

Indravati Bhawan, 2ⁿᵈ Floor, Block "4" Naya Raipur - 492 002, (CG)
Phone: 0771-2221840/44 FAX: 0771-2221841 e-mail: dgm.cg@gov.in

No. 4508   Mine-1/Iron/F.No. 06/2021,   Nawa Raipur Atal Nagar,
dtd.

                                                   2 2 SEP 2022

To,

Dr. Veena Kumari D.
Joint Secretary,
Govt. of India, Ministry of Mines,
Shastri Bhawan, New Delhi, 110001

Subject: First report of the committee "To examine the issue of misclassification
           of grades of Iron Ore and other Minerals" for acceptance and
           Signature.

Ref.-   Email dtd. 13.09.2022 of Govt. of India, Ministry of Mines, New Delhi.

===00===

       With reference to the above email on misclassification of different grades of
iron ore and other minerals, kindly find attached State's views along with signature of
members on the "**first report of the committee constituted by ministry of mines to
examine the issue of misclassification of different grades of iron ore and other
minerals**".

Encl.:- As above.

                                                   Director
                                                 Geology and Mining
                                                 Nawa Raipur Atal Nagar.

Encl No. 4509 Mine-1/Iron/F.No. 06/2021,   Nawa Raipur Atal Nagar,
                                                   12 2 SEP 2022

Copy To,
         The Secretary, Government of Chhattisgarh, Mineral Resources Department,
Mahanadi Bhawan, Mantralaya, Nawa Raipur (CG)

                                                   Director
                                                 Geology and Mining

1645645/2023/Mines VI

CHHATTISGARH VIEW ON RECOMMENDATIONS FROM MoM REGARDING THE ISSUE OF MIS-CLASSIFICATION OF DIFFERENT GRADES OF MINERALS

Chhattisgarh State appreciates recommendations suggested by Ministry of Mines, Government of India. However, incorporating the same in Rules framed under Section 23 (c), shall be subjecte to due consultation with the stakeholders considering their quantum of working, their technical know how/skil, network connectivity in the area, and overall feasibility of the proposed system. Some of the measures as recommended might have difficulties in implementing right now and shall be finalized after due consultation with all stakeholders.

It has to be noted that State has successfully implemented **Khanij Online system** and certain measures as suggested by MoM are already in place, like online generation of transit pass, online monitoring of vehicles etc. We are continuously renovating **Khanij Online system** with VTS, Mobile app, ICCC etc.

Page 1 of 13

Annexure -7

DIRECTORATE OF MINES
STEEL AND MINES DEPARTMENT, GOVT. OF ODISHA,
BHUBANESWAR
Heads of Department Building, Unit-V, Pin-751001
Tel No.: 0674-2391537, Fax No.: 0674-2391684
Email ID: dirmines_odisha@rediffmail.com

MXLI(a)-07-2022 _____8356_____ /DM.,   Dt. 29-09-2022

From

      Dr. U.C. Jena, ADM
      Directorate of Mines, Odisha
      Bhubaneswar.

To

      Dr. Veena Kumari Dermal,
      Joint Secretary, Ministry of Mines,
      Govt. of India.

Sub:-   Views on the first report of the committee constituted by Ministry of Mines to examine the issue of misclassification of different grades of Iron Ore and other minerals.

Madam,

      In inviting a reference to the subject above, I am directed to state that the first report of the committee constituted by Ministry of Mines to examine the issue of misclassification of different grades of Iron Ore and other minerals has been received at this end and examined in details. In the said report, we offer our points of observation on the following issues:

Page No. & Para No.	Content	Remarks
Under Para 7.4 (ii) (b) & (d) at page no.24 and under para 3.4 (ii) (k) & (m) at page no. 67	The whole process is time consuming & area extensive	In this issue we would like to inform that the higher quantity of stacks easily compensate both the factors.
Under Para 7.4 (ii) (c) at page no.24 Under Para	Additional cost of re-handling comes to around the Rs.70-80 per	In this connection, it is to contended here that if we compare ASP of Odisha, Karnataka and Maharashtra, Odisha has least rate of Avg. sale price in the month

