



सत्यमेव जयते

GOVERNMENT OF INDIA
**MINISTRY OF
MINES**

**ANNUAL REPORT
2021-22**

Ministry of Mines

Ministry of Mines



<https://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

Abbreviations

AAS	Atomic Absorption Spectrophotometer
ACR	Annual Confidential Report
AIMS	Aluminium Import Monitoring System
APAR	Annual Performance Appraisal Report
ASTER	Advanced Space borne Thermal Emission and Reflection Radiometer
BEE	Bureau of Energy Efficiency
BGML	Bharat Gold Mines Limited
BISAG	Bhaskaracharya Institute for Space Applications and Geo-informatics
BSE	BSE - Bombay Stock Exchange
CBM	Coal Bed Methane
CCoM	Chief Controller of Mines
CEMS	Continuous Emission Monitoring Systems
CETP	Common effluent treatment plant
CGPB	Central Geological Programming Board
CGWB	Central Ground Water Board
CHQ	Central Head Quarter
CHWTSDF	Common Hazardous Waste Treatment, Storage & Disposal Facility
CII	Confederation of Indian Industry
CIMFR	Central Institute of Mining and Fuel Research
CMFRI	Central Marine Fisheries Research Institute, Kochi
CMPDI	Central Mine Planning & Design Institute
CPCB	Central Pollution Control Board
CPGRAMS	Centralised Public Grievance Redressal and Monitoring System
CSR	Corporate Social Responsibility
CUSAT	Cochin University of Science and Technology, Kochi

DGM	Directorate of Geology & Mining
DGMS	Directorate General of Mines Safety
DMF	District Mineral Foundation
DRM	District Resources Maps
EC	Environmental Clearance
EEZ	Exclusive Economic Zone
EIA	Environment Impact Assessment
EPMA	Electron Probe Micro Analyser
EPS	Enterprises Procurement System
ERP	Enterprise Resource Planning
FC	Forest Clearance
FDP	Forest Diversion Proposal
FMCP	Final Mine Closure Plan
FROF	First Right of Refusal
FS	Field Season
FTS	File Tracking System
FY	Financial Year
GCM	Geochemical Mapping
GDP	Gross Domestic Product
GEM	Government e-Market
GIGW	Guidelines for Indian Government Websites
GPM	Geophysical Mapping
GPR	Ground Penetration Radar
GQM	Geological Quadrangle Maps
GR	Geological Report
GSI	Geological Survey of India
GSITI	Geological Survey of India Training Institute
HCL	Hindustan Copper Limited
HINDALCO	Hindustan Aluminium Company Limited

Abbreviations

HR-SIMS	High-Resolution Secondary Ion Mass Spectrometer
IBAAS	International Bauxite, Alumina and Aluminium Society
IBM	Indian Bureau of Mines
ICC	Indian Copper Complex
ICSG	International Copper Study Group
ICNFMM	International Symposium Non-ferrous Minerals & Metals
ICT	Information and Communication Technology
IEBR	Internal and Extra Budgetary Resources
IEC	Information Education and Communication
IGC	International Geological Congress
IMD	Indian Meteorological Department
IMYB	Indian Mineral Year Book
ISRO	Indian Space Research Organisation
ITEC	Indian Technical Economic Cooperation
ITM	Integrated Thematic Mapping
JNARDDC	Jawaharlal Nehru Aluminium Research Development and Design Centre
JV	Joint Venture
JWG	Joint Working Group
KABIL	Khanij Bidesh India Limited
KCC	Khetri Copper Complex
KMS	Knowledge Management System
KPA	Key performance Area
LEWS	Landslide Early Warning System
LME	London Metal Exchange
MCDR	Mineral Conservation & Development Rules
MCP	Malanjkhand Copper Project
MCR	Mineral Concession Rules
MDRD	Minerals Development & Regulation Division
MECL	Mineral Exploration Corporation Limited

ML	Mining Lease
MMDR Act	Mines & Minerals (Development and Regulation) Act, 1957
MNRE	Ministry of New and Renewable Energy
MoC	Ministry of Coal
MoEFCC	Ministry of Environment, Forest and Climate Change
MOIL	Manganese Ore India Limited
MoM	Ministry of Mines
MoU	Memorandum of Understanding
MPD	Mineral Processing Division
MSDE	Ministry of Skill Development and Entrepreneurship
MSMP	Monthly Statistics of Mineral Production
MSS	Mining Surveillance System
MT	Magnetotelluric
MTS	Mining Tenement System
NALCO	National Aluminium Company Limited
NER	North Eastern Region
NFTDC	Non-Ferrous Materials Technology Development Centre
NGCM	National Geochemical Mapping
NGDR	National Geoscience Data Repository
NIIST	National Institute for Interdisciplinary Science and Technology, Thiruvananthapuram
NIMH	National Institute of Miners' Health
NIRM	National Institute of Rock Mechanics
NLCIL	Neyveli Lignite Corporation India Limited
NLSM	National Landslide Susceptibility Mapping
NMEP	National Mineral Exploration Policy
NMET	National Mineral Exploration Trust
NMH-II	National Mission Head-II
NMI	National Mineral Inventory
NMP	National Mineral Policy

Abbreviations

NPCIL	Nuclear Power Corporation of India Limited
NRSC	National Remote Sensing Centre
NRTC	NALCO Research & Technology Centre
NSDC	National Skill Development Corporation
NSE	National Stock Exchange
OAMDR	Offshore Areas Mineral (Development & Regulations) Act, 2012
OCBIS	Online Core Business Integrated System
OGP	Obvious Geological Potential
OL	Official Language
OLIC	Official Language Implementation Committee
OREDA	M/s Orissa Renewable Energy Development Agency
OSPCB	Odisha State Pollution Control Board
PERC	Project Evaluation and Review Committee
PGE	Platinoid Group of Elements
PGRS	Photo Geology and Remote Sensing
PL	Prospecting Licence
PMCP	Progressive Mine Closure Plan
PMKKKY	Pradhan Mantri Khanij Khsetra Kalyan Yojana
PRAGATI	Pro-Active Governance and Timely Implementation
PWDs	Persons with Disabilities
REE	Rare Earth Elements
REIL	Rajasthan Electronics & Instruments Plant
RESCO	A Renewable Energy Service Company
RMDS	Regional Mineral Development Studies
RP	Reconnaissance Permit
RSAC	Research & Scientific Advisory Committee
RSAS	Remote Sensing and Aerial Survey
RTI	Right to Information
R&D	Research & Development

SAIL	Steel Authority of India Ltd.
SCMS	Skill Council for the Mining Sector
SCSP	Special Component Plan for Scheduled Caste
SDF	Sustainable Development Framework
SDGs	Sustainable Development Goals
SEM	Scanning Electron Microscopy
SGM	Systematic Geological Mapping
SGPB	State Geological Programming Board
SoP	Standard Operating Procedure
SSAG	Standing Scientific Advisory Group
SSAMS	Single Stage Accelerated Mass Spectrometer
STM	Specialised Thematic Mapping
STP	Sewage Treatment Plant
STQC	Standardisation Testing and Quality Certification
SU	State Unit
TAMRA	Transparency, Auction Monitoring and Resource Augmentation
TCC	Technical-cum-Cost Committee
TEFR	Techno-Economic Feasibility Report
TEFS	Techno-Economic Feasibility Study
TEM	Transmission Electron Microscope
TL	Thermo Luminescence
TOASS	Twin Otter Airborne Survey System
TSP	Tribal Area Sub-Plan
TW	Territorial Water
UNFC	United Nations Framework Classification
UTs	Union Territories
VC-NIC	Video Conference – National Informatics Centre
VPN	Virtual Private Network
WPI	Wholesale Price Index

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1

Ministry of Mines : An Overview



Ministry of Mines An Overview

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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 seven 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, thereby enabling the country to progress towards attaining self-sufficiency in major mineral production.

Role and Organisation of the Ministry

Main Functions

1.2 Ministry of Mines is responsible for survey, 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 there under 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 there under.

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

Autonomous Bodies

1.6 There were three Research Institutions which are Autonomous Bodies of this Ministry at the start of year 2020-21:

- 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.

However, NIMH has been merged / amalgamated with ICMR - National Institute of Occupational Health (Ahmadabad), Ministry of Health & Family Welfare with all assets and liabilities. NIMH has been dissolved and deregistered under Karnataka Societies Registration Act, 1960 w.e.f. 23.07.2020. Therefore, at present, there are two Research Institutions (which are Autonomous Bodies) of this Ministry viz. JNARDDC and NIRM.

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.

Shri Raosaheb Patil Danve has assumed the charge of Hon'ble Minister of State for Mines along with Railway and Coal after cabinet reorganization/ expansion on 7th July, 2021.

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, 2021

Group	Sanctioned Strength	Total Number of present incumbents (Including general)	No. of SC/ST/OBC/Women/PH Candidates in present incumbents				
			SC	ST	OBC	Women	PH
Group-A Gazetted	34	30	01	03	03	06	01
Group-B Gazetted	37	16	02	02	01	06	01
Group-B Non- Gazetted	56	45	10	06	16	05	01
Group-C	86	62	13	02	06	07	02
Total	213	153	26	13	26	24	05

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

1.9 As per the first advanced estimates of National Income for 2021-22 released by the National Statistical Office, Ministry of Statistics and Program Implementation, the 1st AE of GVA of mining and quarrying sector during 2021-22 at 2011-12 prices is Rs 336859 crore, which shows a growth of 14.33% as compared to PE of GVA during 2020-21 at Rs 294644 crore. The contribution of mining and quarrying sector is shown in **Table 1.2**.

Table 1.2
Gross Value Added (GVA): Share/Contribution of Mining and Quarrying (%)

GVA in Rs crore at current prices		
Sector	2021-22 (1 st AE)	2020-21 (PE)
Mining and quarrying	475202	292120
Total	21036541	17915167
Contribution in %	2.26	1.63

AE: Advanced Estimate; PE: Provisional Estimate;

Source: MoSPI, Press Note on First Advanced Estimates of National Income for the year 2021-22.

1.10 Major Highlights/Achievements of Ministry of Mines

1.10.1 A tripartite agreement was signed between Mineral Exploration Corporation Limited (MECL) – a Miniratna PSU under the Ministry of Mines, Rajasthan State Mines & Minerals Limited (RSMML) and the Department of Mines & Geology (DMG), Govt. of Rajasthan for taking up feasibility studies of Solution Mining of Potash in the state of Rajasthan. The MoU will pave the way to undertake feasibility studies for harnessing sub-surface salt deposits through solution mining, utilize Rajasthan's rich mineral reserves, boost its economy and establish it as a hub of solution mining of potash, the 1st in the country.

1.10.2 Hon'ble Union Minister for Mines, Shri Pralhad Joshi and Chief Minister of Odisha, Shri Naveen Patnaik jointly inaugurated the production in two new iron ore mines of Odisha namely, Jiling-Langlota Iron ore Block and Guali Iron ore Block. Both the mines have production capacity of 15 lakh tonnes per month and they possess approx. 275 million tonnes of consolidated iron ore reserves. These blocks were recently reserved for the Odisha

Mining Corporation (OMC), a State PSU, within a short time of 25 days, after a request was made by State Government to the Central Government, in order to ease the shortage of iron ore in the state of Odisha. These Mines will help in stabilizing the supplies for small industries and will generate huge employment opportunities in the state.

1.10.3 The 2nd meeting of the Joint Committee under the Memorandum of Understanding (MoU) between India and Morocco on cooperation in the field of Mining and Geology was held on 2nd February, 2021 through video conference. Both the sides agreed to cooperate in the area of exchange of information on Geology and Mining. Both the side agreed for finalization of proposed collaboration between Indian companies namely Fertilizers and Chemicals Travancoe Limited (FACT) and Madras Fertilizers Limited (MFL); and their Moroccan counterpart i.e. OCP, through further bilateral dialogues.

1.10.4 Mines and Mineral (Development and regulation) Act, 1957 (MMDR Act) has been amended through the Mines and Minerals (Development and Regulation) Amendment Act, 2021 w.e.f. 28.03.2021. The amendments, inter-alia, provide the following to give immediate boost to mineral production and improving ease of doing business:-

(i) Revitalize mineral sector by giving immediate boost to mineral production:

- (a) Removing the distinction between captive and merchant mines. It allows all captive mines to sell upto 50% of the minerals produced during the year after meeting the requirement of attached plant. All

future auctions will be without any end use restrictions.

- (b) Resolving pending cases under section 10A(2)(b) by bringing them under new auction regime. Around 500 cases under section 10A(2) (b) of the Act are still pending in absence of the sunset clause.
- (c) Substituting 'mining operations' with 'production and dispatch'. Since the interpretation of the term mining operations is generic, it is difficult to cancel non producing leases.
- (d) Re-allocation of non-producing blocks of the Government companies as some of the mining blocks reserved for Government companies are not bought into production for many years.

(ii) Promote ease of doing business:

- (a) Statutory clearances to be valid even after expiry or termination of mining lease and would be transferred to next lessee of the mine. This will ensure continuity in mining operations and production despite change in lessee. It will address around 23 clearances in turn facilitating ease in the business.
- (b) Allowed transfer of all mineral concession without any charges. Lessee who is not interested in mining due to its financial condition or any other reason may transfer its mine to an interested mining resulting in operationalization of mines.

(iii) Other structural reforms:

- (a) Central Government may issue directions regarding composition and utilization of funds by DMF.
- (b) It empowers Central Government to conduct auction in cases where the States face challenge in conduct of auction or fail to conduct auction in prescribed time.
- (c) Simplification of exploration regime will increase the pace of exploration and will bring advance technology in exploration of mineral by giving level playing field for government and private agency.

1.10.5 Following amendments in the subordinate legislation have been carried out during the month of March, 2021:-

- (i) The Mineral (Auction) Rules, 2015 was amended through the Mineral (Auction) Amendment Rules, 2021 and notified on 17.3.2021. It has the provision for incentivizing the lease holders for starting of mining operation and dispatch prior to the scheduled date of mining operations mentioned in the tender document.
- (ii) The Minerals (Other than Atomic and Hydro Carbons Energy Mineral) Concession Rules, 2016 was amended through the Minerals (Other than Atomic and Hydro Carbons Energy Mineral) Concession Amendment Rules, 2021 and notified on 24.03.2021. It has the provision for allowing transfer of letter of intent for grant of mining lease or composite licence in case of auctioned mines.

1.10.6 Ministry of Mines, in collaboration with Geological Survey of India (GSI) and Mineral

Exploration Corporation Limited (MECL), organized a workshop at Bhopal on 2nd March, 2021 on mineral exploration initiatives of National Mineral Exploration Trust (NMET) for the benefit of State Departments of Mining & Geology and State Mineral Development Corporations of States of Madhya Pradesh, Chhattisgarh and Maharashtra. This is the third workshop of NMET on the subject of 'Enhancing Exploration through NMET', after earlier workshops organized in Jaipur and Lucknow.

1.10.7 The Minerals (Other than Atomic and Hydro Carbon Energy Minerals) Concession Rules, 2016 have been amended on 08.04.2021 vide the Minerals (Other than Atomic and Hydro Carbon Energy Minerals) Concession (Second Amendment) Rules, 2021 for making provisions for publication of average sale price (ASP) of those metals for which London Metal Exchange does not publish the daily settlement price.

1.10.8 All arms of the Government are proactively working to tackle the challenges posed by COVID-19 pandemic. Public Sector Undertakings (PSUs) under the Union Ministry of Mines viz. National Aluminium Company Limited (NALCO), Hindustan Copper Limited (HCL) and Mineral Exploration Corporation Limited (MECL) are also leading from the front and contributing in the fight against corona virus. From contributing financially towards establishing special dedicated COVID facilities to upgrading their own health infrastructure & conducting mass vaccination, Mines PSUs are continuously working to help fight the second wave of COVID-19. The details of the work done by PSUs in this regard are at **Annexure -1.2.**

1.10.9 The Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession

Rules, 2016 has been amended through “Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession (Third Amendment) Rules, 2021” vide notification number GSR 397(E) dated 10.06.2021.

1.10.10 The Minerals (Evidence of Mineral Contents) Rules, 2015 has been amended through “Minerals (Evidence of Mineral Contents) Amendment Rules, 2021” and the Mineral (Auction) Rules, 2015 has also been amended through “Mineral (Auction) Second Amendment Rules, 2021” vide notifications number GSR 421(E) and GSR 422(E) dated 18.06.2021 respectively.

1.10.11 The GSI Training Institute conducted specialized e-trainings for Professors/ Asst. Professors/ Research Scholars and officers of Universities/ Institutes/ Organizations. A total of 263 Research Scholars, 114 Asst. Professors/Professors, 269 participants from DGMs/ others organizations, 1816 students and 677 participants of GSI attended the e-training conducted by GSI Training Institute and Regional Training Division.

1.10.12 Hon’ble Minister of Parliamentary Affairs, Coal and Mines Shri Pralhad Joshi chaired a meeting of the Consultative Committee on Coal and Mines on 1st July, 2021 to discuss about India’s balanced energy mix and the importance of mining in a New India. Ministry of Mines is committed to take mining forward with a thrust on sustainability and protection of environment.

1.10.13 Mineral Exploration Corporation Limited (MECL) signed a Memorandum of Understanding (MoU) with Directorate of Mines & Geology (DMG), Government of Goa, offering integrated mineral exploration and consultancy services on 19.07.2021 at New Delhi in the August presence of Shri Pralhad

Joshi - Hon’ble Union Minister of Coal, Mines and Parliamentary Affairs, Dr. Pramod Sawant – Hon’ble Chief Minister of Goa, and senior officers of the Government of India and Government of Goa.

1.10.14 As a part of 75 week-long celebrations in commemoration of 75 years of Indian Independence (Bharat ka Amrut Mahotsav), the field formations under the administrative control of the Ministry viz. Geological Survey of India (GSI), Indian Bureau of Mines (IBM) and National Aluminium Company Limited (NALCO) conducted various activities. The details are at **Annexure – 1.3**.

1.10.15 A delegation led by the Secretary (Mines) visited Argentina to evaluate the potential lithium projects for acquisition by Khanij Bidesh India Ltd. (KABIL) during 29th August to 3rd September, 2021. The delegation visited the province of Catamarca. Camyen, the state-owned enterprise of Catamarca province has assured that they will collaborate with KABIL to ensure preferential allocation of prospective Lithium bearing mineral acreages located within the province. The visiting delegation also had extensive interaction with M/s YPF, a federal government owned enterprise. Both YPF and KABIL outlined a broad contour of activities that need to be taken up with utmost priority as the acquisition process entailing engagement with target companies need to be started expeditiously.

