ANNUAL REPORT
2019-2020

GOVERNMENT OF INDIA

MINISTRY OF MINES

MINISTRY OF MINES

Ministry of Mines	**: http://mines.gov.in**
Geological Survey of India	**: www.gsi.gov.in**
Indian Bureau of Mines	**: www.ibm.nic.in**
National Aluminium Company Limited	**: www.nalcoindia.com**
Hindustan Copper Limited	**: www.hindustancopper.com**
Mineral Exploration Corporation Limited	**: www.mecl.co.in**
Jawaharlal Nehru Aluminium Research Development and Design Centre	**: www.jnarddc.gov.in**
National Institute of Rock Mechanics	**: www.nirm.in**

Contents

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1 Ministry of Mines: An Overview

Back to Index

Ministry of Mines: An Overview

1.1 Vision

(i) India is well endowed with natural resources, particularly minerals, which serve as raw material for many industries, paving a path for rapid industrialisation and infrastructural development. This, in turn, will facilitate the economy's ascent to a path of sustained growth and a five trillion dollar economy.

(ii) During last five years, the Government has introduced important reforms to open up the mineral sector to ensure its contribution in achieving the national policy goals. Major reforms include enactment of the Mines and Mineral (Development & Regulations) (MMDR) (Amendment) Act, 2015, which made the process of allocation of mineral concessions completely transparent by introducing public auctions with active participation of the State Governments. In the federal set up, States are owners of mineral wealth in their respective territories. For realising the benefits of mineral wealth, States have primary and significant role to come up with auctionable mineral blocks that have clearance to start production.

(iii) The Vision is to double the production of important minerals in next 5 years with resultant reduction in import dependency, by allocating and regulating minerals in a transparent and sustainable manner and to promote exploration and mining of deep seated minerals to meet country's needs and to effectively implement other policy goals stated in the National Mineral Policy, 2019, there by enabling the country to progress towards attaining self-sufficiency in major mineral production.

Photo -1.1

CMDs of NALCO, HCL and MECL signed JV to establish KABIL in presence of Hon'ble Minister of Mines Shri Pralhad Joshi

Role and Organisation of the Ministry

Main Functions

1.2 Ministry of Mines is responsible for survey and exploration and mining of all minerals, other than natural gas, petroleum, atomic minerals and coal. In the case of atomic minerals and coal, activities of the Ministry are limited to regional exploration. The Ministry is responsible for the administration of the Mines and Minerals (Development and Regulation) Act, 1957 (67 of 1957) and rules made thereunder in respect of all mines and minerals other than coal, natural gas and petroleum. The Ministry also administers the Offshore Areas Mineral (Development and Regulation) Act, 2002 and rules made thereunder.

1.3 List of Subjects Allocated to the Ministry of Mines:

(a) Legislation for regulation of mines and development of minerals within the territory of India, including mines and minerals underlying the ocean within the territorial waters or the continental shelf, or the exclusive economic zone and other maritime zones of India as may be

specified, from time to time by or under any law made by Parliament.

(b) Regulation of mines and development of minerals other than coal, lignite and sand for stowing and any other mineral declared as prescribed substances for the purpose of the Atomic Energy Act, 1962 (33 of 1962) under the control of the Union as declared by law, including questions concerning regulation and development of minerals in various States and the matters connected therewith or incidental thereto.

(c) All other metals and minerals not specifically allotted to any other Ministry/Department, such as aluminium, zinc, copper, gold, diamonds, lead and nickel.

(d) Planning, development and control of and assistance to all industries related to mineral wealth dealt with by the Ministry.

(e) Administration and management of Geological Survey of India.

(f) Administration and management of Indian Bureau of Mines.

(g) Metallurgical grade silicon.

Attached Office / Subordinate Office:

1.4 Geological Survey of India (Headquarters at Kolkata) is an attached office and the Indian Bureau of Mines (Headquarters at Nagpur) is a subordinate office of the Ministry.

Public Sector Undertakings

1.5 There are three Public Sector Undertakings under the Ministry of Mines, namely:-

- National Aluminium Company Limited (NALCO), Bhubaneswar;
- Hindustan Copper Limited (HCL), Kolkata; and
- Mineral Exploration Corporation Limited (MECL), Nagpur

Photo -1.2

Release of Lignite Atlas of India publication during 58th CGPB Meeting

Autonomous Bodies

1.6 There are three Research Institutions which are Autonomous Bodies of this Ministry:

- Jawaharlal Nehru Aluminium Research Development and Design Centre (JNARDDC), Nagpur;
- National Institute of Rock Mechanics (NIRM), Bengaluru; and
- National Institute of Miners' Health (NIMH), Nagpur.

Organisational Structure

1.7 The Ministry of Mines is headed by Shri Pralhad Joshi as the Minister of Mines, during the period of the report. Shri Pralhad Joshi assumed the charge, after the formation of new Government,

on 31st May, 2019, along with Parliamentary Affairs and Coal.

1.8 The Secretariat of Ministry of Mines is headed by the Secretary, assisted by one Additional Secretary, three Joint Secretaries, one Joint Secretary & Financial Adviser (common for Ministry of Coal, and Ministry of Mines), one Economic Adviser and Nine Directors / Deputy Secretaries, one Director (Economic Service), one Deputy Director (OL), one Assistant Director of IES, one Assistant Director (OL). Sanctioned strength and present incumbency of officers/officials in the Ministry of Mines is given at **Table 1.1.** Organisational structure of the Ministry of Mines is shown in **Annexure 1.1.**

Table 1.1

Information in r/o Secretariat proper employees as on 31st December, 2019

Group	Sanctioned Strength	Total Number of present incumbents (Including general)	Number of SC/ST/OBC/Minority Women out of present incumbents					VH/HH/OH out of present incumbents		
			SC	ST	OBC	Minority	Women	VH	HH	OH
Group-A Gazetted	34	32	03	03	01	01	05	-	-	**-**
Group-B Gazetted	37	27	04	02	03	01	08	01	-	**-**
Group-B Non-Gazetted	56	46	12	06	10	01	09	-	-	**01**
Group-C	87	44	08	01	02	01	03	-	-	**01**
Total	**214**	**149**	**27**	**12**	**16**	**04**	**25**	**01**	**-**	**02**

Contribution of Mining and Quarrying Sector to the Gross Value Added (GVA) of the Nation

1.9 As per the Second advance estimates of national income 2019-20 and quarterly estimates of GDP for the third quarter of 2019-20 released by the National Statistical Office, Ministry of Statistics and Program Implementation, the contribution of the mining and quarrying sector in the estimated Gross Value Added (GVA), at 2011-12 prices, for the Q3 of 2019-20 was 2.5%, which is near to the level of 2.58% in Q3 of 2018-19. At the current prices, the share in Q3 of 2019-20 is 2%, which is close to the share of 2.23% in Q3 of 2018-19. At the 2011-12 prices, for the period April, 2019 to Dec, 2019(Q1 to Q3), the share is estimated around at the level of April, 2018 to Dec, 2018, i.e. 2.5%, similarly, at the current prices, the contribution is around 2%. The details are in **Table 1.2.**

Table 1.2

Gross Value Added (GVA): Share/Contribution of Mining and Quarrying (%)		
Period	**At 2011-12 price**	**At current price**
October,2018 to December,2018 (Q3 of 2018-19)	2.58	2.23
October,2019 to December,2019 (Q3 of 2019-20)	2.5	2.0
April,2018 to December, 2018 (Q1 to Q3 of 2018-19)	2.54	2.17
April,2019 to December, 2019 (Q1 to Q3 of 2019-20)	2.5	2.01

Source: MoSPI, Press Note on Second Advance Estimates of National Income, 2019-20 and Quarterly Estimates of Gross Domestic Product for the Third Quarter (Oct-Dec), 2019-20 dated 28.02.2020. Statement Nos.5,6, 9 & 11

1.10 Major Highlights / Achievements of Ministry of Mines.

- An MoU on cooperation in the field of Geology and Mineral Resources between the Pluri national State of Bolivia, represented by the Ministry of Mining and Metallurgy and the Republic of India, represented by the Ministry of Mines was signed on 29th March, 2019 during the visit of Hon'ble President of India to Bolivia.

- During the visit of Hon'ble President of India to Chile, an MoU between India and Chile on cooperation in the field of geology and mineral resources has been renewed on 1st April, 2019 for further five years. This MoU was signed on 17th March, 2019.
- The Second Joint Working Group Meeting under the MoU on cooperation in the field of Mineral Resources between India and Mozambique was held in New Delhi on 11th April, 2019.

- The presentation ceremony of prestigious National Geoscience Award was held on 19th September, 2019 at The Ashok, New Delhi. Shri Pralhad Joshi, Hon'ble Minister of Parliamentary Affairs, Coal and Mines conferred the National Geoscience Awards – 2018 to 22 meritorious geoscientists of the country to honour individuals and teams of geoscientists for their extraordinary achievements and outstanding contributions in fields of fundamental / applied geosciences, mining and allied areas.

- After several rounds of discussions with the State Government and other stakeholders, the Mines and Minerals (Development and Regulation) Act, 1957 has been amended by way of Mineral Laws Amendment Act 2020 w.e.f. 10.01.2020. This amendment provides for seamless transfer of all valid rights, approvals, etc. to the new lessee to enable commencement of mining operations immediately after auction of mineral blocks under section 8A(5) & 8A(6) of MMDR Act, 1957. This will ensure uninterrupted supply of minerals to the downstream industries.

- Pradhan Mantri Khanij Kshetra Kalyan Yojana (PMKKKY) is being implemented through the funds collected under District Mineral Foundation (DMF). DMFs have been set up in 585 districts in 21 major mineral States. As of January 2020, the amount collected in the DMFs is Rs.35,927.55 crore. Funds to the tune of Rs.30,651.59 crore have been allocated and Rs.12,414.38 crore have been spent. 1,50,178 projects have been sanctioned under the scheme. Rs.3,762.63 crore have been spent on drinking water supply project and Rs.1698.91 crore have been spent on education projects. This Ministry is taking steps to upload these details in the public portal for fostering accountability and information sharing. Based on the inputs received from the States, DMF / PMKKKY revised draft guidelines are under finalisation. In the draft guidelines, it is being proposed that States and DMFs shall ensure convergence with other Central Schemes of Ministry of Rural Development (MoRD), Ministry of Panchayati Raj (MoPR) and other Ministries. It will help to fill the gaps in the existing schemes and cover the whole geographical area affected by mining.

- National Mineral Exploration Trust (NMET) has approved 187 exploration projects with total cost of Rs.895.72 crore up to 31st December, 2019. A total of 69 projects have already been completed and 118 projects are ongoing. An amount of Rs. 209.42 crore has been incurred in financial years 2017-18 and 2019-20.During March, 2020 MECL achieved 58,005 Meter of drilling against a target of 59,000 Meter.

1.11 Major Activities under the Ministry of Mines.

- An Australian delegation led by Shri Matthew Canavan, Hon'ble Minister for Resources, Northern Australia met Hon'ble Minister of Mines, Shri Pralhad Joshi on 27th August, 2019 to

discuss the issues of bilateral cooperation in the field of geology and mining.

- An Indian delegation led by Secretary (Mines) participated in AIMEX-19 at Sydney, Australia from 27th to 29th August, 2019. An Indian pavilion show casing the Indian mineral sector was put up there. The delegation held G2G meeting with Australian Trade & Investment Commission to explore possibility of sourcing lithium from Australia, in addition to G2B meetings on the sidelines of AIMEX-19.

- An Indian delegation led by Secretary (Ministry of Steel) and Additional Secretary (Ministry of Mines) participated in 'International Mining and Resources Conference (IMARC-2019)' held at Melbourne, Australia from 28th - 31st October 2019.

PHOTO - 1.3

Inauguration of Indian Pavilion by Secretary (Steel), Deputy High Commissioner of India at Australia, Additional Secretary (Mines), Additional Secretary (Coal), Consulate General of India at Melbourne, CMDs and Directors of CPSUs

- Bilateral meeting between Russian State Geological Holding "ROSGEO" and Geological Survey of India, an attached office of Ministry of Mines was held on 1st October, 2019 in New Delhi to identify the possible areas of collaboration between India and Russia in the field of mineral exploration.

- Swachhta Pakhawada was observed from 16th November, 2019 to 30th November, 2019 in the Ministry of Mines and its allied organisations like Geological Survey of India, Indian Bureau of Mines, National Aluminum Company Limited, Mineral Exploration Corporation Limited, Hindustan Copper Limited and three autonomous bodies. Various programmes like Clean/Swachha Mine, Swachhta Message dissemination through banners, posters, massive tree plantation and shramdan etc. were organized to mark the occasion.

- The 5th International Yoga Day was observed in Ministry and in all the organisations under its administrative control on 21st June, 2019.

- The 36thInternational Geological Congress (IGC) has organized four outreach programs in Italy, Canada, Ireland and Singapore during July'2019- Aug, 2019 to showcase the activities of 36th IGC including Geo Expo and Field trips, which are aimed to attract international participation in the mega geosciences event scheduled to be held during 2nd to 8th March, 2020 at Delhi NCR.

- The Union Cabinet has approved on 24th July, 2019, the proposal of Ministry of Mines to merge National Institute of Miners Health (NIMH), an autonomous body of Ministry of Mines with National Institute of

Occupational Health (NIOH), an autonomous body under Ministry of Health & Family Welfare. This merger will bring synergy to NIMH and prove beneficial to both the Institutes in term of enhanced expertise in the field of occupational health in addition to the efficient management of public money

- Ministry of Mines, in an approach to enhance the mineral exploration and mining activities in the country, has identified eleven Research and Development projects under its Science and Technology activity from R&D and Academic Institutions. These projects which have identified priorities have been approved for grant-in-aid under S&T programme of Ministry. The details of these projects are available at .
- A Capacity Building Program on 'Resource Efficiency in Aluminium' was organized from 21st to 23rd November, 2019 in Bhubaneswar in pursuance to the recommendations of the Strategy Paper on Resource Efficiency in Aluminium, jointly prepared by the Ministry of Mines and NITI Aayog. The program focused on Aluminium recycling and waste management, including Red Mud. It had wide participation from Aluminium Association of India (AAI), Material Recycling Association of India (MRAI) and Aluminium Secondary Manufacturers Association (ASMA) and the Aluminium Industry. Deliberations and interactions during the program enlightened the participants to contribute in efforts aimed at implementing the desired goals of resource efficiency in Aluminium sector, which is in the national interest.

2 Minerals and Metals in the Country

Back to Index

Minerals and Metals in the Country

National Mineral Scenario

Introduction

2.1 Minerals are valuable natural resources. They constitute the vital raw materials for many basic industries and are a major resource for development. The history of mineral extraction in India dates back to the days of the Harappan civilization. The wide availability of the minerals provides a base for the growth and development of the mining sector in India.

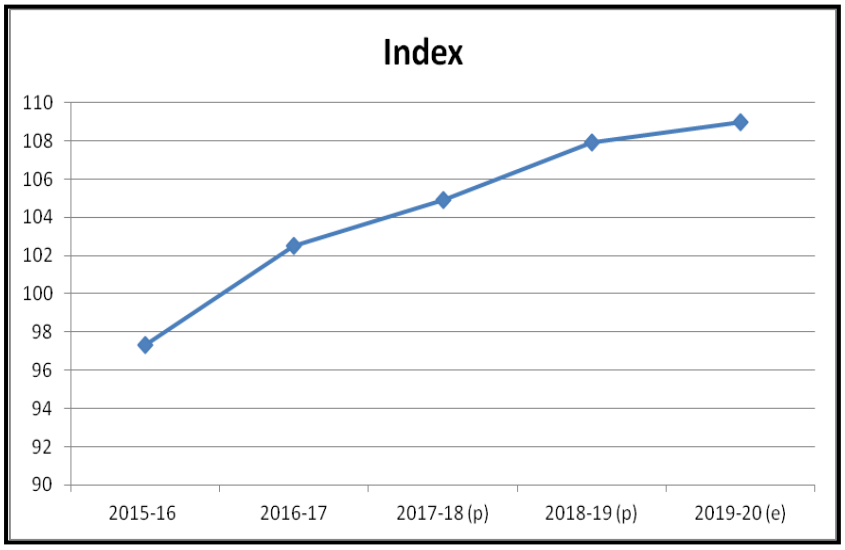
2.2 The country is endowed with huge resources of many metallic and non-metallic minerals. Mining sector is an important segment of the Indian economy. Since independence, there has been a pronounced growth in the mineral production both in terms of quantity and value. India produces as many as 95 minerals, which includes 4 fuel, 10 metallic, 23 non-metallic, 3 atomic and 55 minor minerals.

Index of Mineral Production

2.3 Ministry of Statistics and Programme Implementation has shifted the base year of index of mineral production from 2004-05 to 2011-12. Based on the overall trend so far, the index of mineral production (base 2011-12=100) for the year 2019-20 is estimated to be (109.60) as compared to 107.9 of previous year showing a positive growth of 1.6%. The trend of index of mineral production and trend in value of mineral export and import is depicted in **Figure2.1** and **Figure 2.2** respectively. The value of minerals produced by groups for the last five years is given in **Figure 2.3**

2.4 The total value of mineral production (excluding atomic & fuel minerals) during 2019-20 has been estimated at Rs.1**,**23,588 crore, which shows a decrease of about 3% over that of the previous year. During 2019-20, estimated value for metallic minerals is Rs. 60,822 crore or 49.21% of the total value and non-metallic minerals including minor minerals is Rs. 62,766 crore or 50.79% of the total value. Information on production and value of minerals from 2015-16 to 2019-20 is given in **Annexure 2.1.** The details of export and import of Ores & Minerals during the period 2014-15 to 2018-19 is given in **Annexure 2.2** and **Annexure 2.3** respectively.

Figure 2.1
Index of mineral production (Base 2011-12=100)

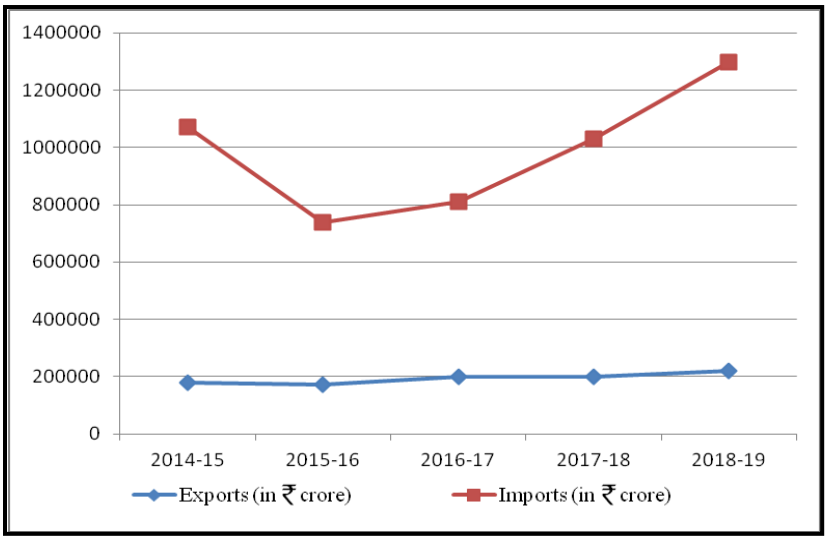


Source: Statutory returns submitted to IBM.

Figure 2.2

Trends in Value of Mineral Exports & Imports

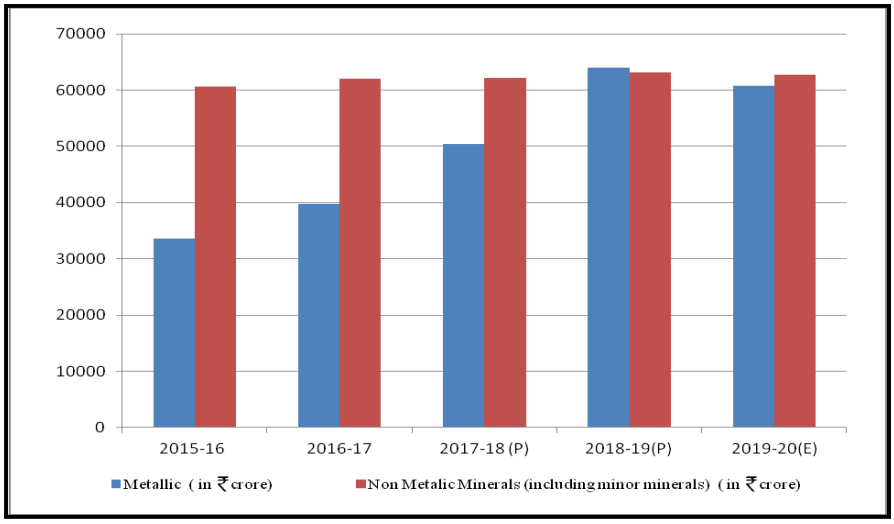
(Export and import are for all minerals excluding atomic minerals)



Source: Directorate General of Commercial Intelligence and Statistics (DGCI&S), Kolkata,

***Figure* 2.3**

Value of Minerals Production (By groups)
(Excluding atomic & fuel minerals)



Source: Monthly statistics on mineral production of IBM.

Price Trend

2.5 The WPI for minerals (base 2011-12=100) stood at 156.8 in March 2020 and the corresponding index was 138.0 for March 2019.

2.6 The minerals included in the wholesale price index are Bauxite, Chromite, iron ore, Copper concentrate, lead concentrate, Garnet, Zinc concentrate, manganese ore, limestone, phosphorite, and sillimanite. The wholesale price index for metallic minerals was 148.0 in March 2020 as compared to 124.9 in March 2019 and that of other minerals was 187.7 in March 2020 as compared to 183.7 in March 2019.

Photo 2.1

Advanced tools in dust suppression arrangement Mist gun

Mining

2.7 Indian mining industry is characterized by a large number of small operational mines. The number of mines which reported mineral production (excluding atomic, fuel and minor minerals) in India was 1364 in 2018-19 as against 1431 in the previous year.

2.8 The number of reporting mines during 2018-19 is 1364. Detailed information regarding mineral wise and state wise distribution along with production and value are available at Monthly Statistics on Mineral production of March 2019 issue at page no. 33 to 36.The source publication is available at the following link: https://ibm.gov.in/writereaddata/files/05192020165845MSMP_MARCH_REV_2019.pdf

2.9 The numbers of reporting mines are given in **Table 2.1**. Area wise distribution of Mining Leases allover India pertaining to all minerals excluding fuel, atomic and minor minerals is given in **Table 2.2.**

Table 2.1

Number of Reporting Mines

Sector	2017-18	2018-19	2019-20 (up to Dec, 2019)
All Minerals*	**1,431**	**1,364**	**1,356**
Metallic Minerals	638	597	583
Non-Metallic Minerals	793	767	773

Source:Statutory returns submitted to IBM.

**Excluding atomic, fuel and minor minerals.*

Table - 2.2

Area Wise Distribution of Mining Leases (Other than Atomic, Hydro Carbons Energy & Minor Minerals) as on 31st March, 2018 (All India)

Size (Hectare)	No. of Leases	Lease area (Hectare)
0 to 2	456	**585.86**
> 2 to 5	1,000	**3,856.80**
> 5 to 10	449	**3,305.82**
>10 to 20	460	**6,761.94**
>20 to 50	521	**16,960.23**
>50 to 100	309	**22,043.51**
> 100 to 200	235	**33,718.21**
> 200 to 500	220	**72,372.49**
Above 500	184	**1,66,271.34**
Total	**3,834**	**3,25,876.20**

Sources: *- Respective State Governments (DGMs/DMGs); however, the data received from respective regional offices of IBM have also been taken in account wherever necessary.*

(P): Provisional.

2.10 During 2019-20, Mineral production was reported from 32 States/Union Territories (actual reporting of MCDR minerals from 22 States and estimation of minor minerals for all 32 States/Union Territories) of which the bulk of value of mineral production (excluding fuel

and atomic minerals) of about 90.74% was confined to 10 States. Odisha is in leading position, in terms of estimated value of mineral production in the country and had the share of 24.68% in the national output. Next in order was Rajasthan with a share of 16.91% followed by Karnataka (8.76%), Andhra Pradesh (8.46%), Chhattisgarh (7.81%), Telangana (6.69%) and Gujarat (5.19%) in the total value of mineral production. The contribution of States in the value of mineral production during 2019-20 (estimated) is shown in **Figure 2. 4.**

2.11 The number of underground mines in operation mineral-wise (excluding fuel, atomic and minor minerals) is given in **Table 2.3**.

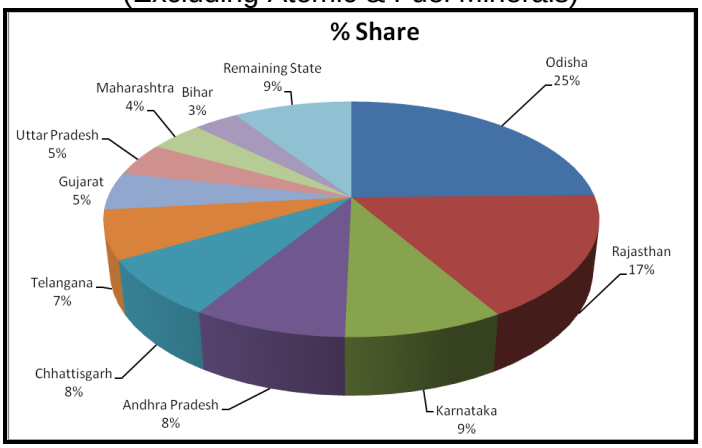
Table 2.3
Number of Underground Mines
2017-18 @
(By Principal Minerals)

Minerals	'A' Category	'B' Category	Total
Apatite	-	1	1
Chromite	6	-	6
Copper ore	5	-	5
Gold	4	-	4
Lead & Zinc	8	-	8
Manganese ore	9	6	15
Rock Salt	0	1	1
Total	**32**	**8**	**40**

@ Excluding fuel, atomic & minor minerals
'A' Mechanized Mines: >150 labour in all or >75 labour in workings below ground.
'B' Other than 'A'

Figure 2.4

Share of States in Value of Mineral Production 2019-20(Estimated)
(Excluding Atomic & Fuel Minerals)



Source: Statutory returns submitted to IBM.

2.12 State-wise analysis revealed that during 2019-20, the value of mineral production (excluding fuel & atomic minerals) have shown a mixed trend as compared to that in the previous year. The States which have indicated major increase in the value of mineral production are Himachal Pradesh (9.41%), Meghalaya (7.95%), Karnataka (7.57%), Jammu & Kashmir (6.97%) etc. However, some of the principal mineral producing States recorded decrease in value of mineral production (excluding fuel & atomic minerals) and those include Chhattisgarh (17.55%), Uttarakhand (8.55%), Rajasthan (7.95%), Jharkhand (7.18%), Maharashtra (6.07%) and Assam (2.0%).

2.13 All India Reserves and Resources of various minerals as on 01.04.2015, as per parameters of UNFC 1997System are given in **Annexure 2.4.**

2.14 During 2018-19 (excluding atomic, fuel, and minor minerals), the Private Sector emerged to play a dominant role in mineral production accounting for 69.34% (Rs. 50,800 crore). The contribution of public sector is 30.66% (Rs. 22,459 crore). Small mines, which were mostly in the private sector, continued to be operated either as proprietary or partnership ventures. The minerals which were wholly mined / recovered by the public/joint sector in 2018-19 were Copper ore and concentrate, Diamond, Fluorite (graded), Selenite, Rock Salt and Sulphur.

2.15 India's ranking in 2017 in world production was 3rd in aluminium, steel (crude/liquid) & Zinc (slab); 4th in Chromite, iron ore, and lead (refined); 5th in Bauxite, 6th in Copper (refined), 7th in Manganese ore, 14th in Magnesite and 16th in apatite & rock phosphate. The statistics on indigenous and world production of principal minerals and metals are given in **Table 2.4.**

Table 2.4
Contribution and Rank of India in World Production of Principal Minerals & Metals, 2017-18

Sector	Unit of Commodity	Production (quantity)		Contribution (Percentage)	India's rank in World order $
		World	India*		
Metallic Minerals					
Bauxite	'000 tonnes	3,03,800	22,313	7.34	5th
Chromite	'000 tonnes	37,500	3,481	9.28	4th
Iron ore	Million tonnes	3,332	201	6.03	4th
Manganese ore	'000 tonnes	51,600	2,589	5.02	7th
Industrial Minerals					
Magnesite	'000 tonnes	28,700	195	0.68	14th
Apatite & Rock phosphate	'000 tonnes	2,53,000	1,534	0.61	16th
Metals					
Aluminium (Primary)	'000 tonnes	60,100	3,401	5.65	3rd
Copper (refined)	'000 tonnes	23,600	830	3.52	6th
Steel (crude/liquid)	million tonnes	1,689	102.34	6.06	3rd
Lead (refined)	'000 tonnes	11,300 ##	565 #	5.00	4th
Zinc (slab)	'000 tonnes	13,700	791	5.77	3rd

Source: *World mineral production data compiled from World Mineral Production, 2013-2017; British Geological Survey.*
** Figures relate to 2017-18.*
Note: (i) Data in respect of World Mineral Production is on calendar year basis, however the data on India's production is based on financial year.
(ii) Data on minor minerals is not included in the table due to non-availability of production data with respect to India.
$: India's rank based on production mentioned in World Mineral Production 2013-17; British Geological Survey.
#: Figures as published in World Mineral Production, 2013-17. However, the production of Lead (Primary) during 2017- 18 is 168 thousand tonnes.
##: Figure relates to both primary and secondary refined lead and includes the lead content of antimonial lead.

Self-reliance in Minerals & Mineral Based Products

2.16 As far as self reliance is concerned about minerals (other than hydrocarbon energy, atomic and minor minerals), India continued to be wholly or largely self-sufficient in minerals which constitute primary mineral raw materials that are supplied to industries such as Iron & steel, Aluminium, cement, refractories, ceramics, glass, etc. India is self-sufficient in Bauxite, Iron ore, Sillimanite. India is deficient in Magnesite, Rock phosphate, Manganese ore, Copper concentrate., etc. which were imported to meet the demand for either blending with locally available mineral raw materials and/or for manufacturing special qualities of mineral based products. To meet the increasing demand of uncut diamonds, emerald and other precious & semi-precious stones by the domestic cutting and polishing Industry, India is dependent on imports of raw uncut stones for their value-added re-exports.

Photo 2.2

Underground mines at the Indian Copper Complex

PRODUCTION TRENDS

Metallic Minerals

2.17 The value of metallic minerals in 2018-19 at Rs. 64,044 crore increased by 26.97% over the previous year. Among the principal metallic minerals, iron ore contributed Rs. 45,185 crore or 70.55%, Zinc concentrate Rs. 5,608 or 8.76%, Chromite Rs. 3,584 crore or 5.60%, Silver Rs. 2,582 crore or 4.03%, while the remaining was contributed by Manganese ore, Bauxite, lead conc., Copper conc., Gold and Tin concentrates.

2.18 The Production of Bauxite at 23,688 thousand tonnes during 2018-19 registered an increase of 6% as compared to the previous year. Odisha with 65.07% contribution was the leading producer of Bauxite followed by Jharkhand (10.18%), Gujarat (9.21%), Chhattisgarh (6.47%) and Maharashtra (6.02%) and the remaining 3% of production was contributed by Madhya Pradesh and Goa. The share of public sector in the total production was 46% while remaining 54% was contributed by private sector.

2.19 The production of Chromite at 3,971 thousand tonnes in 2018-19 increased by 14.1% as compared to that in the previous year. Odisha reported almost entire production of Chromite.

2.20 The production of Copper ore in 2018-19 at 4,135 thousand tonnes increased by 12.4% as compared to that in the previous year. There were five reporting mines of Copper ore in 2018-19. The production of Copper concentrates at 155 thousand tonnes increased by 9.6% in 2018-19 as compared to that in the previous year.

2.21 The production of Gold ore at 566 thousand tonnes in the year 2018-19 increased by 2.9% as compared to that in the previous year. Almost entire production of Gold ore and bullion was reported from Karnataka.

2.22 The production of Iron ore consisting of Lumps, Fines and Concentrates at 206 million tonnes in 2018-19 increased by almost 2.7% as compared to 201 million tonnes in the previous year. There were 268 reporting Iron ore mines in 2018-19 as against 294 mines in the previous year. Odisha was the leading producer of iron ore accounting for 55% of total production followed by Chhattisgarh (17%), Karnataka (14%), Jharkhand (11%) and remaining (7%) production was reported from Andhra Pradesh, Goa, Madhya Pradesh, Maharashtra and Rajasthan.

2.23 The production of Lead & Zinc ore at 13.75 million tonnes in 2018-19 increased by 9% as compared to that in the previous year. There were eight mines reporting production of Lead and Zinc ore in the current year. The production of Lead concentrate increased by 17% and the production of Zinc concentrate decreased by 5% during the year. Rajasthan was the sole producing State of Lead and Zinc ores and concentrates.

2.24 The production of Manganese ore at 2,820 thousand tonnes in 2018-19 has increased by 9% as compared to the previous year. There were 142 reporting mines of Manganese ore in 2018-19. Madhya Pradesh continued to be the largest producer of Manganese ore contributing 33% in the total output of the country.

Non-Metallic Minerals

2.25 The value of production of non-metallic minerals at Rs. 9,215 crore during 2018-19 increased by 12.41% as compared to the previous year. Limestone retained its leading position by contributing Rs. 8,484 crore or 92.07% of the total value of non-metallic minerals in 2018-19. The other non-metallic minerals in the order of importance were Phosphorite/Rock Phosphate (3.85%), and Garnet (abrasive) (1.70%).

2.26 The production of Limestone at 379 million tonnes during 2018-19 increased by 12% as compared to that in the previous year.

2.27 The production of Magnesite at 147 thousand tonnes during 2018-19 decreased by 25% as compared to that in the previous year. Uttarakhand contributed 59% of the total production during 2018-19. The remaining was reported from Tamil Nadu and Karnataka.

2.28 The production of Phosphorite at 1,285 thousand tonnes in 2018-19 has decreased by 16% as compared to that in the previous year. Rajasthan contributed 92% and the rest was accrued from Madhya Pradesh.

Minor Minerals

2.29 The value of production of minor minerals was estimated at Rs. 53,994 crore in 2017-18. Rajasthan with share of 18.28% in the value of minor minerals produced in the country occupied the top position. Andhra Pradesh was at second place had a share of 17.32% in the value of minor minerals. Next in the order was Telangana 14.34%, Gujarat 10.69%, Uttar Pradesh 10.40%, Bihar 7.91%, Maharashtra 7.73%, Kerala 4.12% and the contribution of remaining States and UTs was less than five percent each.

State-wise Mineral Scenario

2.30 Status of top mineral rich States of India is at **Annexure 2.5**

3 Legislative Framework, Mineral Policy and Implementation

Back to Index

Legislative Framework, Mineral Policy and Implementation

National Mineral Policy 2019:

3.1 National Mineral Policy, 2019 has been approved by the Union Cabinet, on 28th February 2019.

3.2 National Mineral Policy, 2019 replaces the extant National Mineral Policy, 2008 ("NMP 2008"). The impetus to review NMP 2008 came about by way of a direction from the Supreme Court vide its judgment dated 02.08.2017 in Writ Petition (Civil) No. 114/2014 entitled Common Cause v/s Union of India & Others.

3.3 In compliance of the directions of the apex Court, the Ministry of Mines constituted a committee on 14.08.2017 under the chairmanship of Dr. K Rajeswara Rao, Additional Secretary, Ministry of Mines and the Committee submitted its Report to the Ministry of Mines.

3.4 The Ministry of Mines accepted the committee Report and invited the comments/ suggestions of the stakeholders and finalized the National Mineral Policy, 2019 taking into account the comments/suggestions received from the stakeholders.

3.5 Objective:

The aim of National Mineral Policy, 2019 is to have a more effective, meaningful and implementable policy that brings in further transparency, better regulation and enforcement, balanced social and economic growth as well as sustainable mining practices.

3.6 Details:

The National Mineral Policy, 2019 includes provisions which will give boost to mining sector such as

- introduction of Right of First Refusal for RP/PL holders,
- encouraging the private sector to take up exploration,
- auctioning of virgin areas for composite RP cum PL cum ML on revenue share basis,
- encouragement of merger and acquisition of mining entities
- transfer of mining leases and creation of dedicated mineral corridors to boost private sector mining areas.
- proposes to grant status of industry to mining activity to boost financing of mining for private sector and for acquisitions of mineral assets in other countries by private sector
- proposes to auction mineral blocks with prembedded clearances to give fillip to auction process.
- Propose to make efforts to harmonize taxes, levies & royalty with world benchmarks to help private sector

3.7 National Mineral Policy, 2019 focuses on Make in India initiative and gender sensitivity in terms of the vision. In so far as the regulation in Minerals is concerned, the main focus of the policy is on ease of doing business by adopting e-governance, IT enabled

systems, awareness and Information campaigns. Regarding the role of State in mineral development online public portal with provision for generating triggers at higher level in the event of delay of clearances has been suggested. NMP 2019 aims to attract private investment through incentives while the efforts would be made to maintain a database of mineral resources and tenements under mining tenement system. The new policy focuses on use of coastal waterways and inland shipping for evacuation and transportation of minerals and encourages dedicated mineral corridors to facilitate the transportation of minerals. The NMP, 2019 reiterates the utilization of the district mineral fund for equitable development of project affected persons and areas. NMP 2019 proposes a long-term export-import policy for the mineral sector to provide stability and as an incentive for investing in large scale commercial mining activity.

3.8 The NMP 2019 also introduces the concept of Inter-Generational Equity that deals with the well-being not only of the present generation but also of the generations to come and also proposes to constitute an inter-ministerial body to institutionalize the mechanism for ensuring sustainable development in mining.

3.9 Benefits:

The NMP 2019 will ensure more effective regulation. It will lead to sustainable mining sector development in future while addressing the issues of project affected persons especially those residing in tribal areas

3.10 Measures taken to control illegal mining:

Illegal mining means any reconnaissance or prospecting or mining operation undertaken by any person or a company in any area without holding a reconnaissance permit or a prospecting licence or, as the case may be, a mining lease as required under sub-section (1) of section 4 of the MMDR Act. Section 23C of Mines and Minerals (Development and Regulation) Act 1957, empowers the State governments to frame rules to prevent illegal mining and the State Government may, by notification in the official gazette, make such rules for preventing illegal mining, transportation and storage of minerals and for the purposes connected therewith in the State.

3.11 There is a three-pronged strategy for prevention of illegal mining viz. constitution of task force by the State government at State and District Level, framing of rules under Section 23C of the MMDR Act, 1957 and furnishing of quarterly returns on illegal mining for review to the Central Government. The details of States who have constituted task force at State level, framed Rules under section 23C of the MMDR Act, 1957 and have furnished quarterly returns on illegal mining to IBM are as follows:

(i) Constitution of State Level Task Force: 22 State Governments have constituted the task force namely,

Andhra Pradesh, Assam, Bihar, Chhattisgarh, Goa, Gujarat, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Manipur, Mizoram, Nagaland, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, Uttarakhand and West Bengal. The function of the task force is to review the action taken by member departments for checking the illegal mining activities in their respective jurisdiction.

(ii) Framing of Rules under section 23C of MM (D&R) Act, 1957: 21 State Governments have framed the rules under section 23C of MM (D&R) Act, 1957 to curb illegal mining namely, Andhra Pradesh, Bihar, Chhattisgarh, Goa, Gujarat, Haryana, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Kerala, Telangana, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, Uttaranchal & West Bengal.

(iii) Receipt of Quarterly returns on illegal mining: The State government submits quarterly returns on prevention of illegal mining to IBM. These returns contain details such as number of cases detected and action taken there on etc. IBM on receipt of the returns from the various State governments, consolidates the information and sends it to the Ministry at the end of each quarter.

3.12 The Mineral Conservation and Development Rules, 2017 (MCDR) provides measures to ensure systematic & scientific mining. Rule 45 of the MCDR provides for the mining companies to submit periodic reports on the extraction and disposal of the mined material. Rule 45 of MCDR also facilitates end-to-end national-scale accounting of all minerals produced in the country from the pit head to its end-use, reducing the scope for illegal mining, royalty evasion, etc. The amended Rule 45 now makes it mandatory for all miners, traders, stockist, exporters and end-users of minerals to register and report on the production, trade and utilization of minerals to the State Government(s) and Indian Bureau of Mines.

3.13 Details of mines/traders registered with IBM as given in **Table 3.1.**

Table 3.1

Details	Registers as on December,2019
Mining Leases*	3,393
End users	3,517
Traders	5,912
Stockists	1,767
Exporters	937

**Mining leases including both working and non-working leases. IBM has recommended 55 cases for termination and 12 cases for suspension under Rule 45(7) (a) (i).*

Note: IBM has also requested the State Governments not to issue transit passes for movement of minerals to unregistered operations.

Space Technology for checking illegal Mining

3.14 Indian Bureau of Mines (IBM) has entered into a MoU with National Remote Sensing Centre (NRSC), for a pilot project "Sudoor Drishti" to demonstrate the feasibility of using High Resolution Satellite Imagery and Digital Elevation Model (DEM) in monitoring mining activities / changes over selected group of mines.

3.15 As a part of Pilot Project in Tandur area, Andhra Pradesh, volume changes in a cluster of mines (6) studied for 2007-2015 period and observed that overall volume change is 10 to 11% only. Regarding setting up of Remote Sensing Laboratories, NRSC has guided IBM in finalizing the technical specification of software, hardware and procurement procedures. IBM has procured all the necessary software and hardware for the lab. Now the remote sensing labs have been established one at Nagpur and other at Hyderabad and are fully operational.Transfer of legacy data of Multi-Mineral Leasehold Map, which was earlier on AutoCAD system, is being carried out on GIS platform and all Reconnaissance Permit and Prospecting Licenses are being digitized on GIS platform along with Integration of regional geology, forest map and mine lease boundary maps.

3.16 An MoU has been signed between IBM & MOIL for pilot study of MOIL leases in Maharashtra state using time series satellite imageries (for the year 2010, 2014 and 2018) procured from NRSC.

Mining Surveillance System (MSS)

3.17 MSS Project using satellite remote sensing technology together with information technology has been developed and rolled out for major & minor minerals to curb cases of illegal mining.

• The system works on the basic premise that most minerals occur in the continuity and their occurrence is not limited to the lease area but is likely to extend in the vicinity. The MSS checks a region of 500 meters around the existing mining lease boundary to search for any unusual activity which is likely to be illegal mining. Any discrepancy is found is flagged-off as a trigger.

• The MSS is a transparent & bias-free system, having a quicker response time and capability of effective follow-up. The deterrence effect of 'Eyes watching from the sky' would be extremely fruitful in curbing instances of illegal mining.

• A user friendly mobile app for MSS has been created and launched on 24th January, 2017 at Gandhinagar for enabling public participation in assisting the governments endeavor to curb illegal mining, which was being used by the inspecting officials to submit compliance reports of their inspections.https://play.google.com/store/apps/details?id=com.mining.mssforpublic&hl=en

• In the initial phase, a total of 296 triggers across the country covering a total area of 3994.87 hectares wherein, 48 unauthorized mining have been detected after inspection of the triggers

by the state government officials. The training of all the States for its adoption of the MSS for minor minerals has also been done. Total 164 Officers from States participated in the training.

• In the second phase, 52 major mineral triggers, have been detected from the 3280 plotted leases (Working Mines 1689 plotted out of 1694 and Non-Working Mines 1596 plotted out of 2129) across the country, out of which 45 have been verified by the State Governments and in 5 cases unauthorized mining activities have been identified.

• Similarly, in respect of minor minerals, so far, 130 triggers have been generated, out of which 104 have been verified and in 9 cases unauthorized mining activities have been identified.

Mineral Concession System

3.18 As per the Amendment to MMDR Act in 2015, the system of allocation of Mineral Concession has been changed from first come first serve basis to a transparent and non discriminatory auction process. The Amendment also has brought in a uniform tenure of 50 years for Mining Leases.

The Mines and Minerals (Development & Regulation) Amendment Act, 2015

3.19 Central Government has notified the Mines and Minerals (Development & Regulation) Amendment Act, 2015 vide Notification dated 27.3.2015 keeping in view reforms in the mining sector. Rules which have to be made to incorporate the provisions of the MMDR Amendment Act, 2015 have been framed and notified in the Official Gazette as well as laid on the Table of both Houses of Parliament. The same is available at IBM's website on web link.

3.20 Mineral Laws (Amendment) Act, 2020

"The Mines and Minerals (Development and Regulation) (MMDR) Act, 1957 was amended through the Minerals Laws (Amendment) Ordinance (MLAO), 2020. The same is available at Ministry of Mines's website on web link on 10.01.2020, to facilitate seamless transfer of valid rights/ clearance to new lessees and to incentivize exploration of deep seated minerals. The ordinance was replaced by Mineral Laws (Amendment) Act, 2020 (No. 2 of 2020). The same is available at Ministry of Mines's website on web link-notified on 13th March, 2020, which came in to effect from 10.1.2020. In order to implement the amended provisions of the MMDR Act, the Mineral Auction (Amendment) Rules, 2020 and Minerals (Other than Atomic and Hydrocarbon Energy Minerals) Concession (Amendment) Rules, 2020, which is available at Ministry of Mines's website on web link were notified on 20.03.2020. These amendments will help in early operationalisation of the mineral blocks auctioned & also facilitate transfer of all the valid clearances of the old lessee to the successful bidder for a period of two years for mining leases expiring under the provisions of the Section 8 A (5) and

(6) of the Act. Further, MoEF&CC has also issued notification for Environment Clearance (EC) dt. 28.03.2020 & guidelines for Forest Clearance (FC)(dt. 31.03.2020) in line with the Mineral (Auction) Amendment Rules, 2020.

3.21 Subordinate Legislation

The following rules have been framed to implement the provisions of MMDR Amendment Act, 2015 and MMDR Amendment Act, 2016: - The same can be accessed on following link

i. The Minerals (Evidence of Mineral Contents) Rules, 2015 [framed under clause (a) of sub-section (2) of section 5] Rules for prescribing the parameters of existence of mineral contents.https://www.mines.gov.in/writereaddata/UploadFile/Minerals(EvidenceofContents)Rules,2015.pdf

ii. The Mineral (Auction) Rules, 2015 [framed under section 10B and section 11] to prescribe the terms and conditions subject to which mining leases shall be granted; terms and conditions, and procedure, subject to which the auction shall be conducted including the bidding parameters for the selection; terms and conditions for grant of prospecting licence-cum-mining leases; and terms and conditions, and procedure, including the bidding parameters for the selection.https://www.mines.gov.in/writereaddata/UploadFile/Mineral%20(Auction)%20Rules,%202015.pdf

iii. The Mineral (Non-exclusive Reconnaissance Permits) Rules, 2015 [framed under section 10C] to prescribe the terms and conditions for grant of Non-Exclusive Reconnaissance Permit. https://www.mines.gov.in/writereaddata/UploadFile/NERP%20Rules,%202015.pdf

iv. The National Mineral Exploration Trust Rules, 2015 [framed under section 9C] to prescribe the manner of usage of funds accrued to the National Mineral Exploration Trust (NMET); the composition and functions of NMET; and the manner of payment of amount to NMET. https://nmet.gov.in/upload/uploadfiles/files/RulesNMET.PDF

v. The Mines and Minerals (Contribution to District Mineral Foundation) Rules, 2015 [framed under section 9b] to prescribe the amount of payment to be made to the District Mineral Foundation. https://www.mines.gov.in/writereaddata/UploadFile/DMF%20rates%20notification.pdf.

vi. The Mineral (Mining by Government Company) Rules, 2015 [framed under section 13] to prescribe the period of mining leases, including existing mining leases, of Government companies or corporations and the payment to be made by Government company or corporation, or a joint venture, for mining lease to be granted under the reservation route.https://mines.gov.in/writereaddata/UploadFile/Government%20company%20rule.pdf

vii. The Minerals (Other than Atomic and Hydro Carbon Energy Minerals) Concession Rules, 2016 [framed under section 13] to regulate the grant of mineral concessions for major

minerals and for purposes connected therewith.https://www.mines.gov.in/writereaddata/UploadFile/MineralsConcession%20Rules2016.pdf

viii. Minerals (Transfer of Mining Lease Granted Otherwise than through Auction for Captive Purpose) Rules, 2016 [framed under powers conferred by clause (qqja) of section 13(2) read with the proviso to 12 A (6) of MMDR Act to prescribe the terms and conditions and the amount or transfer charges for affecting the transfer of a mining lease granted otherwise than through auction for captive purpose.https://mines.gov.in/writereaddata/UploadFile/up636003837427845224.pdf

ix. The Atomic Mineral Concession Rules, 2016 [framed under section 11B of the Act] for regulating the grant of mining leases or other mineral concessions in respect of minerals specified in Part B of the First Schedule and for purposes connected therewith.https://mines.gov.in/writereaddata/UploadFile/Atomic%20Minerals%20Concession%20Rules,%202016.pdf

x. Mineral Conservation and Development Rules, 2017 [framed under section 18 of the Act] these Rules are framed for the conservation and systematic development of minerals in India and for the protection of environment by preventing or controlling any pollution which may be caused by prospecting or mining operations.https://mines.gov.in/writereaddata/UploadFile/MCDR%202017.pdf

xi. Amendments to the subordinate legislations.

3.22 The Central Government has made amendment to the following rules:-

i. In exercise of powers conferred by section 18 of the MMDR Act, 1957 the Central Government has amended the Mineral Conservation and Development Rules, 2017 vide notification no. GSR. 570 (E) dated 13th August 2019. Through this amendment the Central Government has reduced the requirement of star rating from 4 to 3 and also period for achieving the same has been increased from 2 years to 4 years considering the problem of medium and small mining lease holders.

ii. In exercise of powers conferred by section 11B of the MMDR Act, 1957 the Central Government has amended the Atomic Minerals Concession Rule, 2016 vide notification no. GSR 126(E) dated 19.02.2019 and notification No. GSR 134(E) (Second Amendment) dated 20.02.2019. Through this amendment the Central Government is empowered to amend Schedule A of the said rules.

iii. In exercise of the powers conferred by section 35 of the Offshore Areas Mineral (Development and Regulation) Act, 2002, the Central Government amended the Offshore Area Mineral Concession Rules, 2006 to ensure that no reconnaissance permit, exploration licence or production lease of atomic minerals shall be granted to any person, except the Government or a Government Company or a Corporation owned or controlled by the Government.

iv. In exercise of powers conferred by section 13 of the MMDR Act, 1957

the Central Government has amended the Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016 vide notification no. GSR 674(E) dated 20 September 2019 for computing the Average Sale Price of metallurgical grade bauxite.

v. In exercise of powers conferred by section 13 of the MMDR Act, 1957 the Central Government has amended the Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016 vide notification no. GSR 674(E) dated 20 September 2019 for fixing the conversion factor for computing the Average Sale Price of metallurgical grade bauxite.

vi. In exercise of powers conferred by section 13 of the MMDR Act, 1957 the Central Government has amended the Mineral (Mining by Government Company) Rules, 2015, to clarify the legislative intention of Rule 3(2) & Rule 4(2), which prescribe the extension of mining lease of Government company, granted before or after 12th January, 2015.

3.23 Mineral Auctions

Auction Framework and Handholding Support

i. The Government of India amended the Mines & Minerals (Development& Regulation) (MMDR) Act, the principal act which governs the mineral sector in India, with effect from 12th January, 2015, which brought major paradigm shifts in the mining regulations, including the grant of mineral concessions of major minerals through auctions to bring transparency and remove discretion.

ii. The necessary rules enabling the auction of mineral blocks under the MMDR Amendment Act, 2015, viz. Mineral (Evidence of Mineral Content) Rules & Mineral (Auction) Rules were notified soon after by the Ministry. The Ministry also formulated the 'Model' tender documents to facilitate the State Governments to expedite the auction process.

iii. In order to provide handholding support for the implementation of auctions of mining leases/PL-cum-MLs, the Ministry of Mines through its Institutions i.e. Geological Survey of India (GSI), Mineral Exploration Corporation Ltd. (MECL) and Indian Bureau of Mines (IBM) and Central Public Sector Enterprises such as SBI Capital Markets Ltd. (SBICAP), MECON Ltd. and MSTC Ltd. provided initial handholding support to the State Governments for Transaction Advisory Services, Differential Global Positioning System (DGPS) Survey, Geological Report (GR) preparation and e-auction platform.

3.24 Auction Status

i. The MMDR Amendment Act, 2015 instituted the system of e-auction for grant of mineral concessions for major minerals with a view to bringing in greater transparency and removal of discretion in allotment. 76 mineral blocks across 9 States, namely Rajasthan, Odisha, Madhya Pradesh, Chhattisgarh, Karnataka, Jharkhand, Andhra Pradesh, Gujarat

and Maharashtra have been successfully auctioned till 31.12.2019.

a) The estimated value of resources in the 76 successfully e-auctioned mineral blocks across the country is over Rs. 3,15,922 crore. The total estimated revenue to the State Governments over the lease period of these mines stands at Rs. 2,29,521 crore. The estimated additional contribution to the State Governments by way of auction premium is Rs. 1,77,280 crore over the lease period. Out of the cumulative statutory payments of Rs. 52,241 crore, the Royalty, the District Mineral Fund (DMF) and National Mineral Exploration Trust (NMET) contributions work out to be Rs. 46,644 crore, Rs. 4,664 crore and Rs. 933 crore respectively. The year wise auction summary as on 31st December, 2019 is given in **Table 3.2.** Latest status of auctions conducted can be seen on (https://tamra.gov.in)

Table 3.2

Year-wise auction summary as on 31st December, 2019

Year	2015-16	2016-17	2017-18	2018-19	2019-20(as on 31st Dec' 19)	Total*
Number of blocks auctioned	6	15	14	19	22	76
Mineral	4 Limestone, 1 Iron Ore, 1 Gold	7 Iron Ore, 5 Limestone, 1 Manganese, 1 Diamond, 1 Gold	10 Limestone, 2 Iron Ore, 1 Gold, 1 Bauxite	9 Iron Ore, 5 Limestone, 3 Graphite, 1 Manganese, 1 Gold	5 Iron Ore, 5 Bauxite, 4 Limestone, 2 Copper, 2 Graphite, 2 Chromite, 1Manganese, 1 Diamond)	28 Limestone, 24 Iron Ore, 6 Bauxite, 5 Graphite 4 Gold, 3 Manganese, 2 Copper, 2 Diamond, 2 Chromite
Estimated value of the resources (in crore)	29,817.72	63,372.55	90,136.20	42,671.50	89,923.56	3,15,921.53

Year	2015-16	2016-17	2017-18	2018-19	2019-20(as on 31st Dec' 19)	Total*
Additional Contribution through Auction (in crore)	13,032.23	44,501.74	53,850.14	32,004.51	33,891.19	1,77,279.81
Royalty (in crore)	4,565.44	9,564.42	14,895.90	6,703.21	10,914.89	46,643.86
DMF (in crore)	456.54	956.44	1,489.59	670.32	1,091.49	4,664.38
NMET (in crore)	91.31	191.29	297.92	134.06	218.30	932.88
Total of Royalty + DMF + NMET (Statutory Payments) (in crore)	5,113.30	10,712.15	16,683.41	7,507.60	12,224.68	52,241.13
Total revenue to the Government over 50 years (in crore)	18,145.53	55,213.88	70,533.55	39,512.11	46,115.87	2,29,520.93

** Auction detail of 1 chromite is awaited.*

3.25 District Mineral Foundation (DMF) and Pradhan Mantri Khanij Kshetra Kalyan Yojana (PMKKKY)

- DMF is meant to address the long standing demand of the local people in mining areas for inclusive growth. The funds for DMF will be met from additional contributions of 30 % of royalty by existing miners and 10% by miners granted mines after the MMDR Amendment w.e.f. 12th January, 2015.
- The Annual collection of DMFs from major mineral States would be about Rs. 6,000 crore.
- The Government has formulated Pradhan Mantri Khanij Kshetra Kalyan Yojana (PMKKKY) to be implemented by the DMFs of the respective districts. It has been issued as a directive under Section 20A of the Act by the Central Government on 16th September, 2015.

Photo -3.1
Copper Matte Tapping

- The PMKKKY has mandated 60% of the funds to be utilized for high priority areas, such as drinking water / environment preservation and pollution control / Health care / education / skill development / welfare of women, children, aged and disabled people / sanitation and 40% of the funds to be utilized for other priority - roads & physical infrastructure / irrigation / watershed development. The projects implemented under PMKKKY will help create a congenial mining environment, ameliorate the condition of the affected persons and create a win-win situation for the stakeholders.

- Rs. 35,013.71 crore have been collected as on 31st December, 2019.

- More than 1,46,836 projects have been sanctioned under PMKKKY.

- Funds worth more than Rs. 29,772 crore have been sanctioned for various projects.

- A national level portal http://mitra.ibm.gov.in/pmkkky has been launched where up to date information regarding fund collection and utilization is being displayed.

  - District wise breakup of funds is displayed

  - Data for fund collection and utilization will be fed directly from the districts on the national level portal

  - Project details with respect to the high priority and other priority sectors as specified in the PMKKKY guidelines will be entered by the District Mineral Foundations.

- The dashboard displaying the fund and project information is available to the public for view.

Revision Applications

3.26 Under Section 30 of the Mines and Minerals (Development and Regulation) Act, 1957 and Rule 35 of the Minerals (other than Atomic & Hydro Carbons Energy Minerals) Concession Rules, 2016 the Ministry of Mines exercises its Revisionary Powers in dealing with the Revision Applications filed by the applicants who are aggrieved by any order passed by the State Government or any other authority. Under Rule 35 and 36 of MCR 2016 detailed procedure for filing and disposal of Revision Application has been prescribed.

3.27 Disposal of Revision Applications has public interface. In order to ensure transparency in disposal of Revision cases, software i.e. ras.nic.in has been implemented for effective monitoring of the Revision Applications, received in the Ministry of Mines. This system keeps track of the various stages of the Revision Applications filed by the applicants till the final disposal of the applications. The system is web enabled and has link on the website of the Ministry of Mines. The salient features of the system are as under: -

(i) Status of Revision Application is available on website. The Web Link of Status of Revision Application is www.ras.nic.in/WebQuery.aspx

(ii) Final Orders are available on the website; The Web Link of Status of Revision Application is www.ras.nic.in/WebQuery.aspx

(iii) Final Order numbers are generated by the system automatically.

(iv) Hearing details etc. are available on the website;

(v) Revision Application numbers are generated by the system automatically;

3.28 As far as possible, cases are being heard on a chronological order and their age of pendency.

3.29 The website is accessible by public and the copy of Final Order & Hearing Notices can be downloaded from the Website.

3.30 During 1st January, 2019 to 31st December, 2019, 89 Revision Applications were disposed of by the Revisionary Authority in the Ministry of Mines.