page no. 67	typical mine of 10-12 MTPA capacity	other states where this process are not followed. Therefore this is not an issue. Further, in the process of finalising the ASP, State Governments may be included as Committee Member and the views in this regard may be considered for finalising the ASP.
Under Para 7.4 (ii) (e) at page no.24 and Under Para 3.2 (ii) & 3.4 (ii) (n) at page no. 65 & 67	Human intervention is involved in the process at crucial stages of the process	Human intervention in this entire process is very much limited. JMOs have been provided with i3MS software based mobile phones through which they are operating in the field. Entire process of sample collection are getting recorded in cameras eliminating any scope of error and distortion. There are number of JMOs posted in the circle level and two to three numbers of JMOs are visiting mines for this process for different locations. Therefore scarcity of JMOs is not an issue. Moreover JMOs or lab authorities who are involved in this process are Govt. officials working with highest integrity and dedication towards work.
Under Para 7.4 (ii) (f) at page no.24 and Under Para 3.4 (ii) (o) at page no. 67	Most of the sample collection locations in a stack are predictable	During the process of sample collection, the generation of sampling location is based on Augmented Reality through which random sampling locations are generated. Therefore there is no scope of any predictable locations except one at the centre out of almost 25 to 30 locations in random. Further improvisation is also attempted with implementation of IOT devices.
Under Para 7.4 (ii) (g) at page no.24 Under Para 3.4 (ii) (p) at page no. 67	No provision for continuous monitoring of stacks creation and despatch through CCTVs	In a running mines of around 10-12 MTPA capacity, permanent instalment of CCTV cameras are difficult. However footages of temporary CCTVs are getting checked by Competent Authority regularly.
Under Para 3.2 (I) (a) at page no.65	The stacks may not be homogeneous or there is no	In this regard it is to mention here that the samples of around 30 nos. are taken from different places of a mineral stack and then final grade of the ore is arrived

	process to check the stack is homogenous.	at. Moreover, since the mineral in a stack is collected from single face of a mines therefore the stacks are homogeneous.
Under Para 3.2 (i) (b) at page no.65	Bottom material are only available in an auger machine spiral boom which were collected for sample processing	In this regard it is to mention here that, the boom length of an Auger Machine is around three meter and entire boom has spiral edge. Therefore the material which are available in an auger machine's boom is the material of entire depth of the stack. Further the material which is taken out of the auger drill hole lying beside the hole area are also collected for sample processing. Hence there was no scope of any escape of mineral from sampling through auger drill.
Under Para 3.2 (i) (e) at page no.65	There is no methodology prescribed to ensure that same sample that has been sent to the lab has been analysed	In this issue it is to intimate here that, after coning & quartering of collected samples in the field, samples were packed in three numbers of bags having corresponding identification number or bar code to be randomly generated through the i3MS software. Thereafter the lab personnel before receiving any samples, they scan that barcode in their mobile through i3MS software after which the samples are collected and analysed in the lab. After analysis, concerned authority of the lab upload the analysis report in the software through identification number only. Further entire process are getting checked through our JMOs & lab authorities in combine with highest integrity and dedication.

Moreover there is always a second option that exist for mines owners to opt for exempted category through which their process of evacuation will speed up.

Furthermore the suggestion which are recommended by the committee are mostly addressed through our system of i3MS however the recommendation of continuous online analyser mounted on cross belt conveyor is not practicable and feasible in case of all the leases. This mechanism is yet to be available in the market and when it will be available implementation of the same can be thought-of.

4

In this regard we would like to say that, our Integrated Mines and Minerals Monitoring System (i3MS) is India's most successful administration system implemented by any government body. It has garnered nationwide acclaim as one of the best practices in IT intervention in governance. Over the years it has evolved into an important tool for the government of Odisha in streamlining the mines and minerals administration. Furthermore, the i3MS integrated software system has strengthened the government's regulatory framework leading to unprecedented collection of around 50,000 Cr. revenues from the sector in the year 2021-22.

This is for favour of your kind of information and necessary action.

Yours faithfully

ADDL. DIRECTOR OF MINES

Annexure -8

Government of Jharkhand
Dept. of Mines & Geology
Mines Directorate

पत्रांकः– खoनिo(लौह)–21/2021   2217   /एमo, दिनांकः– 07/11/2022

From

      Amit Kumar (IAS)
      Director Mines,
      Jharkhand, Ranchi.