1.10.16 2nd meeting of Joint Working Group meeting of India-Australia under the Memorandum of Understanding (MoU) for cooperation in the field of mining & processing of Critical & Strategic Minerals was held on 10th September, 2021 through virtual mode. In the meeting, it was decided

that on the basis of the list of Lithium and Cobalt projects submitted by Australian side during 2nd JWG, more discussions will be held between CMFO and KABIL on the possible investment opportunities with more specific details of investment or participating interests of Government of Australia in such projects.

1.10.17 As per the directions of Department of Administrative Reforms and Public Grievances (DARPG) dated 09.09.2021, Ministry of Mines has conducted a Special Campaign for Disposal of Pending Matters (SCDPM) during 02.10.2021 to 31.10.2021. Weekly Review meetings were taken by the Secretary (Mines) and Nodal Officer. Hon'ble Minister of Mines and Minister of State for Mines also reviewed and visited the Cleanliness campaign and inspected Record management drive of the Ministry.

1.10.18 Memorandum of Understanding (MoU) between Geological Survey of India (GSI), Ministry of Mines, the Government of the Republic of India and the Florida International University Board of Trustees on behalf of its Department of Earth and Environment, College of Arts, Sciences and Education, United States of America on cooperation in the field of Geology under the Research Project Titled "Study of Post-collisional Magmatism in the India-Asia Collision Zone (Ladakh Granitoids, Indus Ophiolite Belt) and Integrative Geological and Geochronological studies of the Mishmi Tectonic Belt, North Eastern India (Arunachal Pradesh) was signed on 6th October, 2021.

1.10.19 Vigilance Awareness Week was observed in the Ministry of Mines during the period 26th October, 2021 to 1st November, 2021. On this occasion, a message from the Hon'ble Minister of Mines was circulated in the Ministry and its Attached/Subordinate

Offices and PSUs in order to create vigilance awareness among staff members of the Ministry/organizations as well as public. During the Vigilance Awareness Week, various competitions such as essay and debate competitions were organized in the Ministry where the staff members participated with full enthusiasm.

1.10.20 During the month of November, 2021, Ministry of Mines amended the following Rules:

- a. Minerals (Other than Atomic and Hydro Carbons Energy Mineral) Concession Rules, 2016 vide Notification No. GSR 775(E) dated 02.11.2021.
- b. Mineral (Auction) Rules, 2015 vide GSR No. 776(E) dated 02.11.2021.
- c. Mineral Conservation and Development Rules, 2017 vide Notification No. GSR 780(E) dated 03.11.2021.
- d. Rescinded the Mineral (Mining by Government Company) Rules, 2015, vide GSR No. 777(E) dated 2.11.2021.
- e. Rescinded the Minerals (Transfer of Mining Lease Granted Otherwise than through Auction for Captive Purpose) Rules, 2016 vide GSR No. 778(E) dated 02.11.2021

1.10.21 Hon'ble Minister of Coal, Mines and Parliamentary Affairs, inaugurated 5th National Conclave on Mines and Minerals-2021 on 23.11.2021 and felicitated 149 mines obtaining five star rating under star rating of Mines for the performance year 2017-18 to 2019-20. Hon'ble Minister also handed over 52 potential mineral blocks carved out of G4 stage mineral investigations to the State Governments. A technical session with panel

discussions was conducted during the Mines and Minerals Conclave to present and discuss about the recent amendments in Mining Laws for easing the process of auctions of Mineral Blocks and mineral exploration. An online portal of Accreditation Scheme developed by Ministry of Mines through QCI-NABET for Exploration Agencies in Mineral Sector has also been launched during the Mines and Minerals Conclave.

1.10.22 Ministry of Mines and its field formations observed Swachhta Pakhwada from 16th to 30th November 2021 at their office premises. During this period IBM conducted various activities in the mines such as clean & swachh mines, implementation of clean/green energy initiatives at mines, targeting adjoining villages/ towns/ areas to make plastic free village, hygiene kits for the labours/workers, tree plantation, Shramdan, Sensitization workshops, etc.

1.10.23 During the month of December, 2021, Ministry of Mines amended the following Rules:

- i. Minerals (Evidence of Mineral Contents) Rules, 2015 through the Minerals (Evidence of Mineral

- ii. Contents) Second Amendment Rules, 2021 vide Notification No. GSR 856(E) dated 14.12.2021.
- iii. Mineral (Auction) Rules, 2015 through the Mineral (Auction) Fourth Amendment Rules, 2021 vide GSR No. 857(E) dated 14.12.2021

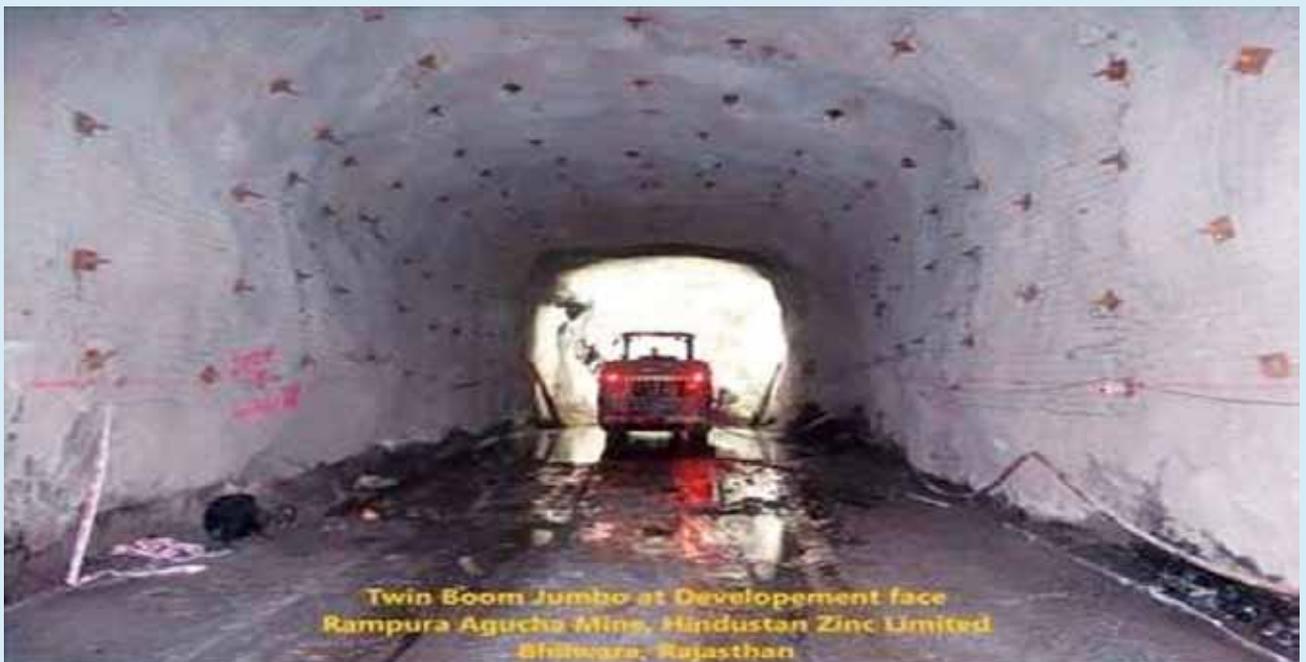
1.10.24 State Governments continuously use District Mineral Foundation (DMF) funds to combat COVID-19, wherein Rs. 1339.45 crore has been spent till 31st December, 2021. The monthly expenditure (in December, 2021 – Rs. 2.65 Crore), latest position of fund utilization by the States up to 31.12.2021 is at **(Annexure – 1.4)**.

1.10.25 With respect to Department of Administrative Reforms & Public Grievances (DAR&PG) Office Memorandum No. 30011/02/2021-O&M (e No. 5866) dated 14.12.2021 the progress report on “Increasing Efficiency in Decision Making in Government” is given at **Annexure – 1.5**.

1.10.26 The 3rd meeting of Joint Working Group (JWG) between India and Mozambique under the Memorandum of Understanding on cooperation in the field of Mineral Resources was held on 10.12.2021 through Virtual platform.

2

Minerals and Metals in the Country





Minerals and Metals in the Country

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National Mineral Scenario

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 mineral resources of fuel, metallic and non-metallic minerals including minor 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 the value as well. India produces as many as 95 minerals, which includes 4 fuel, 10 metallic, 23 non-metallic, 3 atomic and 55 minor minerals (including building and other materials).

Index of Mineral Production

2.3 Based on the overall trend so far the index of mineral production (base 2011-12 =

100) for the year 2021-22 (upto November) is estimated to be 105.8 as compared to 89.5 of previous year showing a positive growth of 18.2%. The trend of index of mineral production and trend in value of mineral export and import is depicted in **Figure 2.1** 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 & minor minerals) during 2021-22 has been estimated at Rs.1,90,389 crores, which shows an increase of about 23.37% over that of the previous year. During 2021-22, estimated value for metallic minerals is Rs.1,05,092 crores or 55.2% of the total value and non-metallic minerals (including Minor Minerals) is Rs. 85,297 crores or 44.8% of the total value. Information on production and value of minerals from 2017-18 to 2021-22 (upto December 2021) is given in **Annexure 2.1**. The details of export and import of Minerals during the period 2016-17 to 2020-21 is given in **Annexure 2.2** and **Annexure 2.3** respectively.

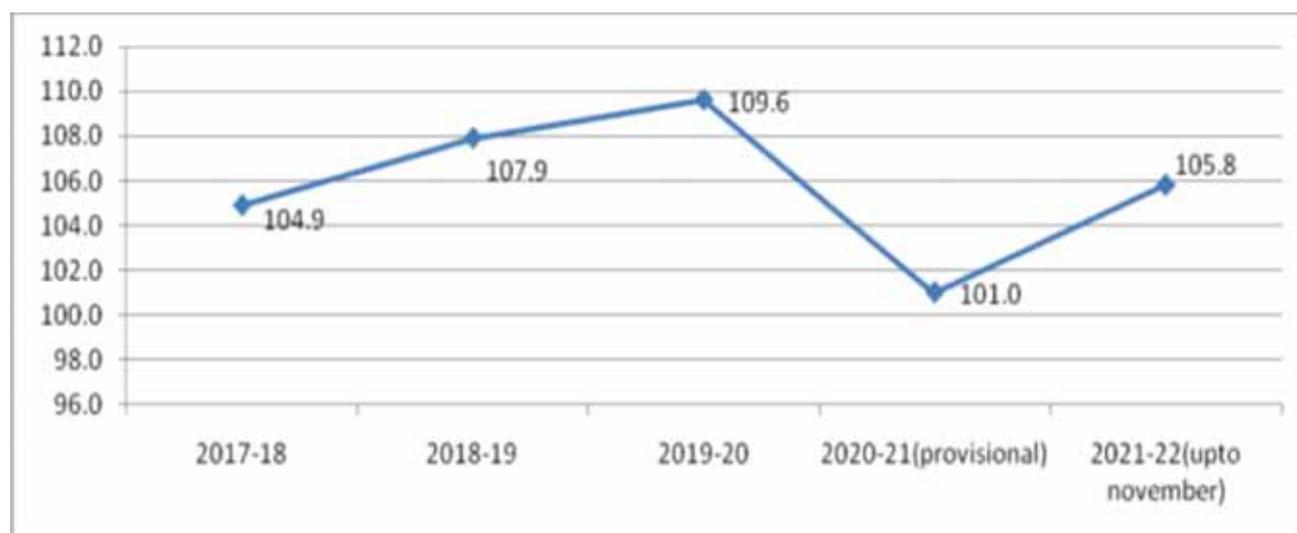


Figure 2.1: Index of mineral production (Base 2011-12=100)

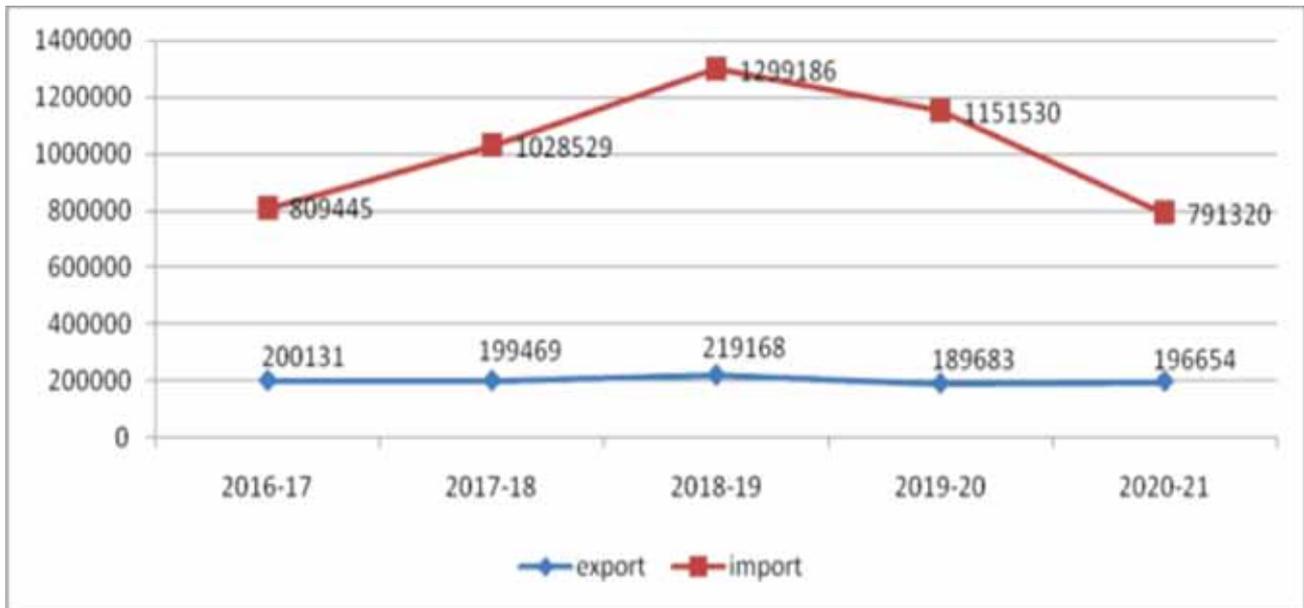


Figure 2.2: Trends in Value of Mineral Exports & Imports

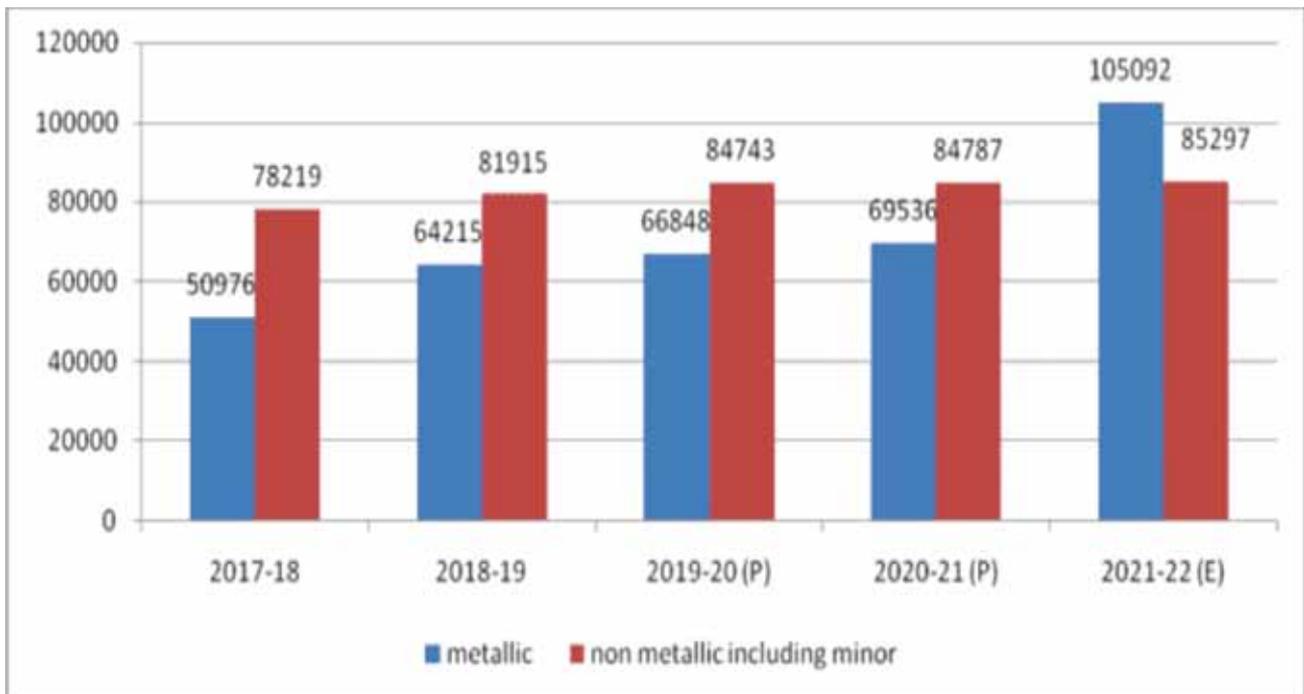


Figure 2.3: Value of Minerals Production (by groups) (excluding atomic & fuel minerals)

Source: Monthly statistics on mineral production of IBM.

Price Trend

2.5 The WPI for minerals (base 2011-12=100) stood at 190.3 in November 2021 and the corresponding index was 157.4 for November 2020.

2.6 The minerals included in the wholesale price index are bauxite, chromite, iron ore, copper conc., lead conc., garnet, zinc conc., manganese ore, limestone, phosphorite, and sillimanite.

The wholesale price index for metallic minerals was 183.8 in November 2021 as compared to 150.1 in November 2020 and that of other minerals was 213 in November 2021 as compared to 183.0 in November 2020. Source of this particular information is www.eaindustry.nic.in.

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 1,332 in 2020-21 as against 1,385 in the previous year.

2.8 Out of 1,332 reporting mines, most of the mines reported are in Madhya Pradesh followed by Gujarat, Karnataka, Odisha, Andhra Pradesh, Chhattisgarh, Tamil Nadu, Rajasthan, Maharashtra, Jharkhand and Telangana.