4 Revenue from Mineral Resources

Back to Index

Revenue from Mineral Resources

Royalty

Legal Provisions

4.1 Under the provisions of Section 9(3) of the MMDR Act, 1957, the Central Government may, by notification in the Official Gazette, amend the Second Schedule, so as to enhance or reduce the rate at which royalty shall be payable in respect of any minerals with effect from such date as may be specified in the Notification, provided that the Central Government shall not enhance the rate of royalty in respect of any minerals more than once during any period of three years. Similarly under Section 9A (2) of the Act, the Central Government may, by notification in the official Gazette, amend the Third Schedule so as to enhance or reduce the rate at which the dead rent shall be payable in respect of any area covered by mining lease and such enhancement or reduction shall take effect from such date as may be specified in the notification, provided that the Central Government shall not enhance the rate of the dead rent in respect of any such area more than once during any period of three years.

Revision of rates of royalty and dead rent in respect of major minerals (non-coal minerals)

4.2 In exercise of the powers conferred under Section 9(3) of the MMDR Act, 1957, the Central Government has amended the Second Schedule (Rates of Royalty in respect of Second Schedule minerals) to the said Act, and notified/published vide notification No.G.S.R.630(E) dated 01.9.2014. Further, in exercise of the power conferred under Section 9A (2) of the above said Act, the Central Government has amended the Third Schedule (Rates of Dead Rent) of the said Act and published/notified vide notification No. G.S.R.631 (E) dated 01.9.2014. Royalty accrual for 4 years for major minerals (other than coal, lignite and sand for stowing) from the various State Governments for the year 2015-16, 2016-17, 2017-18 and 2018-19 are given at **Table 4.1.**

4.3 Existing royalty rates for some important industrial use minerals is given at **Table 4.2.**

4.4 A study group on revision of rates of royalty and dead rent for minerals (other than coal, lignite, sand for stowing and minor minerals) was constituted vide Ministry of Mines order no. 9/1/2018 – M.V dated 9th February, 2018. So far 3 study group meetings and sub group meetings at Nagpur and Hyderabad have been organized for interaction with all stake holders.

4.5 The Study Group submitted its Report to the Ministry on 25.07.2019. The Ministry of Mines has notified the rates of royalty and dead rent vide Gazette Notification No. G.S.R. 621(E) dated 02.09.2019 and G.S.R. 622(E) dated 02.09.2019 respectively. Subsequently, the Ministry of Mines/Central Government has rescinded the above said both Notifications vide their Notifications Nos.

G.S.R. 634(E) dated 05.09.2019 and G.S.R. 635(E) dated 05.09.2019 respectively. Further, Ministry received comments/representations from stakeholders with regard to revision of rates of royalty and dead rent. Accordingly, an official committee has been constituted vide Order No. 9/1/2018-M.V (part III), dated 03.01.2020 to submit a report to the Ministry after examining the issues raised by the stakeholders.

Table 4.1

State wise Royalty accrual of Major Minerals (Other than Coal, Lignite, Sand for Stowing and Minor Minerals) from 2015-16 to 2018-19

(Value in Rs.Lakhs)

State	2015-16	2016-17	2017-18(R)	2018-19 (P)
Andhra Pradesh	21,331	33,647	33,492	41,797
Assam	298	528	464	503
Bihar	367	152	153	589
Chhattisgarh	1,07,376	1,11,533	1,65,130	2,21,168
Goa	4,288	31,475	23,961	2,233
Gujarat	35,559	27,044	26,366	27,818
Himachal Pradesh	7,523	7,082	13,175	NA
J & K	1,335	946	1544	928
Jharkhand	1,17,171	69,037	1,25,559	NA
Karnataka	81,182	1,03,433	1,27,140	1,28,324
Kerala	785	645	851	535
Maharashtra	16,241	14,562	17,146	18,142
Meghalaya	2,998	4,470	5,592	8,639
Madhya Pradesh	39,266	37,792	46,166	53,880
Odisha	3,41,373	2,49,634	3,47,041	7,58,149
Rajasthan	1,87,323	2,36,612	2,64,897	2,90,859
Tamil Nadu	18,777	20,210	15,067	NA

Telangana	19,015	20,126	22,927	23,578
Uttar Pradesh*	NA	628	1,919	NA
Uttrakhand	24	32	26	40

Source: Data received from respective State Governments.

** Based on information received from Regional Office, Jabalpur in respect of Sonbhadra District.*

N.A.: Not Available (Data was not provided by the respective State Government)

R: Revised, P: Provisional.

Table 4.2
Rates of Royalty

(Published vide notification GSR 630 (E) dated 01.09.2014 in Extra Ordinary Gazette of India)

1. Bauxite and Laterite	**(a) Metallurgical Grade:** Zero point six zero per cent of London Metal Exchange Aluminium metal price chargeable on the contained aluminium metal in ore produced for those dispatched for use in alumina and aluminium metal extraction. **(b) Non-Metallurgical Grade:** Twenty five per cent of sale price on ad valorem basis for those dispatched for use other than alumina and aluminium metal extraction and for export.
2. Chromite	Fifteen per cent of average sale price on ad valorem basis.
3. Copper	Four point six two per cent of London Metal Exchange Copper metal price chargeable on the contained copper metal in ore produced.
4. Diamond	Eleven point five per cent of average sale price on ad valorem basis.
5. Dolomite	Seventy five rupees per tonne.
6.Gold : **(a) Primary** **(b) By-product gold**	Four per cent of London Bullion Market Association Price (commonly referred to as "London Price") chargeable on the contained gold metal in ore produced. Three point three per cent of London Bullion Market Association Price (commonly referred to as"London Price") chargeable on the by-product gold metal actually produced.
7. Graphite : **(i) with 80 per cent or more fixed carbon.** **(ii) with 40 per cent or more fixed**	Two hundred and twenty five rupees per tonne. One hundred and fifty rupees per tonne.

carbon but less than 80 percent fixed carbon . **(iii) with 20 per cent or more fixed carbon but less than 40 percent fixed carbon.** **(iv) With less than 20 percent fixed carbon.**	Sixty five rupees per tonne. Twenty five rupees per tonne.
8. Iron ore : (lumps, fines & concentrates all grades)	Fifteen per cent of average sale price on ad valorem basis.
9. Lead	(a) Eight point five per cent of London Metal Exchange lead metal price chargeable on the contained lead metal in ore produced. (b) Fourteen point five per cent of London Metal Exchange lead metal price chargeable on the contained lead metal in the concentrate produced.
10. Limestone : **(a) L.D. grade (less than one and half per cent silica content)** **(b) Others**	Ninety rupees per tonne. Eighty rupees per tonne.
11. Magnesite	Three per cent of sale price on ad valorem basis.
12. Manganese Ore : **(a) Ore of all grades** **(b) Concentrates**	Five per cent of average sale price on ad valorem basis. One point seven per cent of average sale price on ad valorem basis.
13. Silver **(a) By-product** **(b) Primary silver**	Seven per cent of London Metal Exchange Price chargeable on by-product silver metal actually produced. Five per cent of London Metal Exchange silver metal price chargeable on the contained silver metal in ore produced.
14. Zinc	(a)Nine point five per cent of London Metal Exchange zinc metal price on ad valorem basis chargeable on contained zinc metal in ore produced.
	(b)Ten per cent of London Metal Exchange zinc metal price on ad valorem basis chargeable on contained zinc metal in concentrate produced.
15. All other minerals not here-in-before specified **[Agate, Corundum, Diaspore, Felsite,** **Fuchsite-Quartzite, Kyanite, Jasper,** **Perlite, Rock Salt, Selenite, Pyroxenite, etc.]**	Twelve per cent of average sale price on ad valorem basis.

Notes

*** Rates of royalty in respect of item No.10 relating to Coal (including Lignite) as revised vide notification number G.S.R. 349 (E), dated the 10th May, 2012, read with corrigendum G.S.R. 525(E), dated the 14th June, 2012 of the Government of India in the Ministry of Coal shall remain in force until revised through a separate notification by the Ministry of Coal.**

**** Rates of Royalty in respect of item 41 relating to Sand for Stowing revised *vide* notification number G.S.R. 214(E) dated the 11th April, 1997 will remain in force until revised through a separate notification by the Department of Coal.**

The same can be accessed on following link

5 International Cooperation

Back to Index

International Cooperation

Objectives:

5.1 Development of Mining Sector is essential for a country's development in industrial sector. India is deficient in many important minerals and India also needs capacity building in geosciences, technology in mining sector as well as acquisition of mining assets abroad by public and private sector. To ensure the seamless supply of the minerals, Ministry of Mines is engaged to strengthen its cooperation in the area of geology and mineral resources with mineral rich countries. In order to achieve these objectives, International Cooperation Division has been engaging in collaboration with countries like Australia, Russia, African and Latin American countries. A number of Memorandum of Understanding (MoU) have also been signed with mineral rich countries. India has been participating in various International Mining events by setting up India Pavilion, making presentations before the delegates about the recent reforms and opportunities in mining sector in India so as to attract foreign investment in Indian mining sector.

Memorandum of Understanding (MoU) signed during the period

MoU with Bolivia:

5.2 An MoU between the Ministry of Mines of the Republic of India and the Ministry of Mining and Metallurgy of the Plurinational State of Bolivia was signed on 29th March, 2019 at Santa Cruz de la Sierra, Bolivia on cooperation in field of Geology and Mineral Resources for an initial period of five years during the State Visit of Hon'ble President of India to Bolivia. The MoU provides for exchange of information on resources, laws and policy, organization of seminars to exchange views on development strategies, encouragement of transfer of technologies between India and Bolivia for cooperation in the field of Geology and Mineral Resources, promotion of value addition, which will enable taking up of activities like documentation and dissemination etc. Composition of the Indian side of the Joint Working Group has been finalized, which consists of Joint Secretary (IC), Ministry of Mines; Director (IC), Ministry of Mines; CEO, KABIL; Representatives of Ministry of Coal, Ministry of Steel, GSI, IBM, NALCO, HCL, MECL, FICCI, ASSOCHAM, CII and FIMI.

Photo -5.1

Shri Ram Nath Kovind, Hon'ble President of India met Shri Evo Morales Ayma, Hon'ble President of Bolivia during his visit to Bolivia

MoU with Chile:

5.3 An MoU between the Government of the Republic of India and the Government of the Republic of Chile, which was signed on 17.03.2009 at New Delhi on cooperation in field of Geology and Mineral Resources for an initial period of five years and with automatic renewal for a period of five years, was extended for a further period of five years by signing of a Joint Letter of Renewal on 01.04.2019 during the visit of Hon'ble President of India to Santiago, Chile. This will continue the existing institutional mechanism between India and Chile for cooperation in the field of Geology and Mineral Resources. Composition of the Indian side of the Joint Working Group has been finalized, which consists of Joint Secretary (IC), Ministry of Mines; Director (IC), Ministry of Mines; CEO, KABIL; Representatives of GSI, IBM, NALCO, HCL, and other industry representatives, as required.

Photo -5.2

India and Chile signed MoU in the fields of Geology and Mineral Resources. Shri Ram Nath Kovind, Hon'ble President of India participates in India-Chile Business Forum and interacts with young scientists at University of Chile.

MoU with Zambia:

5.4 An MoU between Ministry of Mines, Government of India and Ministry of Mines & Minerals Development of the Government of Zambia was signed at New Delhi on 21st August, 2019 on cooperation in field of Geology and Mineral Resources for an initial period of five years during the State Visit of Hon'ble President of the Republic of Zambia to India.

5.5 Shri Pralhad Joshi, Hon'ble Union Minister of Parliamentary Affairs, Coal and Minessigned the MoU on behalf of the Government of India with Hon'ble Richard Musukwa, Minister of Mines and Minerals Development on behalf of the Government of Zambia to strengthen the cooperation between the two countries in the field of Geology and Mineral Resources.

Photo -5.3

Shri Pralhad Joshi, Hon'ble Minister of Mines, Government of India and Shri Richard Musukwa, Hon'ble Minister of Mines and Minerals Resources, Government of Zambia

MoU with Brazil:

5.6 An MoU between the Geological Survey of India (GSI), Ministry of Mines

of the Republic of India and the Geological Survey of Brazil – CPRM (GSB–CPRM), Ministry of Mines and Energy of the Federative Republic of Brazil was signed at New Delhi on 25th January, 2020 on cooperation in field of Geology and Mineral Resources for an initial period of five years during the State Visit of Hon'ble President of the Federative Republic of Brazil to India. The MoU will provide an institutional mechanism between GSI and GSB-CPRM for cooperation in field of Geology and Mineral Resources.

Photo -5.4

Shri Narendra Modi, Hon'ble Prime Minister of India with H.E. Mr. Jair Messias Bolsonaro, Hon'ble President of Brazil

Bilateral Meetings

Meeting of Minister of Mines and Mining Development, Government of Zimbabwe with Minister of Parliamentary Affairs, Coal and Mines, Government of India:

5.7 Mr. Winston Chitando, Minister of Mines and Mining Development, Government of Zimbabwe met Shri Prahlad Joshi, Hon'ble Minister of Parliamentary Affairs, Coal and Mines, Government of India on 19.11.2019 during his visit to New Delhi and had deliberations on co-operation in the field of geology, mining and mineral resources between India and Zimbabwe for which an MOU has already been signed.

Joint Working Group Meeting between India and Mozambique:

5.8 2nd meeting of Joint Working Group between India and Mozambique under the existing MoU was held on 11th April, 2019 in New Delhi. Shri Anil Kumar Nayak, Joint Secretary (Mines) co-chaired the meeting on behalf of Government of India and Mr. Obete Francisco Matine, Inspector General at the Ministry of Mineral Resources and Energy of the Republic of Mozambiqueco-chaired on behalf of Mozambique side. During the meeting, follow up actions on the minutes of the first JWG meeting held on 01st March, 2012 in Maputo, Mozambique were reviewed and it was inter-alia agreed to revitalize the Memorandum of Understanding on Mineral Resources signed between two countries in September 2010 in New Delhi, and to collaborate for training and capacity building at training institutes of IBM and GSI in several areas, and to cooperate between the two countries for all minerals including heavy sand and Rare Earth Elements for exploration, mining and value addition activities. It was also decided that GSI and National Institute of Mines may explore the possibility for

1:50000 scale geological and geochemical mapping and exploration of unexplored minerals in the prioritized and selected areas in Mozambique. Further, collaboration between IBM and Inspectorate General at the Ministry of Mineral Resources and Energy of the Republic of Mozambique to develop a framework for surveillance and inspection to control mining activities and prevent the illegal mining in Mozambique, and exchange of information and sharing of experiences in the field of small scale mining and gemstone processing was agreed upon during the meeting.

Participation in International mining events to showcase India's capabilities, interest and opportunities in mining sector

Marrakech Mining Convention -2019

5.9 The Marrakech Mining Convention is aimed to become a global platform bring together the mining industry in the entire breadth and depth including mining ministries, geological research authorities & surveys, international mining & quarrying companies, services and technology providers, mining think tanks, etc. Shri Amit Saran, Director, Ministry of Mines along with Director (Geology), Geological Survey of India participated in the 1st Marrakech Mining Convention which was held at Marrakech, Morocco from 17th to 19th April, 2019.

5.10 Indian delegation held a bilateral meeting with the delegation of Government of Morocco on 18th April, 2019 on possibility of operation of KABIL in the mining sector in Morocco w.r.t. cobalt and REE exploration / exploitation and capacity building of officers of Morocco through training programmes of GSI and IBM.

Photo -5.5

Bilateral meeting of Indian delegation with the Moroccan side.

The Asia-Pacific's International Mining Exhibition - 2019 (AIMEX-2019):

5.11 The Asia-Pacific's International Mining Exhibition (AIMEX-2019) is one of the flagship events for mining industry not only for Asia-Pacific region but also across the world. An Indian delegation led by Shri Anil Mukim, Secretary, Ministry of Mines participated in AIMEX-2019 held in Sydney, Australia from 27th to 29th August, 2019.India Pavilion showcasing mining and mineral potential of India was inaugurated by Shri Anil Mukim, Secretary to the Government of India, Ministry of Mines on 27th August 2019 in presence of Shri Anil Kumar Nayak, Joint Secretary to Government of India and other officials

from NALCO, HCL, MECL, NMDC, Coal India Ltd., OMC & CGI Officials etc.

Photo -5.6

Inauguration of India Pavilion by Shri Anil Mukim, Secretary, Ministry of Mines.

5.12 Indian delegation interacted with senior officials of the Australian Trade and Investment Commission (Austrade), on possible partnership between Government of India and Government of Australia on sourcing of strategic minerals like Lithium and Cobalt for India. Austrade gave a detailed account of the regulatory framework there and indicated that they would facilitate India's entry into Australia's mineral sector.

Photo -5.7

Meeting with Australian officials including Ms. Jenny West, General Manager, Trade and Investment, Ms. Catherine Gallagher, General Manager, South Asia and Ms. Mariko Lawson, Senior Adviser, Resources & Energy

The International Mining and Resources Conference-2019 (IMARC-2019):

5.13 The International Mining and Resources Conference (IMARC) is Australia's largest annual mining event. It brings together the global mining leaders to connect policy makers, investors, technical experts and commodity buyers.The Indian Delegation led by Shri Binoy Kumar, Secretary, Ministry of Steel, Government of India participated in IMARC-2019 held in Melbourne, Australia from 28th to 31st October, 2019. Ministry of Mines was represented by Dr. K Rajeswara Rao, Additional Secretary, Ministry of Mines and Shri Sanjeev Verma, Director, Ministry of Mines.

5.14 Shri Binoy Kumar, Secretary, Ministry of Steel, Government of India along with Deputy High Commissioner of India at Australia, Additional Secretary, Ministry of Mines, Additional Secretary, Ministry of Coal, Consulate General of India at Melbourne, CMDs and Directors of CPSUs inaugurated the Indian Pavilion.

5.15 It showcased the achievement of India in mining and mineral resources and its interests and opportunities in mining sectors.

Photo -5.8

Additional Secretary, Ministry of Mines answering the queries of delegates during Q & A session in Investment Theatre at IMARC 2019

UNCOVER (India) Projects

5.16 Two pilot scale projects were taken up by Geological Survey of India involving Geology and Geophysics team of officers from Western, Southern and Central Regions teams a follow-up of National Mineral Exploration Policy (NMEP) 2016

5.17 Project 1: Searching for concealed and deep-seated mineral deposits below unclassified sediments in parts of Aravalli and Bundelkhand Cratons in parts of Rajasthan, Madhya Pradesh and Uttar Pradesh

About 620 km transect starts from, close to Churu in Rajasthan to the northwest and continues up to Tikamgarh in Madhya Pradesh to the southeast to bring out the possible concealed and deep-seated mineral systems by interpreting response of surface and subsurface geophysical data and its integration with other Geoscientific data. A significant pyrrhotite zone with minor chalcopyrite has been intersected in first bore hole near Churu sector. In backscattered images, some grains of lead-sulphide, REE phases and few gold grains were identified under Electron Microprobe Analysis.

5.18 Project 2: Deep Crustal Mapping across Western and Eastern Dharwar Cratons for searching concealed and deep-seated mineral deposits, in parts of Andhra Pradesh and Karnataka

About 560 km transect initiates close to Dharwar type area in Karnataka to the west and continues up to Nellore in Andhra Pradesh to the east. It encompasses different geological belts of the region such as Gadag auriferous schist belt, Bellary-Hospet iron ore belt, Wajrakarur kimberlite province, basemetal deposit in Cuddappah basin, Nellore schist belt etc. The studies will aim at deciphering the gold, basemetal metallogeny associated with the green stone belts besides identification of kimberlite roots.

Khanij Bidesh India Limited (KABIL)

5.19 A company named ‘Khanij Bidesh India Ltd. (KABIL)’ was formed during the year for exploring overseas mineral assets, particularly, strategic and critical minerals, with an objective of ensuring mineral security of the nation. A Joint venture company of NALCO, HCL and MECL with equity participation of

40:30:30 has been created with a mandate to Identify, explore, acquire, develop, mine, process, and sale critical & strategic minerals and other minerals overseas for mineral security and commercial use so as to ensure Mineral Security of the country through supply side assurance of Energy Minerals.

5.20 So far KABIL has initiated engagement with Australia, Russia, Argentina, Bolivia and Chile with a focus on Lithium. While the primary interface in each country has been the respective federal agencies, engagement with central and state-owned public enterprises namely M/s YLB, Bolivia; M/s ENAMI and M/s. CODELCO in Chile; M/s YPF of Argentina, and M/s Remsa of Salta Province and M/s Jemse of Jujuy Province of Argentina are also underway.

5.21 KABIL is in the process of signing MoU with M/s YPF of Argentina, and M/s Jemse of Jujuy Province of Argentina for sharing of information and taking up due diligence for select lithium mineral acreages in Argentina for investment decisions.

6 Attached offices /Subordinate

Back to Index

Attached /Subordinate Offices

Geological Survey of India (GSI)

6.1 Founded in 1851, the Geological Survey of India (GSI) started its voyage to search for and assess coal and mineral resources of the country with regional level exploration. In later years, GSI diversified into various geoscientific activities, and made contributions in geosciences and resultantly, in the economic growth of India. The key functions of GSI are creation and updation of national geoscientific information and assessment of mineral resources.

Towards these, GSI has taken up ground, air-borne and marine surveys, mineral exploration, multi-disciplinary geoscientific, geo-technical, geo-environmental and natural hazard studies, glaciology, seismotectonics, and fundamental research.

GSI, headquartered at Kolkata, has six Regional offices located at Lucknow, Jaipur, Nagpur, Hyderabad, Shillong and Kolkata, and has State Unit offices in almost all States of the country (**Fig.6.1**).

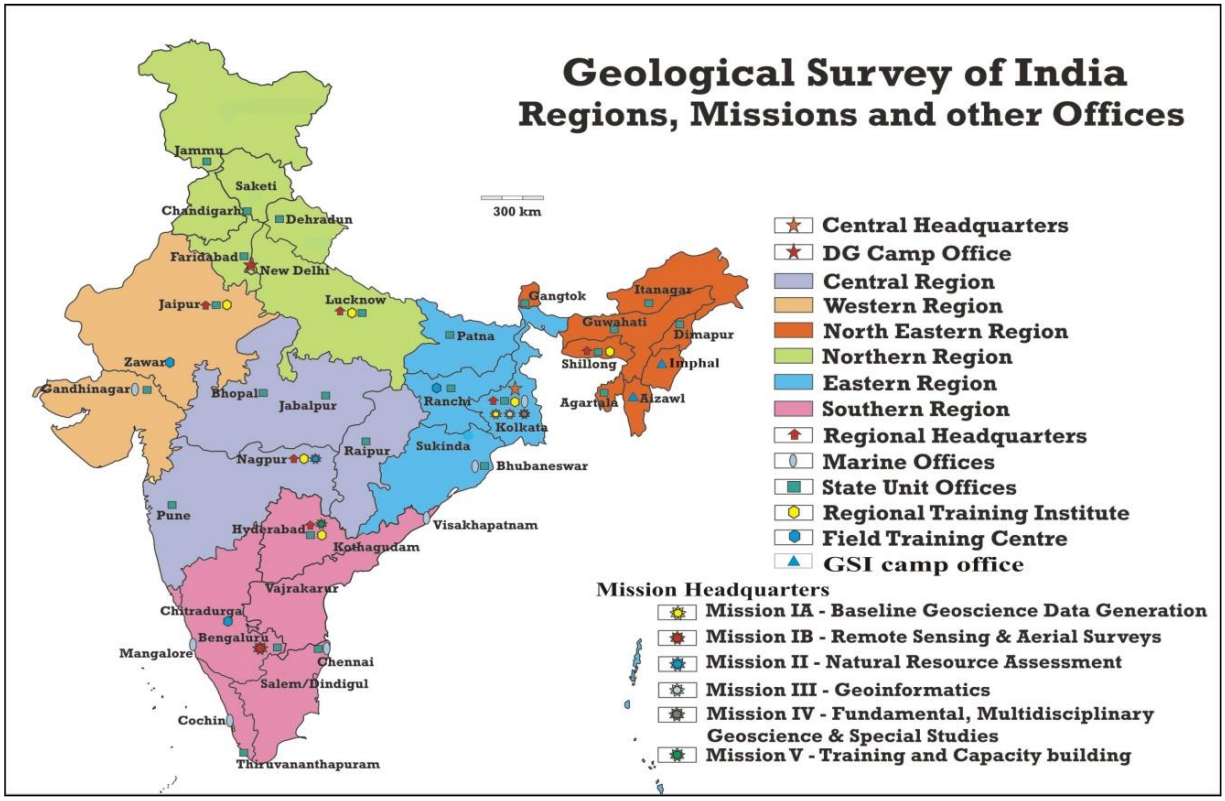


Fig. 6.1

Organization of GSI Mission

6.2 The activities of GSI are carried out through five Missions viz. Baseline Geoscience data generation (Mission-I), Natural Resource Assessment (Mission-II), Geoinformatics (Mission-III), Fundamental and Multidisciplinary Geoscience (Mission- IV) and Training and Capacity Building (Mission-V). Besides these, three Support Systems viz. Policy Support System (PSS), S&T Support System (STSS) and Administrative Support System (AdSS) have been created to provide support and cross-cutting co-ordination in GSI.

MISSION I: BASELINE GEOSCIENCE DATA GENERATION

6.3 Systematic Geological Mapping

Systematic Geological Mapping [SGM] (1:50,000 scale) is the most fundamental and basic mapping program of GSI. The whole country, excluding a few patches of inaccessible and difficult terrains, has been covered under this program. Out of the total mappable area of 3.146 million sq.km of the country, 3.119 million sq.km has been covered till March, 2019 bringing the total coverage to 99.14%. As the rest of the areas are totally inaccessible, therefore SGM programmes have not been mounted after March 2018 (http://bhukosh.gsi.gov.in/Bhukosh/MapViewer.aspx)

The data generated through SGM has immense application value in exploration and other activities. The data generated through this mapping activity has helped to build up the knowledge base and data base for National Geo-scientific information. This knowledge base has been providing the baseline data to earth science related socio-economic activities and programmes of the Nation.

The areas which have not been covered under SGM are the inaccessible terrains of the northeastern parts of the country in the States of Assam, Arunachal Pradesh, Nagaland, Manipur and Meghalaya, the mountainous terrains of the Northern Himalayas in the States of Jammu & Kashmir and Uttarakhand, the Jarwa/Sentineli - inhabited islands of Andaman & Nicobar, and the Abujhmar Plateau of Chhattisgarh and Maharashtra.

6.4 Specialized Thematic Mapping

Wherever it is felt that the geology is complex, and more information on a specific theme needs to be revealed, Specialized Thematic Mapping (STM) is taken up. This mapping is carried out on

1:25,000 or larger scale. It involves collection of multidisciplinary data, and is backed by advanced laboratory studies. STM plays a pivotal role in natural resource prognostication through generation of spin off preliminary mineral investigation programmes (mostly G4 stage). It is also important for environmental analysis, natural hazard recognition, risk evaluation, land use management, and evaluation of major civil engineering projects etc. Till November, 2019, an area of about 0.311 million sq. km (including 21,449

sq km area mapped in 2019) have been mapped.

Photo 6.1

Lighting of lamp by Shri Haribhai Parthibhai Chaudhary, the then Hon'ble Minister of State (Mines), during the inauguration of the 58th CGPB meeting

6.5 Geochemical Mapping

The National Geochemical Mapping (NGCM), in implementation since Field Season 2001-2002, aims to create a seamless baseline geochemical base map of 64 elements (details in **Annexure-6.1**) on 1:50,000 scale for the entire country. However, presently 62 elements are analysed except Platinum & Palladium (Pt & Pd). The data helps in deriving anomalous zone(s) of elemental concentration, which may be prospective for future mineral investigation. It also finds application in environmental, agricultural, human health and other social concerns. The elemental analyses of NGCM samples are being done in the laboratories of GSI as well as other government organizations like NGRI, JNARDDC and NML. The procedure follows international standards, which are considered benchmarks for deciding anomalous value of different elements for preparation of geochemical anomaly maps. For detailed reports visit www.gsi.gov.in .

On the basis of geological mapping and other baseline geoscience data, GSI has demarcated an area of 0.571 million sq km in the country with Obvious Geological Potential (OGP). To systematically cover this 0.571 million sq km, an area of 0.813 million sq km area is to be mapped. As an outcome of NGCM programme, a number of spin off mineral investigation items are already taken up since field season 2013-14.

The entire accessible OGP area has been covered under NGCM by March 2019. However, in the non-OGP part of the country, NGCM is in progress. During January to December 2019, 0.115 million sq km was covered. Till December 2019, about 1.146 million sq km area [including OGP] has been cumulatively mapped under NGCM.

6.6 Geophysical Mapping

Geophysical mapping under the National Geophysical Mapping Program (NGPM) comprises ground gravity and magnetic survey on 1:50,000 scale. It aims at generating a baseline ground gravity and magnetic map of the country. The analysis and interpretation of data will facilitate in deriving the crustal architecture and delineating the mineral prospective zones. The NGPM was initiated in FS 2002-2003 and the entire OGP area is planned to be completed by 2020-21.The results of the NGPM survey is integrated with other

available geological data set and further mineral exploration programme are launched in the areas delineated by integration study.

During the period from January to December 2019, an area of 77,336 sq km was covered, thereby taking the total coverage to 0.737 million sq km.

6.7 Airborne Survey

Airborne geophysical surveys are being carried out by GSI with the fixed-wing Twin Otter Aircraft Survey System (TOASS) consisting of Magnetic and Gamma Ray Spectrometric Sensors. The survey target for FS 2017-18 covering Rajasthan, Haryana, Uttar Pradesh, Madhya Pradesh and Gujarat was 69,984line km. Out of this, 27,574 Lkm was covered till April, 2018. Subsequently, additional 22,482 Lkm was covered up to December, 2019. The remaining 19,928 Lkm is targeted to be covered by March, 2020.

6.8 Multi-sensor Aero-geophysical surveys over Obvious Geological Potential (OGP) and Adjoining areas of India

GSI has launched project called the "National Aero-Geophysical Mapping Program (NAGMP)" in April, 2017, to acquire uniform aero-geophysical data over OGP areas (divided in 12 blocks) during the period from April 2017 to September 2020. During 2019, total 57,243 sq.km area was covered. The project is aimed to provide information including that of concealed and deep-seated structures. The project is being funded by National Mineral Exploration Trust (NMET).

The Project Implementing Agencies [PIAs] have been selected through global tendering. In the first phase, the data acquisition in four OGP Blocks (Block 1-4) covering 1,80,527 sq.km in the states of Rajasthan, Gujarat, Madhya Pradesh, Uttar Pradesh, Chhattisgarh and Maharashtra has been completed. Based on this data, about 60 target areas for exploration or search for minerals has been delineated in which ground exploration programmes will be launched in next field season. The second phase of the survey (Block 5-8 covering an area 3,11,846 sq.km) could not be initiated due to legal issues & third phase of the survey (Block 9-12 covering an area 2,86,268 sq.km) commenced from April-2019 and is continuing.

6.9 Hyperspectral Remote Sensing Technique in Exploration

During FS 2019-20, Photo geology and Remote Sensing (PGRS) Division has taken up mapping of alteration/ mineralized zones on 1:50,000 scale using Multispectral and Hyperspectral remote sensing data and spectro-radiometer covering 10,543 sq.km in potential areas of Ajmer, Bhilwara, Pali and Udaipur districts in Rajasthan; Purulia in West Bengal; Tikamgarh, Sidhi and Chhatarpur in Madhya Pradesh; Sonbhadra in Uttar Pradesh, and areas of Andhra Pradesh with the objective of delineating alteration zones associated with mineralization and

building up of spectral library for different litho-units in these areas.

The integration of all Geo scientific data (Geology, Aero-geophysical, Geophysical, Geochemical and Remote sensing) in GIS platform and its modelling for predictive mapping for mineral potential areas is also included in the hyperspectral study for potential area identification.

Photo 6.2

Dignitaries on the dais during 58th CGPB Meeting.

As a part of the MoU with National Remote Sensing Centre- Indian Space Research Organisation (NRSC-ISRO), two projects have been taken up in FS 2019-20. One of the projects is on utilisation of Advanced Visible Infra-Red Imaging Spectrometer-Next Generation (AVIRIS-NG) hyperspectral data by the scientists of GSI and ISRO to detect surface signatures of mineralization in 14 promising areas in different parts of country in three years. Five promising zones, namely Pur-Banera & Jahazpur, Rajasthan; Hutti-Maski, Karnataka; Kuhi-Khobna, Maharashtra; and Sittampundi, Tamil Nadu, covering an area of 2,253 sq. km, have been taken up with an objective to prepare surface mineral map/ alteration mineral map/ updated host rock map, identify potential areas for mineral exploration and develop spectral library for rocks and minerals of the study areas. The other project is rock phosphate mapping in Hirapur, Chhattarpur district in Madhya Pradesh.
https://www.gsi.gov.in/webcenter/portal/OCBIS/pageReports/pageGsiReports?_adf.ctrl-state=lkmiwvf05_35&_afrLoop=757098779172607#!

6.10 Marine and Coastal Surveys

The Exclusive Economic Zone [EEZ] of the country is being explored for its mineral resources by GSI, in coordination with National Institute of Oceanography [NIO] and National Centre for Antarctic and Ocean Research [NCAOR]. GSI acquires baseline data on bathymetry [sea bottom topography], sea surface sediment distribution, gravity, magnetic, etc. within the EEZ of India. An area of 1.999 million sq. km area out of a total EEZ area of 2.015 million sq.km (on 1:5,00,000 scale) accounting for 99.25% EEZ has been covered. GSI has been carrying out this survey with its own research vessels.

Photo 6.3

Phosphate nodule embedded within shale of Kopili Formation near Larket village, Litang Valley, East Jaintia Hills, Meghalaya.

GSI also carries out focused mineral investigations and deep sea multi-channel seismic surveys in identified target areas. Besides, preliminary marine mineral investigation over an area of1,29,786 sq.km has been completed till December 2019, out of the targeted potential area of 6,38,560 sq. km within the EEZ of India by the Research Vessel Samudra Ratnakar (20.33% coverage in preliminary exploration target area). During the period from January to December 2019, preliminary marine mineral investigation has been carried out over an area of 6,498 sq.km within the EEZ.

Continuous survey since 1985, has paved the way for demarcation of prospective areas of offshore heavy minerals and construction sand within the Territorial Waters (TW) off east and west coasts of India. GSI has estimated an inferred resource of 78.88 million tonnes of Total Economic Heavy Minerals (TEHM), considering seabed sediment up to 1m below seafloor and cut off wt% of heavies ≥ 3 within the TW off India. A total of 745.323 million tonnes of construction-grade sands have been estimated from four sectors off Kerala within the west coast of India. The resources have been estimated up to a maximum depth of 2m below seabed with a sand content of 80-90%.

As a probable solution to the scarcity of high-grade limestone, GSI has delineated potential zones with 1,15,538 million tonnes inferred resource of high-grade lime mud and lime sand over an area of 12,767 sq.km within the Exclusive Economic Zone (EEZ) off Gujarat and Maharashtra. Besides these, potential zones of phosphate bearing sediments, and Iron-Manganese (Fe-Mn) encrustations have also been identified within the EEZ of India. Based on GSI's survey and exploration with its fleet of research vessels, scientific program proposals are being planned and executed regularly to meet the data and knowledge gaps in offshore survey.

Photo 6.4

Massive lateritic bauxite (pinkish color) in Ninginong area, West Khasi Hills Dist., Meghalaya

Photo 6.5

Clayey bauxite in Rambrai area, West Khasi Hills Dist., Meghalaya

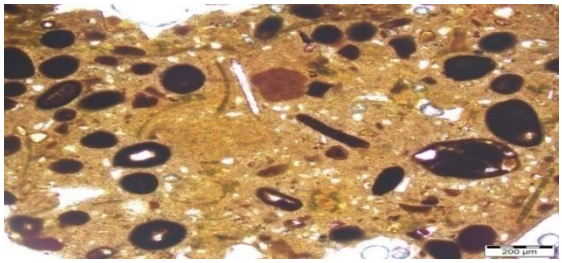


Photo 6.6

Phosphate nodule under thin section showing Francolite mineral with composite structure (yellow boundary), cortoid, nucleated structure (red boundary) Larket village, Litang Valley, East Jaintia Hills, Meghalaya

MISSION II: Natural Resource Assessment

6.11 Mineral Resource Assessment

The mineral exploration activities of GSI have been prioritized keeping in view the thrust areas identified by Govt. of India and State Governments. GSI carries out 'reconnaissance survey' [G4], 'preliminary exploration' [G3] and 'general exploration' [G2] following the guidelines of United Nations Framework Classification (UNFC 1997) and Minerals (Evidence of Mineral Contents) Rules (MEMC)-2015.

During FY 2019-20, a total of 383 investigation programs were taken up by GSI, which include 17 projects on 'offshore mineral investigation', 339 projects on Mineral Exploration [58 on Ferrous Minerals, 52 on Precious Metals & Minerals, 165 on Non-Ferrous and Strategic Minerals, 51 on Industrial & Fertilizer Minerals, 2 RP items and 11 Regional Mineral Targeting items], and 27 projects on Natural energy resources [coal, lignite, geothermal].

Photo 6.7

Pisolitic lateritic bauxite in Rambrai area, West Khasi Hills Dist., Meghalaya

6.12 'Natural energy resources' [Coal and Lignite]:

GSI has augmented in 2019-20 (till December 2019) coal resources of 5135.03 million tonnes in various coalfieds including Godavari Valley (Telangana), Pench Valley and Singrauli (M.P), Tatapani-Ramkola and Mand-Raigarh (Chhattisgarh), Ib River and Talcher (Odisha).

GSI has augmented 259.77 million tonnes of lignite resources in Ramnad sub-basin of Tamil Nadu in 2019-20 (till December, 2019).

6.13 Geothermal Studies:

During the FS 2019-20, geothermal studies will be carried out in Jharkhand, West Bengal, Arunachal Pradesh and Telengana with the objective to delineate and define the geothermal resource characters.

Mission III: Geoinformatics

6.14 Geoinformatics aims at comprehensive management and effective utilization of all geoscientific

information so as to deliver accurate, up-to-date and comprehensive products and services, and provide crucial support to all missions of the organization as well as the stakeholders. The mission is actively involved in national and international collaborative initiatives concerning dissemination of geo-information. It is also involved in active maintenance and management of the IT infrastructure, archival of the datasets, policy making and planning for inclusive IT enablement of the organization. The website of GSI is www.gsi.gov.in.

6.15 Mission III A: Data Repository and Management, Advanced Spatial Data System, IT Infrastructure & Connectivity OCBIS

Online Core Business Integrated System (OCBIS) is an integrated system connecting all users, core processes, data and support systems in a web-based platform. OCBIS was initiated in 2015-16 and is operational since 2017-18. High-resolution survey and exploration data in the form of GSI Reports

(https://www.gsi.gov.in/webcenter/portal/OCBIS/pageReports/pageGsiReports?_adf.ctrl-state=d5puo2xdt_5&_afrLoop=2884509231 0189188#!) and GIS data (http://bhukosh.gsi.gov.in/Bhukosh/Public) can be accessed through the web portal interface of OCBIS

6.16 Mission-III A Data Repository and Management

It includes four e-gov applications i.e. HRMS (Human Resources Management System), Claims, IFMS (Integrated Financial Management System) and MM (Material Management) along with 12 core modules and 12 support modules. In GSI portal, total 125 processes have been in force covering all the applications. The usage percentage of OCBIS has reached 92% by December 2019.

6.17 Mission-III A Advanced Spatial Data System

Bhukosh (http://bhukosh.gsi.gov.in)
Bhukosh is a gateway to all geoscientific information of GSI. The Open Geospatial Consortium compliant Bhukosh Map Services have been published with the latest Geodatabase (.gdb) and Map Exchange Document (.mxd) for multi-thematic map layers like Geology (2M & 50K scale),Geochronology, Geothermal, Glacial Retreat, Mineral, Tectonic, NGCM-NGPM, Seismotectonic, Meteorites, Marine EEZ, Marine TW, and Geomorphology (250K& 50K scale). Through Bhukosh users can view, query, create and download datain SHP or GML format.

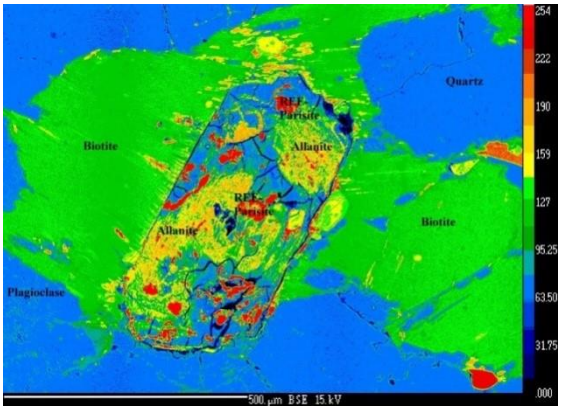


Photo 6.8

REE phases identified through EPMA Lab, NCEGR Bangalore

REE phases identified through EPMA Lab, NCEGR Bangalore. A total of 2722 published paper maps including Atlases, coalfield maps, district resource maps, geological quadrangle maps, geological and mineral maps, EEZ maps, mineral belt maps, international maps, State geological and mineral maps and marine maps have been placed in OCBIS. Publications of GSI are available online under different categories – Indian Journal of Geosciences, Manual Series, PalaeontologiaIndica, Special Publications, Catalogue Series, GSI News, Miscellaneous Publications, Memoirs, Bulletin Series, Records and Indian Minerals (https://www.gsi.gov.in/webcenter/portal/OCBIS/pagePublications/pageViewGSIPublication?_adf.ctrl-state=ijr08rh2u_140&_afrLoop=2892367364 1669596#!)

6.18 Mission III B – Publication & Library

GSI publications include memoirs, bulletin series A, B & C, records, special publications, miscellaneous publications, **catalogues**, PalaeontologiaIndica and Indian Journal of Geosciences (IJG).

Twelve scientific publications were released during April - December 2019. In addition, **technical** papers and abstracts submitted by GSI officers for publication in various forums other than GSI are being scrutinized on regular basis. E-News (https://www.gsi.gov.in/webcenter/portal/OCBIS/pagePublications/pageE-News?_adf.ctrl-state=1n0hctbmj_5&_afrLoop=2900814621 2478720#!) is released from different Regions and CHQ annually or biannually. In addition, the various publications were released and uploaded on the GSI portal between April and December 2019. (https://www.gsi.gov.in/webcenter/portal/OCBIS/pagePublications/pageViewGSIPublication?_adf.ctrl-state=ijr08rh2u_140&_afrLoop=2892367364 1669596#!)

Photo 6.9

Graphite bearing carbon phyllite in association with grey phyllite, south of Jobat, Alirajpur district, Madhya Pradesh

1. Earth Science Abstracts (ESA) Vol. 41, No. 4; Vol. 42, No. 1,2,3 & 4
2. Selective Dissemination of Recent Information on Indian Geology (SDRI) Vol. 7, No. 4; Vol. 8, No. 1,2,3 & 4
3. Current Awareness Service (CAS) Vol. 25, No. 4; Vol. 26, No. 1,2,3 & 4

6.19 Mission III C – Map, Geoinformatics & Data Integration

GSI has been mandated to prepare and publish both analog and digital geological maps / map databases for the entire country. This mission includes compilation of maps like Geological Quadrangle Maps (GQM), District Resource Maps (DRM), Geological and Mineral Maps of States, Mineral Belt Maps (MBM), Coal Field Maps and

Marine Maps. Compilation and preparation of a separate geo-database of Thematic Geological Maps on 1:25,000 scale for selected belts of all the regions along with compilation and publication of the Sea Bed Sediment Maps of Territorial Water (TW) and Exclusive Economic Zone (EEZ) are being carried out by the mission.

The mission has completed all India Projects in digital format like “Revision of Seismotectonic Atlas of India and its Environs [SEISAT]”, “Stratigraphic Database in India on 1:50,000 scale up to litho unit level with stratigraphic hierarchy, colour coding and stratigraphic notation”, “Theme-based compiled geological map of Granite / Granite Complex of India” and “Creation of theme-based compiled geological map of Ultramafic rocks / suites of India”.

The mission is also updating and maintaining the geodatabases, map services and map related thematic applications in Bhukosh (OCBIS Geoportal).

Further, Mission IIIC is presently attending to the following all India projects at GSI Central Headquarters:

- Compilation and Updation of 1:20,00,000 Geological Map of India in Digital Format.
- Synthesis and collation of All India National Geochemical Map data (NGCM) and National Geophysical Map data (NGPM) on 1:50,000 scale and their uploading on Bhukosh (OCBIS Geoportal).
- Creation of National Geoscience Data Repository (NGDR) in GSI.
- Development of Geoscientific data based on arsenic distribution pattern at Nakashipara and Tehatta I & II Blocks, Nadia District, West Bengal to understand arsenic pollution vis-à-vis human manifestation and its remediation / mitigation through spatial data integration modelling.
- Compilation of mineral-wise atlas of India as recommended by the Visibility, Activity and Quality (VAQ) committee. During the period April - December 2019, collation of legacy data was done from published literature and atlases.

6.20 MISSION: IV Fundamental and Multidisciplinary Geosciences and Special Studies

National Mission–IV, with Headquarters at Kolkata, is structured under three sub-missions:

1. Geotechnical Geohazards Management (M-IVA).

2. Climate Change & Eco systems, Polar Studies, Environmental Geology, Medical Geology & Bio-geohazards (M-IVB).

3. Fundamental Geosciences & Research (M-IVC).

During FS 2019-20, 186 items were taken up under Mission-IV which includes 101 items of M-IVA, 30 items of M-IVB and 55 items of M-IVC.

The major activities pursued by GSI in M-IVA centre around developmental and societal issues related to Geotechnical projects, and Landslide studies and Seismotectonic studies.

During FS 2019-20, Geotechnical investigations have been executed to provide geological and geotechnical inputs to the infrastructure and engineering project authorities. Under landslide study, the prototype Rainfall-induced Landslide Early Warning System (LEWS) is under development in collaboration with British Geological Survey (BGS) under the project LANDSLIP and is being validated in Darjeeling district of West Bengal and Nilgiri district of Tamil Nadu. The site-specific landslide investigation using 3D Terrestrial Laser Scanner and DGPS is in progress at Phesama landslide, Kohima, Nagaland for development of a methodology for DPR preparation. Seismotectonic studies are being done through Geodynamic Studies Division (GSD) and Seismo-Geodetic Data Receiving and Processing Centre (SGDRPC) situated at Kolkata. They are carrying out real time recording, monitoring and scientific study of earthquakes through its DGPS and seismograph observatories established in different parts of the country. Out of the total 35 planned DGPS stations, 28 permanent GPS stations have been installed in different parts of the country and data from these locations are being analyzed to monitor crustal movement and establish strain model by GSD. The remaining 7 permanent GPS stations are planned to be installed by March, 2020.

Under M-IVB, glaciology projects are being pursued to study the recessional pattern and mass balance of the glaciers in Higher Himalayas, identify the potentially areas for high Glacial Lake Outburst Flood (GLOF) risk and update the inventory of Himalayan glaciers. Polar researches are mainly devoted to Ice Sheet Dynamics, both in Arctic and Antarctic, with special reference to climate change. In the Antarctic region, study of hard rock geology and thematic mapping of the Archaean-Precambrian terrains are being carried out. Under the public good geosciences and societal cause projects, geogenic contamination of surface/ sub-surface water with Arsenic (As), Fluoride (F), Lead (Pb) and other toxic elements are being studied under Environmental Geology programs in Uttar Pradesh, Bihar, Tamil Nadu, Andhra Pradesh, Rajasthan and Madhya Pradesh and the National Capital Region of Delhi.

In M-IVC, the fundamental research in three principal branches of geosciences viz., Petrology, Palaeontology, and Geochronology & Isotope Geology is being carried out. The other branches are Meteorite and Planetary sciences, Gemmology, Himalayan Geology, Volcanology, Quaternary geology and Experimental petrology. GSI has been declared as the Nodal agency and curator of all Meteorite Falls and Finds within the Indian Territory. The Gemology Laboratory, NCEGR, Kolkata

is extending paid (as per SoC) services to public in identifying purity of gems and precious stones including diamond. GSI uses state-of-the-art advanced instrumentations. The EPMA Laboratory, NCEGR Bangalore has analyzed REE minerals under the Research Project undertaken in Raichur District, Karnataka.

Out of 186 standard items, carried out during FS 2019-20, outcome of 135 items would have direct societal benefits. Out of 186 items, 24 research items have been taken up exclusively on ore/mineral genesis, modeling and characterization. The remaining items have been taken up on geo-scientific R&D aspects with considerable amount of scientific impact.

MISSION V: Training and Capacity Building

6.21 Human Resource Development

Geological Survey of India Training Institute (GSITI) is presently running training programs at nine centres across India. These are 1) Hyderabad, 2) Nagpur, 3) Lucknow, 4) Kolkata, 5) Shillong, 6) Zawar-Jaipur, 7) Chitradurga (Karnataka), 8) Kuju (Jharkhand) and 9) Raipur (Chhattisgarh). The Hyderabad Centre is designated as the headquarters for all other eight centres and has specialized divisions for laboratory and classroom trainings.

During the period from April 2019 to December 2019 as a part of FS 2019-20, 179 (FSP-116, Additional-63) training courses were conducted for 4878 personnel (4471-GSI, 385-Others and 22-International). In total, during January to December 2019, 231 (FSP-148, Additional 83) training courses were conducted for 6063 participants (5401-GSI, 622-Others and 40-International).

In the period from January to March 2020, 05 (FSP-02, Additional-03) trainings are contemplated which include one international course for 20 participants in Geographic Information System for foreign nationals under Indian Technical and Economic Cooperation (ITEC) program sponsored by MEA.

With a view to spreading the awareness about the expertise of GSI in the field of earth sciences, and enhancing its visibility in the society, the Ministry has launched the mechanism “Bhuvisamvad” in June 2018. Under Bhuvisamvad, from January 2019 to March 2019 as a part of FS 2018-19, 50 training programs were conducted for 2,654 participants. From April to December, 2019, as a part of FS 2019-20, 134 training programs were conducted for 14,359 participants. In total, during January to December 2019, 184 trainings were conducted for 17,013 participants.

PSS: Policy Support System

6.22 Central Geological Programming Board

The Central Geological Programming Board (CGPB) is an apex body at the national level to coordinate and prioritize the geoscientific activities undertaken by

various organizations/agencies in the country, especially in the field of mineral exploration. The Secretary (Mines) is the chairman of CGPB and Geological Survey of India (GSI) is the nodal department. The State Geology and Mining departments, Central Government institutions and other stakeholders are members.

The 58th Meeting of the Central Geological Programming Board (CGPB) was held on 15th February, 2019. In this meeting, apart from the representatives of GSI and MoM, representatives from 27 State DGMs, 6 central Ministries and 35 organizations (government organizations, stakeholders from industries and invitees from public/ private organizations) also participated in the meeting.

On this occasion, seven publications (five from GSI and one each from Neyveli Lignite Corporation and DMG, Chhattisgarh) were released. 20 Mineral Exploration reports detailing resources worth Rupees seventynine thousand five hundred sixty crore (INR) were handed over to the state governments of Odisha, Rajasthan, Madhya Pradesh, Haryana, Karnataka, Andhra Pradesh and Kerala.

In preparation for the 59th CGPB meeting, the theme-based 15th CGPB Committee (I-XII) meetings were conducted in the months between August and December, 2019. The main recommendations that emerged out of the discussions from the committee meetings are to i) operationalize the proposed National Geoscience Data Repository (NGDR) with GSI as the Nodal Agency, ii) finalize the list of all pending PLs, relinquished PLs and PLs to expire by March 2020, iii) develop extraction methodology for REE and RM and also of low grade iron ores and better mineral beneficiation facilities, iv) complete sample analyses within reasonable time limit, v) finalize the ISP for coal, vi) finalize the OAMDR Act by IBM, vii) take up spectral geological mapping in OGP areas, viii) enhance thrust on collaborative work by different agencies in domains of common geoscientific activity and to avoid duplication of work and ix) nurture and preserve expertise in geoscience domains, especially in high-end laboratories.

That apart, 27 states have conducted State Geological Programming Board (SGPB) Meetings. The requests from the state governments and the recommendations of the SGPB meetings were given due consideration while formulating annual programme of GSI for the Field Season (FS) 2020-21. Due to outbreak of Corona virus (COVID-19), the 59th CGPB meeting has been cancelled. The summary proposal for FS 2020-21 book and agenda note book have been circulated to all stakeholders to provide response. After incorporating the suggestions of stakeholder, the annual program of GSI for FS 2020-21 have been approved.

6.23 Quality Management (QM) Cell of GSI

The activity of Quality Management (QM) Cell is being carried out by PSS-P&M-5, CHQ, GSI, Kolkata. The mandate of QM Cell is to devise methodology and modus operandi in the form of Standard Operating Procedures (SOP) for improving the quality of services provided by GSI so as to ensure customer satisfaction and strive for meeting international standards. Accordingly, SOPs are formulated, for various activities of GSI, and implemented for compliance.

As per the mandate, the QM Cell had undertaken external peer review of 20% reports of FS 2017-18 circulated during FS 2018-19. Out of the 655 standard reports submitted by the six Regions and Central facilitates (CHQ) of GSI, 131 reports were randomly selected (domain-wise) by the OCBIS. The selected reports were sent for External Peer Review.

Out of these 131 reports sent to external reviewers, 112 reports have already been received back after peer review. Request have been sent to the reviewers of the rest 19 reports for expediting the peer review. Out of the 112 reports reviewed so far by the external reviewers, 89 reports have received grading of 7 and above out of 10. However, 23 reports have received grading below the minimum acceptable grade of 7. After receiving all the reports from the reviewers, the reports which have been graded below 7 will be examined critically by a collegium chaired by the DG, GSI to suggest modifications to upgrade these reports before their final circulation

6.24 International Cooperation

The activities of GSI in the field of International Cooperation include bilateral collaborative programs with various foreign governmental organisations and scientific agencies, participation in international seminars/ symposia, facilitation of foreign visits to India for programs/trainings, and visit of expert teams abroad. The International Division, GSI, CHQ looks after the subject.

During FS 2019-20, the division was involved in providing and facilitating technical and associated inputs from GSI for bilateral activities with Australia, Italy, UK, Finland, Brazil, Peru, Tajikistan, Mexico, Mali, Mozambique, Kazakhstan, Russia, Serbia, USA, Afghanistan, Nepal and Bhutan.

India, along with its neighbouring countries Pakistan, Bangladesh, Nepal and Sri Lanka was all set to host the 36th International Geological Congress during 2-8 March 2020 in New Delhi. However, owing to the outbreak of the Novel Corona virus (COVID-19), the event has been postponed to 9th to 14th November, 2020 by Govt. of India. As the nodal organization for the event, GSI spearheaded the various preparatory activities viz., science, field trips, and legacy programs, business meeting etc. Invitation letters were sent to 14 countries for Business Meetings with

GSI on a number of aspects, during 36th IGC, 2020. Nominated officers from GSI participated in six promotional and outreach programs abroad related to IGC-2020.

6.25 Bilateral Collaborative Activities

GSI continued its participation in bilateral cooperation and collaborative programs with other countries on several geoscientific arenas for mutual benefit. Activities are being taken up as per the signed MoUs with various countries.

6.26 Collaborative Projects with Other Organisations:

A total of 10 collaborative programs have been taken up during FS 2019-20. Out of these, six under collaboration with National Agencies [Haryana Sarasvati Heritage Development Board (HSHDB); Indian Statistical Institute (ISI), Kolkata; Atomic Minerals Directorate for Exploration and Research (AMDER); ONGC; Defence Terrain Research Laboratory (DTRL); NDMA, RSAC, SoI, Govt of Uttarakhand], one in collaboration with Pondicherry University, three as International collaboration items [two with Geoscience Australia and one with British Geological Survey (BGS)].

STSS: Scientific & Technical Support System

6.27 ISO certification of Chemical Laboratories & Central Headquarters

The Central Chemical Laboratories (XRF and ICPMS) at CHQ and the Regional Chemical Laboratories at NRO (NCEGR Faridabad), SRO, WRO, CRO, ERO have been accredited by National Accreditation Board for Testing and Calibration Laboratories, Government of India (ISO/IEC 17025:2005). For an accredited laboratory to maintain its accreditation status, it is mandatory that the laboratory continues to comply with the requirements of ISO/IEC 17025: 2005 and NABL specific criteria for applicable field(s). The Reassessment of all the laboratories was done in the field of Testing as per ISO/IEC 17025:2005. In the November 2017, International Organisation for standardisation (ISO) and International Electro technical commission (IEC) upgraded ISO/IEC 17025:2005 to ISO/IEC 17025:2017 and being signatory of ILAC & APLAC (now APAC) MRA, NABL has adopted ILAC's recommendation to give accredited laboratories a 3-year transition period for conversion from ISO/IEC 17025:2005 to ISO/IEC 17025:2017, i.e. till 29th November 2020. Accordingly, all the Regional Laboratories have initiated the process for further renewal of accreditation as per ISO/IEC 17025:2017. The Central Chemical Laboratory, Kolkata has got its accreditation renewed as per ISO/IEC 17025:2017 up to March 2022. The others Chemical laboratories will get their accreditation renewed as per the schedule given before expiry of the current validity as per ISO/IEC 17025:2017.

6.28 Modernization program in GSI

In order to establish GSI as a world-class geoscientific organization, a modernization program was initiated in

GSI in the XII Plan. The program aims at infusing state-of-the-art technology in the various spheres of functioning of the organization.

During FY 2019-20, the major geological, chemical, geophysical and drilling instruments that are being procured include High Resolution Secondary Ion Mass Spectrometer (HR-SIMS), Laser Ablation-Quadrupole-Inductively Coupled Plasma Mass Spectrometry (LA-Q-ICPMS), Electron Probe Micro Analyser (EPMA), Single Stage Accelerated Mass Spectrometer (SSAMS), Transmission Electron Microscope (TEM), XRF, SEM, ICPMS, IRMS, 4WD Hydrostatic Rotary Core Drilling Rig, DGPS LA-HR-ICPMS hand held spectrometer Scintillation counter Analyzer, several geophysical instruments etc.

Internal Resource Generation

During the period from January to November, 2019, a total of Rs.1,87,09,987 (Rupees One Crore eighty seven lakh nine thousand nine hundred eighty-seven only) has been generated as Internal Resource and Rs. 27,79,618 (Rupees Twenty seven lakh seventy nine thousand six hundred eighteen only) collected as Service Tax and Cess by way of undertaking various commercial activities such as sponsored commercial geotechnical works, sharing of data, multidisciplinary & fundamental research, sale of maps and unpublished reports, providing analyses of samples (petrological/ chemical/mineral physics/ geotechnical Labs.), Electron Probe Micro Analyser (EPMA) studies, gem testing, mineral exploration etc.