To

      Sri Sambhav Jain,
      Sr. Manager(Legal)
      Ministry of Mines,
      Government of India.

Sub :–   **Draft report on misclassification of different grades of Iron Ore and other minerals.**

Ref.:–   your e-mail dated- 15.07.2022

Sir,

    With reference to your above captioned subject, this is to inform you that we have examined the contents of the draft report of the committee constituted by Ministry of Mines to examine the issue of misclassification of different grades of Iron Ore and other minerals and we hereby agree with the draft report.

    It is for your kind information and for further necessary action please.

Yours Sincerely

04/11/2022
Director Mines

[End of the report]

No. 16/86/2021-Mines VI
Government of India
Ministry of Mines
*****

Shastri Bhawan, New Delhi
Dated: 27th July, 2023

To,
Shri Mustaq Ahmad,
Director (Policy),
Ministry of Mines

Subject: Additional note to the report dated 11.11.2022 of the committee on misclassification of grades of different grades of iron ore and other minerals –reg.

Sir,
I am directed to refer to email dated 07.07.2023 received from Ministry of Mines wherein the comments received in stakeholder consultation on recommendations of the committee were forwarded with a request to examine the comments received from various stakeholders and to suggest further changes in the report, if any.

2.   It is informed that a meeting of the committee was convened on 13.07.2023 and based on deliberations in the meeting, an additional note to the report dated 11.11.2022 of the committee on misclassification of grades of different grades of iron ore and other minerals is enclosed herewith along with Annexures.

Encl: As above

Yours faithfully,

(Dheeraj Kumar)
Deputy Secretary / Member Secretary of the Committee
Email: dheeraj.kumar83@gov.in

Signed by Dheeraj Kumar
Date: 27-07-2023 10:55:22
Reason: Approved

Additional note to the report dated 11.11.2022 of the committee on misclassification of grades of different grades of iron ore and other minerals

1. Ministry of Mines vide its order no. 16/86/2021-M.VI dated 16.07.2021, constituted a committee to examine the issue of misclassification of grades of iron ore and other minerals, adversely affecting the revenue of State Governments and suggest measures for preventing misclassification of different grades of iron ore and other minerals. The report of the committee was submitted to Ministry of Mines on 11.11.2022.

2. Subsequently, comments / suggestions of the State Governments / Union Territories / mining companies and individuals were sought by Ministry of Mines on the recommendations of the committee in its report dated 11.11.2022. Ministry of Mines vide email dated 07.07.2023 forwarded the comments received in stakeholder consultation and requested the committee to examine the comments received from various stakeholders and to suggest further changes in the report, if any.

3. Accordingly, a meeting of the committee was convened on 13.07.2023 (the minutes of the meeting are at **Annexure I**). The committee discussed the comments received from State Governments of Chhattisgarh, Jharkhand, Karnataka, and Odisha and observed that the State Governments of Jharkhand, Chhattisgarh and Karnataka have in general accepted / agreed to the recommendations of the committee. However, State Government of Odisha was of the view that they already have similar IT based integrated mines and mineral management system. During the meeting it was discussed that recommendations in the report are recommendatory in nature and it is up to the State Governments to implement these measures in case it is felt that the existing systems can be improved upon.

4. Further, the committee discussed that its recommendations may be implemented on pilot basis and learnings from the same may be utilized to prevent misreporting / misclassification of grades of minerals. The committee members expressed agreement with the same. The committee also discussed comments received from other stakeholders

and based on the discussions the remarks of the committee are at **Annexure II**.

5. Based on deliberations in the meeting, the committee suggests following additional recommendations in addition to those already made in the report:

i. Adequate redressal mechanism in case of variation between physical inspection and system-enabled results: State Governments may set up a redressal mechanism and fix a suitable tolerance limit for deviation from the face sample based on available geological data and previous reporting of grades.

ii. Provision to allow dispatch in case of non-functionality of any equipment in the entire system: States may keep a provision to allow dispatch on the basis of grade as per seam/face analysis or the last determined grade, whichever is higher.

iii. The recommendation of the committee can be of recommendatory in nature and the adoption of the same can be left to the State Government.

iv. The system may initially be implemented on pilot basis, through a PSU and the level of accuracy and detection limits may be cross-verified before full implementation of such system.

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