2.9 The numbers of reporting mines are given in **Table 2.1**. Area-wise distribution of Mining Leases all over 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	2018-19(P)	2019-20(P)	2020-21(P)	2021-22(E)
All Minerals*	1427	1385	1332	1245
Metallic Minerals	610	602	588	525
Non-Metallic Minerals	817	783	744	720

*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 31/03/2020(P) (All India)

Frequency (Hectare)	No. of Leases	Lease area (Hectare)
0 to 2	396	515.23
> 2 to 5	898	3476.95
> 5 to 10	414	3045.10
> 10 to 20	388	5735.68
> 20 to 50	470	15319.63
> 50 to 100	274	19554.02
> 100 to 200	207	29914.08
> 200 to 500	211	69555.86
Above 500	179	165529.17
Total	3437	312645.72

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

(P): Provisional

2.10 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 2020-21(P) @ (By Principal Minerals)

Minerals	'A' Category	'B' Category	Total
Apatite	-	-	-
Chromite	7	-	7
Copper ore	5	-	5
Garnet	-	1	1
Gold	6	-	6
Lead & Zinc	9	1	10
Manganese ore	11	7	18
Rock Salt	-	1	1
Total	38	10	48

@ excluding fuel, atomic & minor minerals;

'A' Category: Mechanized Mines: >150 labour in all or >75 labour in workings below ground;

'B' Category: Other than 'A' category

2.11 During 2021-22, mineral production was reported from 21 States/Union Territories of which the bulk of value of mineral production (excluding fuel and atomic minerals, and minor minerals) of about 88.7% was confined to 4 States. Odisha is in leading position, in terms of estimated value of mineral production in the country and had the share of 47.2% in the national output. Next in order was Chhattisgarh with a share of 16.2% followed by Karnataka (14.31%), Rajasthan (11%) and Jharkhand (4.5%) in the total value of mineral production. The contribution of States/ UTs in the value of mineral production (excluding fuel and atomic minerals, and minor minerals) during 2021-22 estimated is pictorially shown in **Figure 2.4**.

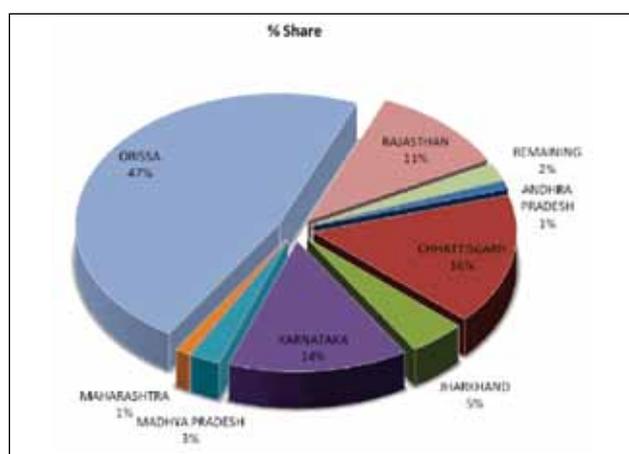


Figure 2.4: Share of States in Value of Mineral Production 2020-21 (Estimated) (Excluding Atomic & Fuel Minerals)

Source: Statutory returns submitted to IBM

2.12 State-wise analysis revealed that during 2021-22, the value of mineral production (excluding fuel & atomic minerals) has 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 Orissa (93%), Jharkhand (87%), Karnataka (65%) etc. However, some of the principal mineral producing states recorded decrease in value of mineral production (excluding fuel & atomic minerals) and those include Tamil Nadu (-0.85%), Kerala (-2.31%), Himachal Pradesh (-5.45%), etc.

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

2.14 During 2020-21 (excluding atomic, fuel, and minor minerals), the Private Sector emerged to play a dominant role in mineral production accounting for 55.96% or Rs.49,357 crores in the total value. Small mines, which were mostly in the private sector, continued to be operated manually either as proprietary or partnership ventures. The minerals which were wholly mined / recovered by the public/joint sector in 2020-21 were Copper ore and concentrate, Diamond, Fluorite (graded), Selenite, Rock Salt and Sulphur.

2.15 India's ranking in 2019 in world production was 2nd in Steel (crude/liquid), 3rd in aluminium (primary) & Chromite; 4th in iron ore, lead (refined) & Zinc slabs; 5th in Bauxite, 7th in Manganese ore, 13th in copper (refined), 16th in apatite & rock phosphate and 17th in Magnesite. 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, 2019

Sector	Unit of Commodity	Production(quantity)		Contribution (Percentage)	India's rank in World order ⁵
		World	India*		
Metallic Minerals					
Bauxite	'000 tonnes	347100	21824	6.29	5 th
Chromite	'000 tonnes	38600	3929	10.18	3 rd
Iron ore	million tonnes	3040	246	8.09	4 th
Manganese ore	'000 tonnes	56600	2904	5.13	7 th
Industrial Minerals**					
Magnesite	'000 tonnes	29700	98	0.33	17 th
Apatite & rock phosphate	'000 tonnes	226000	1400	0.62	16 th
Metals					
Aluminium (Primary)	'000 tonnes	62900	3635	5.78	3 rd
Copper (refined)	'000 tonnes	24100	408	1.69	13 th
Steel (crude/liquid)	million tonnes	1814	109.13	5.89	2 nd
Lead (refined) ^{e##}	'000 tonnes	12500	599 [#]	4.79	4 th
Zinc (slab)	'000 tonnes	13500	516	3.82	4 th

Source: World Mineral Production, 2015-2019; British Geological Survey.

* Figures relate to financial year 2019-20, except lead (refined).

\$: Based on production mentioned in World Mineral Production 2015-19; British Geological Survey.

#: Figures as published in World Mineral Production, 2015-19. However, the production of lead (primary) during 2019-20 was 132 thousand tonnes.

##: Figure relates to both primary & secondary refined lead and includes the lead content of antimonial lead.

e: Estimated

Self-reliance in Minerals & Mineral Based Products

2.16 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, various types of refractories, china clay-based ceramics, glass, etc. India is self-sufficient or near to self-sufficient in bauxite, chromite, iron ore and limestone. India is deficient in kyanite, magnesite, manganese ore, rock phosphate, sillimanite, 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. Degree of Self-sufficiency in Principal Minerals & Metals, 2019-20 (P) is furnished in **Table 2.5**.

Table 2.5
Degree of Self-sufficiency in Principal Minerals & Metals, 2019-20 (P)

Sl. No.	Commodity	Demand/Domestic Consumption ('000 tonnes)	Supply/Domestic supply ('000 tonnes)	Order of self-sufficiency (%)
	Minerals			
1	Bauxite	22189	23688	100
2	Chromite	1920	3971	100
3	Iron ore	159940	206446	100
4	Kyanite	5.1	4.89	96
5	Limestone	350878	379045 ^{1/}	100
6	Magnesite	195	147	75
7	Manganese ore*	5548	2820	51
8	Rock phosphate (including apatite)*	8802	1285	15
9	Sillimanite	56	69	100
	Metals*			
10	Aluminium (primary)	3676	3696	100
11	Copper (refined)	1159 ^{2/}	454	39
12	Lead (primary)	381 ^{3/}	198	52
13	Zinc	778 ^{4/}	696	89

Source: MCDR Returns for production data.

*: Apparent demand/consumption = Production + Import - Export

Note: (i) Includes actual reported consumption and/or estimates made wherever required. Paucity of data, hence coverage may not be complete. Consumption has been prepared on the basis of Annual returns 'form M' received by IBM.

(ii) Even in cases where almost entire domestic demand is satisfied by domestic supplies, some quantities of certain special quality/types of minerals and metals/ferroalloys are imported to meet the requirement in certain specific end-uses.

1/ Excludes production of limestone as a minor mineral, calcite & chalk and includes limeshell, limekankar & marl.

2/ Based on production of copper cathode and imports & exports of copper & alloys.

3/ Based on production of lead (primary), and imports & exports of lead & alloys.

4/ Based on production of zinc (ingots) and imports & exports of zinc & alloys

Production Trends

Metallic Minerals

2.17 The value of metallic minerals in 2020-21 at Rs.69,536 crore increased by 4.02% over the previous year. Among the principal metallic minerals, iron ore contributed Rs.49,396 crore or 71.04%, zinc concentrate Rs.6,667 crore or 9.59%, silver Rs.4,266 crore or 6.14%, chromite Rs.2,291 crore or 3.29%, lead concentrates Rs.2,042 crore or 2.94%, manganese Rs.1,794 crore or 2.58%, while the remaining was contributed by bauxite, copper (concentrate), gold and tin concentrates.

2.18 The Production of Bauxite at 20,379 thousand tonne during 2020-21 registered a decrease of 6.67% as compared to the previous year. Odisha with 76.3% contribution was the leading producer of bauxite followed by Gujarat (7.3%), Chhattisgarh (3.5%), Jharkhand (7.3%), Madhya Pradesh (3.1%), and Maharashtra (2.3%). The share of public sector in the total production was 52.4% while remaining 47.6% was contributed by private sector. There were 132 reporting mines of Bauxite.

2.19 The production of chromite at 2,863 thousand tonnes in 2020-21 decreased by 27.1% as compared to that in the previous year. Odisha reported almost entire production of chromite.

2.20 The production of copper ore in 2020-21 at 3,377 thousand tonnes decreased by 14.5% as compared to that in the previous year. There were five reporting mines of copper ore in 2020-21. The production of copper concentrates at 108 thousand tonnes decreased by 12.8% in 2020-21 as compared to that in the previous year.

2.21 The production of gold ore at 450 thousand tonnes in the year 2020-21 decreased by 24.4% as compared to that in the previous year. Almost entire production of gold ore and bullion was reported from Karnataka and Jharkhand.

2.22 The production of iron ore consisting of Lumps, Fines and Concentrates at 204 million tonnes in 2020-21 decreased by almost 16.9% as compared to 246 million tonnes in the previous year. There were 273 reporting mines in 2020-21 as against 271 mines in the previous year. Odisha was the leading producer of iron ore accounting for 51.1% of total production followed by Chhattisgarh (18.0%), Karnataka (16.9%), Jharkhand (10.4%) and remaining (3.32%) production was reported from Andhra Pradesh, Madhya Pradesh, Maharashtra and Rajasthan.

2.23 The production of lead & zinc ores at 15.45 million tonne in 2020-21 increased by 6.7% as compared to that in the previous year. There were ten mines reporting production of lead and zinc ore in the current year. The production of lead concentrate increased by 7.3% and the production of zinc concentrate increased by 4.64% during the year. Rajasthan was the sole producing State of lead and zinc ores and concentrates.

2.24 The production of manganese ore at 2,688 thousand tonnes in 2020-21 has decreased by 7.4% as compared to the previous year. There were 135 reporting mines of manganese ore in 2020-21. Madhya Pradesh continued to be the largest producer of Manganese Ore contributing 34.3% in the total output of the country.

Non-Metallic Minerals

2.25 The value of production of non-metallic minerals at Rs.8,926 crores during 2020-21 increased by 0.5% as compared to the previous year. Limestone retained its leading position by contributing Rs.8,266 crores or 92.6% of the total value of non-metallic minerals in 2020-21.

2.26 The production of limestone at 349 million tonnes during 2020-21 decreased by 2.8% as compared to that in the previous year.

2.27 The production of magnesite at 78 thousand tonnes during 2020-21 decreased by 20% as compared to that in the previous year. Tamil Nadu contributed 60.9% of the total production during 2020-21. The remaining was reported from Uttarakhand (31.3%) and Karnataka (7.8%).

2.28 The production of phosphorite at 1,455 thousand tonnes in 2020-21 has increased by 3.9% as compared to that in the previous year. Rajasthan contributed 93.27% and the rest was accrued from Madhya Pradesh (6.73%).

Minor Minerals

2.29 The value of production of minor minerals was Rs.75,861 crore in 2019-20. The percentage contribution of Telangana, Andhra Pradesh, Rajasthan, Maharashtra, Gujarat, Madhya Pradesh, Uttar Pradesh, Bihar, Kerala was 18.95, 17.16, 16.09, 9.37, 9.22, 7.44, 7.40, 5.63, 5.07. The remaining states and UTs contributed less than 5%.

State-wise Mineral Scenario

2.30 Status of mineral rich states of India is at **Annexure 2.5**.

3

Legislative Framework, Mineral Policy and Implementation



Legislative Framework, Mineral Policy and Implementation

- National Mineral Policy, 2019 Page - 23
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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 replaced 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 titled Common Cause vs. Union of India & Others..

3.3 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.

3.4 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 in 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 pre-embedded clearances to give fillip to auction process;
- proposes to make efforts to harmonize taxes, levies & royalty with world benchmarks to help private sector.

3.5 National Mineral Policy, 2019 focusses 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.

3.6 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.

3.7 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.

Measures taken to control illegal mining

3.8 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 license 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.

3.9 There is a three-pronged strategy for prevention of illegal mining viz. constitution of task force by the State Governments 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 MMDR Act, 1957:** 21 State Governments have framed the rules under section 23C of MMDR 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.

3.10 The Mineral Conservation and Development Rules, 2017 (**MCDR**) provides measures to ensure systematic and 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.

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

Table 3.1

Details	Registers as on December, 2020
Mining Leases*	6393
End users	3699
Traders	6533
Stockists	1974
Exporters	1119

*Mining leases including both working and non-working leases.

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

3.12 In order to bring a check on illegal mining, the MMDR Amendment Act has made the penal provisions for illegal mining more stringent. Higher penalties and jail terms have been provided. A provision has also been made for constitution of Special Courts by State Governments for speedy trial of cases related to illegal mining.

Space Technology for checking illegal Mining

Adoption of Modern Technology for monitoring and capturing Mine data

3.13 Indian Bureau of Mines (**IBM**) has set up two GIS and Remote sensing laboratories at Nagpur & Hyderabad with technical assistance of National Remote Sensing Centre (NRSC), Hyderabad. The laboratories are fully equipped to carry out the work for monitoring the mining activities using GIS and Remote sensing software.

3.14 Necessary amendments have been brought out in the Mineral Conservation and Development Rules 2017 mandating the mineral concession holders to submit drone images & satellite imageries to IBM. Based on these images, it is proposed to use technology to monitor the mining activities in the country remotely without much human interventions. It is also envisaged to approve the mining plans without physical inspection of mines by using drone images. It is also proposed to create a data bank of images of landuse of the mining areas of the country and effectively plan for their systematic & scientific mine closure.

Mining Surveillance System

3.15 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 and Indian Bureau of Mines (IBM) have developed the MSS, with assistance from Bhaskaracharya Institute for space applications and Geoinformatics (BISAG), Gandhinagar and

Ministry of Electronics and Information Technology.

- 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 and bias-free system, having a quicker response time and capability of effective follow-up.
- Similarly, in respect of minor minerals, 130 triggers have been generated so far, out of which 106 triggers have been verified and in 11 cases unauthorized mining activities have been identified.
- Two phases of triggers have been generated since launch of MSS in 2017. In the third phase, high resolution satellite images (Cartosat-2E) have been acquired from NRSC having resolution of 60 cm. Earlier Cartosat-1 satellite images, which had resolution of 2.5 m, were used.
- In third phase, so far 119 triggers for major minerals have been generated, out of which 64 have been verified by the State Governments and in 9 cases unauthorized mining activities have been identified.

Mineral Concession System

3.16 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 has also brought in a uniform tenure of 50 years for Mining Leases.

Mines and Minerals (Development and Regulation) Act

3.17 Ministry of Mines is responsible for survey and exploration of all minerals, other than natural gases, petroleum and atomic minerals and for mining and metallurgy of metals like Iron, aluminium, copper, zinc, lead, gold, nickel etc. and also for administration of the Mines and Minerals (Development and Regulation) Act, 1957 in respect of all mines and minerals other than coal, natural gas and petroleum, but including offshore minerals. In performing its functions, the Ministry is assisted by Geological Survey of India and Indian Bureau of Mines.

The Mines and Minerals (Development and Regulation) Act, 1957 is available on web link–

https://www.indiacode.nic.in/bitstream/123456789/1421/1/AAA1957_67.pdf

3.18 The details of amendments to the Mines and Minerals (Development and Regulation) [MMDR] Act, 1957 are as under:-

- (i) The Mines and Minerals (Regulation and Development) Amendment Act, 1958 (15 of 1958) (w.e.f. 15.05.1958).
- (ii) The Repealing and Amending Act, 1960 (58 of 1960) (w.e.f. 26.12.1960).
- (iii) The Mines and Minerals (Regulation and Development) Amendment Act, 1972 (56 of 1972) (w.e.f. 12.09.1972).
- (iv) The Mines and Minerals (Regulation and Development) Amendment Act, 1986 (37 of 1986) (w.e.f. 10.02.1987).

- (v) The Mines and Minerals (Regulation and Development) Amendment Act, 1994 (25 of 1994) (w.e.f. 25.01.1994).
- (vi) The Mines and Minerals (Regulation and Development) Amendment Act, 1999 (38 of 1999) (w.e.f. 18.12.1999).
- (vii) The Mines and Minerals (Development and Regulation) Amendment Act, 2010 (34 of 2010).
- (viii) The Mines and Minerals (Development and Regulation) Amendment Act, 2015 (10 of 2015) (w.e.f. 12.01.2015).
- (ix) The Mines and Minerals (Development and Regulation) Amendment Act, 2016 (25 of 2016) (w.e.f. 06.05.2016).
- (x) The Mineral Laws (Amendment) Act, 2020 (2 of 2020) (w.e.f. 10.01.2020).
- (xi) The Mines and Minerals (Development and Regulation) Amendment Act, 2021 (16 of 2021) (w.e.f. 28.03.2021).

3.19 A major amendment was carried out in 2021 in the Act through the MMDR (Amendment) Act, 2021. The objectives of the MMDR Amendment Act, 2021 are:

- Fully harnessing the potential of the mineral sector,
- Increasing employment and investment in the mining sector including coal,
- Increasing the revenue to the States,
- Increasing the production and time bound operationalisation of mines,
- Maintaining continuity in mining operations after change of lessee,
- Increasing the pace of exploration and auction of mineral resources, and

- Resolving long pending issues that have slowed the growth of the sector.

3.20 Some of the major reforms brought in the MMDR Amendment Act, 2021 are as under:

- (i) Removed the distinction between captive and merchant mines by providing for auction of mines in future without restriction of captive use of minerals and allowing existing captive mines including captive coal mines to sell up to fifty percent. of the minerals produced after meeting the requirement of linked plants to ensure optimal mining of mineral resources and specify the additional amount to be charged on such sale [Section 8A(7A) and Section 10B(6)].
- (ii) Provided for payment of additional amount to the State Government on extension of mining lease of Government companies and specify such amount to create level playing field between the auctioned mines and the mines of a Government company [Section 8A(8)].
- (iii) Provided that all the valid rights, approvals, clearances, licences and the like granted to a lessee in respect of a mine shall continue to be valid on expiry or termination of lease and such clearances shall be transferred and vested to the successful bidder of the Mining Lease selected through auction under the Act. This will ensure continuity in mining operations even with change of lessee, conservation of mineral and avoid repetitive and redundant process of obtaining clearances again for the same mine [Section 8B(1)].