6.29 Year wise / activity-wise financial performance of GSI against the approved budget outlay during f.y. 2018-19 and be grant and expenditure till december, 2019 and projection of expenditure in last quarter (jan 2020 to march,2020) of f.y. 2019-20 and fund utilization during calendar year 2019 is given in **Annexure 6.2.**

Photo 6.10

National Geoscience Award

Human Resources

6.31 Out of the total sanctioned strength of GSI i.e. 12,189 as on 30.11.2019, 6135 posts are occupied. The group-wise sanctioned strength of personnel as on 30.11.2019 is given in **Table 6.1.**

Table 6.1

Statement showing sanctioned & filled up strength in GSI as on 30.11.2019

Class	Sanctioned Strength	Total No. of employees in position	SC	ST	OBC	No. of Women	PH
GROUP-A	3,900	2,639	450	197	759	725	25
GROUP-B (Gaz.)	786	513	108	54	115	85	6
GROUP-B (NG) Min.	1,130	656	109	71	42	138	12
GROUP-B (NG) Tech.	1,524	377	60	45	27	35	4
GROUP-C (Min.)	925	496	84	42	82	83	4
GROUP-C (Tech.)	1,924	509	79	52	66	18	8
MTS (Erstwhile Gr. D)	2,000	945	249	125	154	157	33
Total	**12,189**	**6,135**	**1,139**	**586**	**1245**	**1,241**	**92**

6.32 Visibility Activities and Quality (VAQ)

A 100X100 VAQ [Visibility increase; Activity improvement; Quality enhancement] Model Program has been initiated as a unique endeavour of introspecting and churning within the organization with the aim of rejuvenating and reinventing itself to play the role of the national geological organization of the country in an efficient and effective manner. The program was initiated by Dr. K. Rajeswara Rao, Additional Secretary, Ministry of Mines.

14 themes were identified and theme-based groups were constituted, accommodating 125 high performing officers of GSI, to finalise the Base Document for each theme. Under the program, 72 actionable tasks have been identified, each task having sub-tasks totalling to around 300 which are to be executed within periods of 100, 200 and 300 days.

6.33 Intensifying exploration activities: In FS 2019-20, exploration projects were nearly doubled. Efforts are put to target new areas. As Green-field exploration, 7 projects have been taken up in Bundelkh and Craton.

6.34 Public Good Geoscience: VAQ has emphasized on projects for Public Good. As a special measure, "Quaternary and Environment Geology" Divisions have been created in all Regions. Important projects under public good are as follows:

a) Bank Erosion Vulnerability Study of Majuli island in Assam, is being carried out with inputs from Assam SDMA, Brahmaputra Board and other stakeholders
b) Medical Geology project focusing on Chronic Kidney Disease (CKD) is being carried out in Prakasham district of AP.
c) Compendium on Seismic Hazard Zonation and active fault studies is being prepared incorporating latest data

6.35 Capacity enhancement of laboratories: As part of capacity enhancement, 8 XRF, 7 AAS and 10 PBMs have been procured and installed in various chemical laboratories of GSI.

High-end instruments for geological laboratories will substantially improve the work quality in GSI. The following is the list of instruments that are at various stages of procurement:

Instrument	How it will help GSI
HR-SIMS	Fortification of geological maps to help exploration
LA-Q-ICPMS	Ore body vector, Geothermometry
LA-HR-ICPMS	High throughput Lead isotope + PGE analysis
TEM	Alteration mineralogy; Pollution research
Raman Spectrometer	Exploration, STM, Research Project
Portable XRF, XRD, LIBS for field	Mineralization modelling in field

Single Stage Accelerator MS	Paleoclimate research, Marine
IRMS	Track fluids in Mineral Systems

Purchase Order for HR-SIMS is placed.

6.36 Collaboration: VAQ has resulted into collaboration with academia. MoU with IIT-ISM, Banaras Hindu University and Gauhati University is currently operational for specific need based research activity leading to obtaining Ph D degrees. 11 specialized themes were identified by GSI for collaboration.

6.37 Training: Training and skill development is considered as a pre-requisite for quality enhancement. GSI Training Institute conducted various training programs in the domains of core and applied geosciences, project planning and risk management, change management, and core ICT management.

Also, GSITI has developed new Training website whereby GSI employees as well as public can undertake online training courses on 24 x 7 basis. It has special provision of carrying out Promotion Linked Trainings and tests from designated centres within GSI.

6.38 Bhuvisamvad: A collaborative platform, conceptualized by the M/o Mines, is extensively used by GSI officers to interact with students and academia from eminent institutions through lectures, demonstrations, exhibitions and field trainings. Around 1300 interactions involving nearly 99000 participants have been done by GSI officers.

6.39 Annual Strategic Interaction Meet (ASIM): Chief Secretaries/Principal Secretaries/ Mines Secretaries of 25 States/ UTs were contacted by HoDs of the regions and DDGs of the State Units of GSI. Through ASIM GSI highlighted its contribution in development of mining sectors and addressing societal issues in respective states. These annual meets will go a long way in synergizing developmental activities with mutual participation.

6.40 Public Relation and Media Management: PR and media cells have been opened in each office. Highlights of GSI activities, achievements are being shared regularly with media using press releases, press conferences, social network postings, etc. Since, engaging a professional agency, there is steady increase in the viewership of GSI accounts in social media. So far, total 'Reach/Impressions' (at least one visit) in social media including Facebook, Twitter, Instagram, YouTube and Linkedin together has touched the figure of 6,61,925. Number of 'Engagement received (people commented, shared posts)/ Videos Viewed' is 52,842 during the period from 2nd December, 2019 to 29th Feb, 2020.

6.41 VAQ has put to test the agility of an organization in terms of adopting to changes and performing jobs in a resolute manner going beyond the 'normal and routine' process. The benefits of which will be visible in the coming days.

Indian Bureau of Mines (IBM)

6.42 The Indian Bureau of Mines (IBM) is a subordinate office under the Ministry of Mines. It is engaged in the promotion of scientific development of mineral resources of the country, conservation of minerals, protection of environment in mines, other than coal, petroleum and natural gas, atomic minerals and minor minerals. It performs regulatory functions with respect to the relevant provisions of Mines and Minerals (Development and Regulation) Act, 1957 and enforcement of the rules framed there under, namely Mineral Conservation and Development Rules, 1988/2017 and Mineral Concession Rules, 1960/ 2016 and Environmental (Protection) Act, 1986 and Rules made there under.

6.43 It undertakes scientific, techno-economic, research oriented studies in various aspects of mining, geological studies, ore beneficiation and environmental studies.

6.44 Vision for IBM

The National Mineral Policy, 2019 (NMP) has envisioned on strengthening the regulatory mechanism by incorporating e-governance, including satellite and remote sensing applications Evaluations of miners in terms of their comparative performance on suitable development framework and enforce commitment on part of the mining companies to adopt sustainable development. Accordingly, the vision envisaged is: "*IBM to perform as a National technical regulator and to discharge the developmental functions for the sustainable development of the mineral industry and to work as repository of database on mines and minerals*".

6.45 Mission

1) To ensure effective regulation of Indian Mineral Sector which promotes long term benefits for its sustainable growth.

2) To provide capacity building to State regulatory agencies and also to provide quality technical assistance to the mineral industry, and

3) To work as data bank on mines and minerals and to disseminate mineral information for policy formulations.

6.46 Objectives

(i) To work as National Technical Regulator operating at national-level designing systems, processes and guidelines for regulation of the mining sector;
(ii) To function as a facilitator for creation and improvement of state-level regulatory mechanisms and to facilitate state agencies to ensure adherence to standards and

parameters for scientific and systematic mining in the sector;

(iii) To work as catalytic agent for development of mineral sector by evolving capability & proficiency in beneficiation techniques; dissemination of knowledge and skills in mining and allied areas through its training facilities; consultancy services.

(iv) To play crucial role of that of an Advisor to the Government in matters and issues relating to the mineral sector in areas of short-medium and long-term mineral-wise strategies, mineral taxation and legislative processes.

(v) To play the role of National Repository of mineral data through maintaining a data bank of mines and minerals in the country by developing advanced IT based Mineral Information System enabling the industry to report and access information online, and

(vi) To broaden its interactive base and reach out to overseas counter parts through consultations and exchange programmes and to build capacity, skill & expertise through academic and training programmes at institutes of international repute.

6.47 Present Charter of Functions

In the wake of liberalization of the policy regime governing mineral sector and increasing need for adequate environment management as part of systematic and scientific mining, the mandated functions for IBM, as given for notification in Official Gazette vide Resolution No. 31/ 49/ 2014 – M. III, dated 3rd November, 2014. Charters of functions of IBM are available at

6.48 Key Activities and Functions of IBM

In light of the role and charter of IBM, the key functions being performed by IBM can be broadly classified as (i) Regulatory Functions, and i) Developmental Functions. The same are available at https://ibm.gov.in/writereaddata/files/06232020153619Functions%20and%20activities%20Indian%20Bureau%20of%20Mines.pdf.

Organizational set up of IBM

6.49 IBM has its headquarters at Nagpur, 4 Zonal Offices at Bengaluru Nagpur, Udaipur and Kolkata, and 13 Regional Offices at Ajmer, Bengaluru, Bhubaneswar, Chennai, Gandhinagar, Goa, Dehradun, Guwahati, Hyderabad, Jabalpur, Nagpur, Ranchi and Raipur. During the year 2017, IBM opened two new skill development centres for sustainable mining practices at Udaipur and Kolkata.

6.50 IBM has modern mineral processing laboratory and pilot plant at Nagpur and well-equipped Regional ore dressing laboratories and pilot plants at Ajmer, Bengaluru.

6.51 Performance of IBM

The activities of IBM have been conducted through the following continuing schemes:

Scheme No. 1. Inspection of mines for scientific and systematic mining, mineral conservation and mine environment;

Scheme No. 2. Mineral beneficiation studies, utilization of low-grade and sub-grade ores and analysis of environmental samples;

Scheme No. 3. Technological Upgradation and modernization;

Scheme No. 4. Collection, processing, dissemination of data on mines and minerals through various publications

Scheme No. 5. Mining Tenements System (under implementation)

6.52 These schemes are being implemented by the following divisions of IBM:

(i) Minerals Development & Regulation Division (MDRD) erstwhile Mines Control & Conservation of Minerals Division (MCCM);
(ii) Mineral Processing Division (MPD) erstwhile Ore Dressing Division (OD);
(iii) Technical Consultancy, Mining Research and Publication Division;
(iv) Mineral Economics Division;
(v) Mining and Mineral Statistics Division and
(vi) Planning and Coordination Division.
(vii) Performance relating to various regulatory and development functions of IBM during the year 2019 (up to December 2019) is given hereinafter. The same is also enclosed as **Annexure 6.3.**

6.53 Inspection of Mines

During the year 2019 (January to November), 1109 inspections for enforcement of the provisions of Mineral Conservation and Development Rules (MCDR) 2017 and for examination of mining plans/ review of mining plan /mine closure plans were carried out. Consequent to inspection of mines, 1562 violations were pointed out to 643 mines as against 2583 (pointed out to 808 mines) violations in 2018. Total 602 violations were rectified during the year. So far, for the reporting period, 29 cases (including cases launched in previous years also) were decided in favour of IBM as against 6 in 2018. Mining operations were suspended under Rule 11(2) of MCDR 2017 in 66 mines for not carrying out mining operations in accordance with the approved mining plan/ review of mining plan and recommended 12 cases for suspension of leases to State Government for non-submission of online returns/ discrepancies in submitted returns. Also, 55 cases were recommended to State Government for termination of lease under Rule 12(10) of MCR, 2016. A list of principal violations observed during inspection of mines for the year 2018 and 2019 is given at **Table 6.2**

Table 6.2

Principal Violations of MCDR, 2017 detected by IBM during 2018 and 2019 (up to November, 2019)

o	No. of Violations Pointed out 2018	No. of Violations Pointed out 2019, (Jan. to Nov. 2019)	Rule description
11(1)	452	365	Rule11 (1) - Mining operations in accordance with mining plans
11(3)	10	02	Rule 11 (3) - Submission of Review of Mining Plan / Scheme of mining
20	5	5	Rule 20 - Notice of opening of mine
23	1	0	Rule 23 - Submission of progressive mine closure plan
26 (2)	204	105	Rule 26 (2) - Responsibility of the holder of mining lease to submit yearly report
27(2)	205	15	Rule 27(2) - Submission of Financial assurance
28(1)	58	16	Rule 28 (1) - Notice of temporary discontinuance of mining operations
31(4)	58	21	Rule 31(4) - Maintenance of plans and sections
33	56	48	Rule 33 - Copies of plans and sections to

			be submitted
35, 36, 37, 38, 39, 40, 41, 42, 43, 44	247	156	Protection of environment : Rule 35, 36, 37, 38, 39, 40, 41, 42, 43, 44 - Sustainable mining, removal and utilization of top soil, Storage of overburden, waste rock Precaution against ground vibrations, Control of surface subsidence, Precaution against air pollution, Discharge of toxic liquid, Precaution against noise, Permissible limits and standards, Restoration of flora respectively.
45(5)(b)	147	38	Rule 45 (5) (b) - Submission of Monthly Return
45(5)(c)	192	82	Rule 45 (5)(c) - Submission of Annual Return
55(1)(c)(i)	53	63	Rule 55(1)(c)(i) - Employment of Whole time Mining Engineer/Geologist
55(1)(c)(ii)	23	12	Rule 55(1)(c)(ii) - Employment of Part time Mining Engineer/Geologist
Others	872	634	
Total	**2583**	**1562**	

Source: MCDR Inspection

6.54 Inspection of Mines carried out by IBM during 2019 is given in **Table 6.3**

Table 6.3

Inspection of Mines carried out by IBM during 2019 (Jan. to Nov. 2019)

S No	State	No. of inspection
1	Andhra Pradesh	62
2	Assam	0
3	Bihar	1
4	Chhattisgarh	107
5	Goa	9
6	Gujarat	142
7	Haryana	0
8	Himachal Pradesh	17
9	J & K	0
10	Jharkhand	52
11	Karnataka	129
12	Kerala	4
13	Madhya Pradesh	149
14	Maharashtra	66
15	Manipur	1
16	Meghalaya	20
17	Odisha	119
18	Punjab	0
19	Rajasthan	88
20	Sikkim	0
21	Tamil Nadu	111
22	Telangana	27
23	Uttaranchal	3
24	Uttar Pradesh	2
25	West Bengal	0
Total		**1,109**

Source: MCDR Inspection

Mining Plan, Review of Mining and Mine Closure Plan

6.55 The Mineral (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016 and the Mineral Conservation and Development Rules, 2017 stipulate that mining operations are required to be conducted as per an approved Mining Plan and after extraction of minerals, the mines are required to be reclaimed as per an approved Mine Closure Plan. The Mining Plans are approved by the IBM and in case of mines of minor minerals including 31 notified (on 10.02.2015) non-metallic or industrial minerals; the powers have been delegated to respective State Governments. The Mine Closure Plan is required to comprise a Progressive Mine Closure Plan (PMCP) prepared for five yearly periods of the successive mining schemes and a Final Mine Closure Plan (FMCP). Mine Closure Plan is expected to address issues relating to environment protection including air, water and land protection, management of top soil and overburden, reclamation and rehabilitation of land and control on ground vibration, surface subsidence and restoration of flora.

6.56 Till the year, 2019 (January to November), Financial Bank Guarantees for a value of 24,016.84 Million Rupees (As per revised per hectare rate of Rule 27(1) of MCDR, 2017) have been collected.

6.57 During the year 2019 (January to November, 2019), 14 mining plans were approved and 10 not approved, 144 review of Mining Plan were approved and 49 not approved and 33 final mine closure plans approved and 9 were not approved. State-wise break-up is given at **Table 6.4**.

Table 6.4

State-wise Mining Plans/Review of Mining Plans/Final Mine Closure Plans approved by IBM during 2019.

(January to November 2019)

S. No	State	Mining Plans		Review of Mining Plan		FMCP	
		Approved	Not Approved	Approved	Not Approved	Approved	Not Approved
1	Assam	0	0	0	0	0	0
2	AP	0	0	9	6	0	0
3	Jharkhand	2	0	10	3	5	1
4	Bihar	0	0	0	0	0	0
5	Chhattisgarh	3	2	15	1	1	1
6	Delhi	0	0	0	0	0	0
7	Goa	0	0	0	0	0	0
8	Gujrat	0	1	30	3	6	1
9	Himachal	0	0	2	1	0	1
10	Haryana	0	0	0	0	0	0
11	J & K	0	0	2	5	0	0
12	Karnataka	0	0	3	0	7	1
13	Kerala	0	0	0	0	0	0
14	MP	5	2	45	12	2	0
15	Maharashtra	3	0	8	2	2	1
16	Meghalaya	1	3	0	0	0	0
17	Manipur	0	2	0	0	0	0
18	Odisha	1	1	18	15	8	0

19	Rajasthan	0	1	0	0	1	3
20	Sikkim	3	0	0	0	0	0
21	Tamilnadu	0	0	0	0	1	0
22	Telangana	0	0	2	1	0	0
23	UP	0	0	0	0	0	0
24	Uttaranchal	0	0	0	0	0	0
25	W.B.	0	0	0	0	0	0
	Total	**14**	**10**	**144**	**49**	**33**	**9**

6.58 No Reconnaissance permits have been granted during the year 2019. The details of reconnaissance permits granted till 31.12.2019 is given in **Table 6.5.**

Table 6.5

Status of Reconnaissance Permits in India, as on 31st December 2019.

S. No	State	Total No. of RPs	No. of RPs where final exploration submitted to IBM
1	Andhra Pradesh	56	44
2	Arunachal Pradesh	01	00
3	Chhattisgarh	42	26
4	Gujarat	04	00
5	Jharkhand	04	02
6	Karnataka	66	29
7	Kerala	01	00
8	Madhya Pradesh	91	29
9	Maharashtra	10	08
10	Manipur	01	00
11	Odisha	26	19
12	Rajasthan	74	29
13	Uttar Pradesh	21	08
14	West Bengal	04	01
Total		**401**	**195**

6.59 Status of Prospecting Licences (major & minor) in India as on 31st December 2019* are given in **Table 6.6.**

Table 6.6

Status of Prospecting Licences (major & minor) in India as on 31st December 2019*

S. No	State	Total No. of PLs granted by the State Government as on 31.12.2019	No. of PLs where final exploration data submitted to IBM*
1	Andhra Pradesh	93	38
2	Arunachal Pradesh	17	01
3	Chhattisgarh	152	84
4	Gujarat	18	01
5	Himachal Pradesh	07	04
6	Jharkhand	28	05
7	J & K	01	00
8	Karnataka	10	06

9	Kerala	01	00
10	Madhya Pradesh	563	158
11	Maharashtra	48	09
12	Manipur	17	01
13	Meghalaya	15	04
14	Odisha	16	06
15	Rajasthan	234	12
16	Tamil Nadu	18	00
17	Telangana	44	12
18	Uttarakhand	44	00
19	Uttar Pradesh	03	00
20	West Bengal	03	00
Total		**1,332**	**341**

**To the extent grant orders, reports received at IBM Nagpur.*

Preparation of Mineral Maps

6.60 Geographic information system and Remote sensing centre has been established in Indian Bureau of Mines which is functional since December 2018. Multi Mineral Lease hold maps are now updated on Arc GIS platform. Up to 31st December 2019, vectorisation of 294 top sheets and plotting of 2096 mining leases is completed out of 3903 leases. Plotting of 1807 leases under progress. Preparation of attribute tables of all leases for Goa, Maharashtra, Andhra Pradesh, Gujarat, Karnataka, Jharkhand and Telangana states are completed. Preparation for geology layers for Goa and Maharashtra state from Bhukosh data base of GSI is completed. Forest Map showing the forest boundaries for the states of Goa, Kerala and Rajasthan have been obtained from the forest departments. All the maps viz lease boundaries, geology layer and the forest maps have been integrated for the state of Goa.

Mineral Beneficiation

6.61 Mineral beneficiation studies including mineralogical testing and chemical analysis intimately relates to both conservation and development of mineral resources. During the year 2019 (up to 31st December 2019), 37.75 ore dressing investigations, 19,082chemical analysis, 2,046 mineralogical examinations and 02 in-plant study were completed. It is anticipated that annual target of 50 ore dressing investigations, 30,000 chemical analyses (radicals) and 2300 mineralogical examinations (M.E) will be achieved by 31st March 2020.The same is available on IBM website at Ore dressing officers are also associating with officers of MDRD division in carrying out Regional Mineral Development Studies (RMDS).

To identify various gaps /deficiencies in National Mineral Inventory (NMI)

6.62 Identified various gaps/ deficiencies in National Mineral Inventory as on 01.04.2015 of all deposits in respect of free hold and lease hold (public/private) of 46 major minerals with respect of upcoming Mining Tenement System (MTS) and sent to all 13 Regional offices to fulfill

the gaps related to mine code. Data received from 10 regional offices have been mapped. The NMI is based on UNFC system which is being used for making various decisions in the mining and exploration sectors by the domestic/foreign investors. Such a system has wide ramifications of use in different kinds of decision making and policy formulation concerning not only minerals but allied fields as well.

Statistical Publications

6.63 IBM disseminates statistical information on mines, minerals, metals and mineral-based industries through various publications. Information on mineral production, stocks, dispatches, employment, inputs in mining, mining machinery and related matters received from the mine owners on statutory basis under the MCDR, 1988 and ancillary statistics on metals production, mineral trade and market prices of minerals, revenue from the mining sector, rent, royalty and cess on minerals, etc from other agencies is compiled regularly by IBM.

6.64 The statistical publications released during the year 2019 (up to December 2019) include Statistical profiles of minerals 2017-18, Monthly Statistics of Mineral Production (MSMP) up to Feb 2019. Further, Indian Mineral Industry at a Glance 2015-16 issue completed and hoisted on website, Issue of 2016-17 and 2017-18 are under progress. MSMP issues of March, 2019 is under progress.

Consultancy Service

6.65 IBM provides technical consultancy services on prescribed charges for geological appraisals, survey of the areas, preparation of feasibility study reports, environment impact assessment and environment management plan, selection of suitable mining equipment, evaluation of feasibility report prepared by other consultants, financial institutions, etc. During the year 2018-19, 01 Regional Mineral Development study was completed. During the year 2019, RMDS for effective utilization of iron ore fine dump of NMDC, Bailadila is under progress.

In 2019, detailed field work and total station survey was done to know about total excavation and dumps of Pola Dongra Iron Ore Mine, South Goa for SIT Goa.

Technical Publications

6.66 IBM brings out technical publications relating to mines and minerals, mineral-based industries, trade, beneficiation, R&D activities, etc. Indian Mineral Year Book (IMYB) is available at. IMYB is a flagship publication of IBM and bring out in three (3) volumes. It consists of Part I having as many as 11 General Chapters, Part II consists of 19 Reviews on metals and alloys and Part III consists of 50 mineral reviews. This publication covers information on minerals and mineral-based commodities, their development, production,resources/reserves, consumption, trade and policy. It also includes world scenario. IMYB provides

a status report of Mining and Mineral Industry in India on an annual basis. This publication has wide readership-both National and International.

The IMYB, 2018 (data 2017-18),consisting total 60 general/metals & alloys/mineral reviews were prepared, edited, finalized and IMYB, 2018(Advance Release) was uploaded on IBM, website.

6.67 For IMYB, 2019 (data 2018-19) about 13,078 letters/questionnaires/e-mails were issued for capturing of data. Nearly 1071 (including Form O, N and questionnaires) receipts from various mineral-based industries, Central/State Government departments, Central/State Undertakings, National Laboratories etc. were received during the period under review.

6.68 Preparation of IMYB 2019 was taken up for three separate volumes, viz. Volume-I for General Reviews, Volume-II for Metals & Alloys and Volume-III for Mineral Reviews. Preparation of reviews is under progress.

6.69 Half yearly Bulletins on mineral information (October 2018 to March 2019) and yearly Bulletin on Mining Lease and Prospecting Licenses 2018 are released.
https://ibm.gov.in/writereaddata/files/07022019162005BMI_Oct_March_2019.pdf for Oct 2018 to March 2019 data
https://ibm.gov.in/writereaddata/files/10142019160948MLPL_Bulletin_2018.pdf For Bulletin on M.L and PL 2018.

Training

6.70 IBM imparts training to technical and non-technical officials of IBM and also to persons from the mineral industry and other agencies in India and abroad. During the year 2019 up to December 2019, 06 training programmes were conducted in which a total of 136 IBM personnel, 114 industry personnel and 02 State DGM personnel participated. Up to, March 2020 a total 12 training programmes are expected to be conducted by training centre. During the year 2018-19, 16 training programmes were conducted in which a total of 198 IBM personnel, 395 industry personnel, 78 officers of Directorate and Geology participated.

Measures for Abatement of Pollution and Environmental Protection

6.71 The IBM undertakes inspections/ studies for the enforcement of provisions of MCDR, 2017 which include provision on protection of mine environment to ensure that due care is being taken by the mine operators. During inspection it ensures that mine operators are taking due care for preservation and utilization of top soil, storage of overburden / waste rocks, reclamation and rehabilitation of land, precaution against ground vibration, control of ground subsidence, abatement measures against air, water- and noise pollution, restoration of flora, etc. in addition to other conservation and developmental measures. Necessary guidance to mine

managements/ operators are also given for systematic and scientific development of mine including protection of environment. While approving the mining plans, schemes of mining and mine closure plans, IBM ensures that environment impact assessment studies have been carried out and to that effect environmental management plan has been incorporated for its effective implementation, besides reclamation and rehabilitation of mined-out areas.

6.72 As a result of follow up for implementation of EMP, extensive afforestation has been undertaken in the mines by the mine owners. So far, 119.20 million saplings have been planted over an area of about 60,070 hectares with a survival rate of 68.73 percent.

Revenue Generation

6.73 IBM generates revenue through consultancy, training, statutory processing and sale of publications &data etc. Revenue generated during 2019 (January to November 2019) is Rs. 331.20 Lakh from processing of mining plans/Review of Mining plans and compounding fees & fines.

Computerization

6.74 The Regional (Except Raipur & Gandhinagar RO) /Zonal offices and Headquarters of IBM have been linked through a sophisticated system based on client server architecture established with the help of BRGM, France. Proposal for connecting Raipur & Gandhinagar RO with said system along with VC facility is under process. IBM has well established LAN facility, besides WAN system to communicate and exchange data with Regional, Zonal offices and Headquarter offices. In all RO/ZO offices, VC facility is operational.

6.75 The Web Portal of IBM i.e. https://ibm.gov.in/provides information on IBM's history, functions, organization, divisions of IBM and its activities, jurisdiction of regional & zonal offices, services offered by IBM. The new domain https://mitra.ibm.gov.in/Pages/returns.aspx .in is also functional for facilitating the stakeholders to submit the monthly & annual return online and also scrutiny of the same by IBM. Further, the Bilingual Website of IBM is being updated as and when required.

6.76 After introduction of online submission of returns system consequent upon amendment to Rule 45 of MCDR, 1988 vide notification No. 75(E), dated 9th February, 2011, the mine owners have commenced submission of monthly and annual returns online. IBM is monitoring and guiding/ encouraging the mine owners and their representatives for online submission of returns. The month-wise monthly returns submitted online are given in **Table 6.7**

Table 6.7

Month-wise Returns Submitted online (up to November, 2019)

Sl No.	Month	No. of monthly returns received online
1	January, 2019	2,314
2	February, 2019	2,308
3	March, 2019	2,283
4	April, 2019	2,280
5	May, 2019	2,256
6	June, 2019	2,232
7	July, 2019	2,171
8	August, 2019	2,139
9	September, 2019	2,093
10	October, 2019	2,020
11	November, 2019	1,213

6.77 Mineral Wise Summary of Mining Lease Distribution of Minerals (Excluding Atomic, Fuel & Minor Minerals) as on 31/03/2018(P) (All India) is given in **Annexure 6.4.**

Mining Tenement System (MTS)

6.78 MTS has been taken up by IBM during the programme year 2009-10. The objective of the Scheme is to develop an online National Mineral Information System for investors by linking Central and State organizations engaged in administration of mineral resources in the country. The mining tenement system would have graphical information database (GIS) as well as information in textual form. These two databases, i.e., non-spatial database and spatial database would be seamlessly integrated so as to retrieve graphical information as well as relevant textual information. The system will be thus web enabled and access to the system will be given online to prospective investors, government organizations, private and public organizations through Internet as per policy of the Government.

6.79 As approved by Core committee on MTS, the successful bidder M/s WIPRO has signed the contract with IBM on 10.11.2016 in the august presence of Secretary (Mines) at Nagpur. M/s NISG, Hyderabad has signed agreement as Project Management Unit (PMU) on 04.05.2017. Three modules of MTS Project viz. PMKKKY, Registration and Daily Returns were launched by the then Hon'ble Minister of Mines, Shri Narendra Singh Tomar on 20.03.2018 during 3rd National Conclave on Mines & Minerals at New Delhi. PMKKKY is currently live for data entry at district level and most of the States have started data entry. Daily Return and Monthly Return are live to view and submit the returns.

6.80 The Mining Plan, Star Rating and OAS modules are under testing. The SRS V3.1 of Phase II Modules i.e. Grant and Execution of Concession, Inspection Module, GIS Module, IBM existing databases, ML WMMP, NMI, MCP and Final Mine Closure Plan modules are under examination.

6.81 Most of the States have started entering data on DMF collection and projects sanctioned for utilization of fund in high and other priority heads in the affected areas due to mining. The Registration module is available on http://mitra.ibm.gov.in and applicants engaged in mining are updating the details since 15th February 2019. Similarly,daily return forms D1, D2 and D3 and monthly return forms F1, F2 and F3 forms are available on http://mitra.ibm.gov.in to view and submit the returns. Other modules of MTS are at various stages i.e. at staging environment, discussion and finalization etc.

Sustainable Development Framework (SDF)

6.82 Star Rating System: A good governance initiative is designed as a tool for evaluation of the performance of lease operators on the various parameters encompassed by the Principals of the Sustainable Development Framework (SDF) approved by Ministry of Mines in 2011 in line with the National Mineral Policy, 2008. Thus it can be viewed as a mapping of mining footprints from the view point of Sustainability.

- The system has been developed primarily on the basis of self-assessment followed by validation by Indian Bureau of Mines along-with provisions for third party auditing as may be considered fit by Ministry of Mines.
- The Star rating has been mandated by rule 35 of newly notified MCDR 2017.

6.83 All the mine operators are mandated to achieve at least three star ratings within a stipulated time period of four years from the date of commencement of mining operations or the date of notification of the rules (i.e. March 2017) whichever is later in accordance with rule 35 of MCDR 2017, failing which Mining operations are liable to be suspended.

- A system of third party auditing of the award of rating system and the process implementation is also proposed.

6.84 Following are the anticipated outcomes of the Star rating system:

- Reduced environmental and social conflicts in areas awarded for mining.
- Greater clarity for all concerned stakeholders, on risk levels of mining lease areas.
- Potentially reduced delays in obtaining environment clearances for mines.
- Improved protection of high-risk areas in terms of environment and social considerations.
- A Regional Mineral Development Plan for selected mining areas and addressing key regional and cumulative impacts of mining through coordinated and collective action.
- Opportunity for clustering of small operators to become more competitive, and compliant.

- A robust E&S Management framework in mining companies.
- A disclosure process that provides stakeholders with relevant and timely information, and allows issues to be raised in engagement forums.
- Enhanced control on illegal mining activities through intensive stakeholder scrutiny by publishing details on mining activity in public domain.

6.85 Based on evaluation of the performance of lease operators on the various parameters encompassed by the Principals of the Sustainable Development Framework (SDF) approved by Ministry of Mines, validation of self-assessed templates was carried out by IBM and accordingly rating was given as 0 to 5.

The year wise 5 Star Rated mines are given below.

Year	5 Star Rating
2014-15	10
2015-16	32
2016-17	57
2017-18	57

6.86 The mine operators were felicitated for achieving 5 star rating at National Conclave on Mines and Minerals held at Raipur, Delhi and Delhi on 4-5 July, 2016 (for the year 2014-15), 15th February, 2017 (for the year 2015-16) and 20th March, 2018 (for the year 2016-17) respectively.

6.87 During the year 2019-20, till 31st December, so far, 863 online templates for the performance of year 2018-19 have been filed by the lessees. Field verification of these leases for final evaluation is under progress and so far in 280 leases field verification has been completed.

Mining Surveillance System (MSS)

6.88 Mining Surveillance System (MSS) is a satellite-based monitoring system which aims to establish a regime of responsive mineral administration by curbing instances of illegal mining activity through automatic remote sensing detection technology.

- Ministry of Mines & Indian Bureau of Mines (IBM) have developed the MSS, with assistance from Bhaskaracharya Institute for Space Applications and Geo-informatics (BISAG), Gandhinagar and Ministry of Electronics and Information Technology (MEITY).

- The system works on the basic premise that most minerals occur in the continuity and their occurrence is not limited to the lease area but is likely to extend in the vicinity. The MSS checks a region of 500 meters around the existing mining lease boundary to search for any unusual activity which is likely to be illegal mining. Any discrepancy is found is flagged-off as a trigger.

- The MSS is a transparent & bias-free system, having a quicker response time and capability of effective follow-up. The deterrence

effect of 'Eyes watching from the Sky' would be extremely fruitful in curbing instances of illegal mining.

- A user friendly mobile app for MSS has been created and launched on 24th January, 2017 at Gandhinagar for enabling public participation in assisting the governments endeavor to curb illegal mining, which was being used by the inspecting officials to submit compliance reports of their inspections.

- In the initial phase, a total of 296 triggers across the country covering a total area of 3,994.87 hectares were generated wherein 48 unauthorized mining cases have been detected after inspection of the triggers by the state government officials.

- The training of all the States for its adoption of the MSS for minor minerals has also been done. Total 164 Officers from States participated in the training.

- In the second phase, 52 major mineral triggers have been detected from the 3280 plotted leases (Working Mines 1689 plotted out of 1694 and Non-Working Mines 1596 plotted out of 2129) across the country, out of which 45 have been verified by the State Governments and in 5 cases unauthorized mining activities have been identified.

- Similarly, in respect of minor minerals, so far, 130 triggers have been generated, out of which 104 have been verified and in 9 cases unauthorized mining activities have been identified.

Committee for Review and Restructuring of the Functions and Role of IBM

6.89 1.Ministry of Mines had constituted a Committee vide its Resolution No. 16(27)/2009-M.VI dated 23.07.2009 for the Review and Re-structuring of the Functions and Roles of Indian Bureau of Mines (IBM) in terms of the policy directions given in the National Mineral Policy and the Mines and Minerals (Development and Regulation) Act and Rules framed there under.

2. The Committee submitted its Report to the Government of India on 4.5.2012 suggesting for overall restructuring of the IBM. It recommended the creation of 933 posts in addition to the existing strength of 1477. Ministry of Mines reviewed the recommendations of the Committee in the wake of significant changes in the legislative framework by the Government. Ministry optimized the proposal without considering increase in sanctioned strength. The proposal was examined in consultation with the Department of Expenditure, Ministry of Finance. The proposal was finalized with the creation, abolition and up-gradation of posts under various disciplines of IBM keeping the expenditure revenue neutral by way of matching saving through surrender of 180 Group 'A' (level 10) alive posts of Geological Survey of India, an Attached Office of Ministry of Mines.

3. The Department of Expenditure accorded approval to the proposal and suggested that the posts to be surrendered will be done gradually as and when the incumbents retire on superannuation or otherwise or are promoted.

4. The Cabinet approval was also accorded in consonance with the Department of Expenditure instructions vide OM No. 7(I)/ E.Coord-I/2017 dated 12.04.2017 for creation/ upgradation/ abolition of posts of the level of Joint Secretary and above.

5. Accordingly, the detailed discipline-wise, revised sanctioned strength of IBM is published on 15th May 2018 vide notification no. 31/72/2009-M.III.Vol.I (part–I).https://ibm.gov.in/writereaddata/files/06082018125338Restructuring_notification_dated%20170518.pdf

6. For implementation of new manpower strength, recruitment Rules of some disciplines (mining stream up to RCOM, geology, mineral economics, administration, library stream, Rajbhasha stream, private secretary &stenographers) have been notified and for the other disciplines they are under examination at various stages.

Human Resources

6.90 The total sanctioned personnel strength of IBM is 1477. The present filled-in strength is 800 as on December 2019. The cadre-wise employment position in IBM as on December 2019 is given in **Table 6.8**

Table 6.8

Employment of Personnel in IBM as on December, 2019

Group	Sanctioned strength	Total No. of employees in position	Number of Personnel					
			SC	ST	OBC	Minorities	Women	Physically Handicapped
A	459	130	17	09	30	10	05	00
B	502	318	43	17	39	12	57	06
C	516	352	75	25	60	17	35	07
Total	**1,477**	**800**	**135**	**51**	**129**	**39**	**97**	**13**

7 Central Public Sector Undertakings

Back to Index

Central Public Sector Undertakings

National Aluminium Company Limited (NALCO)

Introduction

7.1 National Aluminium Company Limited (NALCO) is a Navratna CPSE under Ministry of Mines. The Company is an integrated and diversified mining, metal and power group 'A' CPSE with net sales turnover of Rs. 11,386 crore in financial year 2018-19 and export sales (i.e. Rs. 4,793 crore) accounted about 42% of turnover and business in more than 15 countries. The Company is 3rd highest net foreign exchange earning CPSE in the year 2017-18. Presently, Government of India holds 51.5% equity of NALCO.To see more details please visithttps://nalcoindia.com/investor-services/annual-reports/.

7.2 With its consistent track record in capacity utilization, technology absorption, quality assurance, export performance and posting profits, NALCO is example of India's industrial might.

Photo -7.1

NALCO Corporate Office, Bhubaneswar

7.3 The Company retained its No. 1 position as the lowest cost producer of Alumina in the world in last 4 years as per Wood Mackenzie report. Adding further flavor, Panchpatmali Bauxite Mines has emerged as the lowest cost Producer of Bauxite in the world in 2018, as per the same report.

7.4 NALCO is the first Public Sector Company in the Country to venture into international metal market in a big way with London Metal Exchange (LME) registration since May'89. The Company is listed at Bombay Stock Exchange (BSE) since 1992 and at National Stock Exchange (NSE) since 1999. Besides, ISO 9001:2015, ISO 14001:2015, OHSAS 18001:2007 & SA 8000:2014 certification; the Company has also adopted ISO 50001:2011 standards for energy management system& ISO 27001:2013 security infrastructure, applications and users.

7.5 The Company has diversified to renewable energy sector by commissioning 198 MW wind power plant in four different places in AP, Rajasthan and Maharashtra to reduce carbon foot print. Moving ahead, the Company has also utilised the entire available roof top space in Corporate Office, Township and NRTC (NALCO Research & Technology Centre) at Bhubaneswar for setting up of 630 kilowatt peak (kWp) solar power plant.

Existing Operations & their Locations

Bauxite Mines

7.6 The Company has its fully mechanised open cast Bauxite Mines which is one of the most sophisticated and eco-friendly mining operations to be found worldwide, situated on Panchpatmali plateau in Damanjodi, Koraput, in the State of Odisha. North& Central blocks of Panchpatmali mine is being presently operated at 100 % capacity i.e. 6.825 million tonne per annum. Bauxite production from new mine i.e. South block of Panchpatmali Mines started at 4th quarter of FY 2017-18 with leased capacity of 3.15 million tonne per annum. The mined-out bauxite is transported from the Mine to Refinery by a 14.6-km. long single-flight, multi-curve, variable-speed cable belt conveyor of 1800 TPH capacity.

Photo -7.2
Panchpatmali mine

Alumina Refinery

7.7 The Alumina Refinery is located at Damanjodi, Odisha, approximately 14 km from the Bauxite Mines at Panchpatmali. The Alumina produced is transported to Aluminium Smelter at Angul (Odisha) and to Vizag (Andhra Pradesh) port by rail with NALCO's captive wagons.

7.8 The present normative capacity of Alumina Refinery is 21 lakh tonne per annum. Alumina produced is used to meet Company's requirements for production of primary Aluminium at Smelter. The surplus Alumina that remains after internal consumption is sold in the export markets. A small portion i.e. 6% of the total sale is also sold in domestic market.

Photo -7.3
Aluminium Smelter, Angul

Aluminium Smelter

7.9 The Aluminium Smelter is located at Angul, Odisha, approximately 699 km from the Refinery and 5 km away from the captive thermal power plant. The Aluminium produced at the Smelter is transported to Vizag port (548 km away), Kolkata Port (526 km away) and Paradeep port (183 km away) by rail for export. Aluminium in the forms of ingots, sow ingots, tee ingots, billets, wire rods, alloy ingots, flat products and cheque red sheets is also sold in the domestic market through its stockyards located across the country.During FY 2018-19 the domestic sales are as follows:

Item	Sales (FY 2018-19)
Standard ingot	1.73 lakh tonne
sow ingot	0.22 lakh tonne
T-ingot-	0.55 lakh tonne
billet-	0.29 lakh tonne
wire-rod-	1.05 lakh tonne
rolled product	0.19 lakh tonne

7.10 The Aluminium Smelter entered into production progressively from 1987. The present capacity of Smelter is 4.60 lakh tonne per year. Alumina is converted into primary Aluminium through a smelting process using electrolytic reduction. From the pot-line, the molten Aluminium is routed to either the casting units, where the Aluminium can be cast into ingots, sow ingots, tee ingots, billets, wire rods, cast strips and alloy ingots, or to holding furnaces at flat Aluminium products unit where the molten Aluminium is rolled into various cold-rolled products or cast into Aluminium strips.

Captive Power Plant

7.11 The Aluminium Smelter and coal-based pit head captive power plant at Angul are strategically located. The Power Plant is located approximately 5 km away from Aluminium Smelter.The location of captive thermal power plant at Angul is also strategic to the availability and supply of coal. NALCO sources its major coal requirement for captive thermal power plant from the Talcher coalfields of Mahanadi Coalfield Ltd. (a subsidiary of Coal India Ltd.), located approximately 15 km from Angul. The 18.5km captive railway system links the captive thermal power plant to the Talcher coalfields, enabling transport of the critical and bulk requirement of coal. Energy charge for power intensive industry in the State of Odisha varies from Rs. 4.20- 5.30 / Unit based on load factor. However, NALCO’s captive power generation cost is Rs. 3.13/ unit for 2018-19.

7.12 The captive thermal power plant commenced operations in 1986. Presently the captive thermal power plant has a generation capacity of 1200 MW by way of 10 turbo-generators, each rated at 120 MW. While the captive thermal power plant provides entire electric power requirement of Aluminium Smelter, it also provides for

approximately 35 MW of the power requirement to the Alumina Refinery through wheeling. NALCO's captive power is meant for captive use of Smelter. It also meets partly power requirements of the Refinery. In FY 2018-19,6,256 million unit power generated against annual target of 5,935 million unit. The target was based on Smelter and refinery production plan.

Wind Power Plants

7.13 The 1st wind power plant of capacity 50.4 MW in Gandikota, Andhra Pradesh was commissioned in Dec'12 and the 2nd wind power plant of capacity 47.6 MW at Ludarva site, in Jaisalmer, Rajasthan were commissioned in January, 2014. 3rd wind power plant of capacity 50 MW at Devikot site, Jaisalmer, Rajasthan and a 50.4 MW Wind Power Plant at Sangli, Maharashtra commissioned in September, 2016 & December, 2016 respectively.

Photo -7.4

Wind Power Plant, Jaisalmer

Photo -7.5

Captive Power Plant

Rooftop Solar System

7.14 NALCO utilised the entire available roof top space in Corporate Office, Township and NRTC at Bhubaneswar for setting up of 630 kilowatt peak (kWp) solar power plant.

Photo-7.6

Roof Top Solar facility

Port Facilities

7.15 On the Northern arm of the inner Harbour of Visakhapatnam port on the Bay of Bengal, NALCO has established mechanized storage and ship handling facilities for exporting Alumina in bulk and importing Caustic Soda.

Photo -7.7
Port Facility

Performance of NALCO

7.16 Physical performance, financial performance and sales performance are presented at **Table 7.1,Table 7.2** and **Table 7.3.**

Table 7.1
Physical Performance of NALCO

Product	Unit	2015-16 Actual	2016-17 Actual	2017-18 Actual	2018-19 Actual	2019-20 Target	2019-20 Actual up toDecember,19	2019-20 Expected achievement
Bauxite	Lakh tonne	63.40	68.25	70.25	72.31	70.95	55.79	73.0
Alumina Hydrate	Lakh tonne	19.53	21.00	21.06	21.53	21.50	15.75	21.60
Aluminium Metal	Lakh tonne	3.72	3.87	4.26	4.40	4.39	3.16	4.13
Net power	Million Units	5,841	6,066	6,547	6,256	6,815	4,507	6,067
Wind Power	Million Units	151	198	243	363	323	281	330

Please go through annual reports for details on https://nalcoindia.com/investor-services/annual-reports/.

Table 7.2

Financial Performance of NALCO

(in Rs. crore**)**

Sl. No.	Particulars	2015-16 Actual	2016-17 Actual	2017-18 Actual	2018-19 Actual	2019-20 Target	2019-20 Actual up to Dec'19	2019-20 Expected achievement
1.	Income *	7,353	7,964	9,789	11,825	12,661	6,702	Shall be submitted after Annual Audit 2019-2020
2.	Operating Cost**	5,825	6,516	7,268	8,607	9,311	6,255	
3.	Interest & Transaction Loss	1	3	2	2	3	5	
4.	Depreciation & Amortization	424	480	480	476	498	395	
5.	Profit before Income tax and Dividend	1,103	965	2,039	2,740	2,849	47	

** Income and expenditure are net of excise duty on sales.*
*** Operating cost includes exceptional items*

Detailed results are available on https://nalcoindia.com/investor-services/financial-results/

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Table 7.3

Sales Performance of NALCO

Sales	Unit	2015-16 Actual	2016-17 Actual	2017-18 Actual	2018-19 Actual	2019-20 Target	2019-20 Actual up toDecember,19	2019-20 Expected achievement
Total Alumina/Hydrate Sale	Lakh Tonne	12.20	12.95	13.37	13.18	12.88	9.14	13.39
Aluminium Export	Lakh Tonne	0.94	1.01	0.76	0.39	0.65	0.49	0.61
Domestic Aluminium Sale	Lakh Tonne	2.78	2.85	3.50	4.02	3.73	2.65	3.51
Total Aluminium Sale	Lakh Tonne	3.72	3.86	4.26	4.41	4.38	3.14	4.12

Projects

7.17 The major activities during FY 2019-20 pertaining to various projects of NALCO are as under:

a) **5th Stream Refinery:** All the statutory clearances were obtained for brown field expansion of 1 million tonne refinery. Technology licensor and Engineering, Procurement, Construction Management (EPCM)consultant appointed and basic engineering package deliverables submitted by the technology provider. Award of work for project packages are under various stages of tendering &evaluation. Work for boundary wall which was disrupted for more than 2 years, has resumed in the last week of June'19 after amicable settlement with the villagers with the support of district authorities. Site grading and enabling work are continuing. However, execution of jobs in multiple fronts are being opposed by the villagers.

b) **Alternate Sourcing of Bauxite from South Block of Panchpatmali Mines:**
EC amendment received. Packaging philosophy finalised. Award of work for project packages are under various stages of tendering.

c) **Development of Pottangi Mines:** Differential Global Positioning System (DGPS) survey for revised mining lease area of 697.979 Ha completed and Mining Plan approved by IBM. Terms & condition for grant of ML over revised mining

lease area of 697.979 Ha issued by Government of Odisha (GoO). Route survey of conveyor corridor is completed. Obtaining Environment Clearance (EC) & Forest Clearance (FC) are under various stages of compliance. Grama Sabha was conducted in Jun'19 for issuance of forest rights certificate by Collector, Koraput for further processing of proposal for FC. Public hearing conducted in December, 2019 for obtaining EC.

d) **Utkal D Coal Mines:** Transfer and registration of Mining lease area land in favour of NALCO is completed**.** R&R colony land mutated and physical possession taken by NALCO**.** Terms and conditions for grant of Mining lease over revised mining lease area has been issued by Government of Odisha (GoO). Pre project activities are in progress and works related to approval of Mine closure Plan, transfer of Environment clearance & Stage – II forest clearance are under progress. Compliance report with respect to 6.5Ha forest land in safety zone have been forwarded by Forest and Environment department, Government of Odisha (GoO) to MoEF&CC, Government of India (GoI).

e) **Utkal E Coal Mines:** Compensation disbursement of private land and land transfer activities (Government & Private) are in progress. About 762.407 acres registered out of total land of about 895 acres DGPS Survey completed. Application has been submitted to MoEF & CC, Government of India (GoI) for diversion of forest land to obtain forest clearance, which is under progress. Inspection of forest land by Divisional Forest Officer **(**DFO) and Regional Chief Conservator of Forest (RCCF), Angul have been completed in December2019.

f) **JV with GACL for setting up of 2.7 Lakhs caustic soda plant at Gujarat:** NALCO has formed a JV Company with GACL named "GACL-NALCO Alkalies & Chemicals Private Ltd. (GNAL)" to set up a 2.7 lakh TPA Caustic Soda Plant along with 130 MW Captive Power Plant at Dahej in Gujarat with an objective of raw-material security and to reduce import dependency by around 50,000 tonnes/annum. Land for the project has been transferred in favour of GNAL. Environmental clearance for the project has been obtained. Financial closure completed. The project is being executed in full swing.The project is expected to be completed by September 2020 as per the input provided by JV Company.

g) **Angul Aluminium Park in JV with IDCO:** NALCO has formed a JV Company with Odisha Industrial Infrastructure Development Corporation (IDCO) for establishment of Angul Aluminium Park Private Ltd. (AAPPL) for promotion of downstream industries to manufacture Conductors, Extrusions, Castings, Foils& other aluminium products. NALCO to facilitate by supplying primary metal i.e. aluminium. Land acquisition and construction of boundary wall of AAPPL have been completed. Development of internal infrastructure and approach road are in progress.

h) **Aluminium alloy manufacturing plant in JV with MIDHANI:** NALCO

has constituted a Joint Venture Company named Utkarsha Aluminium Dhatu Nigam Limited (UADNL) with Mishra Dhatu Nigam Ltd. (MIDHANI) in Aug'19 for establishment of High End Aluminium Alloy Plant for Defence, Aerospace and Automobile sectors reducing import dependency for such alloys and encourage Make in India. Government of Andhra Pradesh has allotted 110 acres of land for the project. Till date NALCO has paid Rs. 20 crore as equity to the JV Company. Further plans and actions & timeline are being developed by the JV Company.

i) **Coal Tar distillation plant in JV with NINL:** NALCO has signed a MoU with Neelachal Ispat Nigam Ltd. (NINL) to set up a Coal Tar Distillation plant in Joint Venture based on the Coal Tar generated in NINL's Coke Oven Plant. Techno Economic Feasibility Report (TEFR) for the project has been prepared. Selection of technology and preparation of DPR is underway. Clearance of NITI Aayog for formation of JV Company obtained in Oct'19.Preparation of tender for technology selection is under process.

j) **Acquisition of Strategic minerals in overseas (KABIL):**JV Company among NALCO, HCL and MECL named Khanij Bidesh India Limited (KABIL) formed on 8th Aug'19 to identify, acquire, develop, process and make commercial use of strategic minerals in overseas locations for supply in India and thus boost "Make in India" initiative of Government of India.Consultant M/s DMT Consultancy presented before the Board on their commissioned study for acquisition of the shortlisted 12 strategic minerals.

k) **Alloy Wire Rod plant:** Setting up of alloy wire rod manufacturing facility of 60,000 tonne capacity at its Smelter in Angul. Different packages are under various stages of tendering & evaluation.The expected completion of the project is Sep'2021.

l) **Smelter (Brownfield Expansion):** Land acquisition/alienation/allotment is in progress by IDCO, the state nodal agency. Detailed project report (DPR) has been finalised. Financial appraisal of DPR is in progress.

m) **Captive Power Plant (Brownfield Expansion):** DPR completed for 2x660 MW units. Approval for applying single window clearance to the Industrial Promotion & Investment Corporation of Odisha Limited (IPICOL) taken from the Board. However, considering that Odisha power transmission corporation limited (OPTCL) is not providing any assurance to supply emergency power in case of trip outs in excess of 600 MW; the possibility of accommodating smaller units in the available area is under evaluation and draft layout for smaller units have been submitted by the consultant.

n) **Aluminium Downstream projects:** The Company has prepared Detailed Project Report (DPR) for establishment of Aluminium Downstream Projects in Kamakhya Nagar block of Dhenkanal district of Odisha. The Industrial Promotion & Investment Corporation of Odisha Limited (IPICOL) has recommended to Odisha Industrial Infrastructure Development Corporation (IDCO)

for allotment of 126 acres land for the project & 26 acres land for the township.The revision of DPR is in progress, considering reduced land for the project.The details of ongoing projects and JVs are given in **Table 7.4** and **Table 7.5** respectively.

o) **Commercialization of Li-Ion cell technology:** NALCO is planning a new business vertical for production of Lithium-Ion cell / battery. The Company has been shortlisted by ISRO for transfer of Li-Ion cell technology. Memorandum of Agreement (MOA) has been signed with ISRO in April,19 for transfer of technology. Process of signing of MOU with IIT-Kharagpur for their technical assistance for setting up a prototype plant based on lithium ion cell technology is in progress.

Table- 7.4
Details of the Ongoing projects

Sl. no.	Name of the Projects and its brief details	Expected completion date	Present status
1	5th Stream Alumina Refinery Expansion Project at Damanjodi, Odisha :Capacity: 1 million tonne/ annum	Dec2022	- Award of work for project packages are under various stages of tendering & evaluation. - Work execution got delayed by 2 years due to local resistance. Resumed on 26th June'19 after amicable settlement. - Site grading and enabling work are continuing.
2	Pottangi bauxite Mines, at Koraput, Odisha: Capacity: 3.5 million tonne/ annum	May 2022	- DGPS survey completed - Mining plan approved &Terrms and conditions for grant of ML issued by GoO. - Obtaining EC & FC are under various stages of compliance. - Gram Sabha and Public Hearing conducted. - Route survey for conveyor corridor conducted.
3	Utkal-D Coal Mines at Angul, Odisha: Capacity: 2 million tonne/ annum	Sep 2020	- Terms and conditions for grant of mining lease over 301.28 Ha issued by GoO. - Total land of R&R Colony mutated and physical possession taken over by NALCO.

			- DGPS survey completed - Obtaining EC & FC are under various stages of compliance
4	Utkal-E Coal Mines at Angul, Odisha: Capacity: 2 million tonne/ annum	Sep 2022	- DGPS Survey completed. - Compensation disbursement of private land and Land transfer activities are in progress. 762 Acres registered out of total land of 1294 Acres. - Obtaining EC & FC are under various stages of compliance. - Issuance of Terms and Conditions for grant of ML over 523.73 Hectares awaited from GoO.
5	Alloy wire rod Plant at Angul, Odisha Capacity: 40,000 - 60,000 tonne/Annum	Sep 2021	- Work order for various packages are under various stages of tendering and evaluation.

Table- 7.5
Details of JV Projects

Sl. no.	**Name of the Projects and its brief details**	**Expected completion date**	**Present status**
1	Caustic Soda Plant in JV with GACL at Dahej, Gujarat Capacity: 2.7 Lakh tonne Per Annum, Approved	Sep' 2020	- Full equity of NALCO i.e. Rs. 240 crore has been paid - Financial closure of the JVC completed - The execution of the project is being carried out by the JV Company GNAL. - Up to Dec'19, 46.35 % project execution completed & total expenditure-Rs. 903 Cr.
2	Angul Aluminium Park (AAP) in JV with IDCO at Angul, Odisha	Aug' 2020	- Full equity of NALCO i.e. Rs. 16.22 crore has been paid. - Pricing mechanism of molten metal / ingots

			for NALCO finalized. - The execution of the project is being carried out by the JV Company. - Construction is in progress.
3	<u>High End Aluminium Alloy Plant - Utkarsha Aluminium Dhatu Nigam Limited in JV with MIDHANI</u> For establishment of High End Aluminium Alloy Plant for Defence, Aerospace and Automobile sectors	NA	- JV Company incorporated in Aug'19. - Nalco paid Rs. 20 crore to the JVC. - Govt. of Andhra Pradesh has allotted 110 acres of land for the project. - Further actions are being initiated by the JV Company.
4	<u>Khanij Bidesh India Limited (KABIL) - JV with HCL and MECL :</u> For Acquisition of 12 strategic minerals abroad.	NA	- JV Company formed in Aug'19. - NALCO's initial subscription of Rs. 4 lakhs transferred to KABIL. - Further actions are being initiated by the JV Company.

New Corporate Plan

7.18 New corporate plan of the company has been prepared as per the guidelines of NITI Aayog, envisaging progressive growth of the company over a period of 3 years, 7 years and 15 years with a changed vision. The corporate plan (2017-2032) of NALCO was rolled out on 8thJanuary 18. (Projects are taken up as per the Corporate plan and the status is enumerated above at **Table- 7.4 & Table- 7.5.**

7.19 The new business initiative to be taken up based on an in-depth study of industries and economic outlook, opportunities arising out of emerging business scenario and Company's core capabilities. These includes growth through expansion in core business activities i.e. Aluminium production from 0.46 million tonne in 2018 to 1.10 million tonne by 2024 & a long term vision of 1.73 million tonne by 2029; Alumina production from 2.1 million tonne in 2018 to 3.1 million tonne by 2024 & a long term vision of 4.1 million tonnes by 2029; along with forward integration through value addition in downstream facilities which will enhance the share of downstream products capacity from present 30% to 38% by 2032 and Backward integration for raw material securitization through

caustic soda project (GNAL) in JV with GACL of capacity 2.7 lakh tonne.

InformationTechnology (IT)

7.20 Information Technology (IT) is being leveraged effectively by NALCO to create a positive impact on efficiency, quality and safety.

7.21 NALCO has implemented Enterprise Resource Planning (ERP) application to integrate all the business functions such as sales& distribution, finance & controlling, materials, human resource and production planning to ensure uniform process, to improve information availability, transparency and decision making. E-procurement of goods are carried out through Supplier Relationship Management (SAP SRM), central public procurement portal and GeM portal. Centralized employee applications such as payroll, attendance, and income tax have been implemented. Online employees self-service applications like leave, loans, perquisites, tour, medical reimbursements, probation confirmation, and appraisal and employee exit processing systems have been provided. Hospital management system has been implemented for the Company hospitals at Angul and Damanjodi. A portal for contract Labour has been deployed to facilitate Contractors to manage their contract workers attendance, their payments and statutory returns.

7.22 For governance and monitoring, online web-based applications such as capital expenditure monitoring, fund monitoring, compliance management system, file tracking system, bill tracking system etc. have been implemented.

The softwares are built in-line with our requirement and linked to ERP. The list of softwares are:

i. Capital expenditure monitoring system software
ii. Fund monitoring system software
iii. Compliance management system software
iv. File tracking system software
v. Bill tracking system software

These have resulted in timely monitoring and efficient management of capital expenditure, cash flow, statutory compliances and capital proposals. Bill tracking enables vendors to track their payments online.

7.23 Adding to the array of existing Mobile Apps for stakeholders:

a. The following have been released.

i. “Suraksha” – A mobile App for onsite safety inspection reporting at plants. Around 50 users are utilizing the App.

ii. A third *language* option, Odia, is being introduced for “NISARG” (NALCO Initiatives for Social Awareness and Responsible Growth), a vibrant App for Citizens at large on NALCO CSR activities.A total of about 51 users have registered.