- (iv) Central Government has been empowered to issue directions regarding composition and utilization of Fund by the District Mineral Foundations [Section 9B(3)].
- (v) Restrictions on transfer of mineral concessions for non-auctioned mines has been removed to attract fresh investment and new technology in the sector [Omission of Section 12A(6)].
- (vi) Pending cases of non-auctioned concession holders which have not resulted in grant of mining leases despite passage of a considerable time of more than five years have been closed/lapsed. The existence of these cases was anachronistic and antagonistic to the auction regime. The closure of the pending cases would facilitate the Government to put to auction a large number of mineral blocks in the interest of nation resulting in early operationalisation of such blocks and additional revenue to the State Governments [Section 10A(2)(b)].
- (vii) Central Government has been empowered to conduct auction in cases where the State Governments face difficulty in conducting auction or fails to notify the area or conduct auction [Section 10B(3), Section 10B(4) and Section 11(5)].
- (viii) Provision introduced to grant short term mining lease to Government companies in situations where the auction of mines pursuant to sub-section (4) of section 8A has failed [Section 8B(1)].
- (ix) The expression “without any lawful authority” occurring in section 21 of the Act has been clarified to limit its scope to the violations of the said Act and the rules made thereunder [Section 21(6)].
- (x) Simplification of exploration regime -
 - (i) National Mineral Exploration Trust (NMET) shall be an autonomous body;
 - (ii) Private entities may be notified under Section 4(1) of the MMDR Act for conducting exploration;
 - (iii) Enable funding of eligible private exploration agencies from NMET;
 - (iv) Provision for seamless PL-cum-ML (composite licence). [Section 9C(1), Section 4(1), Section 9C(5) and Section 3(a)].

3.21 Subordinate Legislation

The following rules have been framed and notified in pursuance of the MMDR Amendment Act, 2021:

3.21.1 The Mineral (Auction) Rules, 2015 were amended vide notifications dated 17.03.2021, 18.06.2021, 02.11.2021 and 14.12.2021. The amendments brought through the respective notifications are as under:

- A. Notification dated 17.03.2021:** The rules provide incentive for production & dispatch earlier than the scheduled date of commencement of production. Details are available at - <https://mines.gov.in/writereaddata/UploadFile/Mineral%20Auction%20Amendment%20Rules%202021.pdf>
- B. Notification dated 18.06.2021:** These rules implement several of the reforms of the MMDR Amendment Act, 2021. The rules specify: (a) the manner of calculation of Average Sale Price (ASP) for mineral(s) where ASP in respect of the relevant State for any month is not published by the IBM; (b) that the State Government shall not reserve any mine for captive purpose or any specific end use or partial

specific end use in the auction; and (c) that auctioned captive mines may sell upto 50% of the minerals produced during the year after meeting the requirement of attached plant subject to the payment of additional amount as prescribed under sixth schedule of the MMDR Act; (d) that bid security shall be for an amount equivalent to 0.25 per cent. of the value of estimated resources or fifty crore rupees, whichever is lower, and shall be submitted in the form of a bank guarantee or through security deposit; (e) for composite licence having such type of deposit as specified in serial number I, II and III of Part III of Schedule I to the M(EMC)R, 2015 (except those covered under Schedule II of the said rules), whose estimated quantity of mineral resources is not possible to be assessed for calculating the value of estimated resources, but the mining potentiality of the block has been identified based on the existing geoscience data, the bid security shall be fifty lakh rupees; (f) cap on Net Worth requirement for ML – Rs. 200 Cr. and for CL – Rs. 100 Cr; (g) upfront payment installments changed from existing 10%, 10% and 80% to 20%, 20% and 60%; (h) time-lines for submission of 1st installment of upfront payment for ML and for issue of Lol by the State Government; and (i) time-lines added for submission of Performance Security for CL. Details are available at - <https://mines.gov.in/writereaddata/UploadFile/The%20Mineral%20Auction%202%20Amd%202021.pdf>

C. Notification dated 02.11.2021: The major amendments are: (a) Explanation

inserted to further clarify that no mine shall be reserved for captive purpose in the auction, notwithstanding any order or direction to the contrary, passed by any court or authority, prior to the commencement of the MMDR Amendment Act, 2021; (b) Explanation inserted to further clarify that auctioned captive mines may sell upto 50% of the mineral produced in market, notwithstanding any order or direction to the contrary, passed by any court or authority, prior to the commencement of the MMDR Amendment Act, 2021; (c) Interest on delayed payments revised from existing 24% to 12%. Details are available at - <https://mines.gov.in/writereaddata/UploadFile/The%20Mineral%20Third%20Amendment%202021.pdf>

D. Notification dated 14.12.2021: Rules provide that in case the area proposed by a person is put up for auction to grant a composite licence, such person shall be required to submit the bid security of only fifty per cent. of the amount specified in this clause for participating in the auction for the said area. Details are available at - <https://mines.gov.in/writereaddata/UploadFile/Fourth%20Amendment%20Rules%202021.pdf>

3.21.2 The Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession (Amendment) Rules, 2016 were amended vide notifications dated 24.03.2021, 08.04.2021, 10.06.2021 and 02.11.2021. The amendments brought through the respective notifications are as under:

A. Notification dated 24.03.2021: The rules provide for transfer of letter

of intent for grant of mining lease or composite licence consequent to conclusion of insolvency, liquidation, or bankruptcy proceedings. Details are available at - <https://mines.gov.in/writereaddata/UploadFile/Minerals%20Concession%20Rules%202021%2031032021.pdf>

B. Notification dated 08.04.2021: The rules provide that in respect of metals for which London Metal Exchange does not publish the daily settlement price, the monthly average price for that metal published by London Metal Exchange shall be multiplied by monthly average of reference rate for the currency in which the price is obtained. Details are available at - <https://mines.gov.in/writereaddata/UploadFile/Minerals%20Second%20Amendment%20Rules%202021.pdf>

C. Notification dated 10.06.2021: The rules provide for the payment by lessee on shortfall in dispatch from the minimum dispatch requirement. Details are available at - [https://mines.gov.in/writereaddata/UploadFile/Minerals%20\(Third%20Amendment\)%20Rules%202021.pdf](https://mines.gov.in/writereaddata/UploadFile/Minerals%20(Third%20Amendment)%20Rules%202021.pdf)

D. Notification dated 02.11.2021: New rules have been inserted to: (a) provide manner of sale of 50% of mineral produced from the captive leases; (b) allow disposal of overburden/ waste rock/ mineral below the threshold value which is generated during the course of mining or beneficiation of the mineral; (c) revision of minimum area for grant of mining lease from 5 ha. to 4 ha., for certain specific deposits minimum 2 ha. is provided; (d) allow part surrender of

mining lease area in all cases; (e) allow transfer of composite licence or mining lease of all types of mine; (f) provide for mutation of ML/ CL in favour legal heirs on death of the lessee or licensee; (g) revise interest on delayed payments from existing 24% to 12%; (h) provide rules regarding period of mining lease granted to Government companies and their payments; and (i) rationalize of penalty provisions in the rules. Details are available at - <https://mines.gov.in/writereaddata/UploadFile/230918637715354688800316.pdf>

3.21.3 The Minerals (Evidence of Mineral Contents) Rules, 2015 were amended vide notifications dated 18.06.2021 and 14.12.2021. The amendments brought through the respective notifications are as under:

A. Notification dated 18.06.2021: Rules provide for simplifying the exploration norms prescribed in the rules for certain category of mineral deposits and benchmarking the MEMC Rules with globally accepted classification standards. Rule notify following - (a) Mining Lease for limestone, iron ore and bauxite having surficial deposit can be granted at G3 level of exploration; (b) Reassessment of resources in respect of expired, terminated, surrendered or lapsed mines on the basis of available reports of exploration before auction; (c) Auction of composite licence at G4 level for all minerals; and (d) Definition of various stages of exploration, etc., exploration norms for different types of deposits and reporting template. Details are available at - <https://mines.gov.in/writereaddata/UploadFile/>

the%20Minerals%20EOMR%20Amendment%20Rules%202021.pdf

B. Notification dated 14.12.2021: Rules to enable any person to suggest block for auction for Composite Licence by submitting a proposal to the State Government in the prescribed format along with available geoscience data. Details are available at - <https://mines.gov.in/writereaddata/UploadFile/Second%20Amendment%20Rules,%202021.pdf>

3.21.4 The Mines and Minerals (Contribution to District Mineral Foundation) Rules, 2015 were amended vide notifications dated 25.06.2021. As per the amended rules, mining leases granted under Section 10A(2) shall pay DMF at the rate of 30% irrespective of date of grant. Details are available at - <https://mines.gov.in/writereaddata/UploadFile/the%20Mines%20and%20Minerals%20CDMF%20Amendment2021.pdf>

3.21.5 The Mineral Conservation and Development Rules, 2017 were amended vide notification dated 03.11.2021. The highlights of amendments in the Rules are as follows:

- (a) Rules prescribed that all plans and sections related to mine shall be prepared by combination of Digital Global Positioning System (DGPS) or Total Station or by drone survey in relation to certain or all leases as may be specified by Indian Bureau of Mines (IBM).
- (b) New Rule inserted to provide for submission of digital images of mining area by lessees and Letter of Intent holders. Lessees having annual excavation plan of 1 million tonne or more or having leased area of 50 hectare or more are required to submit drone survey images of leased

area and upto 100 metres outside the lease boundary every year. Other lessees are required to submit high resolution satellite images. This step will not only improve mine planning practices, security and safety in the mines but also ensure better supervision of mining operations.

- (c) Provision of daily return omitted to reduce compliance burden. Power of taking action against incomplete or wrong or false information in monthly or annual returns given to IBM in addition to State Govt.
- (d) Allowed engagement of a part-time mining engineer or a part-time geologist for category 'A' mines having leased area below 25 hectares. This will ease compliance burden for small miners.
- (e) Penalty provisions in the rules have been rationalized. Violation of 24 rules has been decriminalized.
- (f) Provision of forfeiture of financial assurance or performance security of the lease holder added in case of non-submission of final mine closure plan within the period specified.
- (g) Amount of financial assurance increased to five lakh rupees for Category 'A' mines and three lakh rupees for Category 'B' mines from existing three and two lakh rupees, respectively.

Details are available at- <https://mines.gov.in/writereaddata/UploadFile/The%20Mineral%20Conservation%20and%20Development%202021.pdf>

3.22 In addition to the above amendments, the Ministry of Mines has notified rescission of three rules, namely, Mineral (Non-Exclusive

Reconnaissance Permits) Rules, 2015, Minerals (Transfer of Mining Leases Granted Otherwise than through Auction for Captive Purpose) Rules, 2016 and Mineral (Mining by Government Company), Rules, 2015. These rules had become obsolete in view of the amendment dated 28.03.2021 in the MMDR Act, 1957.

3.23 Vide the MMDR Amendment Act, 2021, enabling provisions have been made so that private entities may be notified under Section 4(1) of the MMDR Act for conducting exploration without prospecting licence and also for funding of eligible private exploration agencies from NMET. The Ministry of Mines issued guidelines on 12.08.2021 for notification of accredited private exploration agencies. The guidelines are available on web

link - <https://www.mines.gov.in/writereaddata/UploadFile/orderdated12aug2021enclosures.pdf>

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 bring in greater transparency and removal of discretion in allotment. 128 mineral blocks across 9 States, namely Rajasthan, Odisha, Madhya Pradesh, Chhattisgarh, Karnataka, Jharkhand, Andhra Pradesh, Gujarat and Maharashtra have been successfully auctioned till 31.1.2022.
- (ii) The summary of Mineral wise auctioned blocks are as under:

Year-wise Auction Summary till 31.1.2022 in Table 3.2:

Table 3.2
Year wise/Mineral-wise Auction Summary

Year Mineral	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	Total
Limestone	4	5	10	5	4	9	15	52
Iron Ore	1	7	2	9	17	1	11*	47
Gold	1	1	1	1	0	2		6
Manganese	0	1	0	1	3	0	3	8
Diamond	0	1	0	0	1	0		2
Bauxite	0	0	1	0	5	1	4	11
Graphite	0	0	0	3	2	0		5
Iron Ore & Manganese	0	0	0	0	6	0	1*	6
Chromite	0	0	0	0	3	0		3
Copper	0	0	0	0	2	0		2
Kyanite	0	0	0	0	0	0	1	1
Rock Phosphate	0	0	0	0	0	0	1	1
Total	6	15	14	19	43	13	36*	144

***Note** :- 2 Iron Ore Block auctioned in 2019-20 in Odisha was Forfeited. The same are re-auctioned in September, 2021. Therefore, in total 146 mineral blocks were auctioned but in actual, the net figure is 144..

(iii) The summary of Year wise/ State wise auctioned blocks are as under in Table 3.3:

Table 3.3
List of Successful auction since 2015, till 31.1.2022

Year wise/Statewise Auction Summary								
Year Mineral	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	Total
Andhra Pradesh	-	1	2	2	-	-	3	8
Chhattisgarh	3	-	2	-	-	2	2	9
Gujarat	-	-	3	-	-	4	3	10
Jharkhand	2	1	1	3	-	-	-	7
Karnataka	-	7	-	7	4	1	5	24
Madhya Pradesh	-	1	-	5	2	5	3	17
Maharashtra	-	-	2	1	10	-	4	17
Odisha	1	2	2	-	25	1	9*	38
Rajasthan	-	3	2	1	2	-	6	14
Tamilnadu	-	-	-	-	-	-	-	-
Telangana	-	-	-	-	-	-	-	-
Total	6	15	14	19	43*	13	36*	144

***Note** :- 2 Iron Ore Block auctioned in 2019-20 in Odisha was Forfeited. The same are re-auctioned in September, 2021. Therefore, in total 146 mineral blocks were auctioned but in actual, the net figure is 144..

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

DMF is meant to address the longstanding demand of the local people in mining areas for inclusive growth. As per MMDR Amendment Act 2015, the funds for DMF will be met from additional contributions of 30% of royalty by existing miners and 10% by miners granted mines w.e.f. 12th January, 2015. Further the MMDR Act has been amended through MMDR Amendment Act, 2021 w.e.f 28.03.2021. The sub-section (5) and (6) of Section 9B of the MMDR Act has been amended for clarifying the rates of DMF to be paid by different categories of mines. Details are available on the web link: <https://mines.gov.in/writereaddata/UploadFile/mmdr28032021.pdf>

(i) The Government has formulated Pradhan Mantri Khanij Kshetra Kalyan Yojana

(PMKKKY). The details are available at weblink- <https://mines.gov.in/writereaddata/UploadFile/PMKKKY%20Guidelines.pdf>

- (ii) Rs 56369.45 Crores have been collected till 30.11.2021.
- (iii) Till November 2021, 215082 projects under different sectors have been sanctioned for various programmes / development schemes under DMF/ PMKKKY. For the said projects, Rs. 50602.59 crores has been allocated and the amount of Rs. 28072.91 crores has been spent till 30.11.2021.
- (iv) Ministry of Mines has issued an order under Section 20A of the MMDR Act, 1957 on 23.04.2021 to all States to ensure that the chairman of the Governing Council and Managing Committee shall be the District Collector/

District Magistrate/Deputy Commissioner and also to include MPs, MLA and MLCs in the Governing Council of DMF Trust in the larger public interest. As per the order, amendment to DMF rules, all states except for Meghalaya, Bihar, Goa, West Bengal, Telangana, Tamilnadu, Madhya Pradesh and Uttarakhand have implemented the said order.

- (v) Directions has also been issued to State Governments vide order dated 12.07.2021 regarding utilization of funds by the District Mineral Foundations. Instructions have been issued prohibiting transfer of District Mineral Foundation funds to the State exchequer or State level fund (by whatever name called) or Chief Minister's Relief Fund or any other funds or schemes. Also, no sanction or approval of any expenditure out of the fund of the District Mineral Foundation can now be done at the State level by the State Government or any State level agency.

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.

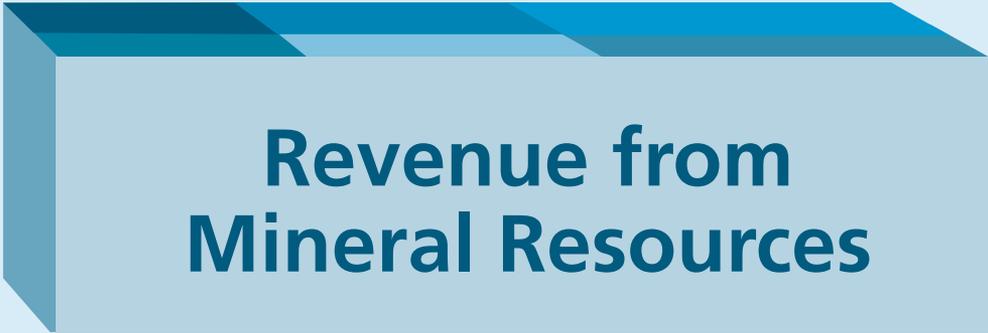
3.30 During 1st January, 2021 to 31st December, 2021, 118 Revision Applications were disposed of by Revisionary Authorities in the Ministry of Mines.

4

Revenue from Mineral Resources



Agriculture over reclaimed area in Amitpani Bauxite mines of M/s Hindalco



Revenue from Mineral Resources

- Royalty - Legal provisions Page - 37
- Revision of rates of royalty and dead rent in respect of major minerals (non-coal minerals) Page - 37
- Rates of royalty Page – 37

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 confer

under Section 9(3) of the MMDR Act, 1957, the Central Government has amended the Second Schedule to the said Act and notified the same 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 of the said Act and notified the same vide notification No. G.S.R. 631(E) dated 01.9.2014. Recently, the Central Government/Ministry of Mines has also amended Second and Third Schedule to the MMDR Act, 1957 vide Notification G.S.R. 621(E) dated 02.09.2019 and G.S.R. 622(E) dated 02.09.2019, respectively. Further, the Central Government/Ministry of Mines rescinds the above said both the Notifications vide Notification No. G.S.R. 634(E) and GSR 635(E) dated 02.09.2019 respectively. Royalty accrual for major minerals (other than coal, lignite & sand for stowing and minor mineral) by the various State Governments for the year 2017-18 to 2020-21(P) are given at **Table 4.1**.

4.3 Existing royalty rates for some important industrial use minerals is available at-

<http://mines.gov.in/writereaddata/UploadFile/ROYALTY%20RATES%2001092014.pdf>

Table 4.1

State wise Royalty Accrual of Major Minerals (Other than Coal, Lignite, Sand for Stowing and Minor Minerals) from 2017-18 to 2020-21(P) (Unit: Lakhs Rupees)

State	2017-18	2018-19 (R)	2019-20 (R)	2020-21 (P)
Andhra Pradesh	33492	41797	36005	34098
Assam	464	503	710	472
Bihar	153	589	NA	NA

State	2017-18	2018-19 (R)	2019-20 (R)	2020-21 (P)
Chhattisgarh	165130	221168	218447	232018
Goa	23961	2233	510	7345
Gujarat	26366	27041 [#]	23343	26876
Haryana	NA	NA	NA	NA
Himachal Pradesh	13175	9781	10311	10037
J & K	1544	1446	671	1284
Jharkhand	125559	116605	115561	107374
Karnataka	127140	128227	142257	NA
Kerala	851	529	864	NA
Madhya Pradesh	46166	53881	45737	48175
Maharashtra	17146	18273	19599	16583
Meghalaya	5592	8639	NA	NA
Odisha	347041	758148	784381	673399
Rajasthan	264897	304514	248565	288626
Tamil Nadu	15067	NA	NA	NA
Telangana	22927	23578	20743	19614
Uttar Pradesh	1919	NA	NA	NA
Uttarkhand	26	40	NA	NA

Source: Data received from concerned state Government/DGM offices P: Provisional; R: Revised; NA: Not Available (Data not received from concerned State Government)

5

International Cooperation





International Cooperation

- Objectives Page- 41
- Memorandums of Understanding (MoUs) signed during the period Page - 41
- Bilateral Meetings Page- 42
- Khanij Bidesh India Ltd. (KABIL) Page – 44

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 Memorandums of Understanding (MoU) have also been signed with mineral rich countries. India used to participate 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.

5.2 Due to COVID-19 pandemic outbreak, the Ministry of Mines could not participate in any of the International Mining events since last year. However, despite multiple waves of corona virus threat and worldwide lockdown, the Ministry of Mines' commitment to mineral development has led to opt rather unconventional but advanced methods of engagement viz. video conferencing, online seminars and virtual training etc. This allowed the Ministry to be progressive and pioneering even in the most adverse situations faced by the whole world during last two years.

Memorandum of Understanding (MoU) signed during the period

5.3 In the interest of developing bilateral cooperation with countries having rich mineral resources and access to the latest technologies in the exploration and development of minerals, the Central Government has entered into bilateral agreements with the Governments of a number of countries. Moreover, the Ministry of Mines is constantly endeavouring to seek greater engagements overseas in order to ensure mineral security for the Country.

MoU with FIU

5.4 MoU between Geological Survey of India, Ministry of Mines, the Government of the Republic of India and the Florida International University Board of Trustees on behalf of its Department of Earth and Environment, College of Arts, Sciences and Education, United States of America on cooperation in the field of Geology under the Research Project Title "Study of Post-collisional Magmatism in the India-Asia Collision Zone (Ladakh Granitoids, Indus Ophiolite Belt) and Integrative Geological and Geochronological studies of the Mishmi Tectonic Belt, North Eastern India (Arunachal Pradesh) was signed on 6th October, 2021.



Photo-1: The signed MoU shown virtually by Dr. S. Raju, ADG & NMH -IV, Shri R.S. Garkhal, DG, GSI. Dr. S.P. Shukla, DDG, IA-IGC and Shri Indranil Chakraborty, Director, IA applauding on the occasion.

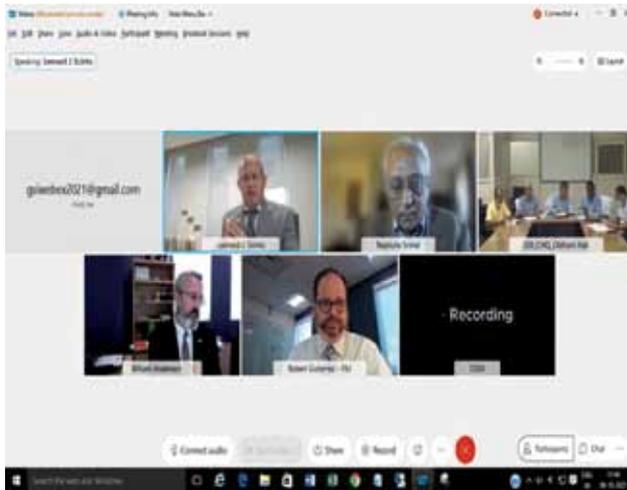


Photo-2: A view of the virtual MoU signing ceremony held on 6th October 2021 on WEBEX platform

MoU with ROSGEO

5.5 An MoU between Joint stock company Rosgeologia (ROSGEO) a legal entity incorporated under the laws of the Russian Federation and Geological Survey of India (GSI), Ministry of Mines, the Government of the republic of India on cooperation in the field of geoscience was signed on 1st December, 2021.



5.6 In addition to the above MoUs, the proposal of signing another two MoUs namely Memorandum of Understanding between Ministry of Mines, the Government of the Republic of India and the Ministry of Mines & Geology, the Government of the Republic of Cote D'Ivoire on cooperation in the field

of Geology and Mineral Resources; and (ii) Memorandum of Understanding between the Ministry of Mines of the Government of the Republic of India and the Secretariat of Mining Policy of the Ministry of Productive Development of the Argentine Republic for cooperation in the field of Mineral Resources, have been approved by the Cabinet on 07.04.2021 and 03.06.2021 respectively and are in the process of being signed in near future.

Bilateral Meetings

5.7 There are a number of bilateral meetings held during the year 2021-22 with various countries to further the cooperation and collaboration in the fields of Mining, Geology and Mineral Resources, including the critical and strategic minerals.

5.8 The second meeting of the Joint Committee under the MoU on cooperation in the field of Mining and Geology between India and Morocco was held on 2nd February, 2021 through video conference. Both the sides agreed to cooperate in the area of exchange of information on Geology and Mining. Both the sides also noted that strengthening of India-Morocco cooperation in the fields of Geology, Mining, and Downstream Industry and collaboration would be mutually beneficial.

5.9 A meeting with Australian High Commissioner in India was held on the 13th July 2021 with Secretary, Ministry of Mines on virtual platform. The various key issues like India's mining outlook, Impact of COVID-19 on the mining sector, Potential areas of collaboration, and Australia-India critical minerals cooperation and how Australia could assist India in meeting its critical minerals demand etc. were discussed in the meeting

5.10 A delegation led by H.E Mr. Hugo Javier Gobbi, Ambassador, Embassy of the Argentine Republic in India assisted by Ms. Denise Perguica Bozic, Head of Commercial Department, Embassy of the Argentine Republic, met with Secretary, Ministry of Mines, Government of India on 18/08/2021 to discuss the issues related to critical and strategic minerals.

5.10.1 Pursuant to the aforesaid meeting, a visit of Government of Indian Delegation led by secretary (Mines) to Argentina took place during 29th August to 4th September, 2021 to evaluate the potential lithium projects for acquisition by Khanij Bidesh India Ltd. (KABIL). The delegation visited the province of CATAMARCA. CAMYEN, the state-owned enterprise of CATAMARCA province has assured that they will collaborate with KABIL to ensure preferential allocation of prospective Lithium bearing mineral acreages located within the province.

5.10.2 The visiting delegation also had extensive interaction with M/s YPF. Both YPF and KABIL outlined a broad contour of activities that need to be taken up with utmost priority as the acquisition process entailing engagement with target companies need to be started expeditiously.



5.11 The 2nd meeting of Joint Working Group of India-Australia under the Memorandum of Understanding for cooperation in the field of mining & processing of Critical & Strategic Minerals was held on 10th September 2021 through virtual mode.





5.11.1 It was decided in the meeting that on the basis of the list of Lithium and Cobalt projects submitted by Australian side during 2nd JWG, more discussions will be held between CMFO and KABIL on the possible investment opportunities with more specific details of investment or participating interests of Government of Australia in such projects. Aus Trade is to organize a virtual event for showcasing investment opportunities in Australia to key Indian Industry Representatives.

5.12 Mr. Sanjiva Desilva, Counselor, Department of Industry, science, Energy and Resources of Government, Australian High Commission, New Delhi of Australia met with Shri Satendra Singh, JS(SS) and Dr. Ranjit Rath, CEO, KABIL on 16th November, 2021 to review the progress of the draft MoU proposed to be signed between Critical Minerals Facilitation Office (CMFO), Australia and KABIL for an initial investment commitment towards the due diligence process for selection of mineral asset for investment out of the shortlisted projects.

5.13 The 3rd meeting of Joint Working Group (JWG) between India and Mozambique under the Memorandum of Understanding on

cooperation in the field of Mineral Resources was held on 10.12.2021 through Virtual platform.

KABIL – Khanij Bidesh India Ltd.

5.14 With the advent of current economic developments of the country, assured supply of critical and strategic minerals is vital for the defence and security of India as well as its transition to a more advanced low fossil fuel based industrial economy. In this regard, import dependency for strategic minerals is one of the most obvious challenges.

5.15 A Joint venture company named 'Khanij Bidesh India Ltd. (KABIL)' was created during the year 2019 by NALCO, HCL and MECL with equity participation of 40:30:30 respectively. KABIL is mandated to identify and acquire overseas mineral assets for 12 critical & strategic minerals viz. Lithium (Li), Cobalt (Co), Germanium (Ge), Indium (In), Beryllium (Be), Niobium (Nb), Selenium (Se), Gallium (Ga), Tantalum(Ta), Tungsten (W), Bismuth(BI) and Tin (Sn). The main objective is to ensure mineral security of the country through supply side assurance of these minerals. Basis a commissioned study and selection criteria

various countries have been shortlisted for exploring the mineral asset acquisition abroad.

5.16 In this context, engagement of KABIL is underway with select source countries such as Argentina, Bolivia, Chile and Australia etc. which are endowed with the cited critical & strategic minerals. The primary interface has been the respective Embassies & Missions of India in those countries for sharing of information with respect to prospective mineral acreages primarily with state owned organizations for taking up due diligence and investment decisions.

5.17 Despite the COVID 19 pandemic, global health crisis and associated constraints, KABIL has been able to secure engagement with Argentina & has signed MoUs for sharing of information with a Non-Disclosure Agreement with the following state-owned organizations of Argentina:

a. M/s. YPF, an energy major & federal owned enterprise

b. M/s. JEMSE, a state-owned enterprise of JUJUY province

c. M/s. CAMYEN, a state-owned enterprise of CATAMARCA province

5.18 As of engagement with Australia, during the apex level discussion between the Premier of Australia and Hon'ble Prime Minister of India held on 3rd June 2020, a MoU has been signed between Government of India and the Government of Australia through Ministry of Mines and Critical Minerals Facilitation Office (CMFO) respectively for co-operation in the field of mining and processing of Critical and Strategic Minerals.

5.19 The follow up discussions are underway between CMFO & KABIL for signing a MoU to take up due diligence of select projects for possible joint investments. The draft MoU is under exchange between the two participants for an investment commitment of USD 3 Million by each KABIL & CMFO.



6

**Attached offices /
Subordinate**

Attached offices / Subordinate

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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, seismo-tectonics, and fundamental research.

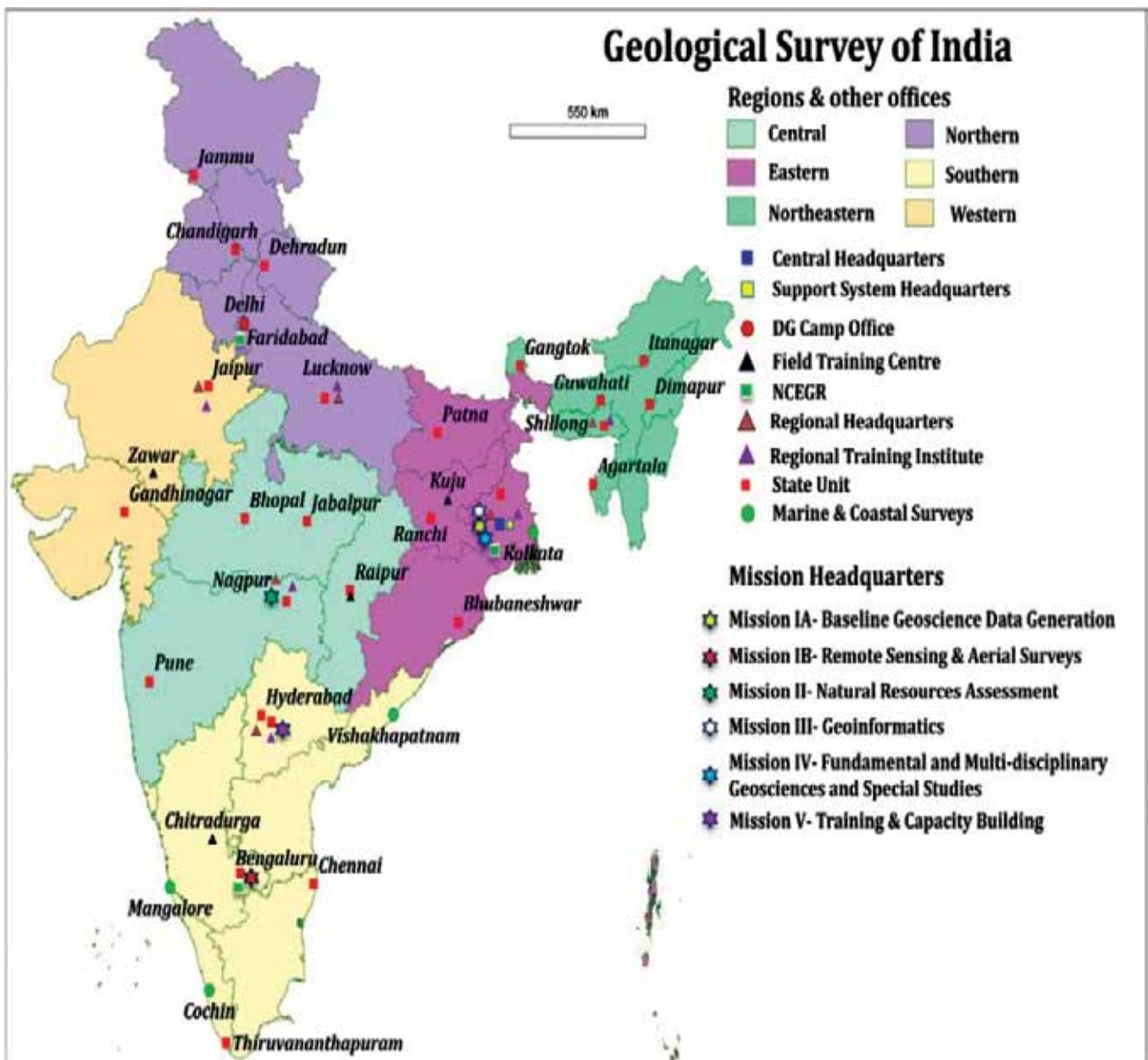


Photo 6.1

Organization of GSI Mission

6.2 The activities of GSI are carried out through five Missions viz. Baseline Geoscience Data Generation (Mission-I), Natural Resources Assessment (Mission-II), Geoinformatics (Mission-III), Fundamental and Multi-disciplinary Geoscience and Special Studies (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] (1:50,000/63,360 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, 3.123 million sq. km has been covered till December, 2021 bringing the total coverage to 99.27%. This includes an area of 4097 sq. km falling in UT: Ladakh covered during FS 2020-21 with the aid of LISS III, LISS IV, Landsat 8 OLI and ASTER L1T multispectral satellite data. The SGM data along with all other geoscientific data of GSI are available on Bhukosh, which can be accessed through the following web link: <http://bhukosh.gsi.gov.in/Bhukosh/MapView.aspx>

The data generated through SGM has immense application in exploration and other activities. The areas which have not been covered under SGM are the inaccessible and inapproachable terrains.

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). Till December 2021, an area of about 0.363 million sq. km (including 34,544 sq. km area mapped in 2021) have been mapped.

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 (details in Annexure-6.1) on 1:50,000 scale for the entire country. Presently 62 elements are analysed except Platinum & Palladium (Pt & Pd), these are only analysed for areas containing basic/ultrabasic rocks. 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.

During January to December 2021, 0.251 million sq. km was covered by NGCM. Till December 2021, about 1.492 million sq. km. area has been cumulatively mapped under NGCM. As an outcome of NGCM programme, numbers of spin-off mineral investigation items are already taken up since field season 2013-14.

On the basis of geological mapping and other baseline geoscience and mineral exploration data, GSI has demarcated an area of 0.68 million sq. km. in the country with Obvious Geological Potential (OGP). To systematically cover this 0.68 million sq. km. area, toposheet area of 0.813 million sq. km. area is to be mapped.

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-magnetic data and prepare anomaly 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. The results of the NGPM survey is integrated with other available geological data set and further mineral exploration programmes are launched in the areas delineated by integration study. During the period from January to December 2021, an area of 0.119 million sq. km was covered, thereby taking the total coverage to 1.005 million sq. km (including 0.082 million sq. km done through outsourcing).

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.

During FS 2019-20 (till March 2020), a total of 42,993 L km. was covered through TOASS survey over Banswara-Udaipur area in parts of Rajasthan.

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). Till December 2021, total 0.269 million sq. km. area was covered against the target of 0.778 million sq.km. The project is aimed to delineate concealed, deep seated structure/litho-units capable of hosting mineralization, delineate extension of the existing mineralized zone and understating of shallow crustal architecture in the context of mineral occurrence.

First phase of the survey, 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 110 target areas for exploration or search for minerals has been delineated. The acquired data has also been shared with NMDC for diamond exploration activities in Madhya Pradesh.

The second phase of the survey includes Block 5-8 covering an area of 3,11,846 sq. km. Survey over block 5 & 7 could not be initiated due to legal issues, However the work orders are issued to the respective PIA (s) for block 6 & 8.

The third phase of the survey (Block 9-12 covering an area of 2,86,268 sq. km) commenced from April 2019 and the survey over block 11 (area 87,429 sq.km) is completed. A total 40 mineral targets are delineated. In OGP Blocks 9, 10 & 12, the Project Implementing Agency(s) have terminated the

project contract, necessary closure activities are under process before retendering.

As a follow up of survey over Block- 1 to 4, total 24 projects are under execution in parts of Madhya Pradesh, Uttar Pradesh and Rajasthan.

6.9 Hyperspectral Remote Sensing Technique in Exploration

During Field Season (FS) 2021-22, 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 and spectro-radiometer data covering 25,200 sq.km. in parts of Rajasthan, Andhra Pradesh, Karnataka Odisha, Chhattisgarh, Mahdya Pradesh, Maharashtra, Uttar Pradesh, Meghalaya, West Bengal and Jharkhand with the objective to delineate alteration zones associated with mineralization and building up of spectral library for different litho-units in these areas.