The following are planned to be launched/ enhanced by Q2 of FY 2020-21:

i. "Navin"- A mobile App for Vendors, a bi-lingual App for vendors. The App empowers vendors with required information about vendor registration process, major items procured through LTE basis, notifications on tenders, vendor meets etc.

ii. Online Mobile App for Employee information viewing.

iii. Mobile App for township maintenance management.

iv. Enhancement to customer mobile APP "NAGINAA" (NALCO Grahak Information and Networking App for All) to include information related to chemicals manufactured by NALCO.

v. Enhancement of SoS feature in Retired Employees mobile App "Hamesha NALCOnian".

7.24 Nalco has the following IT infrastructure in place:

i. In house tier-2 Data Center at Corporate Office Bhubaneswar, and website co-located at STPI Bhubaneswar. Data Center uses virtualized server environment, and houses about 110 Virtual Servers.

ii. Plants and Offices are inter connected with two MPLS circuits (upto 100 Mbps) from two different service providers for uninterrupted access to applications and services from Corporate Data Center as well as the Internet. Corp Data Center has 190 Mbps of internet service from 3 Internet Service Providers.

iii. Each location has Gigabit Ethernet LAN with Firewall and the Corp Data Center has additional gateway protection solutions.

iv. Disaster Recovery Data Center at Damanjodi.

7.25 To provide the senior management with ready insights into company's performance, dynamic visualization dashboards have been introduced as below :

- Sales & Distribution - sales analysis
- Human Resource - manpower analysis
- Production - daily and monthly production and raw material stocks
- Materials - procurement value analysis

7.26 For secure and ready access to digitized documents, the e-office Knowledge Management System is being implemented. This system enables a secure and controlled environment for sharing of documents. Currently 4822 documents belonging to 22 users of 10 Depts are available in the system. Apart from e-office, about 2000 files covering 1,40,000 pages are available in digital form in the repository server.

7.27 The In-House state-of-the-art Data Centre and the Disaster Recovery site have been certified as ISO 27001:2013 compliant. The scope covers the full arena of IT Security for IT

infrastructure, Applications and Users. IT infrastructure and application security is ensured with network gateway and endpoint security solutions. Implementation effectiveness is further assured with application and security audits. Nalco is compliant to the Cyber Security Guidelines of Govt. of India.

Action Taken on Pollution Control and Environment

7.28 As a responsible corporate entity, NALCO is pioneer in pollution control and environment management and is committed for a cleaner, greener and safe working environment in all its production units. All production units are certified to International Standards on Environmental Management Systems (ISO14001:2015) as well as Occupational Health and Safety Management Systems (OHSAS 18001:2007).

7.29 The global climatic change scenarios along with global warming have forced the regulators to enforce stringent environmental regulation day by day. However, being certified to international standards NALCO proactively takes steps to face the challenges of upcoming stringent statutory regulations from time to time. NALCO publish a sustainable development report every year aligned with the international Global Reporting Initiatives (GRI) and moving towards G4 level guidelines. (https://nalcoindia.com/sustainability/sustainable-development-reports/).

7.30 For developing awareness on environmental issues, NALCO imparts internal as well external training to its employees as well as contractor workers on pollution control measures and on prevention of pollution. NALCO encourages active participation of its employees in environmental functions like Earth Day, World Environment Day, Vanamahotsav, Chemical Disaster Prevention Day, Ozone Day, National Pollution Prevention Day. To build awareness the company publishes bulletins, newsletter and annual journal.(https://nalcoindia.com/sustainability/sustainable-development-reports/)
The unit Specific major improvements taken up in the field of environment management at different units of NALCO during the year are:

a) Bauxite Mines:

- 1,00,274 nos. of trees were planted in and around Mines against the target of 1,00,000. Further, 5500 nos. of fruit bearing seedlings were distributed to local villagers to improve awareness about plantation among the villagers.
- 3500 square meter of grass-turfing was carried out inside the Mines as per the target.
- One continuous ambient air quality monitoring station was established at the South Block Mines to enable online monitoring of ambient air quality. Air quality is being monitored in and around Mines once in a month at 15 locations. Particulate Matter below 10 & 2.5 micrometre are measured and maintained within the norm.
- Panchpatmali Bauxite Mine organised a one day environment-cum-mineral awareness programme2019 on 13th December, 2019 for the school children of peripheral villages. School children from 14 nos. of peripheral villages participated in the programme.

b) Refinery Plant

- Unit #2 Boiler ESP (Electro Static Precipitator) revamping completed. Unit #4 Boiler ESP revamping work is in progress. Likely date of completion is Dec'2020.
- Fuel additive with HFO (Heavy Fuel Oil) at Calciners and hydrate dewatering agent in hydrate filtration are being used for getting better specific oil consumption norm and thus leaving out lesser impact on GHG (Green House Gas) emission.
- Sewerage Treatment Plant (STP-III) revamping /technological up gradation work is in progress since September19, and by the end of December, 2019, upgraded STP-III will be commissioned. Bio additive microbial dosing action is continuing for STP-IV for achieving revised treated water quality norms.
- Water from Ash Pond and Red mud Pond is recycled for pulp making and percentage of reclamation is more than 100%.
- During 2019, one Bio digester has been installed to convert organic wastes/food wastes of plant canteen into compost for plantation usewhich is useful for safe disposal of waste)
- Used filter cloth (Plastic wastes) generated from plant is being disposed to Central Pollution Control Board (CPCB) authorized co-processing cement plant.
- Total 67.3 tonne of discarded asbestos (hazardous waste) was disposed to Common Hazardous Waste Treatment, Storage & Disposal Facility (CHWTSDF) at Sukinda, Jajpur through authorized vendor.
- Three rain water harvesting facilities having 6,000 cubic metrecapacity are in use inside the plant premise, plan for installing 3 more Rainwater Harvesting (RWH) units inside Township area is initiated to enhance water conservation.
- During 2019-20, total 17,239 saplings have been planted.
- Alumina Refinery was awarded "Green India Award 2019" by Green Society of India, New Delhi during June'19 for its best waste management practices.
- A massive campaign and drive on "Polythene free township" was organized inside Damanjodi Township.

c) Smelter Plant:

- To monitor air pollution, online laser based fluoride gas monitoring systems are installed at pot rooms G & H (to monitor the fugitive emission). This online laser based monitoring system detect instantaneous fugitive fluoride levels inside the pot room, which are hazardous for workmen and need to be monitored)
- To prevent land contamination by surface water runoff of hazardous waste storage area, garlanding drain with containment reservoir and pump house are constructed along with laying of pipelines. The accumulated water is transferred to holding pool for further treatment & re-use.
- Recycling project of treated STP water at township was commissioned in April'19.
- Disposal of dross started from 5thDecember, 2019 to partly authorised by OSPCB (Odisha State Pollution Control Board). 750 tonne of dross has been disposed till 31stDecember, 2019.

d) Captive Power Plant:

- Stack emission is maintained within the specified norm.
- Remote calibration facility for gaseous emission from Continuous emission monitoring systems (CEMS) has been installed in Unit-1 to 8 as prescribed by CPCB. Installation of the same in Unit-9 & Unit-10 is in progress. Approval is awaited from CPCB for the performance check.
- Zero discharge has been achieved with respect to industrial effluent, ash pond overflow water and sewerage treatment plant treated water which has been certified by State Pollution Control Board.
- During FY 2019-20 (Up to December, 2019) 32,05,689 cubic metre of industrial water has been recycled after treatment and used in ash handling system. Capacity of 3 nos. of Industrial drain water recycling pumps has been enhanced from 400 cubic metre/hr to 500 M3/hr to achieve zero liquid discharge.
- During the FY 2019-20 (Up to December, 2019), 1,34,97,120 cubic metre of ash pond overflow water was recycled and re-used.
- During FY 2019-20(Up to December, 2019) 17,25,137 cubic metre of water from rain water harvesting system was recycled and re-used.
- Organic waste converter (Food waste composting machine) has been installed at main canteen and the food waste is converted to compost and used in horticulture purpose.
- Construction of 3rd phase ash mound by increasing the height of Ash Pond-II from 107 to 111 MRL (Meter Reduced Level) has been completed. In this process 9.4 Lakh cubic metre ash has been utilised by evacuating ash from Ash Pond-I.
- During FY2019-20 (up to December, 2019) the ash utilisation is 12, 68,639 tonne which is 68.70% of total ash generated in FY 2019-20).

Energy Conservation

7.31 Unit wise specific energy conservation majors taken up during FY 2019-20 are as follows:

a) Mines

The energy savings by various methods adopted in Electrical department during FY 2019-20 are given below:

- Replacement of conventional light with LED is underway in phased manner and will becompletedby April, 2020 at primary crushing house, haulage roads & office buildings, Field Maintenance Garage (FMG) &Heavy Earth Moving Machineries (HEMM) workshops. Net savings of electrical energy per annum is 1.25 MU.
- 10 nos. of 30 W solar lamps have been installed at Mines road. Net electrical energy generation from solar lamps per annum is 1,095 KWh.
- Automatic Switching off of air conditioner for cooling of VFD drives is incorporated when Variable Frequency Drives (VFD) is not in operation. Net savings of electrical energy per annum is 0.0324 MU.
- Purchase order has been placed on M/s OREDA (Orissa Renewable Energy Development Agency) for

130 kWp Roof top solar power at Mines. Energy saving expected after installation will be 0.213 MU per annum.

b) Alumina Refinery

- Energy saving achieved due to stoppage of one compressor and elimination of declutching of Ball mill by reduction in Red area plant air pressure from 6.2 Kg/cm^2 to 5.5-5.7 Kg/cm^2 and by diverting girth gear greasing air line from plant air to instrument air.
- Energy saving by improved grinding performance due to replacement of grinding media of BM-701 from Hyper steel to hichrome.

c) Smelter

- Graphitisation of cathode blocks in 730 pots completed till December'19 (Reduction in electrical energy consumption: 55 KWH/tonne of molten metal).
- Energy Saving device in breaker assembly has been incorporated in 03 pots on trial basis with an objective to reduce consumption of compressed air. Procurement action for retrofit in 45 pots in Pot line-4 are in the pipe line.
- Smelter has taken up a pilot project i.e. "Development of low energy cell technology for Smelter plant (AP2XN)" with an objective to reduce specific energy consumption under the development co-operation agreement between Rio Tinto/Alcan, Canada and NALCO. Fifteen pots in pot line -3 are under trial.It will reduce the specific DC energy consumption upto 5%.

d) Captive Power Plant:

- Chemical cleaning of condenser of two units (Unit-4 & 9) have been completed. This has helped in reduction in specific coal consumption. Coal saving is 13,268 tonne per annum.
- Complete renovation & modification of one set of Air-Preheater in Unit-6 with advanced higher surface area to improve upon boiler efficiency and reduction in specific fuel consumption is in progress. Till date 90% material has been received.
- In FY 2019-20, 0.4679 Million units of electrical energy have been saved by replacing conventional light fittings & lights with energy efficient LED light fittings.

Research & Development (R&D)

7.32 Since inception, 39 patents have been filed out of which, 19 have been granted and 7 have been commercialized. Three number of patent application were filed till date in the current financial year. Research & Scientific Advisory Committee (RSAC) meetings are being held periodically to review the R&D activities of the company.

Out of 19 patents granted till date, 10 patents have been granted in favour of NALCO while remaining 9 granted jointly with JNARDDC & other agencies like IIT etc.

Based on these patents, new products were developedi. eHigh speed extrusion Al-Mg-Si alloy billet, ceramic tiles etc., development of commercial plant (Zeo-lite plant), development of new process like purification of sodic condensateetc,..

7.33 Under the development cooperation agreement signed with RTA/ AP, development of low energy cell technology for Smelter plant (AP2XN0) is going on with an objective to reduce specific energy consumption in Smelter Plant.It will reduce to the specific DC energy consumption upto 5% in smelting process.Trial in 15 pots with AP2XN0 technology design have started. Performance of the pots are in observation.

7.34 Memorandum of understanding signed with BARC in May'16, for various R&D works like extraction of Gallium and other rare earth elements from Bayer process liquor and Alumina waste.

Extraction of Gallium from Bayer liquor and studies on the suitability of red mud for sacrificial core catcher material is in progress with BARC (Bhabha Atomic Research Centre).Between 2016-17 to 2019-20 Memorandum of Understanding (MoU) on 'Sacrificial brick development project' finalized by both BARC & NALCO.

7.35 Testing activities at NALCO Research & Technology Centre (NRTC) laboratory has been started. Analysis of 1602 numbers of Bauxite samples NALCO Mines, 86 numbers of Aluminium Alloy & 26 numbers of TRM samples received from Smelter were carried out. Apart from this, 46 number of samples from IIT, Bhubaneswar , 17 number of samples from ITER, Bhubaneswar & 5 number of samples from M/s Torsteel, Keonjhar were analysed.

7.36 In-house project has been taken up under MOU 19-20, for trial with Rolled sheets for cookware applications. After parameter optimization, trial of AA8011 sheets for cookware carried out successfully at the manufacturer's site in Kolkata.

7.37 Benefits Derived as a Result of R&D (In-House& Collaborative):

- Based on a completed collaborative R&D project in 2018-19, monitoring system of compressed air has been developed in Smelter Plant which is based on Internet of Things (IOT). Average values of compressed air pressure and temperature along with history & trend analysis help in taking measures for better control of compressed air utilizationand optimisation of compressor operation in Smelter plant and reduction in wastage.

- Based on a completed collaborative R&D project in 2018-19, a highly porous, good strength & non-leachable concrete material was prepared using fly ash and 1st lot has been sold to third party for utilization in ground water recharging and pavement application.
- CH91 grade billets (new product) developed by R&D department in 2018-19, is incorporated in NALCO's product basket and it brings additional premium of Rs. 500/Tonne.Financial benefits in FY 2019-20 is Rs. 1.2 lakhs.
- Treated water from nano technology based Defluoridation Plant at Smelter Plant is getting recycled for industrial use facilitation zero water wastage. In FY 2019-20 2,03,429 KL of water recycled with accrued saving of Rs. 81.4 lakhs

Procurement

7.38 Against mandatory target of 25% procurement from MSMEs, NALCO has achieved 36.36% for the FY 2019-20 till December'19 (against 26.79% in FY 2018-19

7.39 Total procurement by the Company from MSEs for the FY 2019-20 till December, 2019 including SC/ ST MSEs & women owned MSEs is Rs. 382.35crore (against Rs. 472.51 crore in FY 2018-19) out of which procurement from SC/ST MSEs is Rs. 11.64 crore (against Rs. 12.88 crore in FY 2018-19) & women owned MSEs isRs. 2.76 crore (against Rs. 5.64 crore in FY 2018-19)

7.40 Total procurement by the Company through GeM portal is Rs. 5.07 crore in FY 2019-20 till December,2019 (against Rs. 3.6 crore in FY 2018-19).

7.41 Total 14 nos. of reverse auction done in FY 2019-20 till December, 2019 (against 05 nos. in FY 2018-19) and notional cost reduction due to reverse auction is Rs. 45.90 crore (against Rs. 23.34 crore in FY 2018-19).

Industrial Relations

7.42 The FY 2019-20 has been a year of exemplary industrial relations conducive to maximization of company's performance on productivity. The Company aim to achieve the set targets (i.e. Bauxite- 70.95 lakh MT, Alumina-21.50 lakh MT,Aluminium-4.39 lakh MT) for FY 2019-20 even though total employees reduced by around 4% over last financial year front in the face of stiff market conditions. Celebrating the year 2019 as a year of 'caring and sharing', the company has revised the wages and benefits for the non-executive employees by smoothly implementing the 6th long term wage settlement signed in Mar'19. The un-bargain able positions on zero tolerance to indiscipline, zero man days loss on account of IR situations and worker's participation in management remain strongly rooted in the work culture. There is zero mandays loss due to IR issues during FY 2019-20 till date.

MoU rating of NALCO during the last Five Financial years

Year	Composite Score	Grade
2015-16	91.19%	Excellent
2016-17	88.48%	Very Good
2017-18	91.88%	Excellent

Aluminium Industry in India

7.43 The Indian primary Aluminium industry consists of three major players i.e. National Aluminium Company Limited (NALCO), Hindalco Industries and Vedanta Ltd., having a total production capacity of 4.1 million tonne. The total production of Primary Aluminium metal during FY 2018-19 was about 3.70 million tonne and in FY19-20, it is expected to remain at a similar level. During 2018-19, the total domestic sales of primary metal by the major primary producers, i.e., NALCO, Hindalco and Vedanta was 1.65 million tonne, which is also likely to remain at a similar level during the current fiscal.

7.44 The Aluminium per capita consumption level in India continues to

be very low i.e. it stands currently at around 2.9 kg against the world average of roughly 11 kg. In India, the power sector continues to be the major consumer of Aluminium with almost 40% share of total Aluminium consumption in the country. Besides this, major aluminium consuming industries are automobiles, packaging, machinery & equipment, construction and consumer durables sectors. The related sector wise figures are available with EA and should be mentioned

7.45 Aluminium has been continuously finding new applications due to rising price competence since it is cheaper than copper, has a superior weight to strength ratio, is resistant to corrosion, has better formability etc.

7.46 During the FY 2019-20, the global economy has been witnessing a slowdown in demand of Aluminium. The combination of the severe manufacturing slowdown and increased use of scrap is depressing global primary Aluminium demand and have led to decline in global Aluminium prices. Weak economic data from China and Europe, two of prominent Aluminium consuming regions, have also been bearish on the prices. Moreover, various geopolitical factors, like US-China Trade war, Brexit, US-Iran tensions and recent outbreak of corona virus causing uncertainty regarding Aluminium demand.Announcement of an additional 5% tariff on USD 5 billion of Chinese goods by USA and in retaliation China's decision to hike trade tariffs on USD 75 billion of US products has aggravated the market condition. Due to corona virus effect, LME (London Metal Exchange) Aluminium price dropped from $1807.5/tonne level in Jan'2020 to $ 1687/ tonne as on 6th Mar'2020.

7.47 The domestic Aluminium industry has also exhibiting extremely sluggish demand during the current fiscal. All the major consuming industries, viz., electrical, housing and automobiles have reported drastic decline in sales/ demand. However, the government has announced various stimulus initiatives to boost demand in these sectors, which are likely to yield results in the near future.

7.48 The total domestic production of Aluminium metal by Aluminium producers in the year 2016-17 to 2019-20 (till December, 2019) is given at **Table 7.6.**

Table 7.6
Production of Aluminium in India

(Figs. in Tonne**)**

Sl No.	Producer	2016-17	2017-18	2018-19	2019-20 up to December, 2019
1	NALCO	3,87,422	4,25,515	4,40,242	3,16,402
2	HINDALCO	12,64,062	12,88,351	12,96,468	9,86,099
3	VEDANTA GROUP	12,13,099	16,69,741	19,58,422	14,13,861
	TOTAL	**28,64,583**	**33,83,607**	**36,95,132**	**27,16,362**

(Note: Production figures pertaining to other primary producers are based on available market data)

7.49 The sales figure of Aluminium (Domestic Sales of Aluminium & Export Sales of Aluminium in India are given in **Table 7.7 and Table 7.8**

Table 7.7
Domestic Sales of Aluminium

(Figs. in Tonne)

Sl No.	Producer	2016-17	2017-18	2018-19	2019-20 up to December, 2019
1	NALCO	2,84,926	3,50,469	4,02,134	2,64,728
2	HINDALCO	6,62,902	6,40,617	6,36,120	4,50,446
3	VEDANTA GROUP	5,97,300	6,71,946	6,15,910	4,58,802
Total		**15,45,128**	**16,63,032**	**16,54,164**	**11,73,976**

(*Note: Domestic sales figures pertaining to other primary producers are based on available market data*)

Table 7.8

Export Sales of Aluminium

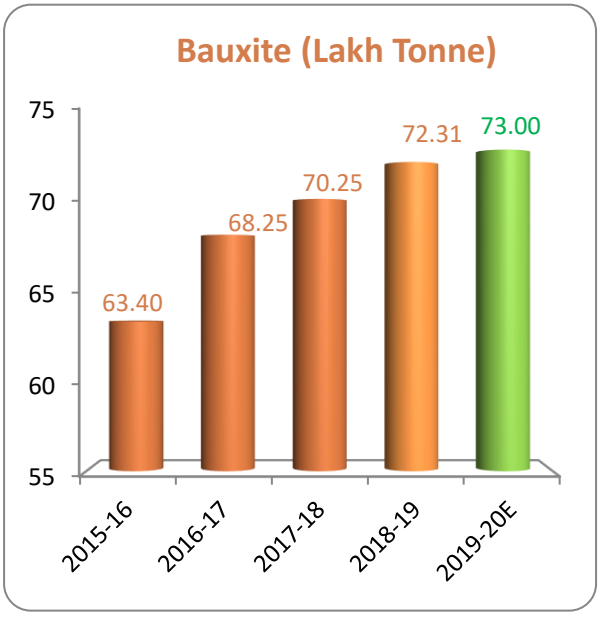
(Figs. in Tonne)

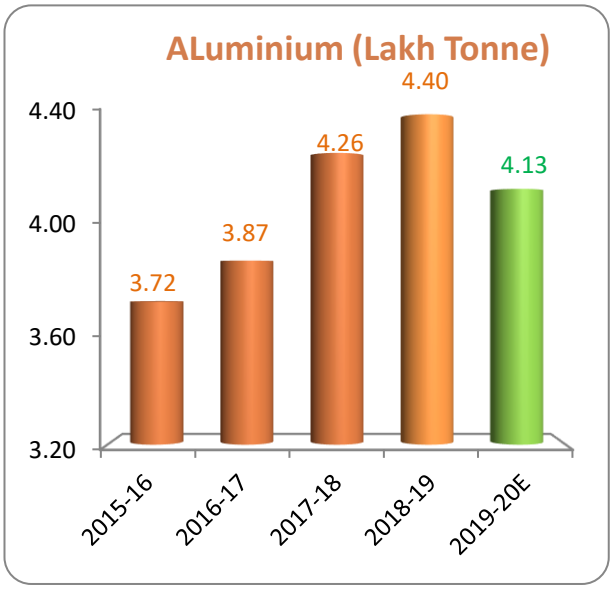
Sl No.	Producer	2016-17	2017-18	2018-19	2019-20 up to December, 2019
1	NALCO	1,00,591	75,847	38,463	49,764
2	HINDALCO	6,00,505	6,49,986	6,58,935	5,31,298
3	VEDANTA GROUP	6,10,657	9,98,522	13,40,201	9,33,374
Total		**13,11,753**	**17,24,355**	**20,37,599**	**1,514,436**

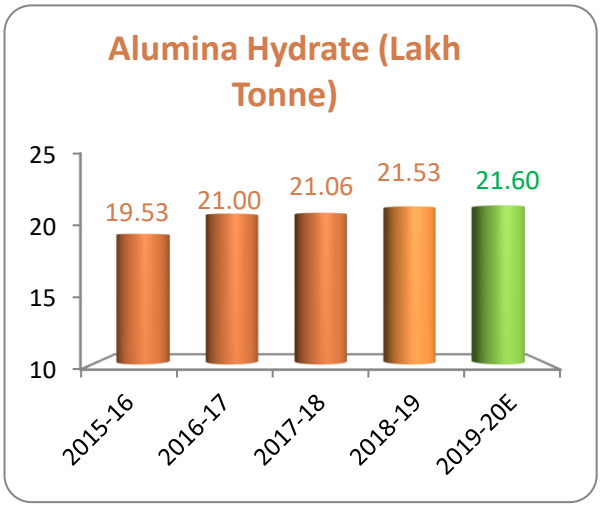
(*Note: Export sales figures pertaining to other primary producers are based on available market data)*

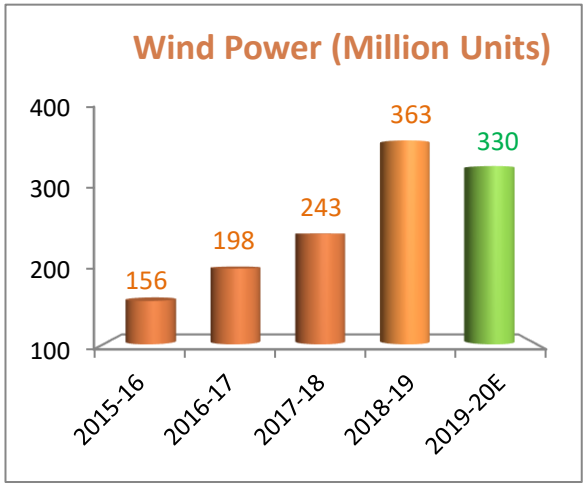
7.50 Trends of Production & Sales Parameters

Production:

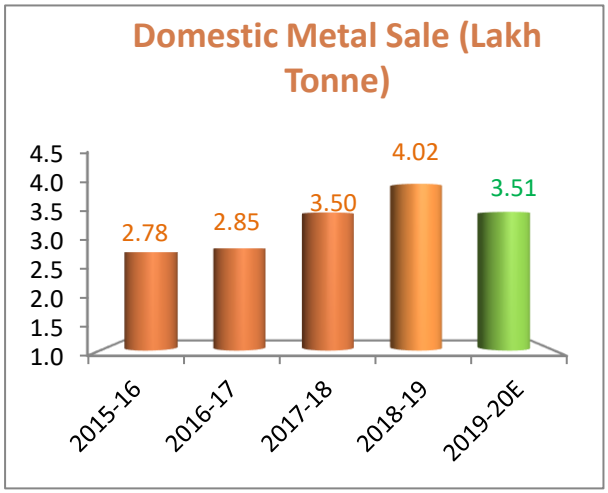


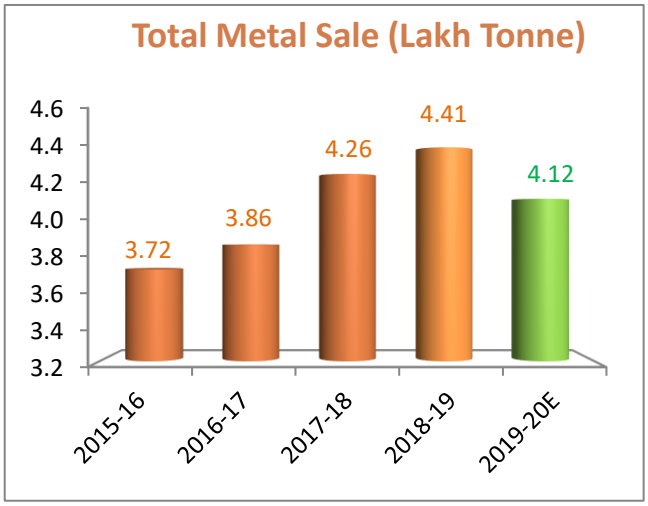






Sales:


Domestic Metal Sale (Lakh Tonne)
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
2.78
2.85
3.50
4.02
3.51
2015-16
2016-17
2017-18
2018-19
2019-20E


Total Metal Sale (Lakh Tonne)
4.6
4.4
4.2
4.0
3.8
3.6
3.4
3.2
3.72
3.86
4.26
4.41
4.12
2015-16
2016-17
2017-18
2018-19
2019-20E

Hindustan Copper Limited (HCL)

Introduction:

7.51 Hindustan Copper Limited (HCL), a Miniratna Category-I, Government of India (GoI) Enterprise under the administrative control of the Ministry of Mines, is the only company in India engaged in mining of copper ore and owns all the operating mining lease of Copper ore and also the only integrated producer of refined copper (vertically integrated company). Major activities of HCL include mining, ore beneficiation, smelting, refining and casting of refined copper metal into downstream products. HCL has acquired assets of Jhagadia Copper Limited from M/s ARCIL (Asset Reconstruction Company (India) Limited) in 2015-16 and renamed as GCP (Gujarat Copper Project). With this acquisition HCL now have five units - one each in the states of Rajasthan, Jharkhand, Madhya Pradesh, Gujarat and Maharashtra. HCL is a listed company on BSE and NSE, with 76.05 % equity owned by the Government of India.

7.52 Highlights of achievement in FY 2019- 20

i. Contract was awarded on 14.08.2019 for commencement of production from underground mines of Malanjkhand Copper Project- an important milestone towards mine expansion project of HCL.

ii. Total 795 KWp solar plant implementation was completed in HCL during FY-19-20 under RESCO model.

iii. Mining Lease agreement of Malanjkhand Copper project at Malanjkhand, Madhya Pradesh was extended till 31.03.2023.

iv. Mining lease agreement of Kendadih Mines, Jharkhand extended till 02.06.2023 vide letter dated 30.10.2019.

v. Mining lease agreement of Rakha Mines, Jharkhand extended till 28.08.2021 vide letter dated 30.10.2019.

Photo- 7.8

Rooftop Solar Power Plant at Gujarat Copper Project (GCP), Jhagadia, Gujarat

7.53 Awards and Accolades:

i. Following mines of HCL got awards in different categories at the National Safety Awards (Mines) at New Delhi on 16.12.2019:

a) Kolihan Copper Mine, Rajasthan won the National Safety Awards (Mines) for year 2015 under category LAFP-Type-6.

b) Surda Copper Mine, Jharkhand got runner-up prize at National Safety Awards (Mines) for year 2015 under category LAFP-Type-6.

c) Kolihan Copper Mine, Rajasthan won the National Safety Awards (Mines) for year 2016 under category LIFRM-Type-6.

Photo- 7.9

HCL receiving the National Safety Award from Shri M. Venkaiah Naidu, Hon'ble Vice President of India at New Delhi on 16.12.2019

ii. HCL received 'Honourable Mention' at the National CSR Awards 2018 in the category - Corporate Awards in CSR in Challenging Circumstances, Sub Category – East on29.10.2019 at Vigyan Bhawan, New Delhi. This was the first National CSR Award organized by Ministry of Corporate Affair.

Photo- 7.10
HCL receiving the award in presence of Smt. Nirmala Sitharaman Hon'ble Finance Minister at Vigyan Bhawan, *New Delhi on 29.10.2019*

7.54 The capital structure of the Company as on 31st March, 2019 is given in **Table 7.9**

Table 7.9

Authorized Capital Structure of HCL

a) Authorized Capital:		
i)	180 crore equity shares of Rs. 5/- each	**Rs. 900 crore**
ii)	20 lakh preference shares ofRs.1000/- each	**Rs. 200 crore**
	Total	**Rs. 1,100 crore**
b) Issued, Subscribed and Paid-Up Capital		
i)	92, 52, 18,000 equity shares of Rs. 5/- each	**Rs. 462. 60 crore**
	Total	**Rs. 462. 60 crore**

7.55 Present capacities of HCL's Mines, Smelters and Wire Rod are given in **Table 7.10, Table 7.11** and **Table 7.12.**

Table 7.10

Production Capacity of Mines under HCL

Location of Mines	Ore Capacity (million tonne per annum) (As per IBM Mining Plan)
Khetri Copper Complex (KCC), Rajasthan	1.8
Malanjkhand Copper Project (MCP), Madhya Pradesh	2.9
Indian Copper Complex (ICC), Jharkhand	0.4
Total	5.1

Table 7.11

Refined Copper Production Capacity of HCL

Location of Smelters	Refined Metal Capacity (Tonne per annum)
Khetri Copper Complex (KCC), Rajasthan	*
Indian Copper Complex (ICC) , Jharkhand	18,500
Gujarat Copper Project (GCP), jhagadia	50,000 **
Total	68,500

* The plant capacity of KCC Smelter & Refinery (31000 tonne per annum) has been suspended since December,2008.

** The rated capacity as per record is 50,000 tonne per annum however it was never operated at full capacity.

Table 7.12

Production Capacity of Wire Rod Plant under HCL

Location of Plant	Capacity (Tonne per annum)
Taloja Copper Project, Maharashtra	**60,000**
Total	**60,000**

7.56 Physical performance details of HCL are given in **Table 7.13.**

Table 7.13

Physical Performance of HCL

Product	**Actual**		**Target FY 2019-20**	**Actual - 1st Jan, to 31st Dec, 2019**	**FY- 2019-20 (Anticipated)**
	FY 2017-18	**FY 2018-19**			
Ore Production ('000 Tonne)	3,675	4,122	5,150	4,206	5,246
Metal in Concentrate (MIC) (Tonne)	31,793	32,439	33,000	28,047	35,447
Refined Copper (Cathode) (Tonne)	25,949	16,215	23,000	9,357	Nil
Wire rod (Tonne)	22,211	21,450	20,669	10,303	Nil

*** *As per the business plan of the Company, concentrate of both KCC and MCP origin is likely to be sold directly in the market and as a result, refined copper cathode and wire rod production is shown as nil.*

Please go through details on https://www.hindustancopper.com/Page/ProductionReport.

7.57 Financial performance details of HCL are given in **Table 7.14.**

Table 7.14

Financial Performance of HCL

(Rs. In crore)

Sl No	Details	Actual		Target FY 2019-20	April,19 to September,19 (Limited Review)	FY- 2019-20 (Anticipated)
		FY 2017-18	FY 2018-19			
1.	Turnover	1,612.47	1,753.44	1,722.77	572.52	1230
2.	Net Profit/(Loss) before Tax (PBT)	121.69	230.00	161.00	64.61	79.61
3.	Net Profit/(Loss) after tax (PAT)	79.61	145.51	114.14	40.68	49.68

Please go through details on https://www.hindustancopper.com/Page/TenYearsataGlance.

7.58 Sales performance details of HCL are given in **Table 7.15.**

Table 7.15

Sales Performance of HCL

Product	Actual		Target for FY 2019-20	Actual from 1st January 19 to 31st December, 2019	FY- 2019-20 (Anticipated)
	FY 2017-18	FY 2018-19			
Total Copper Sales (MT)	36,435	38,273	36,404	24,478	36,478

Please go through detail of sales in volume and revenue on
https://www.hindustancopper.com/Page/SalesVolume.

https://www.hindustancopper.com/Page/SalesRevenue.

Mine Expansion Schemes

7.59 The Company's strategy is to aggressively expand its mine and ore beneficiation capacities. Such a strategy would also enable the company to sustain its profitability even at significantly lower copper prices and also position it to remain a dominant copper player in the country.

The Company has plans to increase its mining capacity from 3.4 million tonne per annum to 12.4 million tonne per annum in phase-I(under implementation) and from 12.4 million tonne per annum to 20.2 million tonne per annum in phase-II through expansion of existing mines, re-opening of closed mines and opening of new mines. During financial year 2018-19, HCL has achieved an ore production of 4.12 million tonne.

7.60 HCL has been entrusted to do the exploration activities and exploration has already being taken up in various area.

7.61 Details of depth exploratory drilling in different mines of HCL for financial year 2019-20 (till December, 2019) is given in **Table 7.16.**

Table 7.16

Sr. No.	Mining Area	Exploration in FY 2019-20 (In meter)
1.	Ghatsila	14,055 (till December,2019)
2.	Khetri	5,425 (Under progress, to be completed by March, 2020)
Total		**19,480**

Above exploration work was funded by HCL through its own resources

R&D Activities:

7.62 During the year the Company has taken following projects:

i. Recovery of copper through leaching from Electrostatic Precipitator (ESP) dust of flash smelter has been successfully carried out and is an ongoing process, Further R&D is in progress for removal of iron from the parent solution. Expected expenditure Rs.20 lakhs and development of resin for this purpose can be completed by March 2021.

In-house modification in crushing unit with debottlenecking of process parameters done and production of MCP concentrator plant enhanced. Further augmentation is being studied with introduction of crushers of higher reduction ratio. Closer

setting of crushers with choke feeding has resulted in increased throughput with finer product generation from crushers resulting in reduced operational hours of crushing unit thus saving power in that specific area. Due to finer fragmentation from crushing unit the throughput of ball mills increased.

ii. **Modernization Initiative of R&D Infrastructure:**

a. ICC R&D is equipped with AAS – Atomic Absorption Spectrometer, Make- Agilent Technology, being used for impurity analysis of copper refinery and Cu-Ni EMEW section and other process intermediate samples. This equipment is used to analyse impurities content in the electrolyte to maintain the process parameter in order to get LME grade copper cathode. With the help of this equipment concentration of ions of metal like Cr, Co, Bi, Mg, Fe, Zn,Na, Ca, Cd, Au, Ba, Pb, Cu, Te, Ni, Mn, Se, Al, Ag, Sr are analysed.

b. Impure Copper Anode and pure Copper Cathode LME Grade A is being analyzed by OES-Optical Emission Spectroscopy (Make – Thermo fisher ARL-4460) in order to maintain the quality of copper anode and cathode. These Equipment are standardized with internationally approved reference standards for analytical confirmation. Reference standard here means standard sample accepted internationally. On the basis of this sample the equipment is calibrated.

c. New Muffle furnace for Fire assay analysis of Gold and Silver to meet international standards has been procured and installed. The equipment is commissioned in August 2019 and so far 277 numbers of sample were analysed.

d. To strengthen R&D infrastructure two new equipment as “Sulphur Analyzer & Oxygen –Hydrogen Analyzer” installed at Taloja copper project in April 2019 to analyse the Sulphur, Oxygen & Hydrogen content in Cathode samples & CC Rod.

7.63 Energy Conservation:

i. High wattage conventional lights replacement by low power consuming LED lights are in progress across HCL since last 5 years. 5000 nos. of LED lights are planned to be installed in year 2019-20. Till 2018-19 HCL have installed 5755 nos. of LED lights. This year HCL is expected to achieve the target by 31st March 2020.

ii. The project for design, supply and installation of solar power plant of various capacities under RESCO model of MNRE has been carried out across HCL with the help of M/s REIL. Total 795 KWp solar plant implementation has been completed under RESCO model.

iii. Two Nos. VFDs of 90KW installed for Cooling Water Pumps to save power at Gujarat Copper Project (GCP), Jhagadia. This year cathode production is 391.63 tonne of cathode and plant last operated in July 2019

iv. Package Boiler burner has been modified to obtain higher specific steam generation at Gujarat Copper Project (GCP), Jhagadia.

7.64 Environment:

HCL emphasizes prevention and minimization of waste generation at source. Reuse and recycling of waste is given prime importance. The waste which is generated beyond the above set practices is disposed in a safe environmentally sound manner as per the guidelines prescribed by andthe Pollution Control Boards.

i. Online Emission Monitoring system for Stacks and Effluent monitoring system for Common Effluent Treatment Plant (CETP) final treated discharge water has been installed at Indian Copper Complex (ICC), Ghatsila and data is being transmitted to CPCB in every 15 minutes. This system ensures achieving zero water pollution by real time pH monitoring for liquid effluent. These systems are installed as per latest pollution control board guidelines.

ii. Sewage Filtration beds - 4 nos. has been replaced and revived to bring the final discharge water of STP in the permissible norms.

iii. Malanjkhand Copper project has been awarded ISO 14001:2015 certification for the Environment management system.

7.65 Information technology (IT) initiatives

The following IT initiatives, spanning all operational areas taken up by the Company for bringing about dynamism, transparency and business efficiency, are being maintained and updated. Major initiatives are:

- **On-Line Performance Management System**

On-Line Performance Management system implemented to record the KPA, KPA Approval, ACR Marking at two levelsand final Scoring as per APAR up to the level of E-7.

- **E-Procurement/EPS**

- **Real time LME booking**

The web-based system is in place to enable customers to place on-line orders for copper wire rod and cathode with the Company in a Real time London Metal Exchange (LME) rate scenario. This system has been started more than decade ago , all the copper wire rod and cathode customers of the company are using the system and the system is proved to be robust.

- On-line Recruitment

- VIDEO Conferencing

Copper Industry in India

7.66 At present, the demand for copper minerals in the country for primary copper production is met through two sources i.e. copper ore mined from indigenous mines and imported concentrates. The indigenous mining activity among the primary copper producers is limited to only Hindustan Copper Limited (HCL). The other primary copper producers in the private sector import the required mineral in the form of concentrate. In 2018-19 copper metal produced from indigenous mines is approx. 6.8 % of total copper production and balance productioncomes from imported concentrate processing.

7.67 Current year production is given in **Table 7.17.**

Table 7.17
Production of Copper in India

(In tonne)

Commodity	Number of Factories	Installed Capacity (tonne per annum)	Production during FY 2018-19	Production during the period (January 2019 to November, 2019)
Cathode Production				
a) HCL	3	68,500 #	16,215	9,357*
b) Sterlite Industries Ltd.	1	4,00,000	89,739	68,769 ##
c) Hindalco Ind. Ltd. (Unit: Birla Copper)	1	5,00,000	3,51,291	3,08,643 ##

The plant capacity of KCC Refinery (31000 tonne) is not considered as it has been suspended since December, 2008.

*(Jan, 2019 to Dec, 2019)

From Monthly Summary Reports on Non-Ferrous Minerals & Metals from Ministry of Mines website

Refined Copper Consumption

7.68 The Indian demand is expected to be strong on the back of improved outlook for Industrial and infrastructure growth. The government's thrust on power sector, smart city, Housing for all, ambitious plan of harnessing renewable energy resources, electric vehicles, Infrastructure development etc. spells good news for copper industries. India's per capita copper consumption is expected to increase from the present level of 0.5 kg to 1 kg by 2025.

7.69 According to ICSG (press release dated 20.12.2019), world apparent refined copper usage grew by 0.3% in the first nine months of 2019.

7.70 As per ICSG press release dated 23.10.2019,World apparent refinedCopper usage is expected to increase by about 1.7% in year 2020.

7.71 MoU ratings achieved by HCL are given in **Table 7.18**

Table 7.18

Year	Grade
2009-2010	Very Good
2010-2011	Very Good
2011-2012	Excellent
2012-2013	Very Good
2013-2014	Very Good
2014-2015	Good
2015-2016	Very Good
2016-2017	Good
2017-2018	Fair
2018-2019	Result Awaited

Reserves & Resources:

7.72 India has limited known reserves of copper ore exploitable for copper production. The total resources of copper ore in the country as on 1.4.2015 are estimated at 1511.50 million tonne with about 12.16 million tonne of copper metal. Of these 207.77 million tonne (13.74%) fall under Reserve category containing 2.73 million tonne of copper metal and the balance 1303.73 million tonne (86.25%) are 'Remaining Resources' containing 9.42 million tonne of copper metal.Reserves are deposits that have been discovered, evaluated and assessed to be economically profitable to mine.

Resources are far bigger and include reserves, discovered deposits that are potentially profitable and undiscovered deposits that are predicted based on preliminary geological surveys.

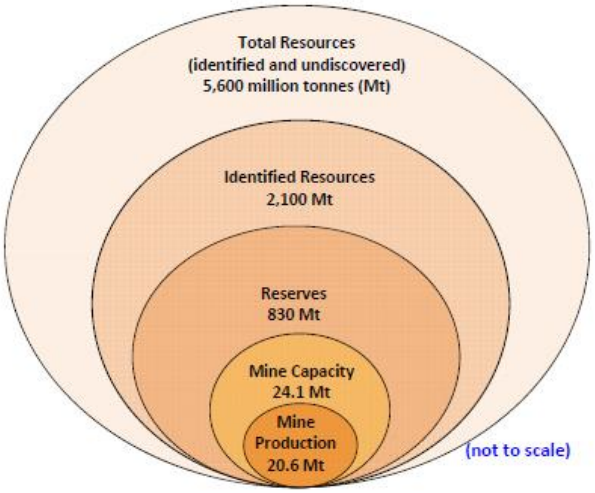
7.73 Rajasthan is credited with 813.33 million tonne ore (53.81%) containing 4.48 million tonne of copper metal, Madhya Pradesh 283.43 million tonne ore (18.75%), containing 3.42 million tonne copper, Jharkhand 295.39 million tonne ore (19.54%), containing 3.28 million tonne of copper metal and the rest 7% are accounted for by other states namely Andhra Pradesh, Gujarat, Haryana,

Karnataka, Maharashtra, Meghalaya, Nagaland, Odisha, Sikkim, Tamil Nadu, Telangana, Uttarakhand and West Bengal. India's share of world reserve is 1.5% only. According to United States Geological Survey (USGS), total global copper reserves amount to 830 million tonne (Mt) of copper. The country wise distribution of world reserves is give in **Table -7.19.**

Table 7.19

World copper reserves - Country-wise distribution	
Country	**Reserves in (%)**
Chile	21
Australia	11
Peru	10
Russia	7
Indonesia	6
USA	6
Mexico	6
China	3
Zambia	2
Congo	2
other	25

7.74 World copper reserves and mine production is represented below (in terms of copper metal content)**: (***Ref. USGS, 2018***)**



Reserves/ Resources under HCL: As on April 1, 2019, HCL holds around two-fifths of the copper ore reserves in India, with an average of 1.02% copper content. HCL as on 1.4.2019 has reserves (proved &probable) of 220.16 million tonne ore (average grade 1.32%) and total reserve and resources of 568.75 million tonne ore (average grade 1.02%) spread over seven mining leases.

Price of Copper

7.75 The domestic price of copper is linked to London Metal Exchange (LME) price. The LME Cash Settlement Price (CSP) is the basis on which prices of copper products are declared by domestic producers.

7.76 The year wise average LME price per tonne of copper is as indicated are given in **Table 7.20**:

Table 7.20

Year	Average LME price of Copper (US $ per tonne)
2010-2011	8140
2011-2012	8485
2012-2013	7855
2013-2014	7103
2014-2015	6554
2015-2016	5215
2016-2017	5154
2017-2018	6444
2018-2019	6340
2019-2020 (Up to December, 19)	5933

Sustainable Development

7.77 HCL adheres to the sustainable development requirement as per the guidelines and policy of the Department of Public Enterprises (DPE). Following projects are implemented under sustainable development plan for the year 2019-20:

i. Covering top soil & plantation at the waste rock dump at Malanjkhand, Madhya Pradesh.

ii. Significant progress has been done towards implementation of roof top solar plant across the organization.Total 795 KWp solar plant implementation completed till date under RESCO model.

iii. Water conservation by recycling of mine water.HCL has excellent system in place to reuse the Mine water in MCP, Malanjkhand. Almost 45 % total water requirement of concentrator plant is fulfilled through recycled mine water. In Khetri Rajasthan we are facing extreme crisis of water so we recycle water from tailing pond, even from sewage treatment plant and through cross country pipe line from Kolihan mine to Khetri for using in concentrator plant which is 3 Km away.

Mineral Exploration Corporation Limited (MECL)

7.78 Mineral Exploration Corporation Limited (MECL), a Miniratna Category-I CPSE under Ministry of Mines is the premier notified exploration agency in the country mandated to carry out detailed exploration of all the minerals. MECL undertakes detailed exploration on behalf of mineral rich States for various minerals through National Mineral Exploration Trust (NMET) fund as well as contractual basis for other agencies including Public Sector, Private Sector and State Government(s) on mutually agreed terms and conditions. Percentage of share in revenue of Public Sector, NMET and State Governments are around 88 %, 11 % & 1% respectively. It has added 174 billion tonne of mineral resources to National Mineral Inventory up to December '2019.

7.79 The authorised share capital and paid up equity of the company areRs.125.00 crore and Rs.119.55 crore,

respectively. The equity is fully held by Government of India. The Company's registered office & operational headquarter is at Nagpur, which includes modern geological, geophysical & geochemical laboratories, regional maintenance centre etc. The pan India operation involving exploration of minerals at remote location are controlled & monitored from Nagpur. The details of office locations are available at www.mecl.co.in.

7.80 Since its inception, MECL has carried out detailed exploration under Promotional Scheme of Government of India for ferrous, non-ferrous, base metals precious, industrial and other minerals on behalf of Ministry of Mines and a total of 9.71 billion tonne of resources have been established. Details are available at www.mecl.co.in.

7.81 Pursuant to the Mines and Minerals (Development and Regulation) Amendment Act, 2015, and after establishment of NMET, MECL is taking up exploration work for State Governments through NMET.

7.82 MECL is also engaged in regional exploration of Coal &Lignite on behalf of Ministry of Coal. The exploration projects have been finalized by the Core Group of Committee on Energy Minerals and Resources, Group V of Central Geological Programming Board (CGPB). So far, a total of 55.75 billion tonne of Coal and 31.75 billion tonne of Lignite resources have been established by MECL on behalf of Ministry of Coal.

7.83 On contractual basis, MECL undertake exploration for PSUs, State Governments, Private agencies etc. The CMPDIL is the major client of MECL for Coal exploration which is being done thorough MoU.For the year 2019-20, CMPDIL awarded around 5 lakh metres of exploratory drilling for Coal exploration. So far, on contractual basis a total of 70 billion tonne of Energy mineral resources and 7.33 billion tonne of Non-energy mineral resources have been established by MECL.

Physico-Financial Performance 2017-18, 2018-19, 2019-20 (Up to December, 2019).

7.84 The physical performance in drilling and geological reports for 2017-18, 2018-19, 2019-20(Up to Dec-19) is given in **Table-7.21** and the financial performance is given in **Table-7.22**

Table – 7.21
Physical Performance of MECL

Items	2017-18	2018-19	2019-20		
	Actuals	Actuals	MoU Target	Actuals (Up to *December,* 2019)	Up to March'2020 (2019-20)
Drilling (Mtrs)	6,32,115	6,10,953	6,30,000	4,33,339	6,38,744

Table No. 7.22
Financial Performance of MECL

(Rs.in crore)

Details	2017-18	2018-19	2019-20		
	Actuals	**Actuals**	**MoU** Target	*Actuals* *(Up to December '2019)*	**Anticipated** (2019-20)
Total Revenue #	385.51	378.49	400.00	284.89	410.00
Operating Cost*	229.33	216.10	233.16	166.22	232.00
Depreciation and DRE	7.37	7.75	10.00	6.50	10.00
Net Profit After Taxes	98.37	100.60	107.46	88.76	126.00

 # Including other income

**Including Depreciation and DRE*

7.85 Enhancement of Drilling Productivity of MECL is given in **Table 7.23.**

Table No. 7.23
Enhancement of Drilling Productivity of MECL

Year	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
Productivity (m/d/m)*	352	378	402	465	539	542

* *Meter drill per month.*

Dividend Paid

7.86 MECL has paid a dividend of Rs. 30.49 crore to Government of India for the year 2018-19.

MoU Performance

7.87 MoU rating of MECL during last 3 years is given in **Table 7.24.**

Table 7.24

Year	Composite Score	Rating
2015-16	87.18	Very Good
2016-17	83.42	Very Good
2017-18	63.39	Good

Awards & Achievements

7.88 MECL has been conferred the first "**National CSR Award**" under the 'Honourable Mention' category for CSR.MECL has also received award in Recognition of Valuable Contribution made by the organisation towards the society at the Air Force Flag Day Fund-CSR Conclave-2019, New Delhi on 2nd December, 2019 from Hon'ble Minister of State for Finance & Corporate Affairs.

Perspective on Non-Ferrous Minerals:

7.89 During the year 2019-20 exploration for various minerals has been carried out by MECL in 18 blocks. Out of these, exploration in 6 blocks has been completed and work is in progress in remaining 12 blocks.

7.90 The brief account of exploration activities by MECL for Government of India and State Governments are as follows:

Exploration of Deep Seated Mineral Deposit

7.91 To enhance the mineral resources in National Mineral Inventory (www.ibm.gov.in) , MECL also undertakes exploration of deep seated mineral deposits. Presently, MECL is carrying out (through MoU with HCL), exploration of deep seated copper deposit at RakhaChapri block, Singhbhum district, Jharkhandand at Kolihan block, Jhunjhunu, Rajasthan. About 1.002 % Cu & 1.19 gram /tonne Au etc. have been reported from Chapri block. For the current year, two blocks as mentioned above, (RakhaChapri, Singhbhum, Jharkhand and Kolihan Block, Jhunjhunu, Rajasthan) are under progress.

Auctioning of Mineral Blocks

7.92 During FY 2019-20 (up to December, 2019, one block i.e. Thanewasna (Copper), Block, Chandrapur district, Maharashtra, explored by MECL has been auctioned for mining, by Government of Maharashtra.

Baseline Environmental Studies

7.93 Final report of Baseline Environmental studies through Remote Sensing submitted for Naubasta - Kolard Limestone Block, District: Satna, Madhya Pradesh and Baseline Environmental studies are in progress for three NMET blocks i.e. 1) Jamodi - Mahanna Limestone Block, District: Satna, Madhya Pradesh, 2) Baraganda Copper Block, District: Giridih, Jharkhand, and 3) Tamiya, Rengali, Babja, Biarapalli and Dungarpalli Manganese Blocks, District: Bolangir, Odisha. Final Reports of volume & tonnage estimation of charnockite in Dankari Area, Odisha, litho-structural mapping and mineral targeting by using Remote Sensing for three NMET Blocks i.e. 1) Block ODS-09, South of Kesharpur, District – Mayurbhanj, Odisha, 2) Block AP-02, Kalyandurg-Timmasamudram Block, District: Anantapur, Andhra Pradesh, 3) Block RAJ-02 Deravad – Chargarhia – Bansara AREA, District – Udaipur have been submitted. Land Use / Land Cover mapping and mineral targeting by using Remote Sensing for BGML lease hold area is also completed.

Action Taken on Abatement of Pollution and Environment:

7.94 MECL is committed for conservation, prevention of degradation and equity of natural resources to ensure an eco-friendly environment in all areas of its operations for sustainable growth.The exploration activities of MECL do not cause any significant pollution. As a part of exploration work, MECL is carrying out environmental studies to generate baseline environmental data on Geology & Geomorphology, Meteorology, Air Quality, and Noise, Land use / Land cover studies, Soil quality, Biota, Water regime & Socio-economic studies. Report of Baseline Environmental Studies are annexed with all the Geological Reports. These reports are handed over to State Govt. along with Geological Reports. This data is used for Environmental Impact Assessment (EIA) studies during and/or after mining.

7.95 For helping the exploration/exploitation agencies to plan measures for abating possible pollution and Environmental Impact Assessment (EIA) in various exploration projects a report on the same is included as a part of G-2 level Geological Report of various exploration projects. As per the guidelines of MoEFCC, MECL is preparing the baseline environmental report since 1993.

7.96 MECL has prepared a Corporate Environment Policy. The objective of the policy is to execute exploration and its associated operations in an environmental friendly responsible manner to comply with applicable laws and other requirements related environmental aspects with due consideration of sustainable development. Some of the important objectives of the policy are as follows:

- To execute exploration and its associated operations in an environmental friendly responsible manner to comply with applicable laws and other requirements related environmental aspects with due consideration of sustainable development.
- To use non-polluting and environment friendly technologies
- To Maintain the machineries in excellent condition and ensure minimum impact of its operation on environment.
- To ensure compliance of Environment Clearance (EC) and Forest Clearance (FC) conditions and other statutory conditions issued by regulatory authorities from time to time for environment protection.
- To conserve the natural resources by ensuring minimum wastage an optimum consumption of fuel oil, lubricant oil, water and electricity.
- To develop awareness on environmental responsibilities among employees and encourage adherence to sound & healthy environmental practices.

The detailed policy is available on www.mecl.co.in..

R&D Projects

7.97 To enhance the mineral exploration initiative, MECL continuously make efforts on Research and Development in mineral exploration. Details of the project are given below.

7.98 With objectives to enhance the drilling production and productivity by reducing hindrances during drilling operation, enhance the penetration rate while drilling, achieve the best maximum core recovery, minimize the drilling fluid loss problem and to keep the borehole open for maximum drilling production, MECL is continuously developing the drilling fluid technology. The project completed at Lakhasar (Potash) block, Bikaner district, Rajasthan.InLakhasar potash project, the core recovery was very less due to caving / collapsing tendency in the bore holes. By using the effective fluid Technology (used chemicals / fluid additives) the core recovery was increased and collapsing of borehole has been reduced.

7.99 To Promote “Make in India” program with objectives to reduce cost on purchases, to avoid dependency on foreign manufactures, save foreign currency, Cost, avoid delay in maintenance MECL has developed a Borehole Deviation Measurement System (BDMS) indigenously and is in the process of filling an application for patent. The instrument has been made as per world class specifications and is being used successfully in the exploration activities. So far, MECL has manufactured 6 nos. of BDMS, by which around Rs. 1.5 crore has been saved.

New Infrastructure

7.100 MECL has developed a new & ultramodern laboratory facility at Nagpur. This is having facilities for all element analysis required for exploration of G-4 to G-1 stages. Being a testing laboratory, ISO/IEC 17025:2017 standard is applicable to MECL’s lab. The chemical lab of MECL is accredited to ISO/IEC 17025:2017 standard for its coal testing facilities. The lab is expanding it’s accreditation scope coverage to include other mineral testing which shall be completed in FY 2020-21. The 17065 -2017 or more higher version would be implemented as per its availability.

7.101 MECL has recently procured and commissioned one “Inductively Coupled Plasma Mass Spectrometer (Quadrupole ICP-MS)” which is useful tool to detect and quantify ultra-trace level elements with accuracy.

7.102 ICP-MS is capable of doing elemental analysis accurately & precisely for REE and PGE and trace elements in higher concentration, trace and ultra-trace (ppm, ppb and pt) levels and isotope ratios in diverse range of matrices. Since its installation in November, 2019, total 52 nos. (10 of Bauxite & 42 of Iron ore of NMET projects) of samples have been analyzed for 14 elements.

Information Technology (IT)

7.103 Using available I.T. Infrastructure, Data processing of total 23 nos. of Geological reportsfor the blocks explored by MECL, under Promotional (MOM/MEF), Contractual exploration and

NMET were carried out for the FY 2019-20 (Till December 2019). Out of the 23 nos. of Geological Reports, 5 nos. of reports were for Coal and 18 nos. of reports were for Base metal. Out of this, 5 GRs of Coal submitted to Ministry of Coal, 17 GRs of NMET submitted to respective State Governments and 1 contractual GR submitted to HCL. The executive summary of all GRs related to NMET are uploaded on MECL's website www.mecl.co.in. Seven GRs of NMET are suitable for auctioning. GR data collection, database preparation and validation for other blocks are going on as per schedule.The above seven GR's (NMET funded projects) has been handed over to respective State Governments for initiation of auction process.

7.104 Geological Report prepared on Copper exploration (NMET WR-RAJ-02) in DeravadChargarhiaBansra Area, Udaipur District State Rajasthan.

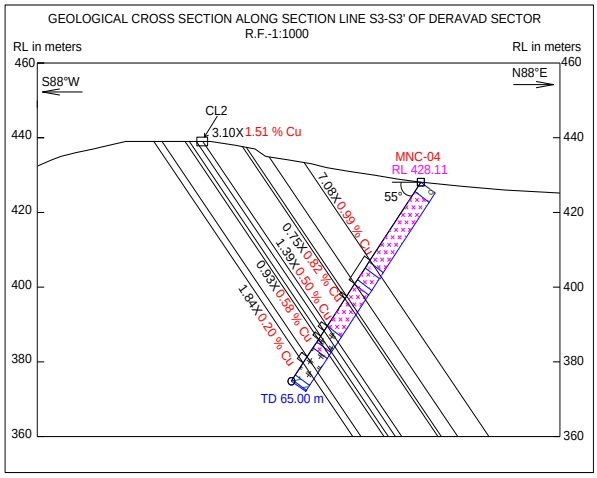


Fig.7.1

Geological Cross Section along Section Lines S3-S3' of DeravadChargarhia-Basra Area

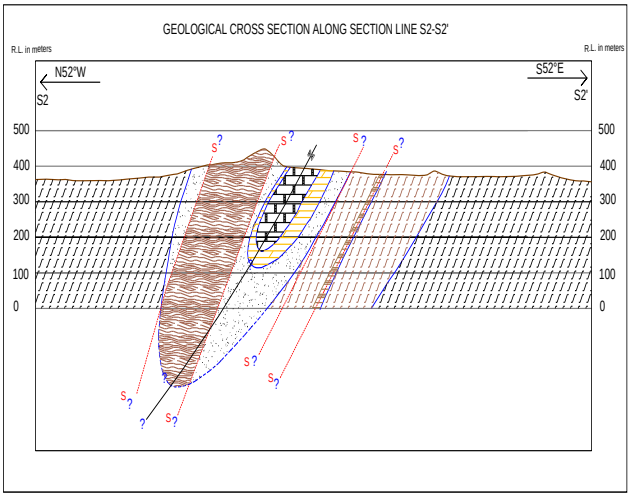


Fig.7.2:

Geological Cross Sections along Section Line S2-S2' Kachola-Amargarh-Jhikri Block (Nmet Wr-Raj-05), RAJASTHAN

SAP ERP Implementation in MECL

7.105 MECL has successfully deployed state-of-the-artInformation Technology tools of ERP - "Khanij Sanjeevani" solution to automate and integrate the business process covering the core functions of finance & costing, marketing, drilling, exploration, project management, sample preparation & testing, materials & stores, procurement and Human Resource Management. MECL has also deployed a state-of-the-artData Center, connecting all its offices for its effective utilisation by all the employees of MECL enabling ERP system utilisation effectively. ERP system of MECL is

based on architecture entailing various modules of SAP which is the most proven & globally accepted system of seamless integration of system & process across the organisation.

In Phase-I of implantation program, MECL has subscribed to 200 transaction users, 350 users for self-services for employees & 1500 users for payroll requirement of the organisation.

The exploration activities of the MECL are being implemented throughout the country including the remote locations in all the mineral rich State. Therefore, a dashboard with maximum capacity of 20 users has been conceived and is under implementation. The IT deployment is expected to enhance customer focus in terms of timely completion of drilling / exploration activities, accuracy in billing and reconciliation, enhancing efficiency of operations, optimumutilisation of machine capacities; and transparency compliance to all the stakeholder's requirement and government regulations. (Specific details are given in the additional para)

In-house developed employee Portal called"MECL Connect"

7.106 Online HRMS activity of MECL is accessible to all employees from MECL Website. It has been developed and upgraded, by adding many more new modules like submission of EPF loans, leaves, leave encashment and receipt of emails when granted. Modules for viewing of Internal Circulars, notices, announcements, various procurement formats, daily progress reports, MECL Policies has also been developed. It has been enhanced with Medical Claim Reimbursement, where employees use this module to apply for medical expense reimbursements and track status of their claim. Details are available at www.mecl.co.in.

7.107 Geological & 3D ore body modelling is the intrinsic part of Geological Report based on which resource/ reserves are estimated.

In this connection, MECL has impeccable credentials in the uses of technological innovative products which are both best in class & globally acceptable.
The exploration/ geological software's like GDM, MINEX, and SURPAC were upgraded during the year and the use of the upgraded version of software in preparation of geological report, has resulted in using recent technology particularly in 3D modelling. Procured DATAMINE Software, to be used for carrying out 3D Geological Model for non-stratified deposits. DATAMINE Software and Advance Geovia SURPAC Training were provided to officials of

Exploration and IT division. Training was provided to officials of Exploration and IT officials for the new software's purchased like, BrisCAD, Spatial Manager and GeoTools.

7.108 In addition to the industry software, the MECL has developed several in-house softwares to improve data processing & interpretation thereof. These customized softwares facilitate creation of block models, borehole correlation & fence diagram.

This is an example of leveraging digital technology to improve operational efficiency, which is in vogue since long.Currently legacy software "MINEXP" (based on legacy technologies) mostly used for Coal Geological Report Data processing have been transformed to new software based on latest Operating System and new platforms like Java, Oracle and other latest technologies. The new application overcomes complexities and issues in legacy applications and also provides new functionalities. These are customised solutions for our own processes and doesn't need any certification.

7.109 Upgraded and refinement were carried out in in-house developed browser based package "MyPlot" for Coal GR Plates Processing and Management. Enhancement in all in-house developed packages are carried out time to time as per requirement. Currently this Myplot package is used for Coal GR processing and Management.

7.110 Globally seam correlation is a basic requirement of resource estimation of coal & lignite. In order to improve and ensure correlation of processing and interpretation, MECL has been using inhouse software for the same & which is well acceptable by all the stakeholders in the industry. Enhanced Graphic Correlation Plate generation program where given seams gets correlated based on same seam's floor depth in adjacent borehole in respective CAD layers. Previously correlation lines were joined by operator manually, now using this program graphic correlation plates easily gets prepared

Business Development Activity

7.111 Through Business Development & Commercial Division, rigorous efforts are being continued to generate/obtain more works from prospective clients through competitive Techno-commercial offers and MoU route as well as bilateral negotiations. As a result, during the financial year 2019-20, the total value of order book stood provisionally at Rs. 531.61 crore. up to 31.12.2019. This includes contractual work of various clients such as CMPDI, DMG Karnataka, HCL, NALCO, DMG Jharkhand, DGM Assam, CCIL, CIL, etc. and NMET funded work on behalf of Ministry of Mines and promotional coal exploration work on behalf of Ministry of Coal (MOC).

7.112 During the period 01.04.2019 to 31.12.2019, MECL has signed MoU with Cement Corporation of India Limited (CCIL), Hindustan Copper Limited (HCL), NLC India Ltd, Tripartite Agreement with GMDC and MOIL and

Bipartite Agreement with DMG, Government of Assam for exploration works. The signing of MoU with DMG, Government of Meghalaya & DGM, Madhya Pradesh are under process. For the year, MECL has received work orders valued Rs.46 crore from HCL, CCI, MOIL & NLC for exploratory drilling and associated geological work in their lease hold areas. Monetization and work details to shared or referred to weblinks on page of company

7.113 Effortswere made to reach out to all prospective clients viz. Government, PSU and Private Sector for securing business for the company for sustainable growth. This is timeless and can be used forever.

7.114 The new diversified areas are given below:

Greenfield Exploration in blocks for various minerals allotted by NMET, Government of India.

7.115 MECL has signed JV cum Shareholder Agreement with NALCO and HCL on 1st August 2019 in connection with the formation "Khanij Bidesh India Ltd. (KABIL) a Joint Venture Company for exploration and mining of strategic minerals overseas and supply to India to make it self-reliant in such strategic/critical minerals. This would boost the **"Make in India"** drive of Government of India. KABIL is in engagement with various source country such as Australia, Argentina, Bolivia, Chile, Russia etc. Two MoU are scheduled to singed between KABIL and M/s YPF (an energy major & Govt. owned enterprise of Argentina)& M/s JEMSE, a provincial enterprise of JUJUY province of Argentina.

Photo -7.11

Systemetic Limestone mine developed in NER State

7.116 Participation in exhibitions/events related to Exploration and Mining:

In India:

- Participation in Government Achievements & Schemes Expo-2019 at Pragati Maidan, New Delhi during 1-3 August 2019.
- Participation of MECL in Exhibition and Convention of Mining Mazma-2019, International Convention and Trade Show being organized by FIMI from 12-14 September, 2019 at Bangalore International Exhibition Centre (BIEC), Bangalore.

Abroad:

- Participation in AIMEX-2019 from 27th to 29th August 2019 at Sydney, Australia.
- Participation in IMARC-2019 from 28thto 31stOctober 2019 at Melbourne, Australia.
- Details are available at www.mecl.co.in.

Future Plan

7.117 To achieve its vision, MECL has prepared 'Corporate Rolling Plan' from 2019 to 2022 for Enhancement in Growth and Profitability of MECL'. Salient feature of the Corporate Rolling Plan are given below:

- Replacement of old conventional drills with modern Hydrostatic drills in phased manner. The new hydrostatic drill rigs have depth capacity of 1000 to 1500 metre with High rate of penetration, less breakdown, fast shifting between boreholes, high productivity.
- Up gradation thorough procurement of advance Geophysical equipment such as procurement of 2D Seismic survey equipment, Gravimeter, Magnetometer etc.
- Planned recruitment and Skill development of manpower.
- Infrastructure Development: Construction of modern and State of the Art building for Laboratories and Workshop at Utility Complex of MECL, Nagpur. The construction of laboratory has been completed and all the elementary analysis will be done under one roof. About 1 to 1.25 lakh samples are planned to be analyzed in the new laboratory.
- Gearing up for faster& more accurate survey by addition of DGPS etc.
- Up gradation of workshop by installation of Induction Hardening Plant, setting up diamond bit manufacturing plant, Gear Hobbing Machine, CNC etc. for reliable and uninterrupted supply of accessories which has resulted in faster drilling and the productivity has been increased from 378 metre/drill/month (2014-15) to 542 metre/drill/month (2018-19)
- Modernization and expansion of laboratory by purchasing of AAS, XRF, XRD, Derivatograph etc. for enhancing capacity of analytical studies.
- Increase in outsourcing of drilling work to meet additional drilling requirement of about 50,000 to 60000 m.
- Augmentation of IT enabled software facilities for 3D ore body modelling and geological models for resource estimation

7.118 Construction of new & ultramodern infrastructure for laboratories has been completed and commissioning of the facilities are

under progress including state-of-the-art laboratory equipment. The chemical lab of MECL is accredited to ISO/IEC 17025: 2017 standard for its coal testing facilities. The standards process has been initiated to take up re-certification of ISO standard. Standardization of ISO 17065 and timelines

7.119 MECL has also signed a Mining Lease (ML) deed for mining of bauxite in Serangdag block, Chhattisgarh. The clearance from National Board for Wild Life (NBWL) is being pursued.

Manufacturing Unit

7.120 MECL has a well equipped central workshop and manufacturing unit at Nagpur to cater to the needs of drilling and to provide engineering support to field operations. It carries out repairing/ overhauling of drilling and light/heavy vehicles. It manufactures Tungsten Carbide (TC) bits and spares & accessories for coring and non-coring drill machines. Also, it has CNC lathe machine for manufacturing of drill tubular. During 2019-20 (up to December 2019) a total of 4093 items were manufactured, which include 851 TC bits and 3242 other drill accessories. The inhouse manufacturing of above accessories has resulted in timely supply of item required for drilling operations well in time. Thereby reducing the idle hours of drill rigs. This adds to MECL's cost optimisation and enhanced operational profit. Further, this is also a make in India initiative of MECL to develop in house capabilities.

Energy Conservation

7.121 MECL is replacing age old drill rigs with new Hydrostatic drill rigs which are fuel efficient, high performance capacity and have resulted in conservation of energy. By induction of hydrostatic drill rigs the consumption of HSD has reduced by 5 to 10 percent. The company has also set up POL Norms for all types of drilling machineries and are maintained effectively based on energy conservation factors. Corrective measures like fuel pump and nozzles calibration of each drill rig, tappets setting etc. are being carried out regularly for enhancing the fuel efficiency, carbon emission reduction and thereby resulting considerable energy saving. All the conventional and CFL lights are being replaced with energy efficient LED bulbs and tube lights. MECL has started replacing conventional source of energy with non-conventional Renewable sources from year 2011-12 by Installation of Solar power plant and Solar Water Heating system which has resulted in saving of 18000 units of electricity a year.

Bharat Gold Mines Limited (BGML)

7.122 Bharat Gold Mines Limited (BGML) has been closed since 1stMarch, 2001. The Cabinet had taken a decision in the year 2006 to dispose off the assets and liabilities of the Company through an open tender, with First Right of Refusal (FROF) in favour of the co-operative society formed by the ex-employees of the Company. However, the Cabinet decision could not be implemented due to litigation. Finally

in 2013, the Supreme Court allowed the Government to go ahead with the tender.

7.123 Meanwhile, many changes had taken place, hence the Cabinet decision of 2006 could not be implemented, it was decided to explore the possibilities of revival of mining operations in KGF after Techno-Economic Feasibility Study (TEFS). Mineral Exploration Corporation Ltd. (MECL)'s exploration reports indicated approximately Rs. 8700 crore worth of gold available in dumps & Mines of BGML. A Monitoring Committee is supervising all the work regarding suggesting a way forward for BGML by doing legal review, asset Valuation, TEFS, Techno-Economic Feasibility Report (TEFR) etc.

Government of India is actively considering to finalize its future plan for BGML with the approval of the Cabinet. Non-ferrous Materials Technology Development Centre (NFTDC) is setting up a pilot plant for extracting not only Gold but also other precious and rare minerals, the results of the same will be followed by the Techno-Economic Feasibility Report. As sorting out of land issues is a necessary perquisite, security of land, land revenue map & mutation of the land in the name of BGML are actively being considered. A 'Drone Survey' is being done for BGML for preparing the land map and with the support of land revenue map unencumbered land will be identified.

7.124 Alongside, Ministry is considering for transfer of 49 acres and 28 ½ guntas of BGML land to South Western Railway for the construction of Marikuppam-Kuppam new Broad Gauge Railway Line, which will benefit local people.

8 Science, Technology and Autonomous Bodies

Back to Index

Science, Technology and Autonomous Bodies

Research & Development

Introduction

8.1 Recognizing the paramount importance of safety, economy, speed and the efficiency in extraction of mineral resources and in its convergence into viable economic alloys and metals, National Mineral Policy has accorded higher priority to Research and Development (R&D) programmes. For fructification of principles as enunciated in the National Mineral Policy, guidelines for support to 'Mining Research' was issued in May 2013. With a view to promoting R&D in the mining sector, Ministry of Mines has launched a comprehensive Science & Technology Programme which includes (i) R&D component (ii) Information Education and Communication (IEC) (iii) one-time capital component for up-gradation of R&D facilities of Jawaharlal Nehru Aluminium Research Development & Design Centre, National Institute of Miners' Health and National Institute of Rock Mechanics.

Science & Technology Programme (R&D component)

8.2 The underlying principle behind R&D component is to foster utilisation of the available mineral resources judiciously, economically efficiently and in an environmentally sustainable manner. Under the R&D component of the Science & Technology Programme, Research projects are funded through grant–in–aid. The broad thrust areas for supporting research in mining sector include(i) Prospecting exploration for strategic and rare earth minerals (ii) Research in mining methods. This includes rock mechanics, mine designing, mining equipment, energy conservation, environmental protection and mine safety (iii) Improve efficiency in process, operations, recovery of by-products and reduction in specification and consumption norms. (iv) Research in metallurgy and mineral beneficiation techniques to utilize lower grade and finer size ores. (v) Extraction of value added products from mine waste, plant tailings etc. (vi) Development of new alloys and metal related products etc. (vii) Evolve low capital and energy saving processing systems (viii) Production of materials of high purity. The details of the projects approved under the Scheme are available at .

8.3 Based on scrutiny which passes through different stages of evaluation including presentation of shortlisted projects before the Project Evaluation and Review Committee (PERC) and final approval of an inter-ministerial Standing Scientific Advisory Group (SSAG) chaired by Secretary (Mines), grants are given to the projects submitted by R&D institutions.

8.4 During the Financial Year 2019-20 (till December, 2019), 11 projects amounting to Rs. 461.44 lakhs which have been considered as relevant to the identified priorities have been approved by SSAG for grant-in-aid by the Ministry under S&T programme. The details are available at .

Information Education and Communication Component (IEC)

8.5 The purpose of this component of the Scheme is to create awareness regarding issues relating to the mining and mineral sector by organizing or being associated with promotional events, like seminars, workshops, exhibitions etc. evaluation studies, surveys, awareness

programmes, consultation with stakeholders, organization of national and international events/conference,creating audio-visual publicity materials and propagation of policies and programmes.

8.6 The detailed guidelines are available at. 

Under this component, grant-in-aid of Rs. 10 lakh each was released to Federation of Indian Mineral Industries (FIMI) and Jawaharlal Nehru Aluminium Research Development and Design Centre (JNARDDC) during the year 2019-20 (till 31.12.2019) for organizing "Mining – Exploration Convention & Trade Show (Mining Mazma 2019), 12-14 September, 2019, Bengaluru" and "23rd International Conference on Non-Ferrous Minerals and Metals – 2019" (ICNFMM-2019) 12-13 July, 2019, Kolkata", respectively.

"Grants for Creation of Capital Assets" Component for up-gradation of R&D facilities

8.7 The quality of R&D hinges upon availability of state of art research facilities in the country. Apart from the initiatives of the public and private enterprises in the mining sector, R&D activities are also being pioneered by the three autonomous bodies functioning under Ministry of Mines i.e. Jawaharlal Nehru Aluminium Research Development & Design Centre (JNARDDC), Nagpur National Institute of Miners' Health (NIMH), Nagpur and National Institute of Rock Mechanics (NIRM), Bengaluru. During the financial year 2019-20 (till 31.12.2019), grant to the tune of Rs. 322 lakhs has been released to JNARDDC for up-gradation of R&D facilities under "Grants for Creation of Capital Assets" Component.

8.8 Grants for Creation of Capital Assets and Grant-in-aid-Salaries provided to the three autonomous institutions under Ministry of Mines is given in **Table 8.1 and Table 8.2.**

Table 8.1
Grants for Creation of Capital Assets

(Rs.**in crore)**

Institute	Amount
JNARDDC	3.22
NIMH	0
NIRM	0

Table 8.2
Grant-in-aid-Salaries

(Rs.**in crore)**

Institute	Amount
JNARDDC	6.07
NIMH	0.98
NIRM	6.74

Jawaharlal Nehru Aluminium Research Development and Design Centre (JNARDDC), Nagpur

8.9 JNARDDC is a Central Government Autonomous Body under Ministry of Mines. This "Centre of Excellence" was set up in 1989 with a view to provide major R&D support system for the emerging modern aluminium industry in India.

8.10 JNARDDC is 17025:2005 NABL accredited laband is also recognized as a scientific & industrial research organization by the Department of Scientific & Industrial Research, Ministry of Science & Technology, Government of India. It is the only institute of its kindin India pursuing the

cause of R&D from bauxite to finished product under one roof.

8.11 The objective of the Centre is to assimilate the technology available in the country and abroad for the production of alumina, aluminium, aluminium alloys as well as to develop technical know-how for the basic engineering process and downstream areas. Centre provides training to the personnel employed in the Indian aluminium industries.

8.12 JNARDDC has made key contributions in the areas of beneficiation, characterization, technological evaluation, upgradation of bauxites, Bayer process modeling, reduction of energy consumption and environmental pollution in smelter, development of alloys, product development, effective utilization of aluminium industry residue such as red mud, dross, spent pot lining and scrap for both primary and secondary industry. The annual reports are available at http://www.jnarddc.gov.in/en/rti/rti_annual_report.aspx.

8.13 Major activities

The Centre completed seven projects in the field of aluminiumand ten R&D projects are in progress for various government and non-government organization. The details are mentioned in **Annexure 8.1.**

8.14 Designated Sector Expert

JNARDDC is the designated aluminium sector expert for the following key authorities: -

8.15 NITI Aayog

In accordance with commitment of the Government of India to SDG vision 2030, NITI Aayog along with EU delegation released a Strategy on resource efficiency prepared by JNARDDC. The draft National Resource Efficiency Policy 2019 has been circulated by Ministry of Environment Forest & Climate Change (MoEF&CC). In this regard, a core committee has been constituted to undertake capacity building programs on aluminium recycling and waste management for promoting resource efficiency in aluminium sector. Such programs will generate awareness and assist the stakeholders in understanding and implementing the desired goals of resource efficiency / circular economy in the interest of aluminium industry and nation.

http://www.jnarddc.gov.in/en/rti/rti_annual_report.aspx

8.16 Bureau of Energy Efficiency (BEE), Ministry of Power

JNARDDC is the aluminium sector expert under PAT-2/PAT-3(Perform, Achieve &Trade) scheme in the National Mission for Enhanced EnergyEfficiency (NMEEE) under Climate Change of Bureau of Energy Efficiency (BEE), Ministry of Power. The Centre has successfully carried out technical evaluation under PAT-1 to support the BEE in reducing energy consumption of aluminium sector. Presently evaluating PAT2 scheme and supporting PAT3 for data collection. The recommendation will help BEE in generation and trade of e-certificates under PAT scheme. Will also be useful in setting up energy reduction targets for PAT3 scheme. The scheme details are available on https://beeindia.gov.in/sites/default/files/Aluminium.pdf

8.17 Central Pollution Control Board (CPCB).

The institute has submitted a brief status report along with recommendation for environment friendly solution for the aluminium industry waste. The institute has submitted recommendations of aluminium industry for supporting CPCB in formulating guidelines for safe disposal and utilisation of aluminium industry waste i.e. red mud.

8.18 Bureau of Indian Standards (BIS)

JNARDDC is in the process of formulating recommendations for Bureau of Indian Standards (BIS) regarding setting up standards for aluminium scrap and other aluminium alloys. The Centre is assisting BIS to develop methods and methodology for testing and analysis of materials related to aluminium sector.

8.19 JNARDDC conducted the following seminars, workshops and programs.

- 23rdInternational Conference on Non-Ferrous Minerals and Metals – 2019 (ICNFMM – 2019) during 12-13 July 2019 at Kolkata

- An interactive meet on "Waste to Wealth - productive utilization of red mud (bauxite residue)" on 26th July 2019 at New Delhi

- Interactive Indo-European Meet on "Resource efficiency in the aluminum industry with a focus on effective utilization of red mud (bauxite residue)" on 19th Sep 2019 at New Delhi

- 8thIBAAS International Conference & Exhibition (IBAAS–GAMI-2019) in Guiyang, China during 04-06 Sep 2019. "Technological Advances in Alumina, Aluminium Smelter, Downstream Operations, Energy Conservation, Environmental Control and Intelligent Manufacturing with Special Reference to China". Best presentation award to JNARDDC scientist in downstream segment, IBAAS China.

- "Capacity building and awareness program on aluminium" organized at Bhubaneshwar during 21-23 Nov 2019 in association with NITI Aayog, Aluminium Association of India (AAI), Material Recycling Association of India (MRAI) and Aluminium Secondary Manufacturers Association (ASMA).

8.20 Patent

One patent was filedfor the following indigenous R&D process developed by JNARDDC under various research projects. "A process for delamination of laminated multi-layer packaging industrial refuse and recovery of Aluminium at ambient conditions". The process will assist scrap recyclers to separate the plastic from aluminium foil before melting for enhancing the melt quality and lowering the pollution.The list of patents filed and granted for JNARDDC in the last five years is at **Annexure 8.2.**

8.21 Finances:The Centre is likely to achieve an Internal and Extra Budgetary Resource generation (IEBR) of ₹ 5.00crorein 2019-20. A revenue budgetary grant of ₹6.07 crore for salary component and ₹3.22 crore was

allocated for creation of capital assets by Ministry of Mines in 2019-20 for the Centre.

National Institute of Rock Mechanics (NIRM)

8.22 National Institute of Rock Mechanics (NIRM) carries out various investigations in the area of rock engineering and rock mechanics. The Institute extends R&D support and expertise to mining sector (underground, opencast and quarries), energy sector (hydel, thermal and nuclear power) and infrastructure sector (rail, road, metro, irrigation, urban construction etc.). Key area of activities of the Institute involve site characterisation studies which includes geological, geophysical & geotechnical investigations, excavation engineering, controlled blasting, numerical modelling, engineering seismology, seismotectonic studies, mine design, slope stability, laboratory testing of rock samples & wire ropes and in-situ testing of various mining accessories using NDT technique. Complete portfolio of various areas of activities of NIRM are available at their website www.nirm.in.

8.23 On 18th February 2019 NIRM organised "*Conference with Industry Partners on Future Strategies*" at Bengaluru to comprehend the present status and future requirement of the Industry.For further visibility of the research capabilities of the Institute, NIRM along with Ministry of Mines, Govt. of India organised an Inter-ministerial conference "*Future strategies for NIRM*" on 26th April 2019 at New Delhi, which was chaired by Shri. Anil Mukim, Secretary, Ministry of Mines. During interaction with Industry Partners across various sectors on technical issues, NIRM has identified newer areas of investigations where future development needs to be synergised. In the concluding session, it was exhorted by the Secretary, Ministry of Mines that there is need for expansion of NIRM's activities in International Arena and urged other ministries to take note of NIRM's exhaustive portfolio in rock mechanics and rock engineering. As a follow-up action, NDMA (MHA) has associated NIRM scientist on its panel for all technical guidance on all disaster related preparedness; Ministry of Railways have nominated one NIRM expert in the High power Committee for technical planning of their future rail projects; NPCIL has signed an MOU to engage NIRM experts in all their construction and investigation needs; Even in International arena, NIRM has joined hand with some private partners for competitive bidding in both Indian and overseas projects.Thus, the conference helped NIRM to accelerate its path of sustained growth.

8.24 Apart from industry-sponsored consultancy projects, the Institute also carries out R&D projects aimed at developing new technologies and methodologies for new areas of investigations. During the current reporting period, three S&T projects are completed by the Institute and their full details are published in our Annual Report (Annual Report 2017-18 pp 7 to 11), wherein it is highlighted that accomplishment of these S&T projects led to development of new techniques and investigation tools such as

- Development of new geophysical investigation methods for identification of subsidence prone regions in mining and civil construction arena
- Mapping of seismic hazard zones over the old mined-out region of Kolar Gold Fields

- In-situ stress measurements in deeper horizons upto 600m for planning development of deep-seated underground coal mines over old mined-out regions.

8.25 These projects are sponsored by various private entities and Government of India's ministries. The institute has been enlisted as research centre by Visvesvaraya Technological University (VTU), which has the authority over engineering education throughout the state of Karnatakafor its academic programme. The process of intake of research scholars for Ph.D. programs will begin in January, 2020 for the academic year 2020-21. Advertisement for admission under this research program has been released on 20/02/2020 in all major National Newspapers and posted on NIRM website at the following link: https://www.nirm.in/NIRM-Academics.php

8.26 Most of the technical departments of NIRM are accommodated at its head office at Bangalore while all types of testing facilities are located at its registered office at Kolar Gold Fields. In addition, NIRM plans to develop a skill development centre in the near future for the benefit of the mining sector.

8.27 Out of the sanctioned strength of 82, the institute has 49 staff on roll which includes 40 scientific and 9 administrative staff. The Institute has completed83 industry projects between 1st January to 31stDecember, 2019. List of completed projects can be assessed from their website at the following link: https://nirm.in/completed-projects.php. Over 40% of the revenue budget of the Institute is earned as Internal and Extra Budgetary Resources (IEBR) from industry sponsored projects. As a part of human resource development and human resource augmentation, NIRM has been organising workshops and training programs for the industry and depute its employees to various training programs and international/national conferences.

8.28 Some of the major ongoing projects that are being executed by the Institute during this financial year include:Geodetic and deformation monitoring of Sardar Sarovar Dam and its underground power house cavern; vibration impact analysis on underground ONGC pipe line passing through Surat airport; engineering geological investigation for slope stability of the hillock above Polavaram Hydroelectric Project; monitoring ground vibration and air overpressure due to blasting carried out for construction of various civil engineering installations associated with Kudankulam Nuclear power plant; geophysical studies to identify isolated boulders in the underground tunnels of Bangalore metro rail project; feasibility study for siting nuclear power site at Chatrapur Odisha; instrumentation and analysis of data pertaining to dam complex of Punatsangchhu Hydroelectric project at Bhutan; determining safe bearing capacity and in-situ rock mechanics parameters at the Arun Hydroelectric project in Nepal anddetailed seismotectonic evaluation of proposed Nuclear power site at Jaitapur.List of ongoing projects can be assessed from their website at the following link: https://nirm.in/ongoing-projects.php

National Institute of Miners' Health (NIMH)

About NIMH

8.29 National Institute of Miners' Health, an autonomous Institute under Ministry of Mines, conducts applied research in the field of occupational health and hygiene

among persons employed in mining and mineral based Industry with the vision of ***"Safe Mines and Healthy Miners"*** and the mission ***"Indian mining and mineral industry sans occupational diseases"***. The Institute is recognized as a Scientific & Industrial Research Organization by the Department of Scientific & Industrial Research, Ministry of Science & Technology, Government of India. The Institute has completed 27 years of service to the nation in conducting research and promoting occupational health & hygiene among mine workers. The Institute submits final report of health & workplace monitoring carried out in the mines along with findings and recommendations to the respective mine management and the management submits the same to DGMS. The DGMS ensures implementation of recommendations by NIMH.

8.30 The institute has state of the art infrastructure, facilities and trained manpower to officer Technical Support Services for;

- Routine Initial and periodic medical examinations as per Mines Rules, 1955
- Health surveillance as recommended by Conferences on Safety in Mines.
- Personal exposure assessment studies for noise, dust, vibration, heat & humidity as required under the Mines Act, 1952 and recommended by Safety Conferences.
- Work environment evaluation for dust, noise, vibration, illumination, etc as required under Metalliferrous Mines Regulations 1961 and Coal Mines Regulations 1957.
- Evaluation of Mining Machineries for vibration, noise, dust emission etc.
- Ergonomic assessment of Mining Machinery as per ISO Standards.
- Training of airborne dust survey in-charge as per circulars of Directorate General of Mines Safety (DGMS).
- Health awareness and promotion programme on occupational health issues.
- Action on findings and recommendations in the final reports are to be taken by respective mine managements to comply with the mines rules 1955 and recommendations of conferences on safety in mines.

8.31 The Institute provides services to both Private and Public sector mining companies viz. Reliance Industries, Ambuja Cements Ltd., NALCO, ACC Limited, UltraTech, NMDC, Essel Mining, Sesa Goa, GMDC, APMDC, RSMML, Western Coalfields Ltd. etc.

8.32 The main objectives of the Institute include:

- Promotion of health and prevention of diseases among persons employed in mines and mineral based industries.
- Research & development to ensure safe and healthy extraction of the country's mineral wealth.
- Assessment of health hazards in the work environment of mines and allied industries for regulatory and remedial measures.
- Develop human resources in the field of occupational health, hygiene and safety.
- In the last three years, institute has completed 82 clientele projects and published 26 publications & conducted 08 workshops which are elaborated in the Annual Reports.

8.33 Merger/Amalgamation of National Institute of Miners' Health (NIMH), Ministry of Mines with ICMR-National Institute of Occupational Health (NIOH), Ministry of Health and Family Welfare

Union Government has approved to dissolve National Institute of Miners' Health (NIMH) and merge / amalgamate with ICMR-National Institute of Occupational Health (NIOH), Ahmedabad, Ministry of Health & Family Welfare (MoH&FW).

Activities during the year 2019-20

Clientele/ Sponsored Projects;

8.34 Clientele /sponsored projects undertaken during the year are given below;

i) Dust, Noise and vibration studies at NALCO Damanjodi
ii) Workplace monitoring studies at NMDC-Kirandul, Bacheli and Panna
iii) Workplace monitoring studies at Sadera (RCCPL)
iv) Workplace monitoring studies at ACC -Gagal, Kymore
v) Workplace monitoring studies at Ambuja solan and Bhatapara
vi) Periodical Medical Examination of employees of Gujarat Mineral Development Corporation
vii) Initial and Periodical Medical Examination of contract workers of Panchpatmali Bauxite Mines, Damanjodi, NALCO
viii) Details are given at **Annexure8.3**

S&T Projects

8.35 The Institute has completed following S&T project

i) Postural risk analysis of Mining equipment operators and its relation to Musculoskeletal Disorders. (Sponsored by Ministry of Mines)

Students' Dissertation Projects

8.36 The institute has been providing research facilities for dissertation to students from Biochemistry and Biotechnology stream as part of its academic contribution.In Year 2019-20 five, 2018-19 four and 2017-18 two students completed dissertation from the institute

8.37 Publication

i) ShalvinNimje, Umesh Dhumne, Dr.SarangDhatrak, Dr. Subroto Nandi (2019): Assessment of health status among mine workers of Maharashtra.Journal of Practical Biochemistry and Biophysics. Vol -4 Issue -1, Page 15-19
Impact factor: e-ISSN 2456-5032.
Available on: https://www.rfppl.co.in/about_journal.php?jid=68

8.38 Scientific Events

- Organized Training programme on "Safety and First Aid Operations" for Jawaharlal Nehru Aluminium Research Design and Development Centre on 5th November 2019
- Organized Proteomics and ELISA workshop for one month in May and June 2019 respectively for research scholars, PG and UG students of

Biochemistry, Microbiology, and Biotechnology.

National Mineral Exploration Trust (NMET)

8.39 The National Mineral Exploration Trust (NMET)was established by the Central Government by notification dated 14th August, 2015 in pursuance of sub-section (1) of Section 9C of the Mines and Minerals (Development and Regulation) Amendment Act, 2015 with the objective to boost the regional and detailed mineral exploration in the country. The NMET Rules were also notified on 14th August, 2015. As per the Act, the holders of mining lease and prospecting licence-cum-mining lease pay to the Trust, alongwith the royalty, a sum equivalent to 2 percent of the royalty paid in terms of the Second Schedule to the State Government.The total funds accrued to NMET is Rs. 1,938.17 crore as on 31st December, 2019, whereas the total expenditure till 31st December, 2019 is Rs.209.42, out of which Rs.41.07 crore has been incurred during 2019. List of projects funded from NMET are available at www.nmet.gov.in..

8.40 NMET has two-tier structure. While the overall control, periodical reviews and policy directions of the Trust vest with the Governing Body (GB), chairedby Hon'ble Minister of Mines, the Executive Committee (EC), chaired by Secretary (Mines) is mandated to manage, administerand supervise the day-to-day activities of the Trust. The Technical-cum-Cost Committee (TCC), comprising of domain experts, evaluates the technical as well as cost parameters of the project proposals submitted by Notified Exploration Agencies (NEAs) for NMET funding. The TCC recommends the appropriate proposals to EC for approval. The minutes of meetings of EC and TCC are available at https://nmet.gov.in/content/circular-listing.php.

8.41 During 2019, 4 meetings of TCC and 05 meetings of EC were held. Based on recommendations of TCC, EC approved 26 mineral exploration projects and one Technical Supervision and Quality Control (TS-QC) Consultant for the project "Multi-Sensor Aero Geophysical Survey" Over OGP and adjoining areas over OGP Block 9 to 12 for Phase-III", at an estimated cost of Rs. 55.67 crore.

Photo -8.1

22nd Technical-cum-Cost Committee (TCC), NMET meeting held on 13th and 14th November 2019 at NALCO (HRD Centre for Excellence), NALCO Nagar, Bhubaneswar, Odisha.

Photo-8.2

12thExecutive Committee meeting of NMET was held under the Chairmanship of Shri Anil Mukim, Secretary, Mines on 25thApril, 2019 in KhanijKaksh, Ministry of Mines, Shastri Bhawan, New Delhi.

8.42 National Aero-Geophysical Mapping Program (NAGMP) with Magnetic- Gradiometry and Radiometric Surveys has been taken up by GSI through NMET Fund to acquire uniform aero-geophysical data, initially over the Obvious Geological Potential (OGP) areas,subsequently, extending the coverage to the remaining area of the country. The objectives of NAGMP are: (1) acquire high resolution baseline aero-geophysical data; (2) identify new target areas for mineral prognostication; and (3) understandsubsurface geological and structural set up. The Aero-Geophysical survey of OGP area is envisaged to be carried out in three phases, each phase has 4 blocks. The block wise details are given in **Table 8.3**

Table 8.3

Block wise OGP area details

Block No.	Area in Sq. Km	Line Km
Block-1	52,700	1,93,234
Block-2	43,822	1,60,680
Block-3	39,144	1,43,530
Block-4	44,861	1,64,490
Block-5	91,219	3,34,470
Block-6	76,049	2,78,846
Block-7	56,664	2,07,768
Block-8	87,914	3,22,351
Block-9	71,132	2,60,817
Block-10	91,801	3,36,604
Block-11	89,583	3,28,471
Block-12	33,752	1,23,757
Total	7,78,641	28,55,018

8.43 Under NAGMP, data acquisition over OGP blocks1, 2, 3 and 4 (Phase-I) have been completed and reports have been submitted. Based on integration of these aero-geophysical data with archived geophysical, geological and known mineralization data, a total of 57 potential target areas have been identified for G-4 level exploration. The Aero-Geophysical survey over Phase-II has been delayed due to litigation. Meanwhile, data acquisition over OGP blocks-9, 10, 11 and 12 (Phase-III) is in progress.

8.44 A Strategic Plan Group has been formed in November, 2019 to prepare a Strategic Plan for prioritizingfunding for Mineral Exploration from NMET. The first meeting was held on 21st November 2019 and the report is likely to be submitted soon.

9 Corporate Social Responsibility

Back to Index

Corporate Social Responsibility

National Aluminium Company Limited (NALCO)

9.1 Periphery Development & CSR Initiatives

- CSR policy of NALCO is compliant with schedule –VII (section 135) of Companies Act 2013 and DPE Guidelines. The Company allocates 2% of average net profit of last 3 financial years as CSR fund as per Companies Act, 2013.
- Accordingly, for FY 2019-20, CSR fund allocation of the company amounts to Rs. 4050.00 lakh against mandated amount of Rs. 3835.00 lakhs.

9.2 Highlights on CSR activities for the financial year 2019-20 arefurnished below

i) PM's Iconic Shrine Development Programme:

- Projects like LED illumination of temple, thematic painting of both sides of the VIP road, Installation of clean water posts, establishment of open air theatre at slum dwelling, beautification of important chalk, installation of hoarding signage, development of Gandhi Park completed.

- Battery-Operated Vehicle (BOVs) service, free of cost, launched for senior citizens, differently-abled passengers from Jagannath Ballav Math to Jagannath temple at Puri.

Around 3 lakhs devotees availed the facility from July 2019 to February 2020.

ii) Education:

a. **Indradhanush:** Till the financial year 2019-20, 1003 tribal students from BPL families of periphery villages of Koraput district sponsored in 3 reputed residential schoolsi.e. Kalinga Institute of Social Sciences (KISS), Bhubaneswar, BikashVidyalaya and AdarshaVidyalaya, Koraputin Odisha. During the current financial year, 83 such students have been enrolled in above three residential schools.

b. NALCO-ki-Ladli: Financial support has been extended to 603 meritorious girl students of BPL category till FY 2019-20 under: '

BetiPadhao' programme, initiated by Government of India. The Company launched an innovative Employee Social Responsibility (ESR) programme on 1st January19 that offer employees a satisfying way to meaningfully contribute towards social causes by way of contributing Rs. 3,000 each towards education of girl child under this scheme. The Company will match with equal grant for the same.

iii) Health care:

a) **Door step health service:** During FY 2019-20 till 31st December,19, more than 1.17 lakh patients of peripheral villages of Angul, Damanjodi,&,Pottangi sector have given consultancies through 8 mobile health units & 1 OPD. More than 1.5

lakh patients were treated in FY 2018-19.

b) A state-of-the-art secondary plus eye care centre in association with LVPrasad Eye Institute (LVPEI) was inaugurated at Angul. It will benefit morethan 60,000 outpatients, perform 6000 surgeries annually and offer freetreatment to poor patients. The ultra-modern hospital, which has been builtata cost of Rs. 25 crore, inaugurated by Hon'ble Union Minister, Petroleum &Natural Gas, Skill Development & Entrepreneurship on 18th Feb'19.

c) A 600 bedded Night Shelter is under construction to facilitate short stay for outdoor patients & attendants of Indoor patients at AIIMS, Bhubaneswar for people of Odisha & nearby states.Likely date of completion of the project is December, 2020.

iv) ODF Village: 6 villages i.e (Uppergadati, Jholaguda, Goudaguda, Badnerka, Rangapani and Miting) names are made open defecation free (ODF) by providing 611 individual household latrines with water system in M&R Complex, Damanjodi in Koraput district. Similarly, construction of individual household latrines in 5 villages of S&P Complex, Angul has been taken up out of which,2 villages have been made ODF and the same has been confirmed by district administration.

i. Drinking water supply to 30 water scarce villages (Name of the villages attached at **Annexure-9.1**) of Angul completed during FY 2019-20.

ii. 50 numbers of Self Help Groups (SHG)strengthened and supported to engage in new income generation activities like mushroom farming in remote village of Pottangi block of Koraput district.

iii. Solar lights installed in 21 remote villages of Koraput district in FY 2019-20.(Name of the villages attached at **Annexure-9.2**)

iv. Construction of road, culverts, community centers renovation and revamping of the water bodies have been undertaken in the periphery areas.(Details attached at **Annexure-9.3**)

v. NALCO's Response to "FANI Cyclone victims is given in **Annexure 9.4**.

9.3 Skill Development Program

- In accordance with MOU signed with NSDC (National Skill Development Corporation), RPL (Recognition of Prior Learning) certification training imparted to 420 workmen engaged in NALCO Bauxite Mines under various contractors. Further, skill training also imparted to 1,209 candidates in company's operational areas on retail, health care, beauty & wellness, banking & hospitality etc. Out of which, 850 candidates placed till December,19.
- In addition, skill training provided to 836 unemployed youths through 2 skilling partners out of which, 255 already been placed till December,19.
- In a move to create skilled manpower and make unemployed youth job ready, centre of excellence for skill development with heavy mining equipment simulator facility and training is being established at Bhubaneswar.MoU signed with SCMS for preparation of

DPRanddraft DPR submitted by SCMS.

- In collaboration with Madhya Pradesh Consultancy Organisation Limited (MPCON) Gwalior, training on mobile repairing and laptop repairing has been imparted to 300 candidates and placement is in progress.

- For other details of CSR activities done by NALCO please refer.

Hindustan Copper Limited (HCL)

9.4 HCL's CSR Policy revolves around the principles laid down in the Sustainable Development Goals (SDGs), Government Rules and DPE guidelines on CSR.

9.5 The actual expenditure on the CSR activities during last two financial years and current financial year is given in the table below.

CSR expenditure during last two financial years and current financial year

(Rs. in lakhs)

Financial Years	Required (2 % of average net profit (PBT) of last three FYs)	Expenditure
2017-18	147.00	343.00
2018-19	170.33	208.16
2019-20	297.26	241 *

*As on 28.02.2020

9.6 A detailed Plan for FY 2019-20 was prepared in alignment with The Companies Act, 2013 and also considering the learnings from projects implemented during FY 2018-19. The company allocated CSR Budget of 2% of the average net profits of the company made during the three immediately preceding financial years to the extent of ₹ 297.26 lakh for FY 2019-20.

9.7 The projects are being implemented in the target communities with the help of NGO, state government and other agencies in Indian Copper Complex (ICC), Ghatsila, East Singhbhum District (Jharkhand), Malanjkhand Copper Project (MCP), Malanjkhand, Balaghat District (Madhya Pradesh) and Khetri Copper Complex (KCC), Khetrinagar, Jhunjhunu District (Rajasthan).

Following are the major CSR activities that have been taken up during the year.

i. Drinking Water, Health and Sanitation:

- Constructed 5 number of Drinking Water Structures in ICC benefitting 150 families.
- Supplied Drinking Water through Water Tankers for 4 villages in MCP benefitting more than 500 families.
- Constructed 40 Individual House Hold Toilets in ICC.
- Installed 5 number Sanitary Napkin Vending Machines and Incinerator in ICC
- Promoted menstrual hygiene in Villages and Schools near MCP benefitting 500 adolescent girls and women.

ii. Education, Vocational Skills and Livelihood:

- Skill training to 210 persons under Kaushal Vikas Yojna at ICC, MCP & KCC in Mining trades.
- Training to 30 youth in the 'Winding Engine Driver' trade at Skill Development Institute, Khetri, Rajasthan.
- Training on Hand Glove Making, Handloom, Wooden Craft, Dokra Craft, Muri and Nursery raising to 12 Self Help Groups with 125 women at ICC.
- Support to School education by creating smart Classes at 21 Schools in areas around ICC.
- Renovation of Kendriya Vidyalaya School Building and construction of 2 Toilets in Government Schools in Khetri.

iii. Medical Services:

- Organized 44 Health Camps through Mobile Health Vans in Villages and treated around 2800 cases around MCP, Malanjkhand.
- Organized 110 Health Camps covering 800 patients and treated cataract of 184 patients in villages around ICC.

iv. Sports:

- Promoted Sports by organizing Football and Cricket tournaments with participation of 35 and 25 teams respectively. Established, 3 Archery training centers covering 103 Girls at ICC.

9.8 HCL received 'Honourable Mention' at the National CSR Award 2018 in the category – Corporate Awards in CSR in Challenging Circumstances, Sub Category – East on 29th October, 2019 at Vigyan Bhawan New Delhi, for its project on Drinking Water and Sanitation.

For other details of CSR activities done by HCL please refer https://www.hindustancopper.com/Page/CSR

Mineral Exploration Cooperation Limited (MECL)

9.9 MECL has drawn a long term Corporate Social Responsibility (CSR) Policy.

9.10 For the year 2019-20, an amount of Rs. 362 Lakhs have been spent under CSR. The details of proposed CSR programmes are given below:

1. Promoting Sanitation & Safe drinking water:

a. Establishment of water purifier cum coolers near exploration project sites/zonal offices of MECL in the districts of Hyderabad, Shahdol, Bikaner, Nagaur, West Godavari, Sundergarh, Raigarh, Dhanbad, Surguja, Balrampur and Nagpur.Construction of bore well at West Godavari District, A.P. and at Raigarh District, Chhattisgarh.

2. Promoting Healthcare

a. Providing one Ambulance each at:
   - Ranchi District, under TADP
   - Public Health Centre, Dhanla, Nagpur Dist.
   - NGO Shri Adinath Samiti, Jabalpur (M.P.)

The ambulances will benefit people in these districts/locations to avail Ambulance facilities in case of health and emergency needs.

b. Financial assistance to Ramakrishna Math, Nagpur for purchase of medical equipment i.e. Soft Tissue Dental Laser and Prima DNT Microscope Stand with 5 Step floor.

3. Promoting Education

a. Setting up of Computer Centre at Government Schools near exploration project sites of MECL in the districts of Hyderabad, Shahdol, Bikaner, Nagaur, West Godavari, Sundergarh, Raigarh, Dhanbad, Surguja, Balrampur and Nagpur.

b. Providing School bus to school run by NGO Janjati Kalyan Kendra Mahakaushal, Dindori (M.P.) benefitting tribal & other students at Dindori, M.P

c. Providing Stationery Items, Braille Kits, Almirah, School Bags etc. for benefit of underprivileged students near MECL's corporate office, Nagpur.

d. Improving quality of education at Residential Tribal School at Kosumdhih, Dindori Dist.

e. Implementation of learning management and school management system by NGO Pragya Social Organisation at Government School in Raigarh, Chhattisgarh

4. Promoting Women Empowerment

a. Imparting Tailoring Skill for poor women at Mahakaushal, Jabalpur, M.P

b. Imparting training on "Early Childhood Care & Women's education & Livelihood Program" to 30 Women by NGO Daksh Foundation at Jabalpur, M.P.

c. Distribution of Sanitary Napkins to girl students near MECL's corporate office, Nagpur, through NGO UPAY.

d. Distribution of Sewing Machines for vocational training of girls/women near MECL's corporate office, Nagpur.

5. Promoting Art & Culture/Rural Development

a. Construction of community hall at Bikaner, Rajasthan.

9.11 MECL has received "National CSR Award 2019" under the 'Honourable Mention' category on 29thOctober, 2019 at New Delhi, for its contribution in challenging areas to the nation through its CSR Activities.

9.12 MECL has also received award in Recognition of Valuable Contribution made by the organisation towards the society at the Air Force Flag Day Fund-CSR Conclave-2019, New Delhi on 2nd December, 2019.

9.13 Community Welfare

a. Tarpaulin Sheets distribution for protection in rainy season to 100

Nos. of below poverty line beneficiaries living in Raj Nagar and other Slum areas of Nagpur.

b. Distribution of 1000 Nos. blankets to poor and needy people in and around MECL's corporate office, Nagpur.

9.14 Impact Assessment by TISS

MECL has engaged Tata Institute of Social Science (TISS) for conducting Impact Assessment of CSR Activities undertaken during the last 03 years. The same is underway.

9.15 Armed Forces Flag Day Fund

MECL has approved contribution of an amount of Rs. 50.00 Lakhs to the Armed Forces Flag Day Fund (AFFDF) for the welfare and rehabilitation of Ex-Servicemen, War Widows and their dependents, for FY 2019-20.

For other details of CSR activities done by MECL please refer

10 Progressive Use of Hindi

Back to Index

Progressive Use of Hindi

Introduction

10.1 The Ministry of Mines continues to take steps to ensure compliance of the Official Language Policy of the Union in the Ministry of Mines as well as in its attached/subordinate Offices and PSUs. The compliance of Section 3(3) of Official Languages Act, 1963 is ensured.As per rule 5 of Official Languages Rules, 1976, during the year out of the 866 letters received (up to Dec. 2019) in Hindi 335 letters were for information only and reply was not required and remaining 531 letters were replied to in Hindi.

Hindi Salahakar Samiti

10.2 After the expiry of the tenure of the erstwhile Hindi Salahkar samiti of the Ministry of Mines and formation of the XVIIth Lok Sabha, the process for reconstitution of Hindi salahkaar samiti is in progress. Out of the 15 non-official members to be nominated in the samiti, nominations of 02 members (Member of Parliament) by committee of Parliament on Official Language and nomination of 01 non-official member by Rashtrabhasha Prachar Samiti, vardha has been received. 04 members (Member of Parliament) by Ministry of Parliamentary Affairs, 04 members by Ministry of Mines and 03 members by Ministry of Home Affairs are yet to be nominated.

Official Language Implementation Committee (OLIC)

10.3 The Official Language Implementation Committee (OLIC) has been constituted in the Ministry under the chairmanship of Joint Secretary. Meetings of the committee were held on 25.04.2019 and 29.07.2019 during the year (upto Dec.2019). Progress of usage of Hindi in official work in different sections of the Ministry was reviewed and Officers representing different divisions/sections were asked to increase correspondence in Hindi with Offices located in region 'A' and region 'B' and officials who are proficient in Hindi should increase usage of Hindi in noting/ drafting to achieve the targets fixed by Deptt. of Official Language in annual Programme for the year 2019-20.

10.4 Similarly, meetings of the OLIC in Geological survey of India (GSI) Central Headquarters, Kolkata were held on 26.06.2019, 26.09.2019 and 30.12.2019 besides these meetings, GSI reviewed quarterly progress reports of regions and missions through video conferencing on 21.05.2019, 05.08.2019 and 11.11.2019. An all India Annual Rajbhasha Review meeting was also organized on 19.12.2019 at GSI training Institute, Hyderabad.

10.5 Indian Bureau of mines (IBM) Headquarters, Nagpur held meetings of OLIC on 14.06.2019, 30.09.2019 and 11.12.2019. All the subordinate offices of IBM have achieved all the targets mentioned in Annual Programme of the Department of Official language.

10.6 PSUs under administrative control of the Ministry i.e., National Aluminium

company Ltd. (NALCO), Hindustan Copper limited (HCL) and Mineral Exploration corporation Limited (MECL) also held OLIC meetings to review the progress of Hindi in official work in their respective offices.

Town Official Language Implementation Committee (TOLIC).

10.7 As per the directions issued by the Department of Official Language, Ministry of Home Affairs, Town Official Language Implementation Committee (TOLIC) is constituted in every town having 10 or more central government offices. Geological Survey of India, Central Headquarters is nominated as Head of Town Official Language Implementation Committee, Kolkataand the Director General, GSI is ex-officio Chairman of this committee. 62 Offices of Kolkata are included in this committee.

10.8 NALCO participated in 2 meetings of TOLIC held at Angul and Bhuvneshwar. Meeting at Bhuvneshwar was convened under the chairmanship of CMD, NALCO in September, 2019.

10.9 HCL also participated in the half yearly meeting of TOLIC (PSUs), Kolkata held on 31st August, 2019.

Official Language Inspections

10.10 As per Annual programme of Deptt. of Official Language, Ministry of Home Affairs for the year 2019-20 ministries/ departments are required to conduct official language inspections of minimum 25% of offices located outside Headquarters. Ministry couldn't conduct any such inspection during the year 2019-20.

10.11 GSI central Headquarters, Kolkata conducted OL inspections of its sections/ divisions and its 05 subordinate offices.

10.12 Similarly, IBM Headquarter, Nagpur also conducted OL inspections of Its sections and divisions as well as its 02 subordinate offices. Inspection reports were sent to concerned offices highlighting the shortcomings noticed during the course of inspections and suggesting measures to remove the shortcomings.

Inspections by Committee of Parliament on Official Language

10.13 Committee of Parliament on Official Language visited office of Mineral Exploration Corporation Limited, Nagpur on 21.01.2020 and Indian Bureau of Mines Bhuvneshwar on 20.02.2020. Officers representing Ministry of Mines in above inspections held a briefing meeting with Head of the office and officers attending inspection meeting. While appreciating the status of correspondence in Hindi in these offices, Committee suggested some measures to improve the usage of Hindi in other areas of official work. Necessary action on assurances given to the committee is to be taken by concerned Offices.

Measures for Implementation of Official Language Policy

10.14 During the year 2019-20, besides various incentive Schemes of the Department of Official Language,measures taken for implementation of Official language policy include training, workshops, seminars, organization of Hindi week/fortnight/month and publication of in-house magazines which are detailed below:

Training, Workshops and seminars

10.15 In order to encourage officials/ employees to perform their official work in Hindi, Ministry of Mines organize workshops from time to time. A workshop on Official language policy and implementation was organized on 24.04 2019 and in order to train officials to work on e-office in Hindi a workshop was organized on 25.09.2019 wherein 30 and 35 officials participated respectively.

10.16 Similarly GSI CHQ Kolkata organized Hindi workshops on 09.05.2019, 20.08.2019, 19.09.2019 for its officials and one all India Hindi workshop at GSITI, Hyderabad on 20.12.2019. Besides workshops, GSI also organized an all India scientific and Technical Rajbhasha seminar on 20.06.2019 at western region, Jaipur. As many as 30 research paper/articles were presented in this seminar, out of which 07 writers were rewarded. Intensive training classes for Hindi language training are also being organized and typists and stenographers are being nominated in a phased manner for Hindi typing and stenography training.

10.17 Indian Bureau of mines (IBM) Headquarters, Nagpur also organized Hindi workshops on 11.06.2019, 16.09.2019 and 10.12.2019 in which 20, 43 and 20 officials participated respectively. In the same manner, Hindi workshops were also organized in different regional offices of IBM. Hindi Parangat Training was organized at IBM HQs from Jan 2019 to May 2019 in which 25 personnel were trained. All the candidates qualified the examination.

10.18 National Aluminium Company Ltd (NALCO) organized06 Hindi workshops wherein employees and officers were trained to do official work in Hindi.A workshop on 'Hindi Implementation provisions' for the executives of the level of E7/E8 was convened in November, 2019. During the year 28 officials of NALCOwere provided Hindi Training and passed Pragya examination under Hindi teaching scheme of Government of India.

10.19 A workshop under the banner of TOLIC was convened on 20th Dec.,2019 wherein official from NALCO participated.

10.20 Hindustan Copper Limited (HCL) also organized Hindi workshops in its Units/Offices for its employees.

10.21 Mineral Exploration Corporation Ltd. (MECL) organized 03 Hindi workshops in which 60 Executives and Non-Executives participated.

Organization of Rajbhasha Fortnight/Month

10.22 Ministry of mines observed Rajbhasha Hindi PrayogProtsahan Month from 1st to 30thSeptember, 2019. A message by Hon'ble Minister of Mines, Shri Pralhad Joshi was circulated on the occasion of 'Hindi Diwas'. Various competitions i.e. Hindi Noting/Drafting competition, Hindi Sulekh and Dictation, Quiz Competition, Hindi typing, extempore speech competition and Hindi workshop were organized during the month. As many as 53 officials, who were winners in the competitions, were given away cash awards and certificates by Dr. K. Rajeswara Rao, Additional Secretary (Mines) in an event organized on 25.10.2019.

10.23 Hindi fortnight/week/day was also celebrated during the month of September, 2019 in GSI Central Headquarters, Kolkata, IBM Headquarters, Nagpur, NALCO Corporate Office, Bhuvneshwar, HCL Office, Kolkata, MECL Office, Nagpur, JNARDDC Office, Nagpur and NIMH. Various Hindi competitions were organized and winners were rewarded with prizes and certificates.

Translation Work

10.24 Translation work relating to Meetings of Standing Committee, audit paras, Cabinet Notes, Annual Report, Parliament Questions, outcome budget, material relating to Demand for grants, MoUs for International Cooperation in the field of mines & minerals with various countries was carried out during the year. Against around 2,94,698 words translated in 2018-19, during the year 2019-20 (upto Feb.2020) more than around 3,52,729 words were translated in Hindi, excluding routine translation work.

10.25 GSI central headquarters, Kolkata translated abstracts of reports related to various survey programmes in addition to routine translation work.

10.26 IBM, Nagpur also translated various technical and administrative documents, in addition to routine translation.

In-house magazines

10.27 In-house Hindi magazines namely 'BHOOMANTHAN' 7th edition of GSI, CHQ, Kolkata; 'Dhauli'9th edition of GSI, State Unit: Odisha, Bhubaneshwar; 'Lichchhivi'5th edition of GSI, State Unit: Bihar, Patna; 'CHETANA' 19th Edition (Special Edition) of GSITI, Hyderabad and 'AKANKSHA' 4th Edition of Southern Region, Hyderabad were published during this period. House magazines of NALCO 'Akshar' and 'Tamralipi' of HCL were also published. Magazines can be viewed at: https://mines.gov.in/UserView/index?mi

d=168_4 Along with that, monthly e-news related to the Training Institute, course material on geology for the Chemist and course material on remote sensing and digital image processing, compilation of activities related to Bhuvisamvad, the institute calendar was published in official language Hindi and can be viewed at:

https://mines.gov.in/UserView/index?mid=1690

Special initiatives taken by PSUs for promoting use of Hindi in Official work

10.28 National Aluminium Company Limited (NALCO**)**

- Two issue of monthly Hindi News letter "Daman Varta" was published from Mines and Refinery unit.
- A Hindi Kavi Sammelan with Hindi poets of national repute was organized at Damanjodi.
- Faculty assistance on Unicode and tools and techniques of Hindi computing was provided to the member offices of TOLIC (Undertaking), Bhubaneswar.
- Rajbhasha Inspection of eastern regional office, Kolkata was conducted by Assistant Director (Implementation), Deptt. Ofofficial languages, Kolkata in November, 19.
- An initiative was taken to make all the new computer to enable with Indic input to create awareness among the employees to type in Hindi in their day to day activity.

10.29 Hindustan Copper Limited (HCL)

- Employees are constantly motivated to use Hindi in their day-to-day official work. Hindi Workshops were conducted in the Units/ Offices at regular intervals.
- Advertisement of company recruitment/ tender etc. is also published bilingual.
- "One Hindi Word Every Day" scheme is operational for improving the Hindi vocabulary of employees.
- At the timeof superannuation, all the employees are given Service Certificate in Hindi.