In pursuance of the MoU with National Remote Sensing Centre- Indian Space Research Organization (NRSC-ISRO), a three-year (from FS. 2019-20) collaborative project on utilization of Advanced Visible Infra-Red Imaging Spectrometer-Next Generation (AVIRIS-NG) hyperspectral data by the scientists of GSI and ISRO has been launched. The objective was to prepare surface mineral map / alteration mineral map / updated host rock map, identify potential areas for mineral exploration and develop spectral library of rocks in 14 promising areas in different parts of country covering an area of 6336 sq. km. During Field Season (FS) 2019-20, a total 2253 sq. km area in parts of Rajasthan, Tamil Nadu, Maharashtra and Karnataka has been covered and during FSP 2020-21, an area of 2338 sq.

km in parts of Rajasthan, Gujarat, Andhra Pradesh, Jharkhand and Madhya Pradesh has been covered. Remaining 1745 sq. km area in parts of Gujarat, Rajasthan and Madhya Pradesh was covered during FSP 2021-22.

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 Polar and Ocean Research (NCPOR). GSI acquires baseline data on bathymetry [sea bottom topography], sea surface sediment distribution, gravity, magnetic, etc. within the EEZ of India. An area of 2.03039 million sq. km. out of a total EEZ area of 2.15962 million sq.km. (on 1:5,00,000 scale) accounting for 94.016% EEZ has already been covered. GSI has been carrying out this survey with its own research vessels. GSI also carries out focused mineral investigations and deep sea multichannel seismic surveys in identified target areas. Besides, preliminary marine mineral investigation over an area of 2,14,314 sq. km has been completed till December 2021, out of the targeted potential area of 5,89,560 sq. km. within the EEZ of India by the Research Vessel Samudra Ratnakar (36.35% coverage in preliminary exploration target area). During the period from January to December 2021, preliminary marine mineral investigation has been carried out over an area of 11,244 sq. km within the EEZ. Continuous survey since 1985 has paved the way for demarcation of prospective areas of offshore heavy minerals, lime mud, lime sand and construction sand within the Territorial Waters (TW) and EEZ of India. Besides these, occurrences of phosphate bearing sediments, and Fe-Mn encrustations (Fig. 6.2) have also been identified off Tamil Nadu coast and in the Andaman Sea, 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.

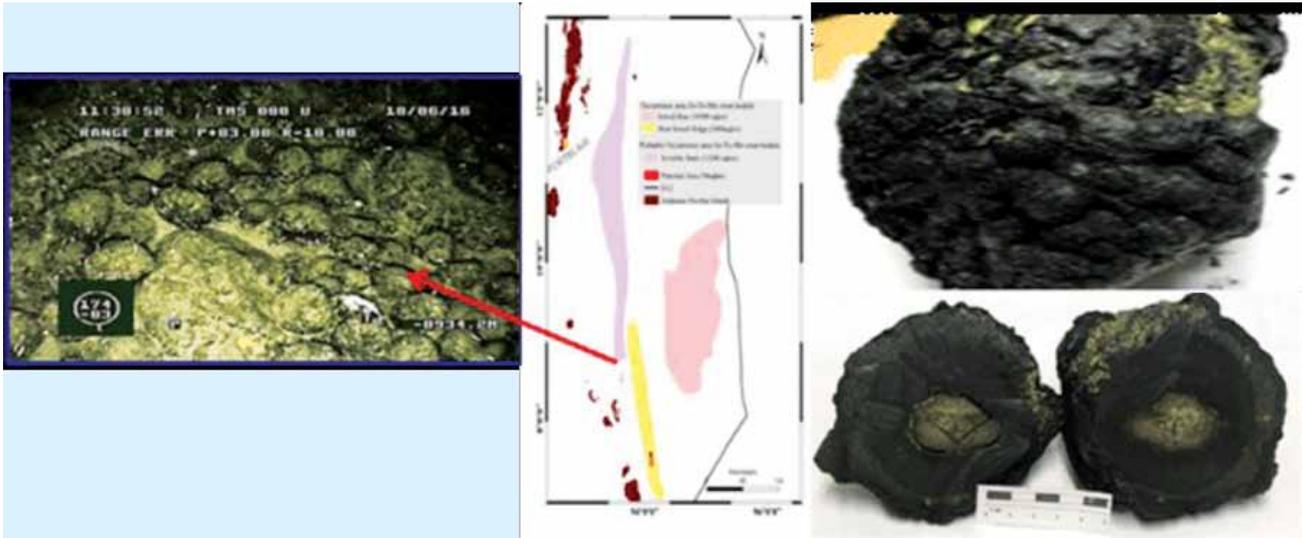


Photo 6.2 Fe-Mn samples collected by ROV dives from West Sewell Rise, Andaman Sea

MISSION II: Natural Resources Assessment

6.11 Mineral Resource Assessment

The mineral exploration activities of GSI have been prioritized keeping in view the thrust areas identified by Government 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) Amendment Rules, 2021.

During FY 2021-22, a total of 251 investigation programs were taken up by GSI, which include 11 projects on 'offshore mineral investigation', 212 projects on Mineral Exploration [11 on Ferrous Minerals, 31 on Precious Metals and Minerals, 143 on Non-Ferrous and Strategic Minerals, 27 on Industrial and Fertilizer Minerals] and 11 projects on Natural energy resources [8 coal, 1 lignite, 1 shale gas and 1 geothermal], 11 Regional Mineral Targeting

(RMT) projects, 3 R&D projects and 3 projects on Uncover (India).

6.12 Natural Energy Resources [Coal and Lignite]

GSI has augmented in 2021-22 (till December 2021) coal resources of 1243.23 million tonnes in various coalfields including Pench valley coalfield (Madhya Pradesh), Mand-Raigarh (Chhattisgarh) and Talcher coalfield (Orissa). A total of 177.33 million tonne resources has also been calculated in G4 (334) category from Raniganj Coalfield (West Bengal) and Pench valley coalfield (Madhya Pradesh).

Lignite resource of 5.93 million tonne has been augmented from Gandhalpada west block, Kendujhar & Sundargarh District (Orissa).

6.13 Geothermal Studies

During the Field Season (FS) 2021-22, one programme to delineate and define the geothermal resource characters is under execution in Maharashtra.

Mission III: Geoinformatics

Geo-informatics 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 maintenance and management of the IT infrastructure, archival of the datasets, policy making and planning for inclusive IT enablement of the organization.

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

The Online Core Business Integrated System (OCBIS) portal is an integrated enterprise portal connecting all users, core processes, data and support systems in a web based platform. This was initiated in 2015-16 and it became operational since 2017-18 for most of the modules across all GSI offices.

The OCBIS portal consist of 31 Modules (5

e-Gov applications, 13 Core Modules and 13 Support Modules) comprising of 125 processes. In Content Management System (CMS), various documents, maps and progress reports are uploaded. A total of 29912 field season progress reports of all regions are available ((https://www.gsi.gov.in/webcenter/portal/OCBIS/pageReports/pageGsiReports?adf.ctrlstate=d5puo2xdt_5&_afrLoop=28845092310189188#!) and GIS data (<http://bhukosh.gsi.gov.in/Bhukosh/Public>)

OGC Compliant Bhukosh Map Service is the geoscientific data repository with latest Geodatabase (.gdb) and Map Exchange Document (.mxd) for viewing multi-thematic map layers like Geochronology, Geothermal, Mineral, Tectonic, NGCM-NGPM, Seismotectonic, Landslide Inventory, NLSM, Meteorites, Marine Geology & Geophysics, Geology (2M) and Geomorphology (250K) which facilitate the users to visualise, query data, create maps and download. A total of 147 geospatial layers with 1,29,66,926 features and 3711 geophysical datasets are available. This is available in the link: <https://bhukosh.gsi.gov.in/Bhukosh/Public>

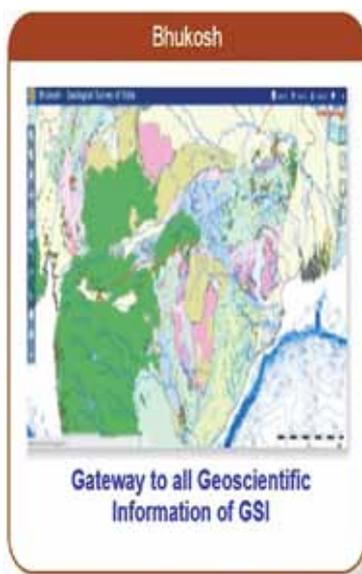


Photo 6.3 BHUKOSH: Gateway to all Geoscientific Information of GSI

6.15 Mission III B: Publication & Library

The major categories of GSI publications available in OCBIS portal are Memoirs, Bulletin Series A, B & C, Records, Special Publications, Miscellaneous Publications, Catalogues, Palaeontologia Indica and Indian Journal of Geosciences (in-house quarterly journal of GSI). A Memoir contains detailed reports on complete surveys and investigations detailing with either with a particular region or with a particular mineral in one or more regions. Records mainly cover brief outline of activities of GSI of different Regions and CHQ. The Bulletin Series A contains work done under economic geology projects, engineering geology and ground water works are dealt under Bulletin Series B and Bulletin Series C documents, the basic data generated by various laboratories/ specialised divisions. Special Publications include the proceedings

of various symposia and seminars organised by GSI as well as a set of papers dedicated to a particular field of study in earth science or of some special projects. Miscellaneous Publication is a consolidated document on Geology and mineral resources of different states of India. 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 gets released from different Regions and CHQ annually or biannually. Newsletters of GSI are being prepared and uploaded in GSI portal on monthly basis.

Total 14 scientific publications in form of Memoirs, Special and Miscellaneous Publications, Coffee Table Book, Records and quarterly journals have been released during January 2021 to December 2021.

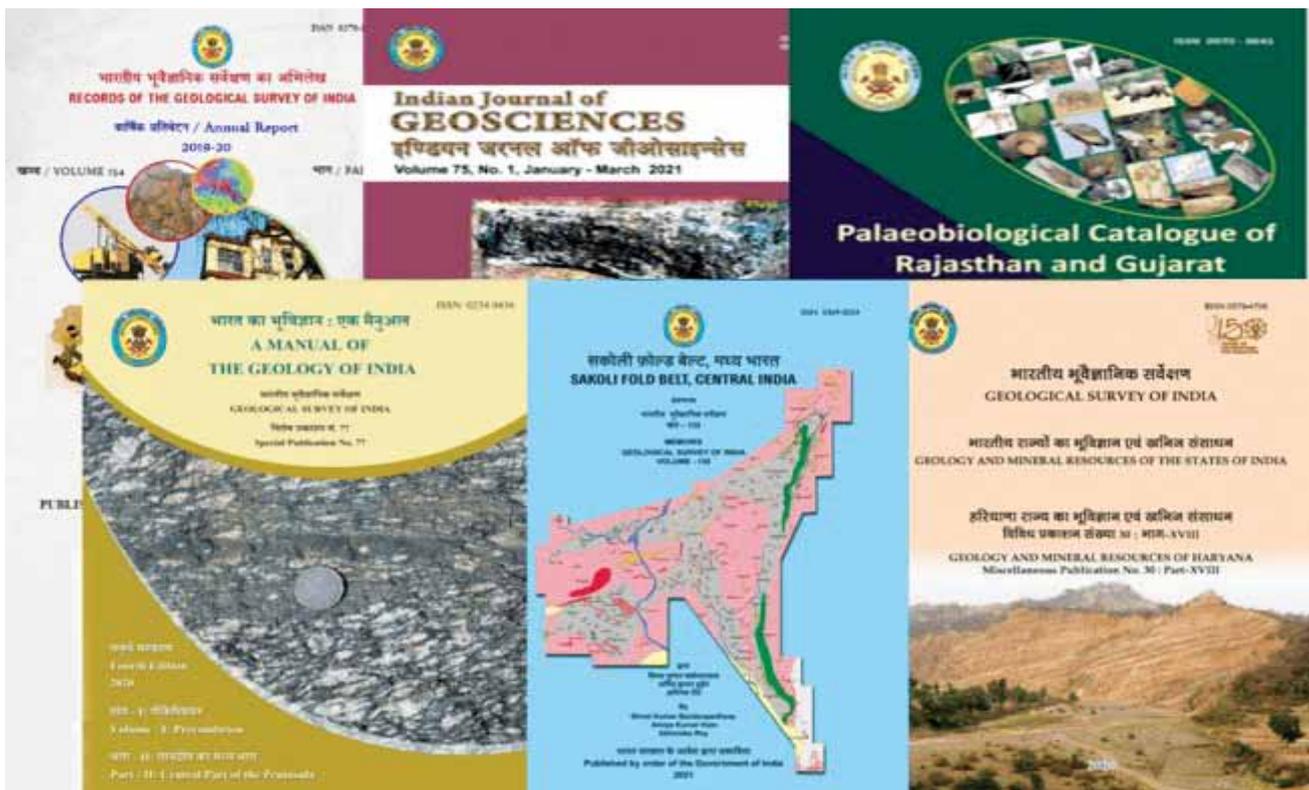


Photo 6.4 Glimpses of GSI publications available in OCBIS portal [viz. Memoirs, Bulletin Series, Records, Palaeontologia Indica and Indian Journal of Geosciences (in-house quarterly journal of GSI)]

6.16 Mission III C: Map, Geoinformatics & Data Integration

Map, Geoinformatics & Data Integration, has been mandated to prepare, scrutiny and disseminate both analog and digital geological maps / 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, TW Maps etc.

Mission III C is presently attending to the following projects at various locations of GSI:

- Development of Geo-scientific database on fluoride distribution pattern at Warora and Bhadravati areas of Chandrapur and Yeotmal District, Maharashtra.
- Geological Quadrangle Maps: (3 nos., first edition, Northeastern Region; 3 nos. Second edition from NR)
- Mineral Belt Maps of Sohagpur Coal Field
- DRM: (10 nos. of Maharashtra, 4 nos. of Chhattisgarh; 4 nos. of MP; 3 nos. of WB; 3 nos. of Nagaland; 2 nos. of Sikkim; 18 nos. of UP; 22 nos. of Tamil Nadu; 9 nos. of Rajasthan)
- Geological and Mineral Map of Goa state.
- Creation of stratigraphic database for North Eastern Region
- 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 is in progress.

Bhaskaracharya National Institute for Space Applications and Geo-informatics (BISAG-N) has been selected as System Integrator for project NGDR in nomination basis by Ministry of Mines. The procedure of signing MoU is in progress.

- The final report has been circulated for the project titled "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 and preparing a separate geo-database for Thematic Geological Maps in 1:25K scale is in progress, where such mapping has been carried out by GSI.



Photo 6.5 Seismotectonic Atlas of India available in BHUKOSH-OCBIS portal

MISSION-IV Multi-disciplinary Geoscience and Special Studies

The 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 Field Season (FS) 2021-22, 167 items were taken up under Mission-IV which includes 82 items of M-IVA, 34 items of M-IVB and 51 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.

6.17 Geotechnical Geohazards Management (M-IVA).

During the period, under landslide study, the prototype Rainfall induced Landslide Early Warning System (LEWS) is under development in collaboration with British Geological Survey (BGS) under multi-consortium international research program (LANDSLIP, www.landslip.org) since 2017.

Like previous year, GSI issued experimental landslide forecast bulletins on daily basis for the two test areas (Darjeeling district, West Bengal and Nilgiri district, Tamil Nadu w.e.f. 1st June, 2021 and Kalimpong district, West Bengal w.e.f. 1st July 2021). The issuance of bulletin for Darjeeling and Kalimpong was closed on 29.10.2021 after the end of the SW monsoon, whereas it will be issued for the Nilgiris district, Tamil Nadu up to 31st January 2022. The evaluation of the various components of model is under progress by GSI/LANDSLIP. As per the approved strategy plan, similar LEWS experimentation in 10 landslide prone States will be carried out up to 2025. During 2021-22, projects have been initiated in Uttarakhand, Kerala and Sikkim. The augmentation of essential infrastructure for establishing a state-of-the-art landslide forecasting facility at GHRM Centre, Kolkata is

under progress, which will enable GSI, in near future, to operationalize landslide forecasting in India. In landslide sector, GSI has already prioritized its investigations on meso scale (1:10,000) and site specific (1:1000/2000) scales for generating more detailed scientific inputs for directly using the same in detailed developmental planning and site-specific landslide mitigations. During 2021-22, GSI has taken up 28 meso-scale (1:10k) projects and has also taken up detailed site-specific landslide investigations for five active landslides, in the ongoing National Landslide Susceptibility Mapping (NLSM) program, GSI is going to complete macro-scale (1:50k) landslide susceptibility mapping for 4.28 lakh sq. km area spreading over 18 landslide-prone States/UTs by March 31, 2022. GSI has already uploaded the above GIS enabled landslide susceptibility map data of 3.63 lakh sq. km. areas on its Bhukosh map portal (<https://bhukosh.gsi.gov.in/Bhukosh/Public>) for free downloading and use by all stakeholders and the community. Along with the 1:50k landslide susceptibility map, the vital geodata also contains 61,287 landslide incidences as polygons and 29,972 field validated landslides as landslide inventory points with detailed geoparametric attributes. The national level landslide geodatabase of GSI is now also mirrored with the GIS map portal services of the National Disaster Management Authority (NDMA) through Web Map Service (WMS) for integrating the same vital geodata with an aim to use it for landslide disaster management plans by different landslide prone States/ UTs.

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 pan India network of GPS-GNSS stations and seismograph observatories established across the country. Out of the total 35 planned Permanent GPS stations, 33 GPS stations have already been installed in different parts of the country and data from these locations are being analysed to monitor crustal movement and establish strain model by GSD. The remaining 2 stations will be installed at Siliguri, North Bengal and North Andaman Island by March, 2022. GSD is carrying out a campaign mode GPS survey in parts of the Andaman Islands to understand the ongoing crustal deformation and dynamicity of the existing fault system. GSD is also providing technical support to the Earthquake Geology divisions of various Regional offices of GSI from where campaign mode GPS studies are being carried out in parts of the Himachal Himalaya, Central Indian Tectonic Zone and North Bengal.

SGDRPC is doing acquisition, processing and analysis of Real-Time Seismo-Geodetic data collected from ten (10) broadband seismo-geodetic observatories. Noise survey in different parts of India is also underway for establishment of 25 more Seismo-Geodetic Observatories at 25 locations across the country. Micro-Earthquake (MEQ) survey in parts of North Bihar and around Idukki-Madupetty-Ponmudi-Idamalaya dam sites in Kerala is going on to understand the seismicity pattern, nature and distribution of seismogenic source.

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

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 Nagaland, Manipur, Jharkhand, Uttar Pradesh, Bihar, Karnataka, Tamil Nadu, Telangana, Rajasthan, Punjab and Madhya Pradesh.

6.19 Fundamental Geosciences & Research (M-IVC)

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 Gemmology 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.