10.30 Mineral Exploration Cooperation Limited (MECL)

- As per the orders of Ministry of Home Affairs, RajbhashaVibhag, Unicode Encoding "Smarthit' font has been installed in all computers / Laptops also in MECL, so that more officials are able to work in Hindi due to its easy functionality.
- In order to encourage employees to do official work in Hindi, 292 awards were given to employees during the year (till December, 2019).
- In addition, 'Mecsamachar' and internal news letter of MECL has also been published in Hindi only.

11 Exploration Activities in the North-Eastern Region

Back to Index

Exploration Activities in the North-Eastern Region

11.1 Exploration Activities in the North-Eastern Region

Introduction

The North Eastern Region (NER) has a unique geomorphological and geological setup. It consists of eight states with spectacular Himalayan Ranges, massif plateau and alluvium plains of Brahmaputra River. The rocks ranging in age from Precambrian to Recent age are exposed here. This part of the country attains significance with the presence of mighty Himalayan Mountain Belt in the north; Shillong Massif Plateau in the south and gorgeous Brahmaputra valley forming the extensive Assam plain in between and Indo-Myanmar Range in the east.

11.2 Work done by Geological Survey of India (GSI) in North Eastern Region:

The major activities of NER, GSI include baseline data generation through geological, geochemical & geophysical mapping, mineral exploration, compilation and generation of different types of maps and publications, fundamental researches & societal works like landslide/ geotechnical/ earthquake studies. GSI is continually striving for the development of NER states through augmentation of above activities and helping the states of NER in training, capacity building by providing free courses to a number of officers of state DGMs of NER. GSI NER provided technical and scientific assistance by arranging very high end instrument analyses like EPMA (Electron Probe Micro-Analyzer) and SEM (Scanning Electron Microscopy) ofthe representative samples of the DGMs.

11.3 Geological Mapping on 1:25,000 scale

During FS 2018-19, a total of nine items of Geological Mapping including two Research Projects (RP) were taken up in NER of which one project was taken up in Arunachal Pradesh, two in Assam, three in Meghalaya, one in Manipur-Nagaland and two in Tripura-Mizoram. A total of an area of about 811 sq. km and 148 Line km (RP) have been covered during the period from 1stJanuary, 2019 to 31stMarch, 2019.

During FS 2019-20, total six items of Geological Mapping on 1:25,000 scale including one Integrated Thematic Mapping (ITM) and two RP items have been taken up in NER of which one item taken in Arunachal Pradesh, three items in Meghalaya, two items in Assam. During the period from 1st April, 2019 to 31st December, 2019, an area of 543 Sq. km and 137 Line km in RP items have been covered **(Annexure-11.1).**

11.4 Geochemical Mapping (GCM)

GCM is carried out by GSI in different parts of NER to generate baseline regional geochemical data with elemental distribution for targeting areas for search for mineral deposits and detailed studies on the societal concerns viz. environmental, agricultural and human health.

A total of fifteen items of Geochemical Mapping on 1:50,000 Scale with collection of samples in grid pattern have been taken up during the FS 2018-19 in parts of Arunachal Pradesh, Assam, Nagaland and Meghalaya and an area of 6,437 sq. km has been covered during the period from 1stJanuary, 2019 to 31st March, 2019.

Total three items of Geochemical Mapping on 1:50,000 Scale with collection of samples in grid pattern have been taken up during the FS 2019-20 in parts of Assam and Manipur and an area of 860 sq. km has been covered during the period from 1st April, 2019 to 31st December, 2019 **(Annexure-11.2**).

11.5 Geophysical Mapping (GPM)

GPM is taken up with an objective to prepare gravity magnetic anomaly maps so as to delineate sub surface geological structures. These studies along with the geological and geochemical maps help in postulating conceptual models to focus on potential/probable target areas of interest for mineral exploration in deep as well as shallow levels. Two items of Gravity-magnetic mapping in Hojai, Karbi-anglong and Kamrup districts, Assam have been taken up during FS 2018-19 and an area of 1113 sq. km have been covered during the period from 1stJanuary, 2019 to 31st March, 2019.

Two items of GPM in Ri Bhoi, East Khasi Hills and West Khasi Hills districts of Meghalaya, Nagaon, Morigaon and KarbiAnglong districts of Assam have been taken up during FS 2019-20 and an area of 1725 sq. km have been covered during the period from 1st April, 2019 to 31st December, 2019 **(Annexure-11.3).**

As an outcome, a total of 7nos. of Mineral Investigation items have been generated as a spin off items from Geological Mapping, GCM and GPM items.

11.6 Mineral Exploration in NER

Mineral Exploration in NER includesexploration of minerals like Gold, Copper, Graphite, Vanadium, REE, Tungsten, Lateritic Bauxite, Phosphate, Tin, Chromium, Nickel, PGE, Coal and Limestone carried out through Large Scale Mapping on 1:12,500 scale (LSM), Detailed Mapping on 1:1000/5000 scale (DM) and Drilling.

During FS 2018-19, a total of twenty items (12 G4 and 8 G3 stage) have been taken up in the states of Arunachal Pradesh, Assam, Meghalaya, Manipur and Nagaland. During the period from 1st January 2019 to 31st March 2019, an area of 272.50 sq km of LSM, 4.62 sq km of DM and 1445 m of Drilling were carried out.

During FS 2019-20, a total of thirty three mineral investigation items (4 G-2, 9 G-3 & 19 G-4 stage, 1 Regional Mineral Targeting Item) were taken up in the States of Arunachal Pradesh, Assam, Meghalaya, Sikkim, Nagaland and Manipur out of which two G3 stage items on limestone were taken up on the request of DGM, Assam.During the period from 1stApril, 2019 to 31st December, 2019, an area of 641.7 sq. km has been covered by large scale geological mapping (1:12,500 scale) and 14.07 sq.km by detailed mapping. Total 2,345m drilling has been done during the period from 1stApril, 2019 to 31st December, 2019 (**Annexure- 11.4**).

11.7 Publications:

During FS 2019-20, the following items on Publications have been taken up:

- Publication of Records of GSI- Vol. 152, Part 4 (Extended Abstracts of progress reports of FS 2017-18 of NER) and Vol. 153, Part-4 (Extended Abstracts of progress reports of FS 2018-19 of NER).

- Geology and Mineral Resources of Arunachal Pradesh(Publication of Misc. Pub. No. 30 Pt IV, Vol. 2 (II).

- Publications of GSI, E-news (NER), Vol. 29 (i) for the period from April 2019 to June 2019

- Creation of geo database on 1:25,000 scale: Attributes for 16 Nos. of toposheets viz., 82L/15 & 16, 82P04, 83J/3, 4, 6, 7, 8, 10 & 11, 83E/3, 4 & 8, 83G/13, 14, 83K/2 parts of 78O/14 & 15 and parts of 78A/11 & 12 have been incorporated in geo database after consulting reports of Specialized Thematic Mapping projects of Arunachal Pradesh, Nagaland and Meghalaya.

- Compilation of Quadrangle Geological Maps (GQM), for degree sheet 82L (Arunachal Pradesh), 83L& 84I (Manipur & Nagaland) has been completed and is under scrutiny.

- For Arunachal Pradesh, finalization of seven DRMs (District Resource Maps) of Tirap, Longding, Lohit, Namsai, Changlang, Dibang Valley and Anjawdisticts) is under progress whereas five DRMs of Tawang, East Siang, West Siang, KurungKamey and East Kameng districts will be uploaded in GSI portal very shortly for public viewing.

Research and Development

11.8 Petrological Studies

Two Research items have been taken up as (a) Comprehensive petrological, petro-chemical and geochronological studies of the Abor and Lichi volcanic of Arunachal Himalaya to understand their significance in the tectonic evolution of North Eastern Region and (b) Petrological studies of the Higher Himalayan Crystal lines along Yinkiong-Tuting and Monigong-Tato-Menchuka sections of Arunachal Himalaya.

11.9 Paleontological Studies:

During FS 2019-20, “Study of the Palaeo-biology of mega-invertebrates across K-Pg transition in Meghalaya shelf and the Palaeo environmental implication” has been taken up in and around Amlarem, Amlari Quarry and Syndai, West Jaintia Hills District and around Lyndem and Pongtung, East Khasi Hills District, Shillong. Formation has brought out a change in the faunal diversity pattern and variation in the taxonomic richness which is analogous to many Upper Maastsichtian sections. In “Faunal diversity and palaeo-environment of Upper Cretaceous Mahadek Formation of Meghalaya Plateau” project, a few numbers of vertebrate fragments suspected to be dinosaurian bones have been collected.

Special Investigation

11.10 Geotechnical investigations:

NER may be termed as the ‘power house’ of India as it possesses hydropower potential, which is about 30% of the total hydel potential of the country. The hydel potential of major river basin of Arunachal Pradesh like Kameng, Subansiri, Siang, Lohit and Dibang totals production of 34,920 MW at 60% load factor (CEA) i.e. about 90% of the total hydropower resources of NER.

GSI, NER is intimately associated with the development of hydel power in NER conducting geotechnical studies at various stages of geotechnical investigation to identify suitable sites for locating dams,

powerhouses, selecting tunnel alignments and suggesting remedial measures during construction. Besides Hydro-Electric Project, GSI also carried out geotechnical investigation of various transport and communication projects such as Sela Pass Tunnels, Gangtok-Sherathang-NathulaHighway (JNM Road) and Jiribam-Imphal Broad Guage Railway Line (NFR).

During the current FS 2019-20, Engineering Geology Divisions, GSI, NER, Shillong has taken up two Geotechnical Investigation projects i.e. DPR stage geotechnical investigation of Haora and Champaicherra irrigation project, West Tripura District, Tripura and Geotechnical investigation of proposed residential building at Lower Lachimure area, Shillong, Meghalaya.

11.11 Landslide Hazard Studies:

In North-Eastern Region, Twenty-two standard items in FS. 2018-19 and fourteen standard items under the National Landslide Susceptibility Mapping programme have been taken up during FS 2019-20. In addition, 3 Meso-scale and 1 Site specific landslide studies are being taken up, out of which five items have been taken up on the request of State Governments in FS. 2019-20.

11.12 Earthquake Studies:

Three regular items have been taken up in NER on seismic and earthquake studies in FS 2019-20 (2 items requested by the State Governments). The Level B Seismic Microzonation for three cities (Dibrugarh, Silchar and Pashighat) is being taken up which involves integrated studies of seismic source, seismic response through geological, geotechnical and geophysical parameters and their relation to seismic susceptibility following guidelines of GSI, 2017. Monitoring of Ground Motion in Brahmaputra Basin, Naga Patkoi and NE Himalaya with the objective to generate and process data for long term monitoring of the ground motion in the selected parts of Brahmaputra basin, Naga Patkoi range & northeast Himalaya and to delimit the boundaries especially southern and eastern boundaries of the micro plate breaking off from the Indian plate through Campaign mode DGPS.

11.13 Environmental Geology

In FS 2019-20, two projects have been taken up on environmental Geology. One project is dealing with the study of flood and erosion of bank areas in Majuli, Brahmaputra River, Assam and other on the geo-environmental appraisal of the Kalyanpur and Kamalnagar in parts of Khowai River Basin, Tripura.

11.14 Budget and Expenditure of the North Eastern Region for the Financial Year 2019-20 (Allocated Plan Outlay for NER) is given in the Table-11.1.

Table –11.1

(Rs. In Lakh)

F.Y. 2019-20

Activities	BE Grant-2019-20	Additional fund allotted to NER -2019-20	Total Allocation 2019-20	Grant from April,19 to Dec, 2019	Actual Expenditure (April,19 to Dec,19)**	Grant from Jan,19 to Mar, 2019	Budget from Jan 2019 to Dec., 2019
	1	2	3 (1+2)	4	5	6	7 (6+4)
Survey and Mapping	80	0	80	45.01	35.32	38.95	83.96
Mineral Exploration	165	9.5	174.5	130.88	118.51	42.45	173.33
Special Investigation	45	0	45	35.7	35.65	7.45	43.15
Research & Development	46	0	46	27.86	21.1	13.59	41.45
Information Dissemination	125	6.75	131.75	98.81	35.83	68.56	167.37
HRD	17	0	17	12.75	9.64	6.91	19.66
TSP	0	400	400	401.25	175.54	48.15	449.4
SCSP*	0	0	0	0	0	0	0
Administrative Support Activity including minor works authorization to MoUD	817	5.62	822.62	745.24	701.28	227.88	973.12
Establishment Expenditure	5500	133.5	5633.5	4888.38	4876.06	954.61	5842.99
Total Revenue	6795	555.37	7350.37	6385.88	6008.93	1408.55	7794.43
Capital (Modernization & Replacement)	140	151	291	218.25	143.45	91.76	310.01
Total (Rev + Capital)	6935	706.37	7641.37	6604.13	6152.38	1500.31	8104.44
% of Utilisation of Fund against RE	-	-	-	-	93.16	-	-

* Scheduled Caste Sub Plan (SCSP) head introduced in FY 2019-20

** Expenditures beyond the allocated BE grant of NER have been made from the BE grant of GSI (excluding NER).

Work done by Indian Bureau of Mines (IBM) in North Eastern Region

11.15 The Regional Office of IBM at Guwahati continued to undertake inspection of mines and studies on development of resources in North-Eastern Region. During the year 2019 (January to November 2019), 21 Nos. of inspections were carried out for enforcement of provisions of MCDR, 2017 and for processing and disposal of mining plan/scheme of mining. The details of inspections, results and follow up actions thereof are given below:-

Parameter	Details
No. of inspections	Total - 21 Nos. MCDR– 6 Nos. MP/RoMP/FMCP– 10 Nos. Check up/ Others– 5 Nos.
No. of violations issued	12 Nos.
No. of rules violated	7 Nos. [Rule 11(1), 11(4), 26(2), 27(2), 33, 35(2) & 55 of MCDR 2017]
No. of show cause notices issued	5 Nos.
No. of mines where violations not complied even after issue of show cause notice	Not complied -1 No. Within time frame of showcause notice – 3 Nos.
Action taken: **Court case –** **Suspension –**	In process 1 No.

11.16 Based on the proposals received, two day training programme on MMDR Act, 2017,MCR, MCDR, Mineral Auction Rules and various rules made there under was organized on 8th and 9th July 2019 at Kolkata . Course module in this regard was devised as per specific requirements. In this training, two persons from NE region have participated.Annual Strategic Interaction Meet was organized with the Principal Secretary (Mines & Minerals Dept.), Govt. of Assam, Secretary (Mines), Govt. of Meghalaya & Addl. Chief Secretary, Govt. of Manipur on dated 25.4.2019, 26.4.2019 & 27.4.2019

respectively; wherein different issues were discussed with the respective States.

Work Carried Out by MECL in North Eastern Region

11.17MECL has been associated with mineral exploration activities and geo-technical studies for the development of mineral industry in the North Eastern Region since 1977. It has completed exploration for coal in 15 blocks in the states of Assam, Arunachal Pradesh, Nagaland and Meghalaya on behalf of Ministry of Coal, North Eastern Council and CMPDIL. Under its promotional programme funded by Ministry of Mines, it has completed twelve projects which include Copper, Sillimanite, Glass sand, shell Limestone and ferro-silicon grade quartzite in the states of Assam, Meghalaya, Nagaland, Mizoram, Sikkim and Arunachal Pradesh. In addition, it has carried out geo-technical studies on behalf of Brahmaputra Flood Control Board in the State of Assam and Arunachal Pradesh and consultancy work for remote sensing studies at Tripura on behalf of Ministry of Mines. Exploration services were also rendered to Atomic Minerals Division involving survey, drilling & mining in Umarangaon/ Domiaset block, West Khasi Hill district.

11.18 On behalf of Directorate General of Hydrocarbon, Government of India, MECL with BRGM France has completed studies for resource estimation in respect of oil shale deposit in an area of 254 sq. km. of Assam & Arunachal Pradesh. A total of 932 million tonnes of Oil Shale deposit have been established in the study area.

11.19 MECL is keen for development of North Eastern States. Hence with focus on North Eastern Region to augment exploration, MECL has signed MoU with Government of Assam. Exploration in Khotarda block, Mikir hills district was commenced in December, 2019.

11.20 Discussions are under progress with Government of Meghalaya and Arunachal Pradesh for signing of MoU Draft MoU has been sent to the respective State Governments and it is under consideration at their level.

12 Welfare Activities for SCs/STs, Women, Minorities & Persons with Disabilities.

Back to Index

Welfare Activities for SCs/STs, Women, Minorities & Persons with Disabilities.

Welfare of Scheduled Castes (SCs), Scheduled Tribes (STs), Women and other Weaker Sections

Ministry of Mines

12.1 The Ministry of Mines, with its attached office, subordinate office and the Public Sector Undertakings under its administrative control follow the Government guidelines with regard to welfare of weaker sections of the society, in letter and spirit. For upliftment of weaker sections of society, PSUs identify and implement a number of programmes in the peripheral area of their units/locations.

12.2 A number of activities like community education programmes, facilitating availability of drinking water, development/repair of approach roads of surrounding areas, arranging health awareness programmes and medical camps in rural areas were undertaken by the PSUs for upliftment of the community in and around their townships as part of their social responsibility.

Women's Welfare

12.3 A complaint committee under chairpersonship of Smt. Reena Sinha Puri, JS&FA has been constituted to look into cases of sexual harassment of women at work place.

12.4 Ministry of Women & Child Development has developed an online complaint Management System titled Sexual Harassment electronic –Box (SHe-Box) (www.shebox.nic.in) to receive complaints related to Sexual Harassment at workplace.

12.5 The Geological Survey of India GSI), an attached office of Ministry of Mines and Indian Bureau of Mines (IBM) subordinate office under Ministry of Mines have also undertaken a number of activities for the welfare of Scheduled Caste (SC) / Scheduled Tribe (ST), Other Backword Class (OBC), persons with disabilities (PWD) and other weaker sections of the Society.

12.6 Measures were undertaken for officials belongs to SC, ST, OBC and PwD communities @15%, 7.5%, 27% and 4% respectively against vacancies reserved for them as per order issued by the Govt. of India/MoM/DoPT from time to time. Reservation has been followed strictly in case of their employment/promotion wherever applicable.

12.7SC/ST cell has already been established in Headquarters as well as in the respective Regional offices under supervision of the Liaison Officer to address difficulties faced by these communities and also to initiate appropriate measures for resolving their issues.

12.8 The total strength of employees in the Ministry, GSI and IBM and the representation of SC/ST/OBC and other weaker sections during the year 2019 is as follows: -

Ministry of Mines	Representation of SCs/STs/OBCs				
Group	**Total Employee**	**SCs**	**STs**	**OBCs**	**Others**
(1)	(2)	(3)	(4)	(5)	(6)
A	32	3	3	1	25
B	72	16	7	13	36
C(Excluding SafaiKarmchari)	43	7	1	2	33
C(SafaiKarmchari)	0	0	0	0	0
Total	147	26	11	16	94

GSI	Representation of SCs/STs/OBCs				
Group	**Total Employee**	**SCs**	**STs**	**OBCs**	**Others**
(1)	(2)	(3)	(4)	(5)	(6)
A	2634	449	197	724	1264
B	1540	275	168	184	913
C(Excluding SafaiKarmchari)	1933	406	218	299	1010
C(SafaiKarmchari)	0	0	0	0	0
Total	6107	1130	583	1207	3187

IBM	Representation of SCs/STs/OBCs				
Group	**Total Employee**	**SCs**	**STs**	**OBCs**	**Others**
(1)	(2)	(3)	(4)	(5)	(6)
A	133	17	9	32	75
B	315	43	16	39	217
C(Excluding SafaiKarmchari)	351	75	25	60	191
C (SafaiKarmchari)	0	0	0	0	0
Total	799	135	50	131	483

National Aluminium Company Limited (NALCO)

12.9 Welfare of activities for SCs/STs, Women, Economically Weaker Section (EWS), Minorities and Persons with Disabilities

- The Presidential Directives issued from time to time on reservation of SC/ST persons in employment has been scrupulously followed by the company. There are exclusive cells constituted for the welfare of the SC/ST employees which meet and discuss their view points at regular intervals both at complex level as well as corporate level.

- The following concession/relaxations are given to SC/ST candidates in the matter of direct recruitment.

(a) Age relaxation of 5 years.
(b) Exemption from payment of application fee.
(c) Re-imbursement of travelling expenses for attending both written test and interviews.
(d) Relaxation of experience up to one year.
(e) Relaxation in qualifying marks for eligibility.
(f) Relaxation of 10% marks both in written test and interview (for posts requiring interview).

- Relaxation/concession in promotions - relaxation of 10% of marks both in written test and interview is given to SC/ST employees in promotion up to lowest rung of Group-A.
- 10% reservation in A & B type quarters & 5% in C, D & E type quarters is given to SC/ST employees in allotment of residential quarters.
- Liaison Officers have been appointed for each of the units for implementing the presidential directives as well as to look after the welfare of SC/ST employees. SC/ST cell has also been constituted under the control of the respective Liaison Officers to ensure prompt disposal of grievances and representations of SC/ST employees.

- 20% of the scholarships are reserved for the children of SC/ST employees under Nehru memorial scholarship awarded to the children of NALCO employees along with relaxation of 10% in marks.
- Invariably in all the selection committees/boards for recruitment and the departmental promotion committees for promotion, an officer from SC/ST category of appropriate status is included as one of the members in order to take care of the interest of the SC/ST candidates.

12.10 Minority Welfare

A member of the minority community is associated in the selection committees for recruitment in order to give a fair deal to the minority community. Advertisement to fill up the vacancy position is notified in regional languages in order to encourage the minority candidates about recruitment especially in Group- 'C' & 'D' posts.

12.11 The Persons with Disability (PWDs)

The Company has been making efforts to achieve representation of PWDs (Divyangs) in all posts in Group: A, B, C & D as per Section -34 of the Rights of Persons with Disabilities Act, 2016. From 19thApr' 17 onwards, 4% of vacancies are being reserved for persons with disabilities as provided in the Act. As on 31stDecember, 19, there are 92 persons with Disability in employment of the Company in various identified posts. An 'Equal Opportunity Policy' as required under the Act has been formulated and the same has been widely circulated in addition to web-hosting.The different facilities/establishments of the Company have been made accessible as required under the Rights of Persons with Disabilities Act, 2016 and the 'Accessible India' campaign. However, these are being constantly monitored to bring about further improvement in the facilities.

12.12 Perspective Plan for Women Welfare

The Company has adopted the principle of equal opportunity to the women employees in the matter of employment and the Company as on 31st December, 19 has 360 nos. of women employees at different levels and categories.

The ladies clubs in all units have extended necessary assistance for carrying out their various activities which in turn enhances their leadership and organizing capabilities in addition to welfare of the society.

Hindustan Copper Limited (HCL)

12.13 Welfare Activities:

- **Employees Participation in Management**

Employees Participation in Management over the years has been the backbone of harmonious Industrial Relations in the Company. The successful operation of various Bi-partite forums at all three levels, namely, at the Apex level, Unit level and Shop floor level has immensely contributed in the smooth performance of the Company. Quality Circles which were introduced in all the production units of the company have been successfully functioning and

contributing towards reduction of cost and increasing productivity.

- **Perspective Plan for Women Welfare**

In pursuance to the judgment of the Supreme Court, HCL has set up Committees in all the Units/Offices of the company for the prevention of sexual harassment of women in work place. A provision in this regard has also been incorporated in the Conduct, Discipline and Appeal Rules of HCL. During the year no incidence has been reported / registered to the Committee at different Units / Offices.

- **Representation of SC/ST and OBC**

The representation of SC, ST and OBC employees out of the total manpower of 2006 as on 01.01.2020 is 17.4%, 13.5% and 14.2% respectively.

- **Other Welfare Measures**

The retired employees of the Company and their spouses are extended medical treatment at the Company's Hospitals at the Projects. Company also extends support to 'Mahila Samiti' and other institutions / NGOs in their endeavor to run 'Health Camps' for the local population under CSR programme.

In the townships of the Company located at Khetri, Malanjkhand and Ghatsila as well as in other places of work, the employees of different caste, creed, religion, live together and celebrate all religious festivals with pomp and gaiety.

The Company maintains Cultural Clubs for the employee at all the production Units.

12.14 Industrial Relations

Industrial Relations situation in all the Units of the Company continued to be harmonious and peaceful during the year 2019-20.

The Status of Implementation of the Persons with Disability act, 1995.

12.15 During last few years, there has been limited recruitment in the company. Therefore, there was hardly any scope of fresh inductions of physically challenged persons. In addition, the mining operations of the Company being hazardous in nature, the scope of engagement of physically challenged persons is limited. The number of physically challenged persons employed in the Company as on 01.01.2020 is given in **Table 12.1.**

Table 12.1

Group	Number of Persons with Disabilities (PWDs)
A	15
B	1
C	6
D	6
Total	**28**

Human Resource Development

12.16 Training and Development of all levels of employees is given due priority by HCL to increase efficiency and effectiveness. Special emphasis was given to organization building and shaping right attitudes, team building and work culture besides preparing employees to understand the trends in fast changing technology/switching over to latest technology for achieving higher results in production, productivity and profitability.

MANPOWER STRENGTH:

12.17 National Aluminium Company Limited (NALCO): Employment of SC/ST/Ex-SM/PWD/LDP/Minorities in the Company as on 31StDecember, 2019 is given in **Table 12.2**

Table 12.2

Group	Total No Of Employees	SC	ST	EX-SM	PWD	LDP	Minority
Executives	1,748	265	147	0	22	28	71
Non-executives	4,444	748	1010	12	70	1,615	165
Trainees	84	14	19	1	0	59	5
Total	**6276**	**1,027**	**1,176**	**13**	**92**	**1,702**	**241**
		2,203					

It may be seen from above that every third employee of the organization belongs to SC or ST Community.

12.18 Hindustan Copper Limited (HCL): The manpower strength of the Company as on 31.12.2019 is 2006 is in **Table 12.3**

Table 12.3

Category	SC	ST	OBC	General	Total
Executives (Nos.)	87	30	105	356	**578**
Non-Executives (Nos.)	262	241	180	745	**1428**
Total (Nos.)	**349**	**271**	**285**	**1101**	**2006**

12.19 Mineral Exploration Cooperation Limited (MECL) - The category wise employment position including General /SC /ST /OBC /Minorities /Women (As on 31.12.2019) in the company is given in **Table-12.4**

Table – 12.4

Employment of Personnel as on 31.12.2019

Group	Total No. of employees	General	SC	ST	O.B.C	Minorities	Women
A	278*	164	33	12	69	13	21
B	09	06	02	00	01	00	01
C	734	329	131	49	225	29	31
D	-	-	-	-	-	-	-
Total	**1021***	**499**	**166**	**61**	**295**	**42**	**53**

* Including functional directors.

12.20 Welfare of SC/ST: MECL gives due importance to meet socio-economic needs of the SC and ST employees of the organisation.

12.21 Women and weaker sections: MECL has continued woman development & childcare under MoU with Daksh Foundation for its CSR project – "Early childhood care & women's education and livelihood programme". Wherein a focused approach has been given to women development and childcare in the state of MP, district, Jabalpur. Under these project 30 women belonging to under privileged background have been benefitted.

12.22 MECL has initiated '**MECL ki Ladli'** Scheme, through which hygiene kits to under privileged girls child is being distributed.

12.23 Creche facility with well equipped rest room, air conditioning, soft toys, and water facility has been continued at MECL premises at Gurukul for female employees and their children.

12.24 MECL is an equal opportunity employer for women employees where the service rules are uniformity applicable to both male and female employees. The company is successfully running its crèche facility. The women employees in the Company are provided Maternity benefits as per rules.

12.25 Laws relating to protection of dignity and safety of women in the workplace are being adhered to. The ratio of male to female employees turned out to be 18:1 in the financial year 2019-20 (data as on 31.12.2019)

12.26 The company has in place an Anti-Sexual Harassment policy in line with the requirements of the Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013. Internal Complaints Committee (ICC) has been set up to redress complaints received regarding sexual harassment. All employees (permanent, contractual, temporary, trainees) are covered under this policy. Number of complaints received is nil and number of complaints disposed off is nil as on 31.12.2019.

12.27 In line with the Rights of Persons with Disability Act, 2016, MECL has implemented Equal opportunity Policy as per directive of Ministry of Social Justice & Empowerment.

Jawaharlal Nehru Aluminium Research Development and Design Center (JNARDDC)

12.28 Welfare for Persons with Disabilities (PWD), Women, SC & ST. The Centre is following the various government guidelines w.r.t PWD, SC, ST and OBC reservation.

National Institute of Miners' Health (NIMH)

Women

12.29 The Institute is following all the standard guidelines & policies issued by Govt. / Ministry towards the woman employees. Dr. Shubhagi Pingle, SRO has been nominated as nodal officer to handle the grievances of the woman employees & till date the Institute has not received any grievance from any woman employee.

SC/ST/OBC

12.30 The Institute is following all the standard guidelines & policies issued by Govt. / Ministry towards the SC/ST employee's reservation in recruitment. Till date the Institute has not received any grievance from any SC/ST/OBC employee.

Physically Handicapped

12.31 The Institute is following all the standard guidelines & policies issued by Govt. / Ministry towards the Physically Handicap employee's reservation in recruitment.

13 Budget and Audit Paras

Back to Index

Budget and Audit Paras

Budget Allocation for the year 2019-20 and 2020-21.

13.1 Budgetary support under Revenue and Capital is obtained for different schemes implemented by Geological Survey of India (GSI), Indian Bureau of Mines (IBM), and the S&T programme.Revenue provision is also obtained for GSI, IBM, Secretariat (Proper), Grants-in-Aid to Autonomous bodies, etc. A brief summary of Demands for Grants (2020-21) is given in the **Table13.1**.

Table 13.1

SUMMARY OF DEMANDS FOR GRANTS

(Rs.in crore)

Sl. No.	Name of the Organisation	2018-19		2019-20		2020-21
		BE	**RE**	**BE**	**RE**	**BE**
1	Secretariat (Proper)	43.58	29.96	48.55	41.75	42.43
2	Geological Survey of India	1057.87	1028.55	1322.93	1241.59	1349.98
3	Indian Bureau of Mines	129.08	107.09	124.31	109.11	128.31
4	Grants to MECL	6.00	6.00	0.00	0.00	0.00
5	Bharat Gold Mines Limited-Grants	4.50	4.50	4.50	4.50	5.50
6	S&T Programme/Other Programme (6.1 to 6.6)	***28.49***	**23.92**	***25.26***	**21.27**	**25.18**
6.1	NIRM	7.99	7.30	7.99	6.74	8.21
6.2	NIMH	1.96	1.28	0.98	0.98	1.00

6.3	JNARDDC	9.29	8.34	9.29	9.29	9.92
6.4	IC	0.35	0.35	0.35	0.35	0.40
6.5	NMA	0.65	0.65	0.65	0.65	0.65
6.6	Other Research Programme	8.25	6.00	6.00	3.26	5.00
7	NMET	400.00	150.00	150.00	110.00	150.00
	Total	**1669.52**	**1350.02**	**1675.55**	**1528.22**	**1701.40**

Geological Survey of India (GSI)

13.2 During the Financial Year 2020-21, the allocated budget outlay of GSI is Rs.1349.98 crore which includes Rs. 1241.68 crore in revenue head and Rs.108.30 crore in capital head. Out of this total allocated budget grant of Rs.1349.98 crore, Rs 73.50 crore has been allocated for GSI activities of NER. The proposed outlay for establishment expenditure is Rs.772.72 crore with a mandatory salary component of Rs.740.00 crore and the proposed outlay for GSI mission activities including modernization and administrative support activities is Rs.577.26 crore. The activity-wise budget outlay as per BE 2020-21 is summarized below: -

(a) Under 'Survey & Mapping' head (Mission-I), an amount of Rs.149.00 crore has been allocated for operation and maintenance of three GSI vessels including pending instalment payment of the Financial Year 2019-20 to Shipping

Corporation of India (SCI), maintenance of the TOASS airborne Survey System, execution of ground survey projects e.g. Specialized Thematic Mapping (STM), Geochemical Mapping (GCM), Geophysical Mapping (GPM); outsourcing of vehicles for field activities and outsourcing of GPM.

(b) Under 'Mineral exploration' head (Mission-II) an amount of Rs.43.00 crore has been provisioned for taking up G4, G3 & G2 stage (as per United Nations Framework Classification for Resources (UNFC)) mineral investigation programmes on different commodities including the anticipated expenditure for outsource of drilling.

(c) Under 'Information Dissemination' head (Mission-III), an amount of Rs.77.26 crore has been allotted for maintenance of OCBIS and Bandwidth (Primary & Secondary), AMC of various IT equipment; procurement of hardware; establishment and management of IT Infra and security; subscription of e-journals; printing of various publications; data archival system and other miscellaneous activities of IT in all offices of GSI.

(d) Under Mission-IV, Rs.17.80 crore has been provisioned for 'Research & Development' activity; Rs. 2.40 crore has been provisioned for multidisciplinary 'Specialized investigations' and Rs.0.10 crore has been allotted for polar studies in Antarctica.

(e) Under 'Research & Development' head Rs.17.80 crore has been provisioned for taking up research and development programmes, AMC of the laboratory instruments and equipment of GSI and also for the expenditures towards procurement of laboratory consumables.

(f) Under 'Specialized Investigations' & 'Other Exploration (Antarctica)' heads funds have been provisioned for execution of field work of Geotechnical investigation on societal issues, National Landslide Susceptibility Mapping (NLSM), site specific landslide studies, seismological studies, environmental studies, climatology, glaciology etc. and expedition to Antarctic, Arctic regions, miscellaneous expenditure related to AMC and maintenance seismic and Geo-technical laboratories.

(g) Under 'Training (Human Resource Development)' head (Mission-V), Rs.3.30 crore has been provisioned for carrying out various training courses e.g. orientation courses, thematic refreshers course, promotion linked training programme, courses for international participants for capacity building of GSI personnel as well as geoscientists from other geological institutes from India and abroad.

As per the guidelines of Government of India, Rs.22.00 crores have been allotted under 'Tribal area Sub Plan (TSP)'head for utilisation in tribal areas and Rs.42.20 crore has been allocated under 'Scheduled Caste Sub Plan (SCSP)' head for utilisation in the scheduled caste areas, through mandated field activities of Mission-I, II, IV and V in different parts of India.

(h) Under 'Modernisation& Replacement' head, capital grant of Rs.108.30 crore has been provisioned out of which Rs.8.30 crore has been provisioned for procurements related to motor vehicles required for field activities and Rs.100.00 crore for procurement of machinery and equipment to improve the capabilities in the field as well as GSI laboratories with an aim to generate quality earth science data contemporary in nature.

(i) Under 'Administrative Support Activities' head, an amount of Rs.69.00 crore has been allocated to meet the expenditure on domestic & foreign travel expenses, office expenses, rent, rates and taxes and professional services.

(j) Under 'Other Expenditure' head, Rs.40.40 crore has been kept under 'Minor Works' head for maintenance of different GSI buildings and Rs.2.50 crore has been kept for supply & material, clothing & tentages and advertisement & publicity heads.

(k) Under 'Establishment Expenditure',Rs.772.72 crore has been allocated out of which Rs.740.00 crore has been allocated under Salary head and remaining fund has been provisioned for various establishment expenditures such as wages, Over Time Allowances (OTA), medical, office expenses (Voted), Other Administrative Expenses (OAE), Swachhta Action Plan etc.

During the Financial Year 2020-21, GSI will take up programmes in five Missions, out of which bulk of the items will be under Mission I & II.

GSI demanded Budget Estimate (BE) of Rs.1464.89 crore (Revenue Rs.1306.59 crore & Capital Rs.158.30 crore) to carry out all activities during the Financial Year 2020-21. However, Rs. 1349.98 crore approved BE has been received for the Financial Year 2020-21 and accordingly GSI, has made a proposal for a total outlay of Rs.1349.98 crore (Revenue Rs.1241.68 crore & Capital Rs.108.30 crore) to carry out all mission activities, modernization, administrative activities and establishment expenditure. The detailed object head wise breakup of the budget allocation for the Financial Year 2020-21 is given in **Table 13.2**

Table 13.2

(Rs. in Lakhs)

BE 2020-2021 Total Grant			
Head	**GSI**	**NER**	**Total**
Establishment Expenditure			
Direction & Administration (Administrative Support)			
Salary	68000.00	6000.00	74000.00
Wages	1350.00	-	1350.00
Over time Allowances (OTA)	2.00	-	2.00
Medical treatment	750.00	-	750.00
Office Expenses [OE (V)]	800.00	-	800.00
Other Administrative Expenses (O. A. E.)	300.00	-	300.00
Swachhta Action Plan (Other Charges)	70.00	-	70.00

Total	**71272.00**	**6000.00**	**77272.00**
Activities / Mission			
Survey & Mapping (Mission-I)			
Ground, Aerial and Marine Survey			
Wages	665.00	35.00	700.00
POL	185.00	15.00	200.00
OC	13970.00	30.00	14000.00
Total	**14820.00**	**80.00**	**14900.00**
Mineral Exploration (Mission-II)			
Economic Mineral			
Wages	1120.00	80.00	1200.00
POL	575.00	25.00	600.00
OC	2435.00	65.00	2500.00
Total	**4130.00**	**170.00**	**4300.00**
Information Dissemination (Mission-III)			
Publication	266.00	5.00	271.00
IT(Office Expenses)	7405.00	50.00	7455.00
IT (OAE)			
Total	**7671.00**	**55.00**	**7726.00**
Spl. Investigation (Mission-IVA)			
Geo-Tech, Seismic, Environment (Mission-IVA)			
Wages	75.00	15.00	90.00
POL	32.00	8.00	40.00
OC	93.00	17.00	110.00

Total	**200.00**	**40.00**	**240.00**
Antarctica (Mission-IVA)			
Other Charges (OC)	**10.00**	**-**	**10.00**
Research & Development (Mission-IVC)			
Laboratory Research			
Wages	125.00	15.00	140.00
Supply & Material	485.00	15.00	500.00
POL	37.00	3.00	40.00
Other Charges (OC)	1070.00	30.00	1100.00
Total	**1717.00**	**63.00**	**1780.00**
Training (Mission-V)			
Human Resource Development			
Other Administrative Expenses	315.00	15.00	330.00
Total	**315.00**	**15.00**	**330.00**
Other Expenditure			
Supply & Material	90.00	10.00	100.00
Clothing & Tentages	30.00	-	30.00
Advertising & Publicity	115.00	5.00	120.00
Minor Works	4000.00	40.00	4040.00
Total (Other Exp)	**4235.00**	**55.00**	**4290.00**
Tribal Area Sub Plan (OC)	**2200.00**	**-**	**2200.00**
Special Component Plan for SC (OC)	**4220.00**	**-**	**4220.00**
Administrative Support Activities			
Domestic Travel Expenses (DTE)	4100.00	400.00	4500.00
Foreign Travel Expenses (FTE)	100.00	-	100.00

Office Expenses (OE)	1600.00	250.00	1850.00
Rents, Rates and Taxes (RRT)	200.00	100.00	300.00
Professional Services	148.00	2.00	150.00
Total	**6148.00**	**752.00**	**6900.00**
Total (Revenue)	**116938.00**	**7230.00**	**124168.00**
Capital Expenditure			
Motor Vehicle	810.00	20.00	830.00
Machinery & Equipment	9900.00	100.00	10000.00
Total (Capital)	**10710.00**	**120.00**	**10830.00**
TOTAL (Revenue + Capital)	**127648.00**	**7350.00**	**134998.00**

Indian Bureau of Mines (IBM)

13.3 The Demands for Grants i.e. sanctioned Budget Estimates for the Financial Year 2020-21 is Rs.128.31 crore including Rs.28.63 Crore under Activities and Rs.99.68 Crore under Establishment.Scheme wise breakup of Activities Budget is **Table 13.3.**

Table 13.3

(Rs. In Crore)

Sl. No.	Object Head	Establishment	IBM Activities								GRAND TOTAL
			Sch. No.1	Sch. No.2	Sch. No. 3	Sch. No. 4	Sch. No.5	Non-Schemes	TOTAL	NER	
1	2	3	4	5	6	7	8	9	10	11	12
1	Salary	83.50	0.20	0.10	0.10	0.10	...	...	0.50	1.10	85.10
2	Wages	0.12	0.02	0.00	0.01	0.00	...	...	0.03	0.01	0.16
3	Overtime allowances	0.00	0.00	0.00	0.00	0.00	...	...	0.00	0.00	0.00
4	Medical	1.40	0.00	0.00	0.00	0.00	...	...	0.00	0.00	1.40

	Treatment										
5	Dom. Travel Expenses	1.70	0.10	0.10	0.10	0.10	...	...	0.40	0.05	2.15
6	Foreign Travel Expenses	0.05	0.00	0.00	0.00	0.00	...	...	0.00	0.00	0.05
7	Office Expenses	1.90	0.10	0.10	0.10	0.05	...	...	0.35	0.05	2.30
8	Rent, Rate & Taxes	2.30	0.20	0.00	0.00	0.00	...	...	0.20	0.08	2.58
9	Publication	0.00	0.00	0.00	0.10	0.00	...	...	0.10	0.00	0.10
10	Other Admn. Expenses	0.01	0.00	0.00	0.00	0.00	...	...	0.00	0.00	0.01
11	Supplies & Materials	0.03	0.02	0.01	0.01	0.00	...	...	0.04	0.00	0.07
12	POL	0.00	0.06	0.02	0.02	0.02	...	...	0.12	0.00	0.12
13	Advertising & Publicity	0.00	0.03	0.00	0.00	0.00	...	...	0.03	0.00	0.03
14	Minor Works	6.00	0.50	0.20	0.30	0.00	...	...	1.00	0.00	7.00
15	Professional Services	0.17	0.02	0.00	0.01	0.00	...	...	0.03	0.00	0.20
16	Subsidies	0.00	0.00	0.00	0.00	0.00	...	...	0.00	0.00	0.00
17	Other Charges	2.50	0.20	0.10	0.15	0.05	...	...	0.50	0.02	3.02
18	Mining Tenement System (OAE)	...	...	...	...	...	13.50	...	13.50	0.00	13.50
19	Information & Technology	...	...	...	...	...	...	0.50	0.50	0.01	0.51
20	Swachhta Action Plan	...	...	...	...	...	...	0.10	0.10	0.00	0.10
21	Training	...	...	...	...	...	...	0.25	0.25	0.00	0.25
22	Tribal Area Sub Plan	...	...	...	...	...	...	1.23	1.23	0.00	1.23

23	Scheduled Caste Sub Plan	**...**	**...**	**...**	**...**	**...**	**...**	2.38	2.38	0.00	2.38
	TOTAL (REVENUE)	**99.68**	**1.45**	**0.63**	**0.90**	**0.32**	**13.50**	**4.46**	**21.26**	**1.31**	**122.25**
24	Motor Vehicles	**...**	**...**	**...**	**...**	**...**	**...**	2.50	2.50	0.00	2.50
25	Machinery & Equipment	**...**	**...**	**...**	**...**	**...**	**...**	2.00	2.00	0.00	2.00
26	Major Works	**...**	**...**	**...**	**...**	**...**	**...**	0.01	0.01	0.00	0.01
27	Other Capital Expr. (NER)	**...**	**...**	**...**	**...**	**...**	**...**	**...**	**...**	1.55	1.55
	TOTAL (CAPITAL)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**4.51**	**4.51**	**1.55**	**6.06**
	G R A N D T O T A L :	**99.68**	**1.45**	**0.63**	**0.90**	**0.32**	**13.50**	**8.97**	**25.77**	**2.86**	**128.31**

Audit

13.4 The Status of CAG paras pertaining to GSI (As on 31.12.2019) is given in **Table 13.4**

Table 13.4

Sl No.	Report, Para No.	Subject	Status
1.	Para No. 9.1- Report No. 5 of 1999 (Civil)	**GSI residential quarters lying vacant at GSI, Hyderabad.** Due to inaccurate assessment, 260 of the 428 residential quarters constructed at Hyderabad were lying vacant for the last 12 years. License fee on vacant quarters during this period would amount to Rs.27.25 lakh besides avoidable payment of Rs.120.94 lakh on house rent allowance.	CAG Para No.9.1 – Report No. 5 of 1999 (Civil) has since been settled.
2.	Para No.12.2 – Report No.	**Non-recovery of outstanding dues.** Failure to evolve mechanism by GSI, CR, Nagpur to	CAG Para No.12.2 – Report

	2 of 2007 (Civil)	recover outstanding dues resulted in loss of revenue of Rs.75.74 lakh and consequential loss of interest of Rs.24.81 lakh.	No. 2 of 2007 (Civil) has since been settled.
3.	Para No.12.1 – Report No. 16 of 2011-2012 - Compliance Audit Observation (Civil)	**Expenditure due to non-recovery of service tax.** GSI failed to recover an amount of Rs.4.62 Crore from outside agencies on account of service tax. As a result, it had to pay Rs.4.62 Crore from its resources. Due to non-payment of service tax in time, GSI is also liable to pay penal interest of Rs.1.05 Crore. Further, Coal Wing of GSI again failed to follow the provisions of the Finance Act, 1994 as well as instructions of its headquarters issued in November, 2004 and did not recover service tax amounting to Rs.68.91 lakhs thereby making it liable to pay the service tax and interest thereon in the future.	CAG Para No.12.1 – Report No. 16 of 2011-2012 - Compliance Audit Observation (Civil) has since been settled.
4.	Para No. 17.1 – Report No. 12 of 2017- CAG of India for the year ended March, 2016 Union Government (Civil)	Failure to evolve a mechanism by Geological survey of India, Jaipur to recover outstanding dues resulted in non-recovery of service charges of Rs. 1.67 Crore.	CAG Para No. 17.1 – Report No. 12 of 2017- CAG of India for the year ended March, 2016 Union Government (Civil) has since been settled.

13.5 The Status of Internal Audit Paras of GSI (As on 31.12.2019) is given in **Table 13.5**

Table 13.5.

	No of Paras
Outstanding Paras of the last Audit Adalat	**810**
Para raised /settled after Audit Adalat	**766**
Para still standing	**1576**

Follow up action with Regions has been taken up to settle the paras.

13.6 The status of the compliance report of Audit paras of IBM (Up to December, 2019) from HQ & Regional Offices is given in **Table 13.6** :

Table 13.6

Local Audit (C.A.G.) Inspection	**38 paras.**
Internal Inspections	179 paras.

14 Miscellaneous

Back to Index

Miscellaneous

National Informatics Centre (NIC)

IT Support by NIC at Ministry of Mines

14.1 National Informatics Centre (NIC) of the Ministry of Electronics and Information Technology is providing network backbone and e-Governance support to the Ministry of Mines. The following are the IT Services that NIC is providing to Ministry of Mines.

Management Information Systems for the Ministry

14.2 Ministry of Mines with the help of National Informatics Centre (NIC) is implementing various decision support system required for better planning, monitoring and decision making. The key driver for the MIS websites/applications is to reduce the Ministry's workload & increase overall efficiency by promoting 'self service'. The computerization has been done in the area of prior approval for Mineral Concession Applications, Registration under Rule 45, Revision Applications, Information on Mining blocks auctioned/to be auctioned along with revenue generated, National Mineral Exploration Trust, indent, Conference Hall Booking and Video Conference request booking.

b) Mineral Concession Approval System (MCAS) and Post approval activities of Mineral Concessions at Indian Bureau of Mines (https://mcas.nic.in)

c) Revision Application System (RAS)(https://ras.nic.in)

d) Registration under Rule 45 of MCDR Act 1988(https://ibmreg.nic.in)

e) Website of the Ministry of Mines (https://mines.gov.in)

f) TAMRA (Transparency, Auction Monitoring and Resource Augmentation) Portal (https://tamra.gov.in)

g) NMET (National Mineral Exploration Trust) Website and Project Monitoring and Fund allocation/transfer of NMET (https://nmet.gov.in)

h) Intramines Web portal (Covers e-Indent of various stationary items and cleaning material, online booking of Conference rooms and Service Request). This service is operational on Local Area Network of the Ministry.

i) Web Portal for Science and Technology Schemes (Under development).

Support for e-Governance Applications

14.3 The following e-Governance applications have been implemented and supported by NIC in the Ministry:

- Public Financial Management System (Total number of transactions in year 2019-20 are 4746)
- eOffice and SPARROW (Total efiles created: 1564)
- eVisitor System (Total visits: 6316)
- Biometric Attendance System (Total 234 active registered users are marking their attendance in the system)

- ACC Vacancy Monitoring (Total Active users: 10)

Local Area Network (LAN)

14.4 LAN has been established in the Ministry, which interconnects various officers/staff in the Ministry. There are approximately two hundred users connected to the LAN. All kind of trouble shooting is done by NIC to facilitate the smooth functioning of internet on user machines with the help of FMS team of the ShastriBhawan network centre.

Wifi Support

14.5 Ministry of Mines has been made wifi enabled by NIC-Mines team. Form processing for wifi connection and device configuration is done by NIC Mines Team. As on date 10 wifi access points are installed in the Ministry covering A and D Wing. Trouble shooting of wifi related problems is done on regular basis.

Videoconferencing Support

14.6 Videocon ferencing of the Ministry Officials with the State Governments, Subordinated Offices, PSUs and PRAGATI VC being facilitated by the NIC-Mines team. In the 2019-20 year a total number of 57 VC sessions have been held including PRAGATI.

Email/VPN support:

14.7 Email requests of the Ministry Officials are processed by NIC Mines Teams as and when required. Requests related to Virtual Private Network (VPN) accounts to access the e-office from networks other than NIC net are also processed through NIC team of Ministry of Mines.

IT support to Associated Offices of the Ministry

14.8 Besides the routine coordination work at Ministry of Mines, the team is also extending support to all the associated offices of MoM (through NIC staff deputed at various locations) such as-

i. Indian Bureau of Mines (IBM) – for Registration System and for conducting video conferencing sessions with the Ministry.
ii. Geological Survey of India (GSI) – for conducting video conferencing sessions with the Ministry and guiding them to resolve security issues in application.
iii. PSUs of Ministry of Mines - for conducting video conferencing sessions with the Ministry

E-Office

14.9 The e-office is being implemented in the Ministry of Mines from May, 2013.

14.10 The following modules have been successfully adopted.

• **e File** – (File Management System) – eFile system has been started with migrated data of File Tracking System (FTS). All new files are opened as e-files. All legacies files are being digitized for bringing them into e-file system. eSign option has also been introduced in eFile system (i.e. Aadhaar Based

authentication) for easy and smooth functioning.

• **KMS**(Knowledge Management System)- KMS is a central repository for all employees to share all the documents/OM/Office order which they want to share with all as well as for personal use if they want to restrict.

• **eTour**-(Tour Management System)- eTour has started in September, 2013 and all officer(s) apply for tour and obtain approvals in this module.

• **eHRMS**- (Human Resource Management System) - LMS (Leave Management System) has been replaced by eHRMS- Electronic Human Resource Management System. eHRMS was implemented in Ministry from 1st of August 2019. There are 20 modules of eHRMS, out of which only 6 are currently implemented. These are Service Book, Personal Information, Leave, LTC, eHRMS Help Desk and Dash Board. As of now Service Book of all the officers has been digitalized and migrated to E service Book in eHRMS. Leave Module has been fully functional from 15th November 2019 in Ministry of Mines.

14.11 Total Number of e-files created till 13th March, 2020, is 17,261. It is decided to digitalize all physical filesby end of March 2020. The scanning of physical files is under implementation for migration of files to e-office. Ministry of Mines on 12-02-2019 has been awarded “Certificate of Appreciation” by Department of Administrative Reforms & Public Grievances, Ministry of Personnel, Public Grievances &Pensions,for the successful implementation of e-office and closure of 80% of physical files.

14.12 Other than these applications the additional activities which have been carried out in e-Office are as follows:

• SMS/Email alert regarding file closing, file movement and leaves to all personnel.

• E-file MIS reports for all the employees to monitor the pendency of VIP/ PMO/ CabSec/ CAG & Audit Paras/DCN/Court Cases /DO Letters from Secretaries/ Joint Secretaries (Central)/ DO Letters from Chief Secretaries (States)/ LokSabha references and other categories of receipts and take necessary action accordingly.

• INTRA MINES link at dashboard of e-Office has been created in September, 2018 for issuing stationary items which makes it a transparent and easy process. Booking conference halls and video conference for meetings and trainings and to lodge complaints regarding LAN/ internet and for general complaints like furniture, computer etc. are the features available in this link.

14.13 Website of the Ministry

- Website of Ministry of Mines is developed and maintained bythird party with the technical help of NIC. It provides comprehensive information on various subjects like Acts & Rules and working of the Ministry, Right to

Information Act, National Mineral Policy, information about the Indian Mineral Sectors, current status of the Revision Applications and Mineral Concession Cases, Annual Report of the Ministry and provides links to its PSUs and offices. The website is bilingual.

The website of the Ministry (https://mines.gov.in) is according to the Guidelines for Indian Government Websites (GIGW) compliant and is Standardisation Testing and Quality Certification (STQC) certified.

E- Samiksha

14.14 e-Samiksha is a real time, on-line system for monitoring of follow-up action on the decisions taken during the presentations made by different Ministries/Departments to the Prime Minister, Centre State Coordination, and Committee of Secretaries etc. The follow-up action in respect of all issues concerning other Ministries/Departments and State Governments is to be updated by the concerned Ministry/Department/Agency on the e-samiksha portal and replies to issues raised by the Ministries/Departments and State Governmentsare taken up on priority and reply/status uploaded on e-samiksha every month. Ministry of Mines has been regularly monitoring the follow-up action in respect of e-samiksha portal.

Skill Development

14.15 The Ministry of Mines has joined hands with Ministry of Skill Development & Entrepreneurship (MSDE) to achieve faster, sustainable and inclusive growth through Skill Development in the Mining Sector. MoM along with its PSUs (NALCO, HCL and MECL) has signed Memorandum of Understanding (MoU) with Ministry of Skill Development and Entrepreneurship (MSDE) and National Skill Development Corporation (NSDC). The apprenticeship training initiative being undertaken by the CPSEs for the last 3 years is given in **Table 14.1.**

Table 14.1

The apprenticeship training initiative being undertaken by the CPSEs for the last 3 years.

Name of CPSE	No. of apprentices engaged in 2017-18	% total manpower	No. of apprentices engaged in 2018-19	% of total manpower	No. of apprentices engaged in 2019-20 (till Dec, 2019)	% of total manpower
NALCO	866	12.78%	811	12.454%	900	14.34%
HCL	290	4.7%	290	4.8%	308	4%
MECL	71	3.9%	46	2.5%	68	3.6%

14.16 Status of Centre of Excellence:

National Aluminium company Limited (NALCO)

- In a move to create skilled manpower and make unemployed youth job ready, Centre of Excellence for Skill Development with heavy mining equipment simulator facility and training are being established at Bhubaneswar.

- MoU signed with SCMS in Oct' 2017 for preparation of DPR and draft DPR submitted by SCMS after due diligence.

14.17 Hindustan Copper Limited (HCL)

- An MOU was signed on 29th January, 2019 between Skill Council for Mining Sector and HCL, Khetri Copper Complex for training program in trade of Winding Engine Operator/Driver. The duration of this training program is 14 months including classroom training, mine vocational training, and on-the-job training. The program was rolled out in March, 2019. Presently, the trainees divided into two groups are continuing OJT at Kolihan and Khetri Mines. Further, the trainees were split into three shifts for better hands on experience.

- On 8th-9th July 2019, SCMS organized First-Aid training program with the help of Red Cross Society at Khetri Complex. During this training, the candidates are trained on First-Aid as per prescribed procedure and awarded Certificates. The batch will be completing the 6 months of classroom cum practical training.

- Earlier SCMS has conducted training program at HCL Khetri Copper Complex in the trade of Assistant Mine Surveyor over 2 batches covering 56 candidates. This program consisted of 6 months of class room and practical

training followed by 18 months on the job training at the mines.

Skill Plan for the next 5 years

14.18 As part of the skill development initiative of Ministry of Mines a concerted effort is underway with following broad contours:

a. Advanced training for adoption of technology towards augmented exploration.
b. Application of remote sensing data for mines surveillance including usages of GIS platform.
c. Training on health, safety and environmental issue for safe and sustainable mining practices.
d. Operation of plants & machinery for open cast and underground mining with primary objective of enhancing productivity.
e. Training on acquisition, processing and interpretation of geo-scientific data involving fundamental and applied research.
f. Advance method of mineral beneficiation process involving optimum utilization of energy and utilities.

Geological Survey of India (GSI):

14.19 Skills for which training required for employees of GSI are: Field Training, Techno-administration, HR Management, Financial Management, Hands-on training on software technology in the field of geosciences, 3D-Modelling of Mineral Resources, Geo-scientific data handling techniques and integration, Fundamental and Applied Research in geo- sciences, Development of domain expertise, Statistical data modeling, Public-Good Geosciences, Processing and interpretation of Aero-geophysical data, Multi-seismic marine data etc.

Method envisaged for carrying out training are:

14.20 Hands-on training at geological field sites, Hands-on training at geo-scientific laboratories, Classroom training on Geo-scientific techniques and advancements in geological technology, Hands-on training on resource modeling, Classroom trainings on Administration and Management, Imparting training in a specific domains viz. Basic, Refresher and Advanced, etc. by classroom lectures, laboratories and field sites, Training in collaboration with reputed agencies/academic institutes etc.

Skills for which training required for other stakeholders connected to GSI are:

14.21 Geo-scientific investigations, Management and reporting of mineral resources, operation of geo-scientific equipments, software technology in the field of geosciences, 3D-Modelling of Mineral Resources, Imparting training in a specific domains viz. Basic, Refresher and Advanced, etc. by classroom lectures, laboratories and field sites, Training in collaboration with reputed agencies/ academic institutes etc. It is envisaged to train 12500 numbers of own employees and 2500 numbers of other stakeholders connected to GSI in the next five years.

Indian Bureau of Mines (IBM)

14.22 IBM is discharging its roles and responsibilities through a mandated

charter of functions. In the wake of recent policy initiatives and statutory amendments, IBM need to enhance its skills in various advanced technologies for mine regulation and development.

Method envisaged for carrying out training are:

14.23 The training imparted to IBM personnel is of 2 to 3 days which is being held at Headquarter and its regional offices as well as at two skill development centre located at Udaipur and Kolkata. Nominations are sought in advance. After approval of Competent Authority, training programme is organize through Classroom lectures / presentation by the faculties drawn from IBM as well as Industry. In last couple of years, IBM personnel had attended training programme in outside organization/Institute like GSI, National Remote Sensing Centre, ASCI, etc. accordingly, for further training programme wherever necessary, will be conducted in association with these organization / institutions. Further, through bilateral cooperation with other Countries, capacity building programme will be taken up.

Skills for which training required for other stakeholders connected to IBM are:

14.24 Implementation of Provisions of MMDR Amendment Act, 2015 & Sub-Legislation there under. Preparation of Mining Plan/Mining Scheme including Mine closure Plan, Mine Reclamation and Rehabilitation.Sustainable Development Framework and Star Rating System for Mines, Mining Surveillance System.Mineral Resources as per United Nations Framework Classification (UNFC).Technological improvements and innovative advances in the areas of mineral processing and beneficiation.

14.25 It is envisaged to trained 799 numbers of own employees and 1000 numbers of other stakeholders connected to IBM in the next five years.

Mineral Exploration Corporation Limited (MECL):

14.26 Skills for which training required for employees of MECL are: Drilling & Exploration, Advanced Drilling Technology, Use of high end equipment DGPS-(PPK) system, Exploration for REE & Rare Earth Metals, Diamond Core Drilling Skill Enhancement, Use of software like Minex, Surpac, AutoCAD, Datamine, Mud Technology, Jerk Technology for estimation of Minerals.

Method envisaged for carrying out training are:

14.27 Lectures, Seminars and conferences, and on the job trainings.It is envisaged to train 400 numbers of own employees MECL in the next five years.

National Aluminium Company Limited (NALCO):

14.28 Skills for which training required for employees of NALCO are: **Behavioural skill**- Leadership- Labour Laws, EQ, legal drafting skill, **Functional skill**- (i) Safety, (ii) Electrical, (iii) PLC skill, (iv) O&M of Testing and safety of materials handling equipment, (v) Digitisation skill- PLC & System Automation etc.,

14.29 Working as per international standard- (i) SA 8000, (ii) Internal Audit, (iii) Productivity improvement & measurement, (iv) Quality management, Project execution skill of employees, Contract handling skill for employees, Presentation skill for employees, Communication skill for employees, Negotiation skill for employees.

Method envisaged for carrying out training are:

14.30 In house through internal faculties, through external agencies of repute, through equipment provider. It is envisaged to train 14000 numbers of own employees in the next five years.

Hindustan Copper Limited (HCL)

14.31 Skills for which training required for employees of HCL are: Mines Refresher Training, Fire Fighting Training, First Aid Training, Safety Training, Soft Skills Training, Fitters, Mechanics, Riggers, Welders, Mine surveyor Assistant, Loader & hauling operation, Blasters, Winding engine operators for underground shaft, Mining mate, HEME operators, Drilling machine operators, Ball Mill operations for beneficiations, Pump operators for mine dewatering.

Method envisaged for carrying out training are:

14.32 Training by own faculty at the Vocational Training Centers in Khetrinagar Copper Complex (KCC), Malanjkhand Copper Complex (MCP), Indian Copper Complex (ICC), Reskill / Upskill in Collaboration with National Skill Development Corporation (NSDC), Delhi.

Skills for which training required for other stakeholders connected to HCL are:

14.33 Loader & hauling operation, Blasters, Winding engine operators for underground shaft, Electrician, Mechanical, Fitter, Welder, General Technician, Machinist, Crane Operator, Carpenter, Plumber, Draftsman, Turner. It is envisaged to train 935 numbers of own employees and 750 numbers of other stakeholders connected to HCL in the next five years.

National Institute of Rock Mechanics (NIRM)

14.34 Skills for which training required for employees of NIRM are: **Destructive Testing-** Reverse Bend Testing, Torsion Testing, Impact Testing, Compression Test, Tensile Strength (Vertical & Horizontal), **Non-Destructive Testing (NDT)-** Visual Testing, Dye-Penetrant Test, Magnetic Particle Test, Ultrasonic Testing, Vibration Test, Noise analysis, IR Thermography, Wire Rope Defectograph, Soil / Rock Testing, Instrumentation Installation and monitoring, Statistical Software Training, Computerised Accounting, MIS training, Advance training mine planning & design, Numerical Modelling training, Material & Rock Testing, Skill Certification courses, Safety & Rescue Courses.

Method envisaged for carrying out training are:

14.35 On job training, Certification course training viz., ISNT/ ASNT level I& II Course, Participation in Conference, Seminar, Workshop, Symposium, Short term courses. **Skills for which training**

required for other stakeholders connected to NIRM are: Drilling &Exploration,Advanced Drilling Technology, Use of High end equipment DGPS-(PPK) system, Exploration for REE & Rare Earth Metals, Diamond Core Drilling Skill Enhancement, Use of software like Minex, Surpac, AutoCAD, Datamine, Mud Technology, Jerk Technology for estimation of Minerals.

Redressal of Public Grievances

Ministry of Mines

14.36 Department of Administrative Reforms & Public Grievances (DAR&PG) is implementing a web based Centralized Public Grievance Redressal and Monitoring System (CPGRAM) vide which grievances of Ministries/ Department are forwarded for redressal. A Joint Secretary has been designated as the Nodal Officer of Public Grievances. During the period w.e.f. 1st January, 2019 to 31st December, 2019, 1197 Public Grievances were received including 153 cases brought forward. A total of 1059 Public Grievances have been disposed of during the period and the remaining cases have been referred to the concerned Organization/ Authority for taking further necessary action in the matter.

14.37 During the year 2019-20 (up to 31st December, 2019)details pertaining to public grievances of this Ministry as the its attached/ subordinate offices is given in **Table 14.2.**

Table 14.2

Organization	No. of complaints pending as on 31.12.2018	Complaints received during 01.01.2019 to 31.12.2019	Disposed cased during 01.01.2019 to 31.12.2019	Pending cases as on 31.12.2019
Ministry of Mines	153	1197	1059	291
Geological Survey of India(GSI)	13	396	390	19
Indian Bureau of Mines (IBM)	-	31	20	11
National Aluminium Company Limited (NALCO)	-	50	50	-
Hindustan Copper Limited (HCL)	9	96	90	15
Mineral Exploration Corporation Limited (MECL)	-	5	5	-
JNARDDC	3	1	4	-
NIRM	-	3	3	-
NIMH	-	-	-	-

Vigilance cases

Ministry of Mines

14.38 During the year 2019-20 (up to 31st December, 2019) details pertaining to vigilance division of this Ministry as its attached/ subordinate offices is given in **Table 14.3.**

Table 14.3

Organization	No. of complaints pending as on 31.12.2018	Complaints received during 01.01.2019 to 31.12.2019	Disposed cased during 01.01.2019 to 31.12.2019	Pending cases as on 31.12.2019
Ministry of Mines, New Delhi	9	28	16	21
Geological Survey of India	6	99	101	4
Indian Bureau of Mines	-	13	13	-

14.39 The details of disciplinary cases arising from vigilance complaints during the mentioned period is given in **Table 14.4.**

Table 14.4

Organization	No. of Disciplinary cases	Nature of the penalty recommended	Status (as on 31.12.2019)
Ministry of Mines, New Delhi	6	Major: 6 Minor: 0	Disciplinary proceedings underway
Geological Survey of India	2	Major: 2 Minor: 0	Major Penalty imposed in both cases
Indian Bureau of Mines	NIL	NIL	NIL

14.40 Vigilance Awareness Week was observed from 28 October, 2019 to 2nd November, 2019 in the Ministry as well as in subordinate / Attached offices of the Ministry. During the week, Essay and Debate competitions related to vigilance activities were organized.

Geological Survey of India (GSI)

A glimpse of Vigilance activities carried out at GSI during FS 2019-20

14.41 To enforce Preventive Vigilance total 10 CTE type inspection, and 121 periodic inspections were carried out. The outcome of the said inspections were shared with the competent authorities in appropriate cases. To promote awareness in vigilance 13 training programs were organized. Further, the rules, guidelines in pertinent matters issued from time to time by DoPT, CVC, DoE etc. have been circulated through online portal. In the Structured Meeting with DG, GSI implementation of Computerized File Tracking and Computerized vendor Bill Tracking System were advised. Progress on implementation of the same is monitored at IT Division of GSI. Provisions have been made to lodge internal whistle blower complains by the employees directly to CVO through online mode. Vigilance status of the employees are maintained online and Vigilance Clearance is processed at this end through online mode. Annual Immovable Property Returns are examined on random basis. Further, as advised by CVC, contracts over Rs. 5 Crore are being examined periodically. TA, LTC bills etc. are being cross checked from the ticket issuing authorities.

14.42 Further, Vigilance Division had identified sensitive posts, conducted random scrutiny of AIPRs, organized training/workshop, prepared ODI and Agreed list etc. as per mandate of Vigilance Manual- 2017.

Indian Bureau of Mines (IBM)

14.43 Preventive Vigilance undertaken during the year 2019: During the period this office conducted 10 preventive inspections; 05 for Annual Performance Assesment Report of IBM employees, 04 for Mining Plans and 01 for limestone mine under jurisdiction of Hyderabad Regional Office. Periodic inspection were carried out in respect of LTC Bills of two officers of IBM.. Periodic inspections were carried out in respect of LTC Bills of two officers of IBM. Inspection of 01 Modern Mineral Processing Laboratory and Pilot Plant of IBM has been done during the year 2019. Outcome of the same has been shared with competent authority. Annual Immovable Property returns for 31.12.2018 have been examined in respect of all the employees of IBM.Further, to promote awareness on vigilance, a Lecture Session was organized on 01.11.2019 to sensitize the officers and staff of Indian Bureau of Mines.Furthermore, the rules guidelines in pertinent matters as issued from time to time by DOPT, CVC, etc. have been circulated through Head of Office, IBM to all Zonal & Regional Offices of IBM.

Swachh Bharat Abhiyan

Ministry of Mines

14.44 Ministry of Mines and organizations under the Ministry organized the following 6 fortnights under the Swachh Bharat Abhiyan;

i) 15.09.2015 to 31.09.2015

ii) 12.12.2015 to 27.12.2015

iii) 01.03.2016 to 15.03.2016

iv) 16.06.2016 to 31.06.2016

(v) 16.12.2017 t0 31.12.2017

(vi) 16.10.2018 to 31.10.2018

(vii) 16.11.2019 to 31.11.2019

Adoption of ICONIC Heritage sites

14.45 NALCO has adopted Shri Jagannath Temple Puri and HZL has adopted Ajmer Sharif Dargah and have started preparation of Action Plan for comprehensive improvement of these two ICONIC Heritage places.

14.46 Under PM's Iconic Shrine development programme, the Company has taken up various projects for comprehensive development of the holy city Puri since FY 2016-17.

- Projects like LED illumination of temple, thematic painting of both sides of the VIP road, Installation of clean water posts, establishment of open air theatre at slum dwelling, beautification of important chalk, installation of hoarding signage, development of Gandhi Park completed.
- Battery-Operated Vehicle (BOVs) service, free of cost, in operational for senior citizens, differently-abled passengers from Jagannath Ballav Math to Jagannath temple at Puri.

Activities under Swachh Bharat Mission

14.47 Ministry of Mines has ensured in its day to day activity that toilets, rooms and corridors are kept clean. Waste item bins have been strategically placed to ensure that things are not thrown around. It has also been ensured that people don't spit or smoke in the premises or use gutka and other chewable items. Posters have been placed at various places to bring home this message. Administration carries out inspections to ensure cleanliness.

Removal/Disposal of waste/condemned items and vehicles

14.48 The Ministry has auctioned all those items which were old/ unserviceable through the tender process. The Ministry does not have any condemned vehicle in its premises.

Seepage of condensed water of ACs

14.49 Ministry of Mines has ensured that water seeping through ACs are properly drained out without any accumulation.

Proper cabling of cable TV/dishantenna wires

14.50 All the electrical cables/TV cables have been placed inside the conduit pipes and it is ensured that there are no loose wires hanging around. The false ceilings in the corridors have been strengthened.

Fire safety measures

14.51 Instructions have been issued for fire safety and instruction has been issued to ensure that all electrical points are switched off after closing of the office.

National Institute of Miners' Health (NIMH)

Swachh Bharat Abhiyan

14.52 On 2nd October Swatchta shapath was solemnized to all the employees of the Institute. The Institute carried cleanliness drive of its premise on this day. Each & every employee of the Institute was educated & briefed on the issue.

Jawaharlal Nehru Aluminium Research Development and Design Centre (JNARDDC)

Swachh Bharat Abhiyan

14.53 JNARDDC undertook a pledge to implement the Swachh Bharat Abhiyan launched by Hon'ble Prime Minister ShriNarendraModi. JNARDDC has already undertaken the cleanliness of all labs and office premises, toilets etc which includes disposal of old Central AC and obsolete materials. The office lighting systems have been changed with LED lights in a phase-I. Swachatha pakhwara was observed in Nov 2019 with a view to encourage the zeal of the above program. LED lighting in guest house and township areas is under process. Ministry of Mines has ban on use of single use plastic item in all its offices including all its fields formation comes under the Ministry of Mines

Right to Information Act, (RTI)

Ministry of Mines

14.54 The Ministry of Mines and its subordinate office, attached office, Autonomous Bodies and Public Sector Undertaking (PSUs) have appointed Central Public information Officers and Appellate Authorities. The List of Nodal Officer, CPIOs and Appellate Authorities in Ministry of Mines is given at **Annexure 14.1.**The Ministry has also set up a 'Public Information Cell' for processing of the requests received from the public under the RTI Act, 2005 and for their monitoring. During the period w.e.f 1st January, 2019 to 31st December, 2019 the Ministry received 460 applications under the RTI Act, which were timely responded. 32 Appeals received against the decisions of the CPIOs were disposed of by the concerned Appellate Authorities within the stipulated time frame. The status regarding receipt and disposal of RTI Application/ Appeals in Ministry and its office is given at **Table 14.5, Table 14.6** and **Table 14.7** respectively.

Table 14.5

RTI Applications/ Request Status (w.e.f 1st January, 2019 to 31st December, 2019)

Organizations		No. of cases				Pendency			
	Previous Pendency	No. of RTI Requests/Applications received during the period	Disposal	Information denied under section 8(1) 9,11,24 & Others of RTI Act	Balance	0-3 Months	4-6 Months	7-9 Months	10-12 Months
Ministry of Mines (Sect.)	72	460	422	6	110	42	52	16	Nil
NALCO	16	282	173	110	15	15	Nil	Nil	Nil
HCL	20	286	275	39	31	31	Nil	Nil	Nil
MECL	17	90	88	08	11	06	Nil	Nil	05
IBM	12	380	383	21	09	09	Nil	Nil	Nil
GSI	49	807	774	21	61	31	07	Nil	23
NIMH	Nil	11	11	Nil	Nil	Nil	Nil	Nil	Nil
NIRM	Nil	18	18	Nil	Nil	Nil	Nil	Nil	Nil
JNARDDC	Nil	10	10	01	Nil	Nil	Nil	Nil	Nil

Table 14.6

RTI Appeals Status (w.e.f 1st January, 2019 to 31st December, 2019)

Organizations	No. of cases					Pendency			
	Previous Pendency	No. of 1st Appeals received during the period	Disposal	No. of Appeals rejected/ inf. denied under Section	Balance	0-3 Months	4-6 Months	7-9 Months	10-12 Months
Ministry of Mines (Sect.)	71	32	21	02	80	04	76	Nil	Nil
NALCO	03	57	51	09	Nil	Nil	Nil	Nil	Nil
HCL	06	23	05	17	7	7	Nil	Nil	Nil
MECL	Nil	04	04	Nil	Nil	Nil	Nil	Nil	Nil
IBM	Nil	25	22	03	Nil	3	Nil	Nil	Nil
GSI	06	86	88	Nil	04	04	Nil	Nil	Nil
NIMH	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
NIRM	Nil	02	02	Nil	Nil	Nil	Nil	Nil	Nil
JNARDDC	Nil	01	01	01	Nil	Nil	Nil	Nil	Nil

Table 14.7

CIC 2nd Appeals Status (w.e.f 1st January, 2019 to 31st December,2019)

Organizations	No. of Cases				
	Previous Pendency	No. of 2nd Appeals filed in CIC	Decided		
					Balance
			In favour of Appellant	In favour of Organization	
NALCO	Nil	08	05	03	Nil
HCL	10	07	05	12	Nil
MECL	Nil	Nil	Nil	Nil	Nil
IBM	Nil	Nil	*	Nil	Nil
GSI	02	07	01	05	03
NIMH	Nil	Nil	Nil	Nil	Nil
NIRM	Nil	Nil	Nil	Nil	Nil
JNARDDC	Nil	Nil	NA	NA	NA

* 8 Cases have been heard by CIC, orders are awaited.

Solar Power

14.55 On the directions of Ministry of New and Renewable Energy under its National Solar Mission, Ministry of Mines has directed all its field organizations to install Roof Top solar power systems as part of its efforts towards adopting renewable energy and energy savings.

- Commitment Certificate for Solar Roof Top and Land Based Systems in respect of Ministry of Mines was signed and given to MNRE on 26.05.2016. Ministry of Mines has committed to install 34 MW capacity of Solar Power generation by 2022.

- M/s. Rajasthan Electronics & Instrumentation Limited (REIL) was nominated as the facilitator by the MNRE for implementing the roof top projects in the field offices of the Ministry of Mines.

- REIL has been nominated for implementation of 10.89 MWp capacity grid connected rooftop solar power plants from MNRE in the roof tops of the buildings of the field organizations of Ministry of Mines.

LED Lighting

Ministry of Mines

14.56 Hon'ble Prime Minister of India, on 5th January, 2015 launched the National LED Programme to facilitate rapid adoption of LED-based home lighting and street lighting across the country.

14.57 The work of installation of LED based lightings in all rooms of Ministry of Mines in Shastri Bhawan have been completed.

- NALCO has also completed the work of fitting of LED based lights in its Mines, Refinery, Smelter, Captive Power Plant and Corporate office.

- HCL & MECL has also completed the work of fitting of LED based lights in all its premises.

- The work of installation of LED based lightings in the offices of GSI and IBM are under progress.

- JNARDDC, NIRM and NIMH has also completed the work of fitting of LED based lights in all its premises.

Government e-Market (GeM) Portal

14.58 Ministry of Mines has been procuring various items it needs through GeM portal those which are available on GeM. During Financial Year 2018-19 the Ministry procured items worthRs.1.86 crore. Total 621 orders were placed on the GeM portal during financial year 2018-19 by Ministry of Mines.

14.59 During the year 2018-19, the following days were observed in Ministry of Mines is given in **Annexure 14.2.**

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Back to Index

Annexures

Annexures

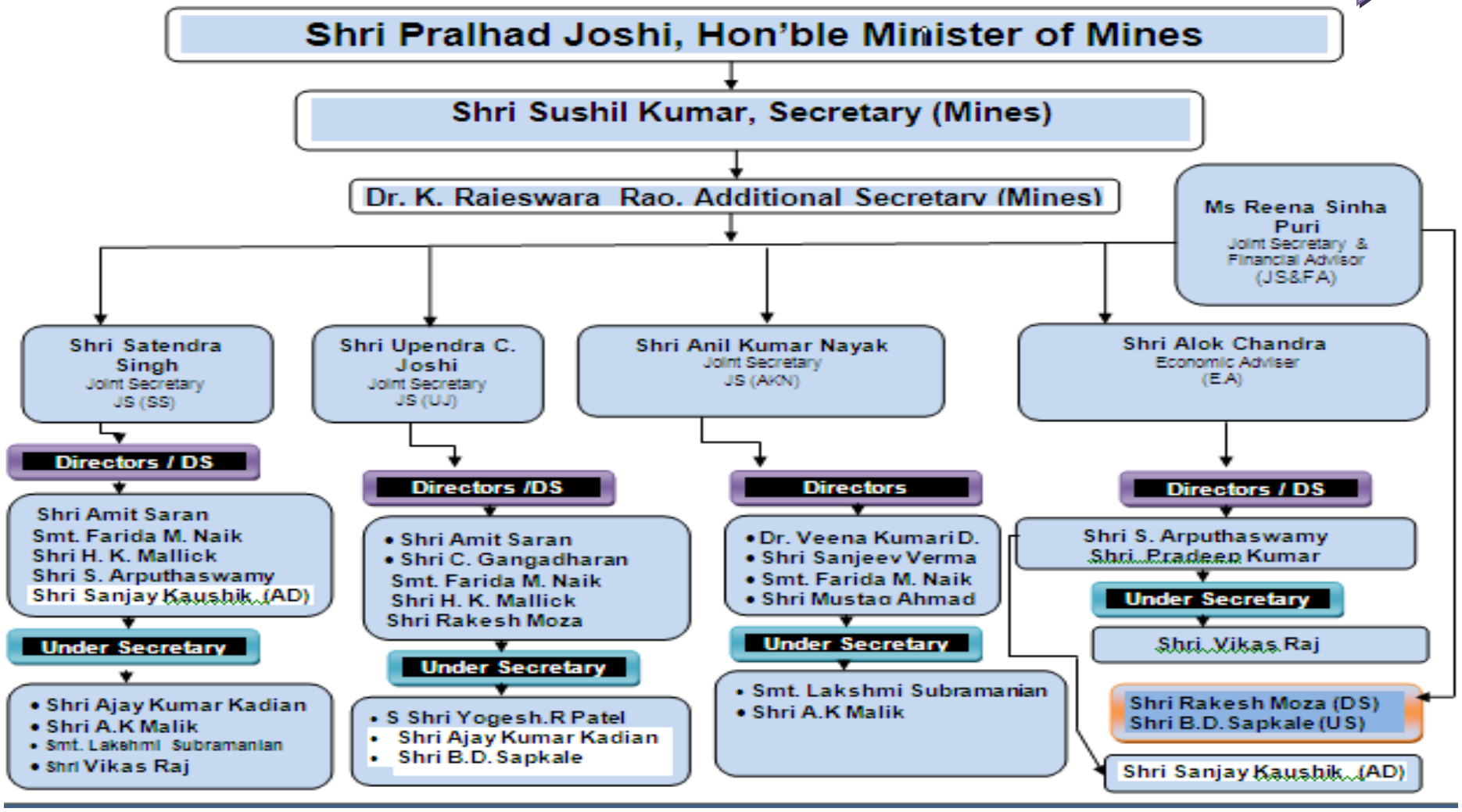
Annexure 1.1	Organizational Structure of Ministry of Mines
Annexure 2.1	Production of Selected Minerals, 2015-16 to 2019-2020 upto March, 2020
Annexure 2.2	Exports of Ores & Minerals (2014-15 (R), 2015-16 (R), 2016-17 (R), 2017-18 (P) & 2018-19 (P) upto March, 2019.
Annexure 2.3	Imports of Ores & Minerals (2014-15 (R), 2015-16 (R), 2016-17 (R), 2017-18 (P) & 2018-19 (P), upto March, 2019.
Annexure 2.4	Reserves/Resources of Minerals as on 1.4.2015
Annexure 2.5	Scenario of mineral rich States
Annexure 6.1	Details of Elements Analysed in NGCM
Annexure 6.2	Year wise / activity-wise financial performance of GSI against the approved budget outlay during f.y. 2018-19 and be grant and expenditure till december, 2019 and projection of expenditure in last quarter (jan 2020 to march,2020) of f.y. 2019-20 and fund utilization during calendar year 2019
Annexure 6.3	Performance relating to various regulatory and development functions of IBM during the year 2019 (up to December 2019).
Annexure 6.4	Mineral Wise Summary of Mining Lease Distribution of Minerals (Excluding Atomic, Fuel & Minor Minerals) as on 31/03/2018(P) (All India)
Annexure 8.1	Detailed time lines and outcomes of ongoing and completed projects of JNARDDC, Nagpur
Annexure 8.2	The list of patents filed and granted for JNARDDC in the last five years.
Annexure 8.3	Clientele /sponsored projects
Annexure 9.1	List of Drinking water scarcity Villages -NALCO
Annexure 9.2	List of villages covered under Solar Lights-NALCO
Annexure 9.3	Details of Rural Development initiatives at villages -NALCO

Annexure 9.4	NALCO's Response to "FANI Cyclone victims"
Annexure 11.1	During FS 2019-20, total six items of Geological Mapping on 1:25,000 scale including one Integrated Thematic Mapping (ITM) and two RP items have been taken up in NER of which one item taken in Arunachal Pradesh, three items in Meghalaya, two items in Assam. During the period from 1stApril, 2019 to 31st December, 2019, an area of 543 Sq. km and 137 Line km in RP items have been covered.
Annexure 11.2	Total three items of Geochemical Mapping on 1:50,000 Scale with collection of samples in grid pattern have been taken up during the FS 2019-20 in parts of Assam and Manipur and an area of 860 sq. km has been covered during the period from 1st April, 2019 to 31st December, 2019
Annexure 11.3	Two items of GPM in Ri Bhoi, East Khasi Hills and West Khasi Hills districts of Meghalaya, Nagaon, Morigaon and KarbiAnglong districts of Assam have been taken up during FS 2019-20 and an area of 1725 sq. km have been covered during the period from 1st April, 2019 to 31st December, 2019.
Annexure 11.4	Total 2,345m drilling has been done during the period from 1stApril, 2019 to 31st December, 2019 .
Annexure 14.1	List of Nodal Officer, CPIOs and Appellate Authorities in Ministry of Mines
Annexure 14.2	During the year 2018-19, the following days were observed in Ministry of Mines

Annexure 1.1

ORGANIZATIONAL STRUCTURE OF MINISTRY OF MINES

Back Annx Ref



Back Annx Ref

Annexure-2.1

Production of Selected Minerals, 2015-16 to 2019-20											
(Excluding Atomic & Fuel Minerals)											
											(Value in Rs. Crore)
Mineral	**Unit**	**2015-16**		**2016-17**		**2017-18(P)**		**2018-19(P)**		**2019-20(E)**	
		Qty	**Value**	**Qty**	**Value**	**Qty**	**Value**	**Qty**	**Value**	**Qty**	**Value**
All Minerals			92584.74		101783.10		112631.74		127253.06		123588.03
Metallic			33621.71		39759.61		50440.00		64043.78		60822.43
Bauxite	th. tonnes	28123.79	1543.77	24745.49	1486.55	22312.68	1502.07	23687.72	1716.84	20393.05	1471.21
Chromite	th. tonnes	2915.58	2121.45	3727.78	3193.75	3480.93	3210.92	3970.69	3583.61	3642.74	3221.84
Copper Conc.	th. tonnes	151.84	654.83	134.79	650.61	141.86	774.28	155.44	939.52	128.70	877.28
Gold	kg	1323	321.46	1595	436.24	1648.00	476.31	1664	524.17	1656	572.42
Iron Ore	M. tonnes	158.11	22320.66	194.58	25229.18	200.96	34262.89	206.45	45185.48	222.33	44436.06
Lead Conc.	th. tonnes	261.86	788.51	268.05	966.93	306.40	1142.94	358.37	1631.68	327.45	1707.18
Manganese Ore	th. tonnes	2166.95	854.55	2395.13	1624.84	2589.27	1971.75	2820.23	2270.25	2865.58	2038.06
Zinc Conc.	th. tonnes	1473.81	3494.31	1484.24	4338.56	1539.66	4979.93	1457.17	5608.38	1378.07	5738.92
Copper Ore	th. tonnes	3907.82	-	3846.43	-	3678.85	-	4134.75	-	4175.31	-
Gold Ore	th. tonnes	562.96	-	582.28	-	549.70	-	565.67	-	581.80	-
Lead & Zinc Ore	th. tonnes	10453.04	-	11881.24	-	12613.87	-	13752.30	-	13977.60	-
Silver	kg	426443	1521.24	460811	1832.08	557691.00	2117.9	679376	2582.47	205776	758.31
Tin Conc.	kg	13541	0.92	12121	0.87	16758.00	1.01	21211	1.37	17956	1.15
Non Metalic Minerals			7572.03		8029.19		8197.44		9214.98		8771.29
Diamond	crt	36044	62.14	36491	63.96	39699.00	41.07	38437	58.11	29334	44.57
Garnet (abrasive)	th. tonnes	82.00	64.81	85.41	78.73	158.15	163.67	123.40	156.82	0.80	0.69
Limeshell	th. tonnes	10.35	2.86	12.34	3.48	10.89	3.96	7.53	2.78	6.63	2.64
Limestone	M. tonnes	307.00	6867.40	314.67	7387.84	338.55	7440.74	379.05	8484.12	359.28	8263.72
Magnesite	th. tonnes	327.66	82.71	299.15	74.93	195.03	50.39	146.58	39.66	98.96	34.44
Phosphorite	th. tonnes	1571.86	376.38	1124.44	299.67	1534.27	377.16	1284.58	354.76	1234.15	363.66
Sillimanite	th. tonnes	69.94	50.93	68.13	53.59	81.64	66.93	69.03	55.98	11.36	3.88
Wollastonite	th. tonnes	175.35	15.03	166.19	15.88	153.05	12.67	184.06	17.4	135.53	13.12
Apatite	th. tonnes	0.11	0.04	0	0	0	0	0	0	0	0
Flint Stone	th. tonnes	0.25	0.01	0.03	0	0	0	0	0	0	0
Fluorite(graded)	th. tonnes	2.33	1.30	1.18	0.67	1.31	0.71	1.08	0.85	1.41	0.94
Graphite (r.o.m.)	th. tonnes	135.53	10.65	122.44	9.42	33.56	2.57	39.37	3.77	35.21	6.38
Iolite	kg	0	0	0	0	0	0	86.00	0.1	138	0.09
Kyanite	th. tonnes	2.90	1.42	3.25	1.35	7.82	2.3	4.89	1.52	0.72	0.12

Marl	th. tonnes	2389.71	32.00	2203.70	31.79	1822.51	28.51	1890.31	32.55	2105.06	34.36
Moulding Sand	th. tonnes	26.04	0.61	27.69	0.66	7.10	0.18	14.42	0.39	21.09	0.59
Salt (rock)	th. tonnes	0.00	0.00	0.00	0.00	0.05	0.03	0.02	0	0.22	0.24
Selenite	th. tonnes	3.10	0.62	4.33	0.87	0.47	0.09	2.91	0.59	1.71	0.35
Siliceous Earth	th. tonnes	47.39	2.07	77.27	5.53	58.88	5.75	77.74	5.19	16.49	1.18
Vermiculite	th. tonnes	23.28	1.06	9.04	0.82	6.06	0.71	3.16	0.39	2.76	0.32
Minor Minerals			51391.00		53994.30		53994.30		53994.30		53994.30

M.Tonnes - Million tonnes th.tonnes - Thousand tonnes Kg - Kilogram

(P) Provisional.

(E) Estimated figures

Note: # Includes 31 minerals declared as minor minerals vide notification dated 10.02.2015. The data for these minerals for 2014-15 onwards is included in minor minerals.

Source : a) Minerals covered under MCDR : MCDR returns

b) Minor Minerals : State Governments (data repeated in case of non-availability).

Annexure-2.2

Back Annx Ref

Export of Ores & Minerals

(value in Rs. '000)

Minerals		2014-15 (R)		2015-16 (R)		2016-17 (R)		2017-18 (P)		2018-19 (P) (Upto, March,19)	
	Unit	Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value
Grand Total		**	**1780194115**	**	**1709463248**	**	**2001306860**	**	**1994690164**	**	**2192001827**
Abrasive (Natural)	Ton	31901	516073	4477	59894	4774	66650	49819	427971	80291	1380078
Alabaster	Ton	21	140	--	--	20	240	4	41	12	130
Alumina	Ton	1583590	32974199	1368526	25895759	1509463	30030427	1361385	32961497	1389106	46982494
Andalusite	Ton	4	127	--	--	150	2063	6	327	100	2660
Antimony Ores & Conc.	Ton	--	--	264	115561	46	9645	4	290	++	7
Arsenic Sulphide (Natural)	Ton	--	--	15	98	--	--	25	280	25	212
Asbestos	Ton	393	12026	524	23587	101	963	132	943	1112	33913
Ball Clay	Ton	57557	194268	61536	148435	92688	233666	157738	357087	213360	497941
Barytes	Ton	651571	4525677	743407	6517075	1067312	7669142	1652975	9308877	2114609	11781176
Bauxite	Ton	6808588	14050662	8914624	19527404	2790675	5105333	1529308	2705041	1567464	3045300
Bentonite	Ton	1300083	3999732	1572469	4814343	1538136	4798148	1599606	4825165	1694139	5846668
Borax	Ton	2655	164700	1724	124645	2480	164055	3136	261796	2360	238104
Building And Monumental Stones Nes	Ton	6127052	7786180	5133276	8489458	8211195	12089832	8073677	10402294	8707264	10838554
Calcite	Ton	30768	192310	25198	177976	26981	202616	38639	289091	39248	303446
Chalk	Ton	490	2978	481	3818	661	4549	682	4296	1201	7736
Chromite	Ton	25361	659260	71839	1314085	230531	3657701	81835	1743015	39273	1337693
Clay (Others)	Ton	25515	217299	23341	312553	40345	459493	37616	367335	44194	428744
Coal(Ex Ligbite)	ThT	1237	7202914	1576	9006274	1773	9669603	1504	8783040	1313	9363727
Coal,Gas Water Etc.(Except Gaseous Hydrocarbons)	Ton	32	7820	1	99	++	95	37	1122	++	100
Coal:Lignite	Tht	1	13881	++	2753	2	251599	2	263660	2	254653
Cobolt Ores & Conc.	Ton	++	4	++	44	++	20	++	4	1	4496

Coke	Ton	98003	1090635	89847	1073159	77641	992814	90400	1624504	63363	1193304
Copper Ores & Conc.	Ton	1	10	11432	712919	22711	1054323	61005	3805458	181642	16627621
Corundum (Natural)	Ton	--	--	--	--	--	--	--	--	101	2149
Diamond		**	1481021700	**	1427340191	**	1627066251	**	1620221010	**	1758926549
Diatomite	Ton	87845	778088	30597	328268	38427	362899	52236	456665	27893	273001
Dolomite	Ton	44620	156630	85273	155664	61021	234403	73428	377099	77958	308054
Earth Clay	Ton	8915	60466	9000	87142	5792	61644	5829	63590	3651	38826
Emerald (Cut & Uncut)		**	15945397	**	17879971	**	20340188	**	17756467	**	23026125
Felspar (Cut & Uncut)		**	26484	**	41189	**	239665	**	303031	**	338488
Felspar (Natural)	Ton	589820	2876165	426172	2232791	481457	2495593	544667	2708372	653737	3310607
Fire Clay	Ton	2503	16314	887	10775	4325	14880	4116	30575	4665	40928
Flint	Ton	484	3991	867	7660	652	6619	824	7684	790	10393
Fluorspar	Ton	561	20763	316	11578	609	21579	470	15315	534	23413
Garnet(Cut And Uncut)		**	31070	**	25405	**	241715	**	416710	**	494842
Garnet(Abrasive)	Ton	448559	5673831	480408	5950862	387277	4691844	157223	2346626	104343	1783920
Granite	Ton	6563271	98322392	5674568	92720986	6094325	93368593	6524819	92485120	6811954	102014067
Graphite(Natural)	Ton	2669	86578	286	17070	404	30317	910	77567	405	22958
Gypsum	Ton	65645	158033	110882	291061	194493	523395	161246	593843	175032	684495
Iron Ore	Tht	7297	31436685	5441	12639633	30731	102929256	24203	94901382	16200	92674234
Kaolin	Ton	258330	941751	304702	1105587	232867	1136296	214469	1010907	443202	1709971
Kieselguhr	Ton	137	2494	90	1900	39	931	124	2577	62	1341
Kyanite	Ton	39	504	144	2703	153	3052	166	3404	284	4873
Lead Ores & Conc.	Ton	509	22298	++	215	1	33	++	52	37	2007
Limestone	Ton	3812759	4671970	3236010	4694274	4330820	4990064	2812257	4102279	3675439	4947454
Magnesite	Ton	6612	120896	6204	124464	8064	135153	9576	188593	6273	204287
Manganese Ore	Ton	11026	65399	444	18945	245	12377	44167	508784	55845	138120
Marble	Ton	325707	5990615	289853	5998393	326967	7048202	355892	7669792	384806	8757384
Mica	Ton	141100	4263733	135805	4229719	135172	4555657	155111	6193284	151821	6200097
Molybdenum Ores & Conc.	Ton	24	17801	45	2199	22	1006	7	1923	6	81
Natural Gas	Ton	138168	4901801	126951	3798603	37072	1521058	179552	6315314	65206	3415537
Nickel Ores &	Ton	41	1452	125	11510	--	--	++	19	50	1618

Conc.											
Niobium Or Tantalum Ores & Conc.	Ton	24	24238	--	--	2	7278	++	213	++	790
Ochre	Ton	4034	92575	3633	75045	3359	78715	4519	69096	3496	65048
Other Minerals Nes	Ton	1768058	1773764	1362345	1200053	757362	1663192	1670511	2298247	3855418	6550340
Precious & Semi-Precious Stones (Cut & Uncut):Total		**	12993434	**	12590259	**	11080272	**	12656409	**	14493955
Preciuos Metal Ores & Concentrates	Kg	10000	24	144051	3166	5743	72	116000	792	50001	484
Quartz And Quartzite	Ton	410497	2938739	388192	3025919	488796	3579275	556435	4305601	788609	5702080
Rock Phosphate	Ton	437	2917	14242	69097	5915	8615	395	599	1453	46795
Salt (Other Than Common Salt)	Ton	4776491	6390692	5926639	6701176	7897940	7450781	9969604	9402718	12755391	14627307
Sand (Excl. Metal Bearing)	Ton	10751	342834	14476	491906	17284	369426	32444	419869	3394	24454
Sandstone	Ton	627008	8523122	744657	10161784	710393	9071316	933455	12329002	1035890	13570943
Silica Sand	Ton	1216	9801	709	6725	1097	8667	2748	22159	3152	27794
Sillimanite	Ton	17304	141261	15078	110847	14064	114679	16193	171833	9986	111874
Slate	Ton	100447	1867163	97591	1927313	122089	2343205	86297	1954270	80536	2180256
Steatite	Ton	158405	2156568	187287	2709689	251546	3456145	244760	3580879	258389	3768162
Sulphur (Exc. Sublimed Precipited& Colloidal)	Ton	397399	3714082	628164	5157081	616473	3469351	573856	4254427	479651	4332476
Tin Ores & Conc.	Ton	--	--	++	14	--	--	++	3	++	54
Titanium Ores & Conc.	Ton	779598	7179647	790489	6644935	532201	5716718	355475	6010132	359974	6566846
Tungsten Ores &Conc.	Ton	175	29666	1	390	7	6064	30	29880	34	43180
Vanadium Ores & Conc.	Ton	--	--	--	--	++	25	--	--	10	2320
Vermiculite	Ton	1044	9906	528	6402	757	8313	453	5093	583	7250
Witherite	Ton	10	526	++	241	++	217	8	319	++	87
Wollastonite	Ton	17864	288086	16616	279263	16699	293525	12479	224918	13786	279116
Zinc Ores & Conc.	Ton	41	745	558	11346	53912	3990176	1206	31460	2079	71170
Zirconium Ores	Ton	12230	488129	4859	241900	1693	95182	308	31131	89	4470

& Conc.											
Source: DGCIS, Kolkata											
P: Provisional											
-- :Nil											
++: Negligible											
****: Not additive**											

Annexure 2.3

Back Annx Ref

Import of Ores & Minerals

(value in Rs. '000)

Minerals		2014-15 (R)		2015-16 (R)		2016-17 (R)		2017-18 (P)		2018-19 (P) (Upto, March,19)	
Grand Total		**	**10717328023**	**	**7387889415**	**	**8094451067**	**	**10285285803**	**	**12991307769**
Minerals	Unit	**Qty**	**Value**	**Qty**	**Value**	**Qty**	**Value**	**Qty**	**Value**	**Qty**	**Value**
Abrasive (Natural)	Ton	5775	80935	4943	63749	4716	54480	5386	68022	4942	74317
Alabaster	Ton	912	24831	970	24062	1055	28667	1145	28996	1378	39474
Alumina	Ton	790305	21244790	998446	22924845	1403570	33417504	2224194	60483412	2856522	102946451
Andalusite	Ton	9350	201731	14072	306082	10909	222533	14375	318253	14263	355231
Antimony Ores & Conc.	Ton	4711	1004079	5330	924223	4756	752104	5257	1093067	7496	1609648
Arsenic Sulphide (Natural)	Ton	31	2041	5	297	12	811	20	1155	7	557
Asbestos	Ton	396493	17168106	355686	14865511	310593	11279370	357182	11603678	364105	12253120
Ball Clay	Ton	125384	957635	167856	1298484	173358	1368664	197848	1514694	175253	1579468
Barytes	Ton	7484	146613	8433	189199	8817	202527	10982	237166	11497	266738
Bauxite	Ton	1800689	8560884	1116010	5982901	1894926	7785093	1461494	7727097	2254595	13364138
Bentonite	Ton	11002	316059	15225	353709	28615	477966	48963	657248	57232	868080
Borax	Ton	146301	4474018	133551	4429455	129409	4359797	160135	4753977	181628	5886239
Building And Monumental Stones Nes	Ton	759539	1438612	521202	1138891	147856	506698	103829	418409	201755	850407
Calcite	Ton	66450	369703	43812	219917	54563	264364	74153	353344	71712	346402
Chalk	Ton	26734	47716	6174	46310	8211	48114	6989	36764	255	6142
Chromite	Ton	242685	2871480	187663	2266406	154226	2105121	160505	2981861	162663	3154446
Clay (Others)	Ton	14347	231876	19485	266438	18997	261132	24338	302247	17482	319967
Coal(Ex Ligbite)	ThT	212106	1045300817	204000	861073456	191015	1003162925	208254	1384845575	235247	1708926389
Coal,Gas Water Etc.(Except Gaseous Hydrocarbons)	Ton	++	1291	++	75	--	--	2	29	--	--
Coal:Lignite	ThT	++	11132	++	5519	++	652	++	1335	1	8171
Cobolt Ores & Conc.	Ton	272	366480	25	44193	--	--	--	--	1	4476
Coke	Ton	3290324	43751480	3019502	31956109	4368062	54356105	4589015	91542188	4933340	120756971
Copper Ores & Conc.	Ton	1702247	285028247	1886199	262965391	1143216	182986972	1488164	278344776	823938	121462018

Corundum (Natural)	Ton	--	--	--	--	++	18	1	29	--	--
Diamond		**	1252140915	**	1105651209	**	1296740694	**	1902035828	**	1779709899
Diatomite	Ton	2122	87085	2023	87086	3143	113037	2426	88318	3648	139463
Dolomite	Ton	2014760	3146095	1931136	2998295	2010665	2999703	5360753	5636086	5864016	6743267
Earth Clay	Ton	4617	2979	12	850	598	3525	43	1845	19	4255
Emerald (Cut & Uncut)		**	63062390	**	87263269	**	113428797	**	77934747	**	36592286
Felspar (Cut & Uncut)		**	9639	**	21267	**	46896	**	48136	**	96750
Felspar (Natural)	Ton	66749	242646	25716	177877	35582	161647	16753	147950	9490	100612
Fire Clay	Ton	4	138	393	16841	1828	60726	1765	110852	1294	88523
Flint	Ton	141	2258	1279	17412	1712	24263	4431	56232	6887	76018
Fluorspar	Ton	155673	2967073	163113	2908707	190444	2992256	221817	3958978	265445	7281830
Garnet(Cut And Uncut)		**	68745	**	62630	**	222296	**	335898	**	169836
Garnet(Abrasive)	Ton	647	10297	883	11053	2286	22192	2256	21243	422	6410
Granite	Ton	65595	2269304	70288	2474283	51422	1683156	60339	1760529	61962	1940630
Graphite(Natural)	Ton	28552	1335291	26160	1213354	37044	1391090	39864	1487947	47053	2328880
Gypsum	Ton	4421048	6747745	4068412	5713627	4423809	6051111	5740956	8254197	6186250	9473422
Iron Ore	ThT	12093	65947377	7099	31971444	4607	21615220	8707	42293970	12808	59136712
Kaolin	Ton	93322	1662637	118524	1996776	142929	2393952	192539	2787447	229734	3581703
Kieselguhr	Ton	20	803	++	73	1	140	1	99	42	3995
Kyanite	Ton	508	17006	478	16913	748	16619	620	17807	997	27590
Lead Ores & Conc.	Ton	39441	3846807	5334	264663	6217	318696	2220	149370	1499	85467
Limestone	Ton	13943781	22138585	17187164	23772768	18300357	24384184	20827698	29016416	24254297	36506243
Magnesite	Ton	102077	3327762	118788	3256840	142600	3089942	229628	5268655	464367	11120844
Manganese Ore	Ton	3172858	34669120	2216864	17413688	1943815	24028136	3627741	50633963	2784473	48484512
Marble	Ton	778503	23839861	858061	27392157	882266	26142984	1164246	22696788	997198	20190592
Mica	Ton	2240	703137	2471	895589	3260	944981	4313	1079664	3692	1172725
Molybdenum Ores & Conc.	Ton	8093	8646301	7511	4903721	7138	5442499	9169	8149458	11028	13606784
Natural Gas	Ton	13289155	563400559	14376924	437824474	17783327	402490252	20176813	523664503	21544662	738878610
Nickel Ores & Conc.	Ton	4185	3842487	3295	2453862	1062	818095	--	--	++	169
Niobium Or Tantalum Ores & Conc.	Ton	115	179733	191	246581	168	284036	185	228699	155	264454
Ochre	Ton	176	25955	135	33919	123	19061	56	14580	40	11794
Other Minerals Nes	Ton	74553	2285428	59203	805957	299442	1590851	536328	2082737	683347	2821851

Petroleum (Crude)	ThT	187913	7093793567	202314	4293999336	214887	4742189327	218107	5630977107	226453	7981583187
Precious & Semi-Precious Stones (Cut & Uncut):Total		**	14675045	**	21000369	**	24660619	**	46165232	**	48292004
Preciuos Metal Ores & Concentrates	Kg	101602	22252601	78654	13658295	83322	19423078	15298	3363976	201	160
Quartz And Quartzite	Ton	215	10403	1224	43801	382	12001	976	22057	1663	54630
Rock Phosphate	Ton	8273261	61888709	8037745	65290422	7511446	49513135	7702634	45457007	7519156	56379205
Salt (Other Than Common Salt)	Ton	41300	113604	55642	173741	52900	173685	67555	291752	78712	472880
Sand (Excl. Metal Bearing)	Ton	58237	98439	165150	375079	31667	140870	361957	530106	390327	843983
Sandstone	Ton	++	18	26	3101	++	21	203	4162	48	973
Silica Sand	Ton	76529	556337	18788	226224	102432	516412	130185	475197	60898	400143
Sillimanite	Ton	116	10754	214	9044	24	3029	18	1027	98	2403
Slate	Ton	472	16815	134	11295	18	5323	139	9623	225	6869
Steatite	Ton	3693	130504	4533	198575	3592	204909	4548	249142	7028	324573
Sulphur (Exc. Sublimed Precipited& Colloidal)	Ton	1626407	17445432	1432632	14172610	1345520	8751425	1206433	10628788	1346777	15219696
Tin Ores & Conc.	Ton	--	--	82	58039	69	37335	57	56980	6	1259
Titanium Ores & Conc.	Ton	51991	971524	106422	1637170	39443	867777	163690	3297464	97307	3013233
Tripoli Earth	Ton	--	--	20	825	19	817	++	8	8	238
Tungsten Ores & Conc.	Ton	191	61581	78	34080	283	29631	350	23609	461	64519
Vanadium Ores & Conc.	Ton	19	1378	64	6301	269	15868	491	89745	2658	451826
Vermiculite	Ton	391	11484	439	15093	552	14413	321	7415	610	16154
Witherite	Ton	184	5261	++	20	--	--	--	--	++	95
Wollastonite	Ton	1948	32549	2818	53218	3483	73052	11461	156398	26484	331612
Zinc Ores & Conc.	Ton	35696	1693837	385	18721	1771	86640	--	--	1422	38776
Zirconium Ores & Conc.	Ton	47656	3331467	53208	3691649	73931	4569039	83780	6202747	76078	8084379
Source: DGCIS, Kolkata											
P: Provisional											
-- :Nil											
++: Negligible											
****: Not additive**											

Annexure 2.4

Back Annx Ref

Reserves/Resources of Minerals as on 1.4.2015

		Reserves				Remaining Resources								Total
Mineral	Unit	Proved	Probable		Total	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	Resources
		STD111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Andalusite	000'tonnes	0	0	0	0	0	0	0	0	0	4000	24201	28201	28201
Antimony														
Ore	tonnes	0	0	0	0	0	0	0	0	0	10588	0	10588	10588
Metal	tonnes	0	0	0	0	0	0	0	0	0	174	0	174	174
Apatite	tonnes	27715	0	1680	29395	1385734	491818	1225345	2281521	11481250	6132768	1017646	24016082	24045477
Asbestos	tonnes	20016	0	4617	24633	2488167	3114728	4064178	100687	2527959	10569233	57800	22922751	22947384
BallClay	tonnes	33526297	11182801	4784522	49493621	11045214	4286560	13437994	624977	2497880	53357091	0	85249716	134743337
Barytes	tonnes	50449000	49358	848467	51346825	410466	323345	1258521	205834	1284390	31735548	105721	35323825	86670650
Bauxite	000'tonnes	434043	18599	203780	656422	254378	132633	382369	710878	430890	1209706	119588	3240442	3896864
Bentonite	tonnes	13926227	50000	609406	14585633	6838864	2721697	68632472	26519818	225744237	212115692	25730000	568302781	582888414
Borax	tonnes	0	0	0	0	0	0	0	0	0	0	74204	74204	74204

		Reserves				Remaining Resources								Total
Mineral	Unit	Proved	Probable		Total	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	Resources
		STD111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Calcite	tonnes	928119	798170	1722578	3448867	1332076	217790	3339239	9122696	1241494	4204311	97476	19555082	23003949
Chalk	000'tonnes	4215	529	319	5064	741	331	151	196	0	269	0	1687	6751
China Clay	000'tonnes	140456	36144	52869	229469	107176	42220	98627	289723	415703	1685730	72599	2711777	2941247
Chromite	000'tonnes	64465	12815	24930	102210	67618	15780	33506	26914	33076	44458	20452	241806	344016
Cobalt Ore	mill.tonnes	0	0	0	0	0	0	0	30.63	2	0.28	12	44.91	44.91
Copper Ore														
Ore	000'tonnes	162972	0	44796	207767	44925	31090	59209	158300	232654	772912	4640	1303730	1511498
Metal	000'tonnes	2127.9	0	606.72	2734.62	382.18	324.55	585.42	1950.87	2050.98	4100.36	29.17	9423.53	12158.15
Corundum	tonnes	200	0	0	200	70844	1073	63060	13	38	105794	52675	293497	293697
Diamond	Carats	959500	0	159	959659	0	0	0	304601	1524317	29047514	0	30876432	31836091
Diaspore	tonnes	3242363	884525	3755546	7882434	114789	498756	480663	14241	110358	1045944	46068	2310817	10193251
Diatomite	000'tonnes	0	0	0	0	634	0	0	0	0	2251	0	2885	2885
Dolomite	000'tonnes	431750	107364	138770	677884	372515	323183	537932	307103	757005	5215075	224194	7737007	8414891
Dunite	000'tonnes	10848	18	1901	12768	436	1925	108887	25202	1087	23832	13680	175049	187818

		Reserves				Remaining Resources								Total
Mineral	Unit	Proved	Probable		Total	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	Resources
		STD111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Emerald	Kgs	0	0	0	0	0	0	0	0	0	0	55869	55869	55869
Feldspar	tonnes	173383004	103054634	43403974	319841612	45903221	42467787	40160373	13882441	17928113	150012330	3371567	313725831	633567443
Fireclay	000'tonnes	13295	5035	8707	27037	13878	30155	18260	49290	54093	524011	6104	695791	722829
Fluorite	tonnes	224824	63860	0	288684	4976749	745390	571311	1713833	6218421	3522537	145183	17893423	18182107
Fuller's Earth	tonnes	3941000	0	0	3941000	0	0	58200	0	912340	256467419	0	257437959	261378959
Garnet	tonnes	9917936	278493	2587427	12783856	84320	1643412	3287667	121099	10247428	27992906	333	43377166	56161022
Gold														
Ore(Primary)	tonnes	10404349	6401725	422100	17228174	1925669	1303000	1968176	30333248	70136727	233608305	145336333	484611458	501839632
Metal (Primary)	tonnes	53.41	16.26	0.42	70.09	7.69	3.85	12.1	128.65	143.8	227.44	61.12	584.65	654.74
Ore (Placer)	tonnes	0	0	0	0	0	0	0	0	2552000	23569000	0	26121000	26121000
Metal (Placer)	tonnes	0	0	0	0	0	0	0	0	2.29	3.57	0	5.86	5.86
Granite (Dimension Stone)	th.cu.m	35741	201377	26574	263692	38462	51990	8234	837325	2063964	42543908	512216	46056098	46319790
Graphite	tonnes	4229675	1204423	2526694	7960793	9571933	3825575	3593404	741377	7368340	22361229	139464128	186925987	194886779
Gypsum	000'tonnes	35141	311	1169	36621	10826	93127	33419	9071	713834	428097	4518	1292892	1329513

		Reserves				Remaining Resources								Total
Mineral	Unit	Proved	Probable		Total	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	Resources
		STD111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Iron Ore (Heamatite)	000'tonnes	4053032	449917	918801	5421751	3444103	1573822	1496674	1762741	1798557	4498142	2491176	17065214	22486965
Iron Ore (Magnetite)	000'tonnes	30352	2311	20037	52699	223388	15494	64091	1513195	1984566	6351286	584436	10736455	10789155
Kyanite	tonnes	639121	0	48958	688079	1505114	568205	2193427	579619	3577402	95869713	0	104293480	104981559
Laterite	000'tonnes	98598	12527	13608	124733	49655	8960	22724	3532	2626	243535	250787	581819	706552
Lead & Zinc Ore														
Ore	000'tonnes	31662	68687	5767	106116	5564	17411	31297	37055	192083	355403	4530	643343	749459
Lead Metal	000'tonnes	624.56	1666.02	191.76	2482.34	119.31	521.74	780.56	690.65	2171.43	6237.67	0	10521.36	13003.7
Zinc Metal	000'tonnes	2871.75	6728.14	399.63	9999.52	364.08	940.26	1362.05	1941.94	7931.06	13722.2	101.65	26363.24	36362.76
Lead & Zinc Metal	000'tonnes	0	0	0	0	0	0	0	0	0	120.76	22.37	143.13	143.13
Limestone	000'tonnes	9438939	3015917	3880897	16335753	4870440	4852713	8623172	7111337	22629060	130787772	8014504	186888998	203224752
Magnesite	000'tonnes	77867	165	4244	82276	6210	9345	45574	59010	59652	131707	213	311711	393988
Manganese Ore	000'tonnes	62982	19715	10778	93475	70742	44606	73823	18189	42803	135722	16513	402399	495874
Marble	000'tonnes	0	0	4551	4551	104236	202003	72387	0	107129	1453386	2200	1941341	1945891
Marl	tonnes	117115856	4650000	2090000	123855856	11704870	0	0	0	0	0	0	11704870	135560726
Mica	Kgs	82187635	20035595	12209547	114432777	38252500	10605400	124089303	143353477	56528016	144446953	3593715	520869364	635302141

		Reserves				Remaining Resources								Total
Mineral	Unit	Proved	Probable		Total	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	Resources
		STD111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Molybdenum														
Ore	tonnes	0	0	0	0	0	1500000	0	36000	569304	17098594	167800	19371698	19371698
Cotained MoS2	tonnes	0	0	0	0	0	1050	0	83	287	11198.03	50.34	12668.37	12668.37
Nickel Ore	mill.tonnes	0	0	0	0	0	21	21	31	53	63	0	189	189
Ochre	tonnes	21959552	4448341	10525912	36933805	44924890	13936202	31896176	2559245	3560819	32369262	1612607	130859201	167793006
Perlite	000'tonnes	0	0	0	0	140	683	595	0	0	0	988	2406	2406
Platinum Group of Metals	In tonnes	0	0	0	0	0	0	0	0	7.71	6.5	1.5	15.71	15.71
(PGM)	of Metal content													
Potash	mill.tonnes	0	0	0	0	0	0	0	0	18142	3660	707	22508	22508
Pyrite	000'tonnes	0	0	0	0	27129	0	32597	9590	77729	1527356	0	1674401	1674401
Pyrophyllite	tonnes	16575493	4322386	4035079	24932958	9539407	8301411	4240016	1118943	3589624	7533340	360006	34682745	59615703
Quartz & Silica Sand	000'tonnes	433014	93339	121169	647522	354566	368216	362128	36872	219180	1897899	21436	3260298	3907819
Quartzite	000'tonnes	47758	2016	33698	83472	120723	141437	160355	119953	152715	868850	11293	1575325	1658798
Rare Earth Elements	tonnes	0	0	0	0	0	0	0	0	6353	19140	0	25493	25493

		Reserves				Remaining Resources								Total
Mineral	Unit	Proved	Probable		Total	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	Resources
		STD111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Rock Phosphate	tonnes	43832936	5179	1969370	45807485	10679080	36271671	25008353	2912633	3549750	185771368	2678275	266871130	312678615
Rock Salt	000'tonnes	0	0	0	0	10035	0	5990	0	0	0	0	16025	16025
Ruby	Kg	0	0	0	0	0	429	3296	0	0	1623	0	5349	5349
Sapphire	Kg	0	0	0	0	0	0	0	0	0	450	0	450	450
Shale	000'tonnes	15027	171	274	15472	495	0	2022	0	0	1175	90	3781	19253
Sillimanite	tonnes	323231	5728868	450016	6502115	1020187	135278	20257525	4580083	17790664	16068690	3849600	63702027	70204142
Silver														
Ore	tonnes	69277075	8413000	72753828	150443903	0	1484543	46726460	29632000	64946000	218721729	0	361510732	511954635
Metal	tonnes	4309.78	220.77	2641.39	7171.94	0	42.85	259.62	2037.99	3236.39	17233.03	0	22809.88	29981.82
Slate	000'tonnes	19619	667	0	20286	0	0	1075	0	0	1511	0	2586	22872
Sulphur (Native)	000'tonnes	0	0	0	0	0	0	0	0	0	210	0	210	210
Talc / Steatite / Soapstone	000'tonnes	72172	8067	26251	106490	18178	13020	32221	2994	8126	128620	6275	209434	315924
Tin														
Ore	tonnes	2067	897	1455	4419	22594200	2653	31330072	168457	561080	29064288	0	83720749	83725168

		Reserves				Remaining Resources								Total
Mineral	Unit	Proved	Probable		Total	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	Resources
		STD111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Metal	tonnes	44.56	94.02	15.62	154.2	33139.45	842.8	54049.65	813.29	231.63	13182.34	0	102259.16	102413.36
Titanium Minerals	tonnes	13552280	0	868436	14420716	19311670	31365	117416	2198668	52373956	325171754	0	399204829	413625545
Ilmenite	tonnes	12980540	0	832970	13813510	17294168	0	0	1242214	41973121	280193087	0	340702590	354516100
Rutile	tonnes	558825	0	35466	594291	1099060	0	0	4460	3425835	9007516	0	13536871	14131162
Leucoxene	tonnes	0	0	0	0	624903	0	0	1994	0	341949	0	968846	968846
Anatase	tonnes	0	0	0	0	0	0	0	0	3345000	0	0	3345000	3345000
Titaniferous Magnetite	tonnes	0	0	0	0	293539	0	117416	950000	3630000	35629202	0	40620157	40620157
Not known	tonnes	12915	0	0	12915	0	31365	0	0	0	0	0	31365	44280
Tungsten														
Ore	tonnes	0	0	0	0	2230000	0	173063	19611152	23435954	25356049	16581246	87387464	87387464
Cotained WO3	tonnes	0	0	0	0	3568.00	0.00	450.00	9914.00	20180.92	103415.15	4566.28	142094.35	142094.35
Vanadium														
Ore	tonnes	0	0	0	0	276530	1720000	4108100	0	232000	18297225	0	24633855	24633855
Contained V2O5	tonnes	0	0	0	0	1106.12	2835	6032.4	0	487.2	54133.29	0	64594.01	64594.01
Vermiculite	tonnes	1582906	19413	30566	1632885	36411	26196	39794	58396	20179	538607	0	719582	2352467
Wollastonite	tonnes	1953384	48075	240003	2241462	3750118	12000	3748191	76088	3325042	3316385	0	14227824	16469286
Zircon	tonnes	1012205	146085	0	1158290	655020	0	105773	81741	377825	1044554	0	2264913	3423203

Annexure-2.5

Scenario of Mineral Rich States

Back Annx Ref

(Excluding Atomic & Fuel Minerals)

Sl. No.	Name of the State	Value of mineral production in 2018-19 (Rs. In crore)	% Change in value as compared to previous year	Leading minerals produced in the State *	Value of minor minerals production in 2018-19 (Rs. In crore) #	No. of reporting mines during 2018-19	Share of the State in country's production of certain minerals *
1	Odisha	30256	49.95	Bauxite, Chromite, Manganese Ore, Sulphur, Iron Ore, Garnet (Abrasive), Graphite (R.O.M.), Sillimanite, Limestone, Iolite	86	136	Chromite(100%), Iolite(100%), Bauxite(65.07%), Graphite (R.O.M.)(58.93%), Iron Ore(54.76%), Garnet (Abrasive)(31.1%), Sulphur(26.88%), Sillimanite(24.68%), Manganese Ore(16.48%), Limestone(1.4%)
2	Rajasthan	22700	8.68	Lead & Zinc Ore,ZincConc, Copper Ore, Phosphorite, Silver, Lead Conc., Wollastonite, Siliceous Earth, Limestone, Copper Conc., Manganese Ore, Garnet (Abrasive), Selenite, Iron Ore	9868	82	Lead & Zinc Ore(100%), Lead Conc.(100%), Selenite(100%), Siliceous Earth(100%), Wollastonite(100%), Zinc Conc.(100%), Silver(99.97%), Phosphorite(92.32%), Copper Conc.(42.39%), Copper Ore(32.64%), Limestone(20.17%), Garnet (Abrasive)(4.19%), Iron Ore(0.54%), Manganese Ore(0.33%),
3	Chhattisgarh	11711	19.27	Bauxite, Limestone, Iron Ore, Tin Conc., Moulding Sand	634	89	Moulding Sand(100%), Tin Conc.(100%), Iron Ore(16.93%), Limestone(11.19%), Bauxite(6.47%),

4	Andhra Pradesh	10645	1.72	Manganese Ore, Garnet (Abrasive), Limestone, Sillimanite, Vermiculite, Iron Ore	9353	130	Vermiculite(77.7%), Garnet (Abrasive)(58.77%), Sillimanite(45.26%), Limestone(12.74%), Manganese Ore(10.4%), Iron Ore(0.32%),
5	Karnataka	10063	5.91	Gold Ore, Manganese Ore, Limestone, Iron Ore, Magnesite, Limeshell, Gold, Silver	1321	139	Gold(99.82%), Gold Ore(99.62%), Limeshell(46.96%), Iron Ore(14.43%), Manganese Ore(11.78%), Limestone(9.05%), Magnesite(6.21%), Silver(0.03%),
6	Telangana	8359	0.93	Limestone, Manganese Ore, Iron Ore	7745	36	Limestone(8.15%), Manganese Ore(0.37%), Iron Ore(0%),
7	Gujarat	6471	0.28	Bauxite, Marl, Sulphur, Limestone	5775	189	Marl(94.95%), Sulphur(10.33%), Bauxite(9.21%), Limestone(6.92%),
8	Uttar Pradesh	5682	0.15	Sulphur, Limestone	5614	2	Sulphur(5.81%), Limestone(0.69%),
9	Maharashtra	5490	1.64	Bauxite, Manganese Ore, Sulphur, Limestone, Sillimanite, Kyanite, Fluorite(Graded), Iron Ore	4173	65	Fluorite(Graded)(100%), Kyanite(100%), Manganese Ore(27%), Sillimanite(19.42%), Bauxite(6.02%), Sulphur(5.27%), Limestone(3.95%), Iron Ore(0.32%), Chromite(%),
10	Bihar	4286	0.27	Sulphur, Limestone	4272	1	Sulphur(0.79%), Limestone(0.06%),

* Except minor minerals.# Figures repeated due to non availability of data from State Governments.