Out of 167 standard items, carried out during FS 2021-22, outcome of 104 items would

have direct societal benefits and 20 projects exclusively taken as R&D items for aiding/boosting the mineral exploration activities of GSI.

Mission V: Training and Capacity Building

6.20 Human Resource Development

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

In total, during January to December 2021, 261 training courses were conducted for 26,934 participants. In the remaining part of FS 2021-22, more than 20 training programmes are contemplated that include three Induction/Orientation training programmes for newly inducted Group-A Officers of Geology, Geophysics and Chemical streams of GSI. Along with these, two international courses has been proposed for about 40 participants in Geographic Information System and Remote Sensing & Digital Image Processing under Indian Technical and Economic Cooperation (ITEC) programme sponsored by MEA, Government of India. With a view to spread the awareness about the expertise of GSI in the field of earth sciences, and enhancing its visibility in the society, the Ministry had launched the "BHUVISAMVAD" platform in June 2018. Under BHUVISAMVAD, two training programmes were conducted for 80

participants from January to December 2021. In addition, as per the directives of Ministry of Mines, GSITI conducted 14 e-Training programmes for academics and trained 2,017 participants across India. Out of that, seven e-Trainings were exclusively for SC & ST Faculty, Research Scholars, PG & Post PG students of Academic Institutions that benefited 400 participants. As a part of 75 week-long celebrations in Commemoration of 75 years of India's Independence (Azadi ka Amrit Mahotsav), GSITI organized 88 field-based, laboratory-based, e-Lecture/Training sessions from its HQ-Divisions, Regional Training Divisions and Field Training Centres from March to December 2021. GSITI could outreach 16046 participants pan India under the Azadi ka Amrit Mahotsav programme.

PSS: Policy Support System

6.21 Central Geological Programming Board

The Central Geological Programming Board (CGPB) is the apex body at the national level under the chairmanship of Secretary, Mines, to coordinate the activities on geological mapping, mineral prospecting and exploration in the country. Similarly the State Geological Programming Boards (SGPB) in every State coordinates the activities in the States, complementing the CGPB and to interface with CGPB and GSI.

The CGPB meeting, chaired by the Secretary, Ministry of Mines, is organized annually to discuss the geological programs, and the related issues and concerns of the state governments, central institutes and other stakeholders working in mineral exploration and other geoscience fields. The Field Season Program of the Geological Survey of India is

also placed before the august gathering to avoid duplication of work.

Outcome of 60th CGPB along with focus/main agenda of 60th CGPB

The 60th CGPB meeting was conducted through email circulation in the month of March, 2021. A total of 974 standard field items were approved for the FS: 2021-22 of GSI during the above meeting.

- Out of the 974 items, 32 were linked with State requests. The highlights are as follows:
- A five-member committee was constituted under the chairmanship of Neyveli Lignite Corporation India Limited (NLCIL) with the members from GSI, MECL, CMPDIL and CIMFR for preparing Indian Standard Procedure for Lignite exploration.
- The base document of CGPB Committee II (Precious Metals and Minerals) was released.
- The vision document titled "Strategic plan for enhancing REE exploration in India" was jointly prepared by GSI and AMD and uploaded on GSI's web portal.
- The SOP for Mesoscale Landslide Susceptibility Mapping was finalized.
- The special publication on "Exploration for PGE in India" was finalized.
- A committee comprising experts from Geology & Geophysics to be constituted for compilation of gold exploration data of India.
- The Tertiary terrain, which is host to lignite deposit, to be covered by NGPM

survey in phased manner under the baseline data generation initiatives of GSI.

- GSI to prioritize and carry out site-specific landslide investigations in connection with NDMA's Landslide Risk Mitigation Scheme (LRMS) program as and when required/ requested by any State Government.
- The MoU between GSI and CGWB for taking up collaborative studies on uranium contamination of groundwater was proposed.

Salient points/outcome of SGPB meetings held during the period

- Discussion on the collaborative work for extraction of ground water in Dimapur between the departments of Public Health Engineering (PHE) and DGM Nagaland.
- Two coal exploration projects in Karbi Anglong district and four Granite exploration projects in Moregaon, Goalpara & Kamrup district were approved by DGM, Assam for the year 2021-22.
- Geological report is to be prepared by GSI for the amalgamated blocks of both central and west Machanur block in the state of Karnataka for handing over to the State Government for auctioning.
- DGM Punjab requested GSI to take up a project on fluoride contamination in the affected districts of Punjab.
- GSI was requested by DGM, Tamil Nadu to carry out micro level landslide susceptibility studies in highly vulnerable

- areas in Kodaikanal and Nilgiris hilly region of Tamil Nadu.
- DGM, Tamil Nadu to initiate the process for auctioning of Platinum Group of Elements in Tasampalaiyam (T3) sector of Namakkal District.
 - A decision was taken to include the site of Kaliyana flexible sandstone in the itinerary of joint traverse by GSI and DGM, Haryana for copper deposit of Mahendragarh district.
 - DGM Itanagar agreed to recommend the preliminary exploration of coal in and around Namgoi area, under Nampong Circle of Changlang District for consideration of the CGPB Committee and provision of fund under promotional scheme from Ministry of Coal, GOI.

Salient points of 17th CGPB Committee meetings

The 17th CGPB Committee Meetings (I to XII) were conducted in the months of September to December, 2021 as per the schedule via video conferencing. The salient points of 17th CGPB Committee meetings are as follows:

- The base document of CGPB Committee I (Ferrous Group of Minerals- Iron, Manganese and Chromite) was released.
- The Active Fault Mapping compendium has been brought up by GSI wherein 26 active faults/fault segments of India have been described.
- Expression of interest by WIHG for collaboration with GSI regarding ore genesis.
- The two compilations were released in CGPB Committee-II meeting, viz. (i) Special Publication of Platinum Group

of Elements exploration in India. (ii) A compilation of Threshold/Cut-off Grades of Strategic and Critical Minerals

- The special publication on Gold is under the process of finalization.
- GSI will take up site specific landslide studies in Chhumkum-Chawngte road section, Mizoram during FS 2022-23.
- DGM Assam, along with AMD, MECL and GSI to finalize modalities and roles of each organization for REE investigation in Sanchampi and Barpung areas, of Assam.
- GSI to take up research item on Brahmaputra basin to study the river dynamics for assessing the causative factors for predictive flood management.
- GSI to take up integrated project in Guwahati city to tackle flash floods and to mitigate ground water shortage.
- Finalisation of MoU between GSI and CGWB on the study of uranium, lead, arsenic, fluoride and mercury contamination in Punjab, Haryana, Andhra Pradesh, Uttar Pradesh, Bihar, Chhattisgarh, Jharkhand and Assam.

As part of the preparation for the 61st CGPB meeting, the Action Taken Reports of the 60th CGPB meeting and the Agenda Items for the 61st CGPB meeting are being obtained from the stakeholders. The CGPB Secretariat is in constant touch with the stakeholders for the purpose.

6.22 Quality Management (QM) Cell of GSI

The activities pertaining to Quality Management (QM) in GSI involve formulating modus

operandi in the form of Standard Operating Procedures (SOP) for different technical activities for improving the quality of services provided by GSI, NABL accreditation of GSI laboratories to ensure customer satisfaction as well as for meeting international standards, and ensuring the quality of FS proposals and GSI reports through external peer review.

As per the mandate, during 2021, GSI had undertaken external peer review of 20% reports of FS 2018-19 submitted during FS 2019-20. Out of 698 standard reports submitted, 140 reports were randomly selected domain-wise through OCBIS for external peer review. These reports are being sent to external experts of the respective domains, for peer review. The external peer review process for the reports of FS 2019-20 submitted during FS 2020-21 has also been initiated and 126 reports (20%) out of 624 reports have been selected randomly through OCBIS which will be sent for scrutiny/peer review by external experts.

For ensuring the quality of the projects taken up in by GSI during the FS 2021-22, 20% randomly selected proposals were passed through the process of external peer review in the first quarter of 2021. Similarly, for ensuring the quality of projects of GSI for FS 2022-23, external peer review of 20% of the proposals of FS 2022-23 has been initiated in 2021 and will continue during the first quarter of 2022.

During the year 2021, SOPs for Meso scale (1:10,000) landslide susceptibility mapping and National Geochemical mapping (NGCM) for non OGP areas were drafted and approved to keep the quality of their work at par with the international standards.

6.23 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 officers abroad. The above activities are overseen by the International Affairs Division, GSI, CHQ.

During FS 2021-22, the division was actively engaged in providing and facilitating necessary technical and associated inputs/comments/agenda points/action taken report/note/talking points to Ministry of Mines, from time to time, regarding International Mines Ministers Summit-March 15, 2021, India -Finland Virtual Summit at the level of Hon'ble Prime Minister-March, 2021, ROSGEO (Russia), Zambia, Morocco, Colombia, India-Finland Virtual Summit, Uzbekistan, Mongolia, Madagascar, Namibia, Malawi, Switzerland, Tajikistan, Australia-India energy dialog, Mozambique, Bhutan, Bangladesh, Surinam, Zambia and Azerbaijan etc. Several correspondences were done for formulation of MoUs between GSI and Russian State Geological Holding (ROSGEO), Florida International University (FIU)-USA, CNR, IRPI- Italy, Geological Mining and Metallurgical Institute- Peru.

6.24 Bilateral Collaborative Activities

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

Memorandum of Understanding (MoU) signed during the period



Photo 6.6: The signed MoU shown virtually by Dr. S. Raju, ADG & NMH -IV, Shri R.S. Garkhal, DG, GSI. Dr. S.P. Shukla, DDG, IA-IGC and Shri Indranil Chakraborty, Director, IA applauding on the occasion.



Photo 6.7: A view of the virtual MoU signing ceremony held on 6th October 2021 on WEBEX platform.

i. **MoU with Florida International University (FIU), USA:**

Geological Survey of India (GSI) has signed an MoU for two research projects entitled "Study of Post-collisional magmatism in the India-Asia collision zone (Ladakh Granitoids, Indus Ophiolite Belt)" and "Integrative Geological and Geochronological Studies of the Mishmi Tectonic Belt, Northeastern India (Arunachal Pradesh)" with Florida International University (FIU), USA on 6th October, 2021 on virtual platform. Subsequently a collaboration agreement among GSI, FIU and University of Florida (UF) has been signed on 18th November, 2021. This three – programme between GSI and FIU has been prepared in anticipation that two sides will bring their knowledge and expertise in field, lab and data analysis work including geochemical, petrologic and multi-isotopic studies. The main objective of the MoU is to understand the geological and tectonic environment for the generation and emplacement of post-collisional magmatism in the India-Asia collision margin in particular

along with constructing a model of post-collisional magma genesis in continental collision zones as well as deciphering the geologic history and tectonic evolution of the Eastern and Northeastern Himalaya.

ii. **MoU with Rosgeologia (ROS GEO), Russia:**

Geological Survey of India signed MoU with Joint Stock Company ROSGEOLOGIA (ROSGEO), Russian Federation on cooperation in Field of Geoscience, on 1st December, 2021 through virtual mode. This MoU will pave the way for collaboration in fields of exploration of deep-seated and / or concealed mineral deposit, Aero-geophysical Survey, PGE and REE exploration and research, Marine Survey and exchange of technology and knowledge in the field of drilling, sampling and laboratory to achieve data accuracy, training and capacity building of scientific personnel etc.

iii. **Signing of Extension of MoU with British Geological Survey (BGS):**

GSI has been working under the above MoU and Implementation Agreement (IA) with

the British Geological Survey (BGS) in a multi-institutional consortium project - LANDSLIP since 2017 for developing prototype regional landslide early warning system (LEWS) for two test areas in India (Darjeeling and Nilgiri). Since July 2020, GSI and Project-LANDSLIP started issuing the experimental landslide forecast bulletins in Darjeeling and Nilgiri districts, in the States of West Bengal and Tamil Nadu respectively, based on the knowledge gained in LANDSLIP research. The LANDSLIP Project and the MoU between GSI and BGS has expired in July 2021. In order to continue to promote collaboration between GSI and BGS, both parties have signed the extension of MoU for a further period of four years, starting from 1st day of August 2021 to 31st day of July 2025 on the same terms and condition.

- iv. Signing of Extension of MoU with SJVN Limited on construction stage geotechnical services for Arun-3 HEP, Nepal: The Geological survey of India, Ministry of Mines and SJVN Limited under Ministry of Power, mutually signed Memorandum of Understanding (MoU) on 16th day of June 2020 for an initial period of one year (up to 15th day of June 2021) pertaining to geotechnical studies for providing possible engineering geological solutions of various problems that will arise from time to time during construction stage in Arun-3 hydroelectric project, Nepal. As the construction stage of the Arun-3 HEP is still continuing, both SJVN Limited and GSI have mutually agreed and signed the extension of MoU for a further period of one-year w.e.f. 16th day of June 2021 to 15th day of June 2022.

Bilateral Meetings

- i. **Meeting with Mr. Mikko Potsonen, Embassy of Finland, New Delhi for implementation of MoU between GSI and GTK Finland:** In pursuance of the Memorandum of Understanding (MoU) between Geological Survey of India (GSI) and Geological Survey of Finland (GSF)/GTK, Finland on cooperation in field of Geology and Mineral Resources, a meeting was held with Mr. Mikko Potsonen, Embassy of Finland, New Delhi and Shri Rajendra Singh Garkhal, ADG, PSS (the then) and officers from International affairs and PSS, CHQ on 5th March 2021 for implementation of MoU- including preparation of roadmap for formulation of project between two organization. Deep Time Digital Earth (DDE) Splinter meeting on v-EGU: - A virtual meeting 'DDE's Splinter meeting on v-EGU' was attended by International Affairs on behalf of DG, GSI on 26th April 2021. In the meeting, a general overview of DDE (Deep Time Digital Earth) programme and the present status/progress of works in different domains were discussed. The meeting was chaired by Prof. Mike Stephenson, President of the Governing Council. DDE, Executive committee gave a comprehensive description on data architecture and evolution of data from massive metadata- data link-physical data collection and data base construction- storage & processing- data products. Four main global issues for better understanding through DDE programme are 1) evolution of materials, 2) evolution of geodynamics, 3) evolution of life and 4) evolution of climate.

ii. Meeting between Director General, GSI and Ambassador of Finland to India for implementation of MoU between GSI and GTK Finland:

A meeting was held between Shri Rajendra Singh Garkhal, Director General, GSI and Her Excellency Ms. Ritva Koukku-Ronde, Ambassador of Finland to India along with Mr. Jukka Holappa, Counsellor (Commercial), Embassy of Finland, New Delhi at GSI, CHQ, Kolkata on 14th September 2021. In their discussion, both sides covered the entire spectrum of the subjects under the MoU between GSI-GTK Finland on cooperation in field of Geology and Mineral resources. The meeting was very successfully conducted and both sides agreed for close cooperation for strengthening the relationship between two organizations in future.

iii. Interactive Meeting between Geological survey of India (GSI), India and Geological Survey of Brazil (CPRM), Brazil under the MoU between GSI- CPRM, Brazil:

An Interactive meeting between GSI officers with representatives of Geological Survey of Brazil (CPRM) under the MoU was held through videoconferencing on

29th Sept-2021. During the meeting detailed discussions were held on i) the different aspects of training courses in different fields of Geology, Geophysics and chemical Analysis in online and offline mode for Geoscientist of CPRM, ii) joint formulation of projects in field of REE, Critical & strategic mineral exploration in India for development of machine learning, data integration & interpretation and preparation of possible model of mineralization and iii) collaboration in field of sea bed mineral exploration, methodology of resource to reserve conversion particularly for near shore heavy mineral exploration.

iv. Interactive Meeting between Geological Survey of India (GSI) and Uzbek Geo-Scientific Team:

The First Interactive meeting between senior officers of Geological Survey of India (GSI) and the representatives of the State Committee for Geology and Mineral Resources, the Republic of Uzbekistan was held through videoconferencing on 15th September, 2021. The meeting was conducted to discuss the details about the training requirements and capacity building of the Uzbek geoscientists by GSI Training Institute.



Photo 6.8: Glimpse of Meeting



Photo 6.9: Shri Rajendra Singh Garkhal, Director General, GSI presenting the memento to Her Excellency Ms. Ritva Koukku-Ronde, Ambassador of Finland to India.

Photo 6.10: Meeting between officials of Embassy of Finland, New Delhi and GSI.



Photo 6.11: Glimpse of interactive meeting between GSI and CPRM Brazil.

6.25 Collaborative Projects with Other Organisations

GSI has taken up 10 projects in collaboration/ sponsorship with different organizations/ institutes like Vizhinjam International Seaport Limited (VISL); Nuclear Power Corporation of India Limited (NPCIL); Indian Statistical

Institute (ISI), Kolkata; Kerala State Disaster Management Authority (KSDMA); Defence Geoinformatics Research Establishment (DGRE), Ministry of Defence; National Remote Sensing Centre (NRSC) Bangalore; Naval Physical and Oceanographic Laboratory (NPOL); Central Ground Water Board (CGWB); Institute of Minerals and Materials Technology

(IMMT), Bhubaneswar and Sikkim State Disaster Management Authority (SSDMA) etc. in the various fields e.g. Geological and Geomorphological Studies; Sharing of Digital Aeromagnetic data; Study of micro and macro vertebrate fossils; Landslide Early Warning System; Geotechnical Investigation related to Landslide; Non-Climatic Glacier Parameters Extraction Marine Geoscience Research project; Ground water contamination study and Detailed study of Bauxite and silica sand deposits etc. during the year 2021.

STSS: Scientific & Technical Support System

6.26 ISO certification of Chemical Laboratories & Central Headquarters

The Central Chemical Laboratories (XRF and ICPMS laboratories) at CHQ, the Regional Chemical Laboratories at NRO, SRO, WRO, CRO, ERO & NCEGR

Faridabad along with SU: Chemical Laboratories at Pune, Bhubaneswar and Chennai have been accredited by National Accreditation Board for Testing and Calibration Laboratories, Government of India as per ISO/IEC 17025:2017. For an accredited laboratory to maintain its accreditation status, it is mandatory that the laboratory continue to comply with the requirements of ISO/IEC 17025: 2017 and NABL specific criteria(s) for applicable field(s). The Re-assessment of all the Regional laboratories have been done in the field of Testing as per ISO/IEC 17025:2017. All the laboratories have been participating in Proficiency Testing (PT) GeoPT Program and Inter Laboratory comparison on regular interval, and the performance of the laboratories were found satisfactory, i.e. Z score within ± 2 .

6.27 Modernization program in GSI

In order to establish GSI as a world class geoscientific institute, the modernization programme is being continued to improve the functioning of GSI in its different spheres of activities by infusion of latest state-of-the-art technology.

High end machineries and equipment are being procured in a phased manner to improve the capabilities in generating vital geoscience data and their processing, interpretation as well as to support the operational activities of GSI.

During FY 2021-2022, the major geological chemical, geophysical and drilling instruments procured/planned for procurement includes High-Resolution Secondary-Ion-Mass-Spectrometry (HRSIMS) along with ancillaries, Automated Thin Section Making Machine, Laser Ablation High Resolution ICPMS (LA HR ICPMS), Electron Probe Micro Analyser (EPMA), Ground Penetrating Radar (GPR), Computerized Automatic Rock Tri-axial Testing Machine, Inductively Coupled Plasma Mass Spectrometry (ICP-MS), Atomic Absorption Spectrophotometer (AAS), various types of Microscopes, Communication Technology (ICT) Infrastructure for National Landslide Forecasting Centre (NLFC), Hydrostatic Drilling Rigs, vehicles etc. These instruments will be very relevant for contemporary research and field activities of the organization. Besides these, various other instruments for geological, chemical, geophysical and geotechnical studies were also procured / planned to be procured during FY: 2021-22 with optimum utilization of the fund.

6.28 Internal Resource Generation

In the year of 2021 total Rs. 2,17,70,982 (Rupees two crore seventeen lakh seventy

thousand nine hundred eighty-two) only has been generated as Internal Resource and Rs. 35,68,014 (Rupees thirty five lakh sixty eight thousand fourteen) 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, unpublished reports; providing analyses of samples (petrological/chemical/mineral physics/ geotechnical Labs.), EPMA studies and gem testing etc.

6.29 Activity-wise budget expenditure of GSI against the approved budget grant during the 2020-21 and the activity wise total BE grant and expenditure till December, 2021 of FY 2021-22 is given in Annexure 6.2.

6.30 Human Resource

Out of the total sanctioned strength of GSI i.e. 11900 (*) as on 31.12.2021, 5820 posts are occupied. The group-wise sanctioned strength of personnel as on 31.12.2021 is given in Table 6.1.

Table 6.1
Statement showing category-wise details of sanctioned & filled up strength in GSI
(as on 31.12.2021)

Statement Showing category-wise details of existing staff of GSI as on 31/12/2021							
Class Sanctioned Strength		Men in position	SC	ST	OBC	No. of Women	PH
Group-A	3611	2632	442	207	736	767	28
Group-B (Gaz.)	786	549	113	61	132	100	11
Group-B (NG) (Min.)	1130	658	100	68	55	134	12
Group-B (NG) (Tech.)	1524	300	52	40	12	23	4
Group-C (Min.)	925	433	66	34	78	70	7
Group-C (Tech.)	1924	450	66	47	72	20	7
MTS (Erstwhile Gr-D)	2000	798	205	117	129	142	29
Total	11900(*)	5820	1044	574	1214	1256	98

(*) Revised Sanctioned strength as approved by CRC and conveyed by the Ministry vide their letter No. 1/2/2020-Mines. II dated 16.11.2021.

6.31 Public Relation and Media Management

PR and media cells have been operational in all the regional headquarters of GSI in coordination with CHQ, Kolkata. Highlights of GSI activities and achievements are being shared regularly with media using press

releases, press conferences, social media posts, influencer programs, TV/Radio talk shows etc. There is steady increase in the visibility of GSI's activities and achievements in all the media platforms throughout the year. GSI achieved a coverage of 362 times in about 12 languages having 78 news items/ specific information in print media, this apart, also got

coverage in 15 Electronic/ TV media, 04 Radio channels and 260 online portals and media platforms, taking the total count to around 640. Total 'Reach / Impressions' in social media including Facebook, Twitter, Instagram, YouTube LinkedIn and Koo together has touched the figure of 35,99,429. Number of 'Engagement received' (people commented, shared posts)/ Videos Viewed) is 2, 54,955. The major events covered in these news impressions were mostly related with the activities being undertaken under the aegis of **Azadi Ka Amrit Mahotsav (AKAM)** being celebrated across the country in general and contribution of GSI in nation building in the last 75 years since independence in particular. The information projected in print/electronic and social media were specific in terms GSI achievements/contribution in the field of mineral augmentation, base line geological data generation and public good geosciences in context of natural hazards, Surface-sub surface water contamination, climate change etc. issues affecting the general public. Different tools like press release, influencer activity, story generation, organising interviews of subject experts on relevant topics, short videos and social media creatives were employed for wider dissemination of information and outreach. In social media, GSI gained about 12,296 new followers across all social media platforms. GSI's Mobile App launched last year under the initiative of **"Digital India Campaign"** for public use is also gaining popularity. The App has so far achieved more than 5K+ downloads with 4.5 /5.0 rating. All in all, the public relation and media management has helped GSI to reach the masses in a faster and more effective manner and has further enhanced the visibility of GSI under Ministry of Mines.

UNCOVER (India) Projects

6.32 Two pilot scale projects (1) Northern transect (2) Southern Transect are taken up by Geological Survey of India involving Geology and Geophysics team of officers.

Northern Transect

6.33 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 (Phase-II).

During field season FS 2020-21 subsurface drilling has been carried out in Churu and Dausa sectors under the aegis of Project Uncover (India), Northern Transect, Phase-II. The two sectors were identified by using multi-geoscience approach during the first phase (FS 2016-17 to FS 2019-20) of the project. In addition to 2362m drilling, detailed electrical survey has been carried out in the Dausa sector to target possible conductive zones present in the area.

Three boreholes have been drilled in Churu sector to test the geophysical anomaly zones identified during the semi regional survey during Phase-I of the project and associated hydrogeochemical anomalies received in groundwater samples. Two boreholes have intersected meta-sedimentary rocks below a transported cover depth of 90m to 100m. Minor sulphides at few drilled depths have been intersected. The main sulphide phases are pyrrhotite and pyrite with very rare chalcopyrite specks, along foliation plane and fracture plane. The third borehole has intersected diorite-granodiorite suite of rocks with apophyses of later intrusive granitoids and minor sulphide zones.

A potential area of about 70 sq. km were identified in the Dausa sector in the first phase of the project. The regional geophysical studies carried out during first phase of work is followed by detailed electrical surveys like SP and IP study of 2.5 sq. km area within partly covered terrain to target possible partly and/or concealed mineralization present in the area. The results show a moderate to low SP zone with moderate IP signature near Gujar-Guwara village whereas a strong IP anomaly has been recorded near the village Gadarwada Gujran. A total of three boreholes have been drilled near Gujar-Guwara village in a single profile to test the surface as well as subsurface continuity of mineralization. The boreholes have intersected sulphides in the form of mostly chalcopyrite and pyrite as dominant sulphide phases with minor amount of bornite and chalcocite in the shallow zone within the host tremolite bearing impure marble unit. Thus, the study indicates subsurface existence of copper mineralization near Gujjar-Guwara area. The detailed geophysical study in the Gadarwada Gujran area has indicated presence 600m long conductive zone below dune sand cover.

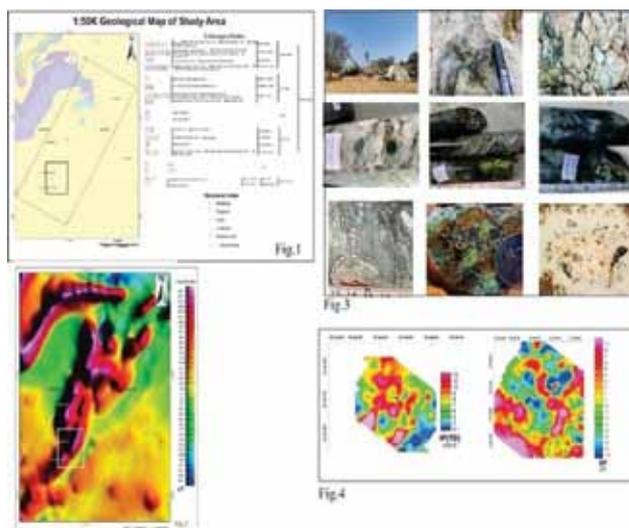


Photo. 6.12. Photographs of the detailed area along with drilled cores showing different sulphide phases along with evidences of shearing.

6.34 Expanding Mineral Exploration Search Space in Buried Terrains by Specialized Geochemical Surveys & Integration Geoscience for Creation of Buried Topography, Predictive Geological Map, Foot printing of Geochemical Signals in Parts of Hanotiya, Vijainagar, Raila, Jaiswanpura, Rajasthan.

The area comprises rocks of Bhilwara Supergroup of Archaean age. The rock types in the area covered are represented by biotite-schist and gneisses with thin intercalated bands of quartzite, calc silicate rock, calc amphibole quartzite and amphibolite. They have been frequently intruded by pegmatite and quartz veins.

Based on available aero-geophysical and ground geophysical data from the area, the field work is being carried out by collecting the rock samples from the study area on the basis of Bouguer gravity map and tilt derivative map of magnetic anomaly, for determination of physical properties (density and susceptibility) and corroborating the same with the existing geophysical signature observed. This shall help in the determination of cause of gravity and magnetic anomalies and delineation of the potential mineral zones, if any.

A total of 1000m drilling is proposed in the target area. Based on the results of detailed GP survey and analytical results of hydro-geochemical sampling 05 boreholes will be planned and drilled in the area.

6.35 Expanding Mineral Exploration Search Space in Buried Terrains by Specialized Geochemical Surveys & Integration Geoscience for Creation of Buried Topography, Predictive Geological Map, Foot printing of Geochemical Signals in Parts of Salasar,

Sujargarh, Ladnun, Nimbi Jodha area.

The study area is mostly sand covered and has scanty outcrops of various rock types which represent the Delhi Supergroup, Malani Igneous Suite, Marwar Supergroup and quaternary sediments, mostly exposed in stone quarries. The Delhi Supergroup of rocks include chlorite schist (metabasic volcanics), Serpentinite (ultramafics) with minor metabasic, slate, muscovite schist, phyllite with quartzite intercalations and amphibolite - granitoid migmatite sequence. Rhyolites are the main rock type of the Malani Igneous Suite.

6.36 Predictive (lithological) map has been prepared using the bore well information and geophysical signatures viz. Bouguer gravity and Aeromagnetic TF data. Identification of potential zones for further detailed sampling and detailed Geophysical survey based on the integrated geophysical and hydro-geochemical map of the study area has also been carried out. The block for detailed geophysical survey viz. SP, IP, Magnetic is delineated near Tanwara and Sarothiya area.

Detailed 30 L Km GP survey comprising SP, IP and magnetic will be carried out in Tanwara and Sarothiya area. On the basis of detailed GP survey, a total of 1000m drilling will be carried out in 04 to 05 boreholes.

Southern Transect

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

The Project UNCOVER, Phase-II (FS. 2020-2022) covers about 560 km long transect from Dharwar type-area in Karnataka to Nellore in Andhra Pradesh and encompasses Western

Dharwar Craton, Eastern Dharwar Craton, and Cuddapah basin. The study aims to delineate the potential zone utilizing geological, geophysical, geochemical as well as high-end lab data, in order to search new areas for further exploration. The entire transect has been covered by geophysical profiling and prospective blocks have been identified for further detailed study. Geophysical (gravity and magnetic) survey has been completed in the Tumbiganur and Ramasagaram blocks and it is under progress in the Thimasamudram block. Gravity survey in Ramasagaram block has led to delineation of a NW-SE trending linear zone possibly representing a concealed schist belt. Magnetic survey in the thickly soil-covered area of Tumbiganur block has brought ENE-WSW, NE-SW, and NW-SE trending magnetic lineaments, the intersections of which may be favourable for kimberlite emplacement. Integrated geological, geophysical and fluid inclusion studies in the Bhadrampalli granite-greenstone belt indicates possibility of deep-seated Au mineralization in the area. A deep borehole (APAB-1) is progressing in the area, which intersected greenstone rocks with sporadic sulphides (Photo. 6.15). Ore petrography in the samples of the Gadag gold prospect reveals presence of arsenopyrite, gold, pyrite, and sphalerite association. Identification of a PGE-grain Braggite (PtPdS) and associated sulfides in a sample by EPMA study indicate the possibility of PGE mineralization in the Gooty mafic intrusion. Ore petrography in the samples of the Gadag gold prospect reveals presence of arsenopyrite, gold, pyrite, and sphalerite association. Two circular carbonate rich bodies with silicified calcrete capping have been recognized in the Eastern Dharwar craton. Subsequently, two boreholes (APAA-1 and APAA-2) one in each body were drilled to check the REE content if

any in these bodies. Detailed studies in these blocks are under progress.

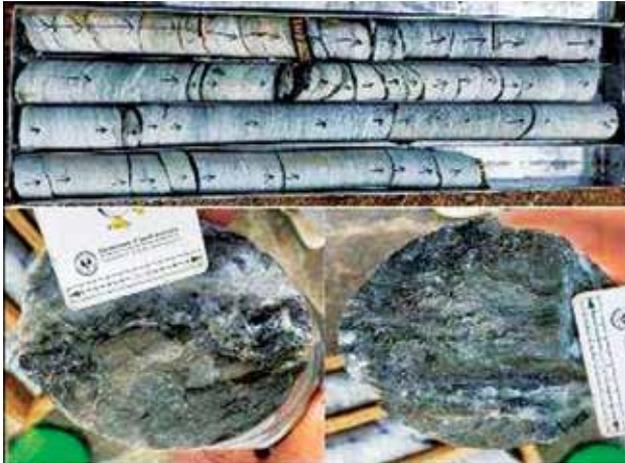


Photo. 6.13. Drilled core of chlorite-sericite schist with sporadic sulphides intersected in APAB-1 in the Bhadrampalli gold prospect.

Indian Bureau of Mines (IBM)

6.38 The Mineral Policy Conference held in January 1947 resulted in the enactment of the Mines and Minerals (Regulation and Development) Act, 1948, the first legal framework in independent India for the regulation and development of mines. The Mines and Mineral (Regulation and Development) Act, 1948 received the assent of the Governor General on 8th September 1948. The Act empowered the Central Government to regulate mines and oilfields and mineral development on the lines contemplated in the Industrial Policy Resolution of the 6th of April 1948. The deliberations of the conference led to the establishment of the Indian Bureau of Mines in March 1948 as the main regulatory agency for monitoring and supervising mining activity in the country.

6.39 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.

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

6.41 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".

6.42 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.

6.43 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.

6.44 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 <https://ibm.gov.in/index.php?c=pages&m=index&id=65&mid=23870>

6.45 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 (ii) 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

6.46 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.

6.47 IBM has modern mineral processing laboratory and pilot plant at Nagpur and

well-equipped Regional Mineral Processing Laboratories and pilot plants at Ajmer, Bengaluru.

6.48 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)

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

- (i) Minerals Development & Regulation Division (MDRD);
- (ii) Mineral Processing Division (MPD);
- (iii) Technical Consultancy, Mining Research and Publication Division;
- (iv) Mineral Economics Division;
- (v) Mining and Mineral Statistics Division; and

(vi) Planning and Coordination Division.

Performance relating to various regulatory and development functions of IBM during the year 2021-22 (up to December 2021) is given hereinafter. The same is also enclosed at Annexure 6.3.

6.50 Inspection of Mines

During the year 2021 (January to December), 1431 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, 2007 violations were pointed out to 959 mines during 2021 (January to December) as against 1199 violations (pointed out to 587 mines) in the year 2020. Total 1004 violations were rectified during the year. So far, for the reporting period, 01 case (including case launched in previous years also) was decided in favour of IBM in the year 2021. Mining operations were suspended under Rule 11(2) of MCDR 2017 in 29 mines for not carrying out mining operations in accordance with the approved mining plan/ review of mining plan and IBM recommended 13 cases for suspension of leases to State Government for non-submission of online returns/ discrepancies in submitted returns. A list of principal violations observed during inspection of mines for the year 2020 and 2021 are given at **Table 6.2**. Inspection of Mines carried out by IBM during the year 2021 is given in **Table 6.3**.

Table 6.2
Principal Violations of MCDR, 2017 detected by IBM during 2020 and 2021

Rule Number and description	No. of violations pointed out in 2020 (Jan. to Dec. 2020)	No. of violations pointed out in 2021 (Jan. to Dec. 2021)
Rule 11 (1) - Mining operations in accordance with mining plans	300	508
Rule 11 (3) - Submission of Review of Mining Plan / Scheme of mining	02	06
Rule 20 - Notice of opening of mine	03	03
Rule 23 - Submission of progressive mine closure plan	01	01
Rule 26 (2) - Responsibility of the holder of mining lease to submit yearly report	164	234
Rule 27(2) - Submission of Financial assurance	06	03
Rule 28 (1) - Notice of temporary discontinuance of mining operations	14	21
Rule 31(4) - Maintenance of plans and sections	25	47
Rule 33 - Copies of plans and sections to Protection of Environment	68	83
Rules 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.	107	308
Rule 45 (5) (b) - Submission of Monthly Return	44	79
Rule 45 (5) (b) - Submission of Monthly Return	07	79
Rule 45 (5)(c) - Submission of Annual Return	49	82
Rule 55(1)(c)(i) - Employment of Whole time Mining Engineer/Geologist	32	50
Rule 55(1)(c)(ii) - Employment of Part time Mining Engineer/Geologist	40	65
Others	337	438
Total	1199	2007

Table 6.3**Inspection of Mines carried out by IBM during 2021 (January to December, 2021)**

S. No.	State	No. of inspection
1	Andhra Pradesh	114
2	Assam	1
3	Bihar	2
4	Chhattisgarh	103
5	Goa	9
6	Gujarat	167
7	Haryana	0
8	Himachal Pradesh	33
9	J & K	0
10	Jharkhand	89
11	Karnataka	94
12	Kerala	0
13	Madhya Pradesh	243
14	Maharashtra	92
15	Manipur	0
16	Meghalaya	33
17	Odisha	174
18	Punjab	0
19	Rajasthan	102
20	Sikkim	0
21	Tamil Nadu	115
22	Telangana	53
23	Uttaranchal	6
24	Uttar Pradesh	1
25	West Bengal	0
	Total	1431

Mining Plan, Review of Mining and Mine Closure Plan

6.51 The Mineral (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016, the Mineral Conservation and

Development Rules, 2017 and Mineral Conservation and Development (Amendment) Rules, 2021 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 dated 10.02.2015) non-metallic or industrial minerals; the powers have been delegated to respective State Governments.

Indian Bureau of Mines has been mandated to exercise the power stipulated under clause (b) of sub section (2) of section 5 of the MMDR Act 1957 and in accordance with the Rules 15, 16 & 17 of the Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016 for processing and approval of Mining Plan. In line with the initiative undertaken by the Government of India for ease of doing business a new simplified format for preparation & submission of Mining Plan / Review of Mining Plan / Modified Mining