Annexure-6.1

Details of Elements Analysed in NGCM

Back Annx Ref

Packages	Instruments used	Elements to be detected with detection limit within bracket
A	XRF	24 elements, viz. SiO_2 (1000 ppm), Al_2O_3 (1000 ppm), Fe_2O_3(1000 ppm), TiO_2(100 ppm), CaO(1000 ppm), MgO (1000 ppm), MnO(30 ppm), Na_2O (1000 ppm), K_2O (1000 ppm), P_2O_5 (100 ppm), Ba (50 ppm), Co (1 ppm), Cr(15 ppm), Cu(1 ppm), Ga (5 ppm), Nb (5 ppm), Ni (2 ppm), Pb (2 ppm), Sc (3.5 ppm), Sr (5 ppm), V (20 ppm), Y (5 ppm), Zn (10 ppm), Zr (5 ppm).
B	GF-AAS	Au (1 ppb)
C	AAS-Flame	NA#
D	AAS with FIAS	Se (0.2 ppm),
E	ISE	F (100 ppm)
F	GF-AAS	Cd (0.1 ppm), Ag (0.02 ppm)
G	DMA	Hg (5 ppb)
H (ICPMS by Fusion Method)	ICP-MS	**14 REE** viz. La (1 ppm), Ce (2 ppm), Pr (0.075 ppm), Nd (0.056 ppm), Sm (0.090 ppm), Eu (0.006 ppm), Gd (0.025 ppm), Tb (0.028 ppm), Dy (0.010 ppm), Ho(0.010 ppm), Er (0.015 ppm), Tm (0.012 ppm), Yb (0.0034 ppm), Lu (0.023 ppm) **and 9 other elements**, viz. U (0.5 ppm), Ta (0.2 ppm), Ge (0.05 ppm), Be (0.3 ppm), Hf (0.5 ppm), Sn (1 ppm), As (1 ppm), Rb (3 ppm), Th (4 ppm).
I	FIRE ASSAY cum ICPMS/GFAAS	Pt (0.3 ppb) & Pd (0.2 ppb) *{Analysis of this package is on hold since FS 2001-2002, due to non-adherence of desired detection limit.}*
J (ICPMS by Acid Digestion Method)	ICP-MS	In (0.03 ppm), Tl (0.05 ppm), Cs (2 ppm), W (0.5 ppm), Mo (0.5 ppm). Sb (0.2 ppm), Bi (0.1 ppm), Te (0.02 ppm) Li (5 ppm).

Presently analysis under package C is not carried out, instead **Li,** which was earlier analysed under Package C is included in Package J.

Back Annx Ref

Annexure 6.2

Year wise / activity-wise financial performance of GSI against the approved budget outlay during f.y. 2018-19 and be grant and expenditure till december, 2019 and projection of expenditure in last quarter (jan 2020 to march,2020) of f.y. 2019-20 and fund utilization during calendar year 2019

(In crore)

	F.Y. 2018-19						F.Y. 2019-20					Calendar Year 2019	
	F.Y. 2018-19 BE Grant	**RE Grant**	**Expenditure (April,18 to Dec,18)**	**RE Grant from Jan,19 to Mar, 2019**	**Expenditure from Jan,19 to Mar, 2019**	**Total Expenditure 2018-19**	**F.Y. 2019-20 BE Grant**	**BE re-appropriated**	**Actual Expenditure (April,19 to Dec,19)**	**% of expenditure till Dec.2019**	**Projection of expenditure for last quarter (Jan,20 to Mar,20)**	**Budget from Jan 2019 to Dec., 2019**	Expenditure from January 2019 to Dec, 2019
Activities	**1**	**2**	**3**	**4 (2-3)**	**5**	**6 (3+5)**	**7**	**8**	**9**	**10**	**11 (8-9)**	**12 (4+9)**	13 (5+9)
Survey and Mapping	76.25	78.15	71.21	6.94	6.83	78.04	109.85	132.30	120.90	91.38	**11.40**	**127.84**	127.73
Mineral Exploration	39.85	44.41	34.79	9.62	9.53	44.32	45.65	45.65	28.80	63.09	**16.85**	**38.42**	38.33
Special Investigation & Antarctica	2.00	1.97	1.23	0.74	0.69	1.92	2.52	2.52	1.61	63.89	**0.91**	**2.35**	2.3
Research & Development	8.43	10.09	7.33	2.76	2.69	10.02	12.15	12.15	8.01	65.93	**4.14**	**10.77**	10.7
Information Dissemination	36.7	48.55	34.64	13.91	13.86	48.50	78.46	63.01	32.13	50.99	**30.88**	**46.04**	45.99
HRD	8.76	8.66	1.90	6.76	6.69	8.59	75.47	75.47	2.52	3.34	**72.95**	**9.28**	9.21
TSP	8.00	10.63	7.28	3.35	3.31	10.59	24.00	24.00	16.51	68.79	**7.49**	**19.86**	19.82
SCSP*	NA	NA	NA	0	NA	NA	45.00	45.00	8.38	18.62	**36.62**	**8.38**	8.38
Administrative Support Activity including minor works	105.73	124.07	101.34	22.73	21.68	123.02	106.08	99.08	73.48	74.16	**25.60**	**96.21**	95.16

authorization to MoUD													
Establishment Expenditure	603.75	628.62	510.42	118.2	115.37	625.79	722.35	722.35	573.25	79.36	**149.10**	**691.45**	688.62
Total Revenue	**889.47**	**955.15**	**770.14**	**185.01**	**180.65**	**950.79**	**1221.53**	**1221.53**	**865.59**	**70.86**	**355.94**	**1050.6**	1046.24
Capital (Modernization & Replacement)	**168.40**	**73.40**	**42.89**	**30.51**	**29.95**	**72.84**	**101.4**	**101.40**	**57.79**	**56.99**	**43.61**	**88.3**	87.74
Total (Rev + Capital)	**1057.87**	**1028.55**	**813.03**	215.52	**210.60**	**1023.63**	**1322.93**	**1322.93**	**923.38**	**69.80**	**399.55**	**1138.9**	1133.98
% of Utilisation of Fund against RE			79.05%		20.47%	99.52%			69.80%				99.57%

*Scheduled Caste Sub Plan (SCSP) head introduced in FY 2019-20

Annexure -6.3

Performance relating to various regulatory and development functions of IBM during the year 2019 (as on 31.12.2019)

Back Annx Ref

Sl.no.	Item	Annual Target	Achievement
1	Inspections (MCDR/MP/RMP/FMCP)	1600	1306
2	Updating of National Mineral Inventory (NMI) adopting UNFC.	Release of NMI for all the minerals	71 minerals inventory completed. NMI at a Glance as on 01.04.2015 is released. Identified various gaps/deficiencies in National Mineral Inventory as on 01.04.2015 of all deposits in respect of free hold and lease hold (public/private) of 46 major minerals with respect of upcoming Mining Tenement System (MTS)
3	Preparation of multi-mineral maps with forest overlays	100	Multi mineral leasehold maps which were earlier prepared in Autocad, now updated on Arc GIS Plateform . Vectorization of 294 toposheets and plotting of 296 M.L completed
4	OD Investigations	50	37.75
5	Chemical Analysis (No. of radicals)	30,000	19082
6	Mineralogical Studies	2000	2046
7	In Plant Studies/ Plant visits	---	2
8	Technical Consultancy & Mining Research Activity	---	Detailed field work and Total station Survey done to know about total excavation and dumps of Pola Dongra Iron Ore Mine, South Goa for SIT Goa. RMDS for effective utilization of iron ore fine dumps in NMDC, Bailadila under progress.
9	Training programmes by IBM.	12	06

Annexure-6.4

Back Annx Ref

Mineral Wise Summary of Mining Lease Distribution of Minerals (Excluding Atomic, Fuel & Minor Minerals)As on 31/03/2018(P)(All India)

Sl. No.	State	No. of Leases	Lease area (Hect.)
1	Amethyst	3	6.63
2	Apatite	2	20.17
3	Aquamarine	1	24.29
4	Asbestos	1	49.22
5	Bauxite	387	28,356.68
6	Borax	1	159.00
7	Chromite	32	8,368.80
8	Copper ore	14	4253.68
9	Diamond	2	275.96
10	Emerald	1	46.32
11	Epidote	1	4.05
12	Flint stone	2	11.77
13	Fluorite	11	331.87
14	Garnet	109	1604.02
15	Garnet(gem)	2	38.22
16	Gold	11	7445.69
17	Graphite	51	1926.79
18	Iolite	12	188.71
19	Iron ore	488	73556.93
20	Kyanite	28	1439.88
21	Lead & zinc ore	11	6657.16
22	Limeshell	24	2779.88
23	Limestone	2,046	164533.57
24	Magnesite	38	2434.05
25	Manganese ore	291	14553.37
26	Marl	3	13.45
27	Moulding sand	8	37.02
28	Perlite	1	144.88
29	Phosphorite	10	2057.52
30	Rock phosphate	1	13.20
31	Rock salt	1	8.12
32	Ruby	1	27.66
33	Sapphire	1	673.40
34	Semi-precious stones	15	183.20
35	Siliceous earth	44	314.03
36	Sillimanite	6	563.01
37	Stibnite	1	40.47
38	Tin	14	302.77
39	Vermiculite	97	1801.18
40	White clay	8	77.54
41	White shale	38	220.94
42	Wollastonite	16	331.10
	Total	**3,834**	**325876.2**

Excludes the mining leases of the Atomic minerals, Coal, Lignite, Petroleum, Natural Gas and Minor minerals.
(P) : Provisional
Source:- Respective State Govt Deptt/ Directorate of Geology and Mining Deptt.
* Note:- Date received from respective regional offices of IBM have also been taken in account wherever necessary.

Annexure-8.1

Detailed time lines and outcomes of ongoing and completed projects of JNARDDC, Nagpur

Back Annx Ref

Completed projects:

Sl.No.	Project Title	Outcomes
1.	Utilization of PLK (Partially LateritisedKhondalite) as a potential & value added filler material with specific reference to white ceramics and pigments" with CV Raman College, Bhubaneswar)(NALCO, Bhubaneswar) (Feb 2017) (2y 9m)	• PLK is an unutilized material at bauxite mines.A process for utilizing PLK as a potential and value-added filler material for manufacturing white Ceramics and pigments has been successfully developed. • The findings provide alternate raw material source for developing filler material at low cost.
2.	Technological characterization of Bauxite sample for establishing the mass balance of the process design of the expansion study at Vedanta Ltd, Odisha. (Mar 2019) : 4 mts	• The complete technological characterization of Kodingamalli bauxite was carried out for Vedanta Alumina refinery at Lanjigarh. • It involved thorough physical / chemical characterization and optimization of parameters required for the unit operations (pre-desilication, digestion, settlling) of Bayer process to produce alumina. • These parameters will be helpful to Worley Parsons (Technology supplier of Vedanta) in designing, manufacturing and supplying of the refinery equipment. • JNARDDC secured this project after bidding with international agencies.
3.	Nano Processing of Industrial Rejects for use as additives in Mixdesigns for improved pozzolanic reaction efficiency with VNIT. (S&T Mines) (Feb.2018) (2 yrs)	• A cost-effective way for preparation of nano-particles/nano-composites using industrial wastes as precursors rather than expensive chemicals was achieved. • The lab scale findings resulted in reduced used of binder (cement) which shall be substituted by the above nano-materials. • A pilot scale studies could help in

		determining technical feasibility of the process which could lead to economic and efficient building and construction materials.
4.	Development of Wi-Fi enabled sensor arrangement for online measurement of anode current distribution of aluminium electrolysis cell :(NALCO, Bhubaneswar) (Feb 2018) : 2 yrs	• The Institute successfully developeda wi-fi enabled sensor arrangement for online measurement of anode current distribution of aluminium electrolysis cell. • The final plant trials were successfully completed in Feb 2020. • The online data on anode current distribution will lead to better process efficiency and energy savings.
5.	Utilization and development of process for recovery of strategic rare earths from industrial waste –Bauxite Residue at lab scale. (Dept. of Science & Technology & HINDALCO) :(Mar 2017: 3 yrs)	• A lab scale process for recovery of invaluable rare earth elements from industrial waste has been developed. • It involves physical beneficiation /pre-concentration of bauxite residue using multi-gravity separator / Hydro-cyclone test, characterization of various size fractions for major, minor and REEs and leaching study using different mineral acid and sulphate ion roasting. • The process can be scaled up to pilot scale for verifying the techno-economic feasibility study for extracting rare earth elements such as scandium (Sc), lanthanum (La) and cerium (Ce) which are very much demand in the India and can be an import substitute.
6.	Development of inline automated anode butt monitoring system to measure anode butt parameters. NALCO, Bhubaneswar : (Feb 2018 : 1y 9m)	• An inline automated anode butt monitoring system was developed and successful trials conducted in the NALCO plant to measure anode butt parameters. • The system will be useful for verifying the process efficiency based on anode consumption pattern. The

		system will alos be useful for assessing the quality of anodes manufactured. • This will help in enahacing the overall efficiency of production process
7.	Technical feasibility study for extraction of alumina as AlF3 from low grade bauxite (IBAAS, Nagpur) (Mar 2019 : 1 year)	• A lab scale study has been undertaken for extraction of alumina as aluminiumflouride from low grade bauxite. • The study was to verify the technical feasibility of converting bauxite in value added product like AlF3 instead of smelter grade alumina.

Ongoing projects :

Sn	Project Title with timeline	Outcomes / Remarks	Completion target
1.	Development of ceramic proppant from low grade materials (Partially LateritisedKhondalite -PLK, Fly ash, etc.) - Phase-II-Scale up studies :(NALCO, Bhubaneswar) (Feb 2018 : 2 ½ yrs)	Based on the successful lab scale process already developed by JNARDDC the scale-up project for developing ceramic proppant from low grade materials (Partially LateritisedKhondalite -PLK, Fly ash, etc.) under Phase-II has been undertaken. The process is an effort for converting unutiised materials into value added products. An effort towards make in India and swatch Bharat.	Aug-2020
2.	Development of a process technology (at lab scale) for low cost production of 3N (99.9%) pure alumina (Ministry of Science and Technology –DST & HINDALCO) (March 2019 : 1 ½ yrs)	The project aims to develop the process know how for the low-cost production of 3N pure alumina suitable for LED (Light Emitting Diode) and Semiconductor applications. Efforts are on to get the required product at much low temperature. Study of cost economics for 3N pure alumina synthesis process will also be evolved. The country does not have a production base of LED due to import of 3N and 4N alumina. In view of the market, product potential and availability of raw materials in India, the current proposal has a commercial potential to add to the vision of Make in India program.	Sept-2020

3.	S-31: Bench scale study on extraction of pure Silica and smelter grade Aluminium Fluoride from Coal Fly Ash (CFA) (March 2019 : 1½ yrs)	Project aims to develop bench scale process for the extraction of pure silica and aluminium fluoride from abundantly available Coal Fly Ash (CFA)- solid waste being generated in thermal power plants around the country which typically contains 27-31% alumina (Al_2O_3), 56-60% silica (SiO_2) and 9-13% oxides of elements (Ca, Mg, Na, Fe, Ti etc.). CFA will be treated with mineral acid for extracting pure silica (which is used in structural materials, microelectronics, food & pharmaceutical) and aluminium fluoride (which is heavily consumed by primary aluminium industries -15 to 20 kg/t Al). Results from preliminary inhouse studies prompted JNARDDC to take up this challenging R & D programme, which has potential to address not only national but internationally burning issue and whose success will be big boost in improving global environment.	Sep-2020
4.	Techno-economic Survey of Aluminium Scrap Recycling in India with MRAI (S&T Mines) (Oct 2018) (2 yrs)	Current recycling rate in India is only 25% compared to the world average of 45%. The country has a long way to go before it can become a major aluminium recycler and feed the secondary metal market which is dependent on imports. Presently key concern areas of aluminium recycling in the country are complete lack of structure for aluminium scrap handling and secondary metal recovery. On this background this project will help Ministry of Mines in establishing the techno-economic status of the aluminium recycling industry in the country and in due course help in formulation of policies pertaining to this industry.	Oct-2020
5.	S-30 :To study the fire retardancy of nano-ATH in polymers with CIPET S&T(Mines) (Oct 2018 : 2 yrs)	The objectives of the project are to investigate the effect of nano-ATH as fire retardant filler in polymers. It will include examination of the mechanical and flame-retardant properties of polymer/ ATH composites obtained using ATH fillers with different	Oct-2020

		particle size and new process and product development using aluminiumtrihydroxide and polymer matrix.	
6.	Fabrication of Advanced Ceramic Nano-coatings for Automotive Applications with Christ University. (S&T Mines) (Dec 2018 : 2 yrs)	The project deliverables include development of a technology to prepare nano sized plasma spray powder from nano ceramic (commercial) compositions involving alumina and zirconia (in line with Make in India Concept). The outcome of the project could lead to overall life enhancement of automobile components.	Dec-2020
7.	Optimization of digestion efficiency in Bayer process by ascertaining the ideal size fraction of bauxite feed. S&T (Mines) (Dec-2019 : 1 yr)	The alumina refineries are presently operating upon the feed size of the bauxite to ball mill after conducting a series of experiments before setting up of plant. But over the years, bauxite characteristics as well as if there is a change in bauxite origin the constituents may vary. Accordingly, to attain the same digestion efficiency a thorough investigation has been undertaken in the above project for recommending the optimum particle size of the feed bauxite to digestion.	Dec-2020
8.	An innovative and viable process for recovery of iron values from red mud and processing of non-iron material for developing value added products – Complete Utilisation of red mud". NALCO (Jointly with IIMT Bhubaneswar &Eesavyasa Tech, Pvt Ltd. Telangana) (Sept 2019 :1 ½ yrs)	Project aims to develop an innovative and viable process for recovery of iron values from red mud and processing of non-iron part for its application as an insulating product with an aim for complete utilization of red mud. JNARDDC will be the nodal agency and the deliverables shall include mass and energy balance of the developed process.	Mar-2021
9.	Utilization of aluminium dross to achieve zero waste – A bench scale study S&T (Mines) (Dec-2019 : 2 yrs)	The main objective of the project is to develop the bench scale process for preparation of Poly Aluminium Chloride (PAC) from waste aluminium dross and to prepare castable refractory from residual dross for industrial applications to achieve zero waste. The potential benefit in preparing PAC from aluminium dross is providing alternative source to primary material	Dec-2021

		and reduction in waste disposed to landfills.	
10.	Production and certification of certified reference materials (CRMs) for the analysis of aluminium alloy S&T (Mines) (Dec-2019 : 2 yrs)	The main objective of the project is to produce certified reference materials (CRMs) for aluminium alloys at JNARDDC for the benefit of the aluminium industry and to provide import substitute. Being accredited with ISO 17025 by NABL for its analytical facilities, JNARDDC is well-placed to produce CRMs. In this regard, accreditation in accordance with ISO 17034 is under progress. Initially, the development of CRM for one wrought and one cast alloy will be taken up and the range will be expanded subsequently. This will be an import substitute to high quality CRMs for aluminium sector.	Dec-2021

Annexure 8.2

Back Annx Ref

The list of patents filed and granted for JNARDDC in the last five years is as below:-

Patents Filed : 16

i) 3582/MUM/2014 (12.11.2015): Development of process for selective insitu dissolution of alumina & silica bearing mineral phases in bauxite at room temperature for geo–analytical application.

This process is useful for separation of alumina and silica from other impurities.

ii) 3585/MUM/2014 (12.11.2015): Development of process for conversion of Saprolite into refractory aggregate

The process developed is value addition to unutilized material lying at bauxite mine site useful for refractory industry as a raw material.

iii) 201621005485 (17.02.2016): A process for preparation of aluminium hydroxide with low soda content.

The product is high value product for specialized application.

iv) 201621038529 (13.11.2016): Determination of calcium in alumina hydrate, calcined alumina and process liquor

This is insitu instantaneous determination of calcium (impurity) in hydrate, alumina and liquor.

Being utilised by NALCO in their refinery.

v) 201621038530 (13.11.2016): A process for selective leaching of iron from alumina hydrate

This is process for enhancing the product quality.

vi) 201621038525 (10.11.2017):A light weight foamed geopolymer (LWFGEOP) and its preparation

Environment friendly construction material from industry waste

vii) 201721022916 (30.06.2017):A Process for selective reduction of Al_2O_3, SiO_2, Na_2O and CaO in red mud for enrichment of Fe_2O_3

Process for recovering of valuables from red mud

viii) 201721032156 (12.09.2017): An improved heat treatment process for production of heat resistant Al-Zr alloy wire for overhead conductor

Product is import substitute for electrical conductor.

ix) 201721037172 (20.10.2017): Development of process for revitalization of high alumina castables from residual Aluminium dross

Value addition of waste from aluminium sector as a product for refractory industry.

x) 201721041581 (21.11.2017): A process for extraction of smelting grade alumina and silica from coal fly ash (CFA)

Value addition to the waste of thermal power plants into economical product for aluminium and electronic industry.

xi) 201721040908 (16.11.2017):Method and Apparatus for Onsite Measurement of Bath Ratio, Alumina Concentration, Liquidus Temperature and Operating Temperature of Aluminium Electrolysis Bath

An innovative low operating cost instrument.

Already commercialised to Aditya Birla & NALCO.

xii) 201721040906 (16.11.2017):A process for conversion of Hazardous 1st Cut SPL Waste of Aluminium Industries into Non-Hazardous Material by Converting Inorganic Toxic Cyanide to Non-Toxic Species by Selective Heat Treatment and Recovery of Sodium, Fluoride and Carbon Value

Converting waste of aluminium smelters into value added products for thermal power plants, alumina refinery and special application product.

xiii) 201821003354 (31.01.2018):PartiallyLateritizedKhondalite based Ceramic Proppant and its preparation

An import substitute for oil & gas industry and value addition to unutilised material.

xiv) 201821024434 (30.06.2018):A process for rapid analysis of reactive silica in bauxite and laterite based on selective autogenous dissolution at ambient temperature

Process for instantaneous determination of quality of ore

xv) 201821049247 (27.12.2018):A process for preparing smelter grade alumina

Low energy process for converting bauxite into smelter grade alumina

xvi) 201921008361 (04.03.2019):A process for removal of iron oxide, silica and enrichment of alumina in ferruginous, siliceous and aluminous laterite by physical separation process

Low grade bauxite enrichment process

Patents Granted :2

292333 (30.01.2018):Process for preparation of light weight Foamed bricks (LWFBs) utilizing red mud and fly ash admixture with NALCO

301579 (27.09.2018): Controlled heat treatment process for destruction of leachable toxic cyanide in first cut aluminium

Commercialization of R&D process: National Aluminium Co. Ltd, Odisha commercialized the R&D process developed by JNARDDC for “Development of heat treatment process for destruction of toxic cyanide from Spent Pot Lining Material (SPL)” with M/s Green Energy Resources, Odisha

Clientele /sponsored projects

Back Annx Ref

Projects	Progress/Status/outcomes output
Dust, Noise and vibration studies at NALCO Damanjodi	Completed. Dust is found to be within permissible limit except in one location.
Workplace monitoring studies at NMDC-Kirandul, Bacheli and Panna	**NMDCL Bacheli:** Dust levels: All samples found to be within permissible limit. Noise levels: 2 samples exceeded permissible limit Vibration levels: 1 HEMM operator found to be above permissible level. **NMDCL Panna:** Dust levels: All samples found to be within permissible limit. Noise levels: 1 Wheel-loader sample exceeded permissible limit Vibration levels: 1 HEMM operator found to be above permissible level. **NMDCL Kirandul:** Dust levels: 1 sample found to be exceeding permissible limit.
Workplace monitoring studies at Sadera (RCCPL)	Dust levels: All samples found to be within permissible limit. Noise levels: 7 samples found to be exceeded permissible limit Vibration levels: 4 HEMMs found to be above permissible level.
Workplace monitoring studies at ACC -Gagal, Kymore	**ACC –Gagal&Kymore** Dust levels: All samples found to be within permissible limit. Noise levels: All samples found to be within permissible limit.
Workplace monitoring studies at Ambuja solan and Bhatapara	**Ambuja: Solan** Dust levels: All samples found to be within permissible limit. Noise levels: 1 sample found to be exceeded permissible limit Illumination levels: Not found as per standards. Recommended for mobile tower lights. **Ambuja: Bhatapara** Dust levels: All samples found to be within permissible limit. Noise levels: All samples found to be within permissible limit.

	Vibration levels: All samples found to be within permissible limit.
Periodical Medical Examination of employees of Gujarat Mineral Development Corporation	Out of total 285 miners examined, 13.87% employees had pulmonary impairment, 7% were found to be affected with Noise Induced Hearing Loss and 56.1% had other types of hearing impairment. Similarly, 3.5% had vision less than prescribed standards and 12.6% employees had anaemia and 12.6% had raised blood sugar level. 5.6% had increased blood cholesterol level and 5.6% had high blood pressure. It was recommended that the mine management should take necessary action to comply with provisions of mines rules 1955 and recommendations of conferences on safety in mines with respect to initial and periodical medical examination standards.
Initial and Periodical Medical Examination of contract workers of Panchpatmali Bauxite Mines, Damanjodi, NALCO	Project in progress.

Annexure-9.1

Back Annx Ref

List of Drinking water scarcity Villages -NALCO

1. Girang,
2. Tentoi,
3. Tentoloi,
4. Kukudang-A,
5. Kukudang-B,
6. Ekgharia,
7. Rankasinga,
8. Rajanipal,
9. Balaramprasad,
10. MundamalSahi,
11. Bhogabareni,
12. Nirakarpur,
13. Kendupalli,
14. Paniola,
15. Dayanidhipur,
16. Basudevpur,
17. Tentulihata,
18. Khamana,
19. Budhapanka,
20. Langulibeda,
21. Karabereni,
22. Kandasar,
23. Kanyabeda,
24. Tulsipal,
25. Nuahata,
26. Chauridiha,
27. Gopinathpur,
28. Bentapur,
29. Ankula,
30. Nandichhod

Annexure-9.2

List of villages covered under Solar Lights-NALCO

Back Annx Ref

1. Medamgandhi
2. Kutraguda
3. Thuria
4. Karanjaguda
5. Sirsaguda
6. Ershantaguda
7. Sipaiput
8. Malkarbandha
9. Purunapadar
10. Badmarla
11. Durkaguda
12. Ranganiguda
13. Modeiguda
14. Ranganiguda
15. Gelaguda
16. Ratamati
17. Jamukoli
18. Majhiamba
19. Baraganda
20. Badapadu
21. Dorasipaiput

Back Annx Ref

Annexure-9.3

Details of Rural Development initiatives at villages –NALCO

Roads:

1. Kosala
2. Bhaluguda
3. Bhitarabhejaput
4. Durkaguda
5. Modeiguda
6. Nuaguda
7. Ranganiguda
8. Geluguda.

Community Centre:

1. Kosala
2. Modeiguda
3. Durkaguda

Renovation & revamping of Water bodies:

1. Jatia
2. Nandichhod
3. Gopinathpur
4. Ainthagadia

Back Annex.Ref.

Annexure-9.4

NALCO's Response to "FANI Cyclone victims"

Response Phase-I: from 4th May to 10th May:

NALCO as a responsible corporate entity, has attempted to respond to the cyclone victims in utmost quickest possible ways in & around the slums of Bhubaneswar city.

1. From 4th May to 6th May- 1000 families were provided with relief material comprising grocery, fruits, candles, match box, water bottles, clothes etc.
2. From 7th May to 10th May- another 3008 families were provided with relief kits.
3. Two water tankers were provided to supply water to various localities in and around Bhubaneswar in the initial 3 days after the cyclone.
4. 7 mobile DG sets deployed to pump/lift water in areas of Bhubaneswar and Puri.
5. Provided around 2000 hygiene kits among the adolescent girls and women along with the relief pack.
6. 1000 families were provided with detergent kits.
7. Till 14th of May 2019, provided relief kits to 4008 families living in more than 10 slums/ villages, which includes 100 kits for the students living in a destitute home.
8. 350 solar lanterns were distributed along with relief kits in Satapada area.

Response Phase-II: From 11th May to 18th May

1. In collaboration with Odia daily Newspapers reachd out to 16,866 families with the relief materials.
2. 2000 hygiene kits distributed along with relief materials in Puri district area.
3. 03 DG sets provided for Puri covering more than 1,000 houses and institutions.
4. Restoration of Parks, clean water posts and traffic posts and other developmental works relating to iconic shrine project.

Back Annex.Ref.

Annexure-11.1

During FS 2019-20, total six items of Geological Mapping on 1:25,000 scale including one Integrated Thematic Mapping (ITM) and two RP items have been taken up in NER of which one item taken in Arunachal Pradesh, three items in Meghalaya, two items in Assam. During the period from 1stApril, 2019 to 31stDecember, 2019, an area of 543 Sq. km and 137 Line km in RP items have been covered.

FS. 2018-19

Sr. No	Item Type	Title of the Item	State	Achievement between 1st Jan'2019 and 31st March 2019
1	RP	Characterization of Proterozoic Shillong Group of rocks in Meghalaya– its tectonics and depositional environment.	MEGHALAYA	62 Line km
2	RP	Tectono-metamorphic Evolution of the Basement Gneissic Complex of Khasi and Garo hills, Meghalaya.	MEGHALAYA	86 Line km
3	STM	Specialised Thematic Mapping in parts of Papum Pare district to elucidate the lithostratigraphy, biostratigraphy and structure of Siwalik Supergroup of rocks.	ARUNACHAL PRADESH	100 Sq. km
4	STM	Specialized Thematic Mapping in the Assam Meghalaya Gneissic Complex (AMGC) and Tertiary rocks in Sarkherbasti-Longlai-Larab area in Nagaon and KarbiAnglong districts, Assam.	ASSAM	195 Sq. km
5	STM	Specialized Thematic Mapping in Assam Meghalaya Gneissic complex and Shillong Group of rocks in area around Nellie- Umpanai-area Nagaon and KarbiAnglong district, Assam	ASSAM	125 Sq. km
6	STM	Specialized Thematic Mapping in and around New Tusom - Chingai to elucidate the tectono-metamorphic history in Naga Hills Ophiolite belt of Nagaland-Manipur and to delineate the associated mineralisation	MANIPUR and NAGALAND	75 Sq. km
7	STM	Specialized Thematic Mapping around Mawlyynong-Nongjiri -Dawki-Sonapur areas, East Khasi, East Jaintia and West Jaintia Hills District, Meghalaya to decipher the nature of Dawki and associated fault systems, their dynamics, stress systems and relation with the upliftment of Meghalaya Plateau.	MEGHALAYA	140 Sq. km
8	STM	Specialised Thematic Mapping in Lunglei-Rohtlong-Theiri-Kalchawarea,Lunglei and Saiha districts, Mizoram to delineate biostratigraphic zones of Surma Group	MIZORAM	85 Sq. km
9	STM	Specialised Thematic Mapping of Kawlkuih-Khawzawl-Chawngtlai-Champhai area, Champhai and Aizawl districts of Mizoram to elucidate biostratigraphy and ichnofossil analysis in Bhuban Formation and Barail Group	MIZORAM	91 Sq. km

FS. 2019-20

Sr. No	Item Type	Title of the Item	State	Achievement between 1st April'2019 and 31st Dec'2019
1	ITM	Integrated Thematic Mapping to establish the tectonic evolution of the Jashora Complex and its relationship with granitoids and to demarcate the different litho components in and around the Jashora complex between Amsoi-Amtreng-Rajagaon areas of KarbiAnglong and Nagaon districts of Assam.	ASSAM	165 Sq. km
2	STM	Specialised Thematic Mapping in parts Papum Pare district to elucidate the lithostratigraphy, biostratigraphy and structure of Siwalik Supergroup of rocks.	ARUNACHAL PRADESH	133 Sq. km
3	STM	Specialized Thematic Mapping around Mawlyynong-Nongjiri -Dawki-Sonapur areas, East Khasi, East Jaintia and West Jaintia Hills District, Meghalaya to decipher the nature of Dawki and associated fault systems, their dynamics, stress systems and relation with the upliftment of Meghalaya Plateau.	MEGHALAYA	115 Sq. km
4	STM	Specialized Thematic Mapping in and around BaithaLangso and DonkaMokam, KarbiAnglong district, Assam to elucidate the evolution of Shillong basin, metamorphic history of basement Gneissic complex and Shillong Group of rocks	ASSAM	130 Sq. km
5	RP	Characterization of Proterozoic Shillong Group of rocks in Meghalaya- its tectonics and depositional environment.	MEGHALAYA	67 Sq. km
6	RP	Tectono-metamorphic Evolution of the Basement Gneissic Complex of Khasi and Garo hills, Meghalaya.	MEGHALAYA	70 Sq. km

Back Annex.Ref.

Annexure- 11.2

Total three items of Geochemical Mapping on 1:50,000 Scale with collection of samples in grid pattern have been taken up during the FS 2019-20 in parts of Assam and Manipur and an area of 860 sq. km has been covered during the period from 1st April, 2019 to 31st December, 2019

FS. 2018-19

Sr. No	Item Type	Title of the Item	State	Achievement between 1st Jan'2019 and 31st March 2019
1	GCM	Geochemical mapping in toposheet no. 83E/3 covering parts of East Kameng and Papum Pare districts of Arunachal Pradesh.	Arunachal Pradesh	744 Sq. km
2	GCM	Geochemical mapping in parts of toposheet no. 83F/6 & 83F/10 of Golaghat, Sonitpur&KarbiAnglong districts, Assam	Assam	500 Sq. km
3	GCM	Geochemical mapping in toposheet no. 83E/14 covering parts of Lower Subansiri and KurungKumey districts of Arunachal Pradesh	Arunachal Pradesh	440 Sq. km
4	GCM	Geochemical mapping in parts of toposheet no. 83E/10 & 13 covering parts of KurungKumey, Lower Subansiri and Papum pare districts of Arunachal Pradesh.	Arunachal Pradesh	532 Sq. km
5	GCM	Geochemical mapping in parts of Kohima and Wokha districts of Nagaland in T.S. no. 83K/1.	Nagaland	400 Sq. km
6	GCM	Geochemical mapping in parts of Kohima, Phek, Zunheboto, Wokha districts of Nagaland in T.S. no. 83K/5	Nagaland	496 Sq. km
7	GCM	Geochemical mapping in parts of Zunheboto and Phek districts of Nagaland in T.S. no. 83K/9	Nagaland	380 Sq. km
8	GCM	Geochemical mapping in the ophiolite belt in parts of Ukhrul district, Manipur in T.S. no. 83K/8	Manipur	292 Sq. km
9	GCM	Geochemical mapping in parts of Imphal East, Senapati and Ukhrul districts of Manipur in T.S. no. 83L/1.	Manipur	309 Sq. km
10	GCM	Geochemical mapping in parts of Thoubal and Chandel districts of Manipur in T.S. no. 83L/3.	Manipur	364 Sq. km
11	GCM	Geochemical mapping in parts of Kohima and Phek district of Nagaland and Senapati district of Manipur in T.S. no. 83K/2	Nagaland and Manipur	248 Sq. km
12	GCM	Geochemical mapping in parts of Senapati district of Manipur and Phek district, Nagaland in T.S. no. 83K/3	Nagaland and Manipur	490 Sq. km
13	GCM	Geochemical mapping in parts of Imphal East, Ukhrul and Senapati districts, Manipur in T.S. no. 83K/4.	Manipur	424 Sq. km
14	GCM	Geochemical mapping in parts of Ukhrul and Senapati districts of Manipur and Phek district of Nagaland in parts of T.S. no. 83K/7.	Nagaland and Manipur	324 Sq. km
15	GCM	Geochemical mapping in parts of toposheets no. 83B/4 , 78O/8, 78O/16 of Ri-bhoi, South West Khasi hills, East Khasi Hills districts of Meghalaya and in parts of toposheet no. 83C/12 in Cachar district of Assam.	Meghalaya and Assam	494 Sq. km

FS. 2019-20

Sr. No	Item Type	Title of the Item	State	Achievement between 1st April'2019 and 31st Dec'2019
1	GCM	Geochemical mapping in Toposheet No.83L/5 in parts of Ukhrul and Kamjong districts of Manipur	Manipur	280 Sq. km
2	GCM	Geochemical mapping in Toposheet No. 83L/02 in parts of Thoubal, Imphal East and Tengnoupal districts of Manipur.	Manipur	220 Sq. km
3	GCM	Geochemical mapping in toposheet no. 83B/5 in parts of Darrang, Sonitpur districts of Assam and West Kameng district of Arunachal Pradesh	Arunachal Pradesh	360 Sq. km

Back Annex.Ref.

Annexure- 11.3

Two items of GPM in Ri Bhoi, East Khasi Hills and West Khasi Hills districts of Meghalaya, Nagaon, Morigaon and KarbiAnglong districts of Assam have been taken up during FS 2019-20 and an area of 1725 sq. km have been covered during the period from 1st April, 2019 to 31st December, 2019.

FS. 2018-19

Sr. No	Item Type	Title of the Item	State	Achievement between 1st Jan'2019 and 31st March 2019
1	GPM	Geophysical mapping in toposheet nos. 78N/12 & 78O/1 covering parts of Kamrup district of Assam and West Khasi Hills district of Meghalaya.	Assam and Meghalaya	553 Sq. km
2	GPM	Geophysical mapping in toposheet nos. 83B/16 and 83G/1, covering parts of Hojai and KarbiAnglong districts of Assam.	Assam	560 Sq. km

FS. 2019-20

Sr. No	Item Type	Title of the Item	State	Achievement between 1st April 2019 and 31st Dec' 2019
1	GPM	Geophysical mapping by magnetic survey (Total Field) in toposheet nos. 78O/10 & 13 and 83B/8 & 11, covering parts of Ri Bhoi, East Khasi Hills and West Khasi Hills districts of Meghalaya, and Nagaon, Morigaon and KarbiAnglong districts of Assam	Assam and Meghalaya	1275 Sq. km
2	GPM	Geophysical mapping in toposheet nos. 83F/3 and 83F/7, covering parts of KarbiAnglong and Nagaon districts of Assam	Assam	450 Sq. km

Annexure-11.4

Total 2,345m drilling has been done during the period from 1st April, 2019 to 31st December,2019 .

FS. 2018-19

Sr. No.	Title	UNFC Stage	Commodity
1	Preliminary exploration for limestone in North Pala Block, Litang Valley, East Jaintia Hills district, Meghalaya	G3	limestone
2	Reconnaissance survey for Titaniferous Vanadiferous Magnetite around Uming area, West Khasi Hills district, Meghalaya.	G4	limestone
3	Preliminary exploration for Copper and associated Au, Sn and W in the metasedimentary sequence of Bomdila Group in PakkeKessang Block in East Kameng district of Arunachal Pradesh	G3	Copper, Au, Sn and W
4	Reconnaissance survey for coal around Mongchen, Dibuia, Waromong and Molungyimsen area of Mokokchung District, Nagaland.	G4	Coal
5	Preliminary exploration for Gold and associated basemetal mineralisation (Cu, Sn and W) in the metasedimentary sequence of Bomdila Group in Ampuli area, Papumpare District, Arunachal Pradesh	G3	Gold
6	Preliminary exploration for limestone in Akshe Block Litang Valley, East Jaintia Hills district, Meghalaya	G3	limestone
7	Preliminary exploration for lateritic Bauxite and associated minerals in the eastern part of Umsung area, West Khasi Hills District, Meghalaya	G3	Lateritic bauxite
8	Reconnaisance survey for chromium, nickel and base metal mineralization in Singcha-Khangkhui-Gamnom area in part of Ophiolite belt, Ukhrul District, Manipur. (G4)	G4	Cr, Ni and Basemetal
9	Reconnaissance Survey for tungsten in granite gneiss and associated granitoids in Inglengagaon-Dokmuka-Baghpani area, KarbiAnglong District, Assam.	G4	Tungsten
10	Reconnaissance survey for REE in biotite gneiss and granitic rocks of Garbhanga-Jorabat area, Kamrup (Metro) district, Assam and Ri-Bhoi district, Meghalaya.	G4	REE
11	Reconnaissance along NH 229 in Pakro-Rilo-PakkeKessang and Longchung-Sagali-Balapu sections for Graphite and associated basemetal and REE mineralisation.	G4	Graphite
12	Preliminary exploration for limestone in South east of Akshe, Litang Valley, East Jaintia Hills district, Meghalaya	G3	limestone
13	Reconnaissance survey for tungsten mineralization in and around Khetri area, Kamrup (Metro) District, Assam.	G4	Tungsten
14	Preliminary exploration for Neodymium and other REE mineralisation in the metasedimentary sequence of Bomdila Group in LaggiGamlin area, West Siang District, Arunachal Pradesh.	G3	REE
15	Preliminary exploration for graphite around Hunli area, Dibang Valley District, Arunachal Pradesh.	G3	Graphite
16	Preliminary exploration for Vanadium and associated basemetal and gold mineralisation in the metasedimentary sequence of Bomdila Group in Depo area, Papum Pare District, Arunachal Pradesh.	G3	Vanadium
17	Reconnaisance survey for phosphate in shales of Kopili Formation in and around Pala-Larket village, Litang valley, East Jaintia hills district,	G4	Phosphate

	Meghalaya.		
18	Recconnasance survey for tin mineralisation in Lyngkhoi - Sohiong Block, West Khasi Hills district, Meghalaya	G4	Tin
19	Reconnaissance survey for Vanadium and associated minerals around Deed area, Lower Subansiri District, Arunachal Pradesh	G4	Vanadium
20	Reconnaissance survey for lateritic Bauxite and associated REE mineralisation in and around Ksehkohlong area, east of Nongstoin, West Khasi Hills District, Meghalaya	G4	Lateritic Bauxite

FS. 2019-20

Sr. No.	Title	UNFC Stage	Commodity
1	Reconnaissance survey for REE, V and associated minerals in phosphate bearing shales of Kopili Formation in BoroHundong area, Dima Hasao district, Assam.	G4	REE, V
2	Preliminary exploration for limestone in North BoroHundong Block, Dima Hasao district, Assam.	G3	limestone
3	Preliminary exploration for limestone in South BoroHundong Block, Dima Hasao district, Assam.	G3	limestone
4	Reconnaissance survey for REE &Nb mineralisation in Jashora Alkaline Complex, KarbiAnglong district, Assam.	G4	REE &Nb
5	Reconnaissance survey for tungsten mineralization in Amgurigaon - Nelle - Ghagra area, KarbiAnglong and Nagaon Districts, Assam.	G4	tungsten
6	Preliminary Exploration for Cu-Au-Ag and associated minerals in Dedollo Block, Papum Pare District, Arunachal Pradesh.	G3	Cu-Au-Ag
7	Preliminary Exploration for Vanadium and associated minerals around Saiya area, Lower Subansiri District, Arunachal Pradesh	G3	Vanadium
8	Preliminary exploration for gold, vanadium and associated minerals in Phop area, Lower Subansiri district, Arunachal Pradesh	G3	gold, vanadium
9	Preliminary Exploration for REE and associated precious and basemetal in Lodoso East Block, Papum Pare District, Arunachal Pradesh.	G3	REE
10	Reconnaissance Survey for copper, cobalt and associated minerals in Balapu - Niyamlo area, Papum Pare district, Arunachal Pradesh	G4	copper, cobalt
11	Reconnaissance Survey for copper, molybdenum and associated minerals in Angolin-Etalin area, Dibang Valley district, Arunachal Pradesh	G4	copper, molybdenum
12	Reconnaissance Survey for copper, gold, silver and associated minerals in Khyate-Parang area, Papum Pare district, Arunachal Pradesh.	G4	copper, gold, silver
13	Reconnaissance Survey for vanadium, graphite, gold and associated minerals in Pyunli-Yachambra-Kano area, Lower Dibang Valley District, Arunachal Pradesh	G4	vanadium, graphite, gold
14	Reconnaissance survey for basemetal, graphite and associated minerals in Isholin-Anelih-Endolin area, Dibang Valley District, Arunachal Pradesh.	G4	basemetal, graphite
15	General exploration for aluminous laterite/lateritic bauxite and REE, North east of Rambrai block, West Khasi Hills District, Meghalaya.	G2	Bauxite
16	General exploration for limestone in Khaidong-Shnongrim block, Litang Valley, East Jaintia Hills district, Meghalaya	G2	limestone
17	General exploration for limestone in South-West of Mynthlu Block, Litang Valley, East Jaintia Hills district, Meghalaya (G2)	G2	limestone

18	General exploration for limestone in Lamarsiang block, Litang Valley, East Jaintia Hills district, Meghalaya	G2	limestone
19	Preliminery exploration for Iron in the Banded Iron Formation in Nongdom-Langtor area, West Khasi Hills District, Meghalaya	G3	Iron
20	Preliminary exploration for PGE, Ni, REE and associated minerals in Northeast of Mawpyut, West Jaintia Hills district, Meghalaya	G3	PGE, Ni, REE
21	Recconnaisance survey for REE and other associated minerals within Regolith cover over the Gneisses and Granitoids of Assam Meghalaya Gneissic Complex (AMGC) and younger Granitoids in parts of East Khasi Hills, West Khasi Hills&Ribhoi districts, Meghalaya	G4	REE
22	Reconnaissance survey for REE mineralization in and around Burnihat area Ri-Bhoi district, Meghalaya and Kamrup (Metro) district Assam.	G4	REE
23	Reconnaissance survey for PGE, Ni, Cr around Mawpyut area, East Khasi and West Jaintia Hills district, Meghalaya	G4	PGE, Ni, Cr
24	Reconnaissance survey for Lithium and REE & RM mineralisation in Umlyngpung Block, East Khasi Hills district, Meghalaya	G4	Li, REE & RM
25	Reconnaissance survey for aluminous laterite/lateritic bauxite and REE in Wahrinong area, West Khasi Hills District, Meghalaya.	G4	Bauxite
26	Reconnaissance survey for tungsten mineralisation in Mannai-Mairang block, West Khashi Hills district, Meghalaya	G4	tungsten
27	Regional Mineral targeting over the Pan-African Granitic plutons of Shillong Plateau	RMT	RMT
28	Preliminary exploration for basemetal and associated minerals around Arubote, West District, Sikkim	G4	Basemetal
29	Reconniatory survey for basemetal and associated mineralisation around Mangkha - Mangalbare area in East and South District, Sikkim (G-4)	G4	basemetal
30	Reconnaisance survey for chromium, nickel and base metal mineralization in Gamnom-Yentem area in part of Manipur ophiolite belt, Ukhrul District, Manipur.	G4	chromium, nickel
31	Reconniasance Survey for Ni-Cr-PGE and associated basemetal around Kudengthabi – yangoupokpi area in part of Ophiolite belt, Tengnougpal District, Manipur.	G4	Ni-Cr-PGE
32	Reconniasance Survey for copper Ni, PGE and associated mineralisation around Kwatha-Namjet Lok area, Manipur Ophiolite belt, Tengnougpal District, Manipur.	G4	copper
33	Reconnaissance for coal around Baghty, Sanis, Chudi and Lotsu area of Wokha District, Nagaland.	G4	coal

Back Annex.Ref.

Annexure 14.1

List of Nodal Officers, CPIOs and Appellate Authorities in Ministry of Mines

Nodal Officer (RTI)	CPIO (RTI)
Shri Rakesh Moza **Deputy Secretary** **Room No.: D-313, III Floor, Shastri Bhawan, New Delhi - 110001** **Tel No. : 23383096** **E-mail : rakesh.moza@nic.in**	Sh. Bhimrao DaulatSapkale **Under Secretary** Room No.: D-303, III Floor, Shastri Bhawan, New Delhi - 110001 Tel No. : 23073046 E-mail :bd.sapkale@gov,in

Sl. No.	CPIO	Subject matter dealt (Section)	Appellate Authority
1.	**Sh. Yogesh R. Patel, Under Secretary** Room No.: D-303, III Floor, Shastri Bhawan Tel No. : 23383946 E-mail : yogesh.patel77@gov.in	Establishment	**Shri C. Gangadharan, Director** Room No.: Tel No. :23381172 E-mail :c.gangadharan@nic
		Administration	**Sh. H. K. Mallick, Deputy Secretary** Room No.: D-307, III Floor, Shastri Bhawan Tel No. : 23070376 E-mail : hk.mallick@nic.in
		Cash	
		R&I Section	
		Records	
2.	**Smt Lakshmi Subramanian, Under Secretary** Room No.: D-303, III Floor, Shastri Bhawan Tel No. : 23387223 E-mail : lakshmi.s@nic.in	Vigilance	**Smt. Farida M. Naik, Director** Room No.: D-312, III Floor, Shastri Bhawan Tel No. : 23384593 E-mail : fm.naik@nic.in
		Metal-II	
		Metal-III	

3.	**Shri Adhir Kumar Mallik, Under Secretary** Room No.: D-314, III Floor, Shastri Bhawan Tel No. : 23384743 E-mail : ak.mallik@nic.in	Mines-VI	**Dr. D. Veena Kumari, Director** Room No.: D-308, III Floor, Shastri Bhawan Tel No. : 23388345 E-mail : veena.kumarid@nic.in
		DMF & PMKKKY	**Sh. Sanjeev Verma, Director** Room No.: D-315, III Floor, Shastri Bhawan Tel No. : 23070260 E-mail : sanjeev.verma79@gov.in
		Mines V	**Dr. D. Veena Kumari, Director** Room No.: D-308, III Floor, Shastri Bhawan Tel No. : 23388345 E-mail : veena.kumarid@nic.in
		Mines IV (Including Sand, Mining Auctions and 2020 MLS)	**Sh. Sanjeev Verma, Director** Room No.: D-315, III Floor, Shastri Bhawan Tel No. : 23070260 E-mail : sanjeev.verma79@gov.in
		Metal-I	**Shri Amit Saran, Director** Room No.: D-310, III Floor, Shastri Bhawan Tel No. : 23381136 E-mail : amit.saran@nic.in

4.	**Sh. Sanjay Kaushik, Asstt.Director** Room No.: D-303, III Floor, Shastri Bhawan Tel No. : 23380610 E-mail : kaushik.sanjay@gov.in	ES & IT (GST, Skill Development & Economic matters)	**Sh. S. Arputha Swamy Director** Room No.: D-311, III Floor, Shastri Bhawan Tel No. : 23073046 E-mail : arputhaswamy.s@gov.in
		Trade issues (FTAs) & economic inputs on matters concerned through respective section	
5.	**Shri Ajay Kumar Kadian, Under Secretary** Room No.: A-314, III Floor, Shastri Bhawan Tel No. : 23070375 E-mail : ajay.kadian@nic.in	Mines III	**Shri Amit Saran, Director** Room No.: D-310, III Floor, Shastri Bhawan Tel No. : 23381136 E-mail : amit.saran@nic.in
		Coordination & Parliament	**Sh. Sanjeev Verma, Director** Room No.: D-315, III Floor, Shastri Bhawan Tel No. : 23070260 E-mail : sanjeev.verma79@gov.in
		International Cooperation	**Shri Amit Saran, Director** Room No.: D-310, III Floor, Shastri Bhawan Tel No. : 23381136 E-mail : amit.saran@nic.in
6.	Sh. Bhimrao DaulatSapkale **Under Secretary** Room No.: D-303, III Floor, Shastri Bhawan, New Delhi - 110001 Tel No. : 23073046 E-mail :bd.sapkale@gov,in	Mines II	**Smt. Farida M. Naik, Director** Room No.: D-312, III Floor, Shastri Bhawan Tel No. : 23384593 E-mail : fm.naik@nic.in
		Revision Cell	**Shri C. Gangadharan, Director** Room No.: D-309 III Floor, Shastri Bhawan

			Tel No. :23381172 E-mail :c.ganadharan@nic
7.	**Sh. Ashok KumarPrasedAsstt. Director** Room No.: D-305, III Floor, Shastri Bhawan Tel No. : 23383085	Hindi (OL)	**Shri Birendra Singh Rawat, Deputy Director** Room No., III Floor, Shastri Bhawan Tel No. : 23384592 E-nmail : bs.rawat62@nic.i
8.	**Shri Vikas Raj, Under Secretary** **Tel. No: 23380610** **E-mail .Vikas.raj@nic in**	Mines I	**Shri Pradeep Singh, Director** Room No.: 306-D Wing, III Floor, Shastri Bhawan Tel No. : 23384741 E-mail : pradeep.singh.gsi@gov.in
		Metal IV	**Sh. H. K. Mallick, Deputy Secretary** Room No.: D-307, III Floor, Shastri Bhawan Tel No. : 23070376 E-mail : hk.mallick@nic.in
9.	**Shri Bhimrao Daulat Sapkale Under Secretary** Room No.:303 Shastri Bhawan Tel No. :23073046 E-mail : bd.sapkale@gov.com	IF Section	**Shri Rakesh Moza, Deputy Secretary** Room No.: D-313, III Floor, Shastri Bhawan Tel No. : 23383096 E-mail : rakesh.moza@nic.in
10.	**Shri Rajendra Prasad, Deputy Director** Room No.: 114-F Wing, I Floor, Shastri Bhawan Tel No. : 23384741 E-mail : rajendraprasad.gsi@gov.in	NMET Cell	**Dr.Lalan Prasad Singh, Director** Room No.: 114-F Wing, I Floor, Shastri Bhawan Tel No. : 23384741 E-mail :l.singh.gsi@gov in.

Back Annex.Ref.

Annexure 14.2

During the year 2018-19, the following days were observed in Ministry of Mines:

i. National Voters Day on 25.1.2019 to mark the Foundation day of Election Commission of India.

ii. Anti Terrorism day on 21.5.2019 to oppose all forms of terrorism and violence.

iii. World No Tabacco Day on 31.5.2019.

iv. International Day of Yoga 2019 on 24.06.2019.

v. Sadbhavanadiwas on 20.8.2019 to commemorate the birth anniversary of late Prime Minister of India, Shri Rajiv Gandhi.

vi. Rashtriya Ekta Diwas on 31.10.2019 to commemorate the birth anniversary of Sardar Vallabhbhai Patel.On this occasion a Run for unity was conducted and T-shirts were provided to all participants.

vii. Constitution Day on 26.11 2019 to commemorate the birth anniversary of Dr. B.R. Ambedkar. "Preamble" to our Constitution was read out on the occasion.

viii. Communal Harmony week was observed during 19.11.2019 to 25.11.2019 and Communal Harmony Flag Day on 25th November 2019. On Flag Day, donations have been collected from all the staff of Ministry of Mines and the collected money was sent to National Foundation for Communal Harmony.

ix. A pledge taking ceremony was also organized on all these occasions and all the officers and employees of Ministry of Mines participated in it.

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Ministry of Mines,
Shastri Bhawan,
Dr. Rajendra Prasad Road,
New Delhi-110001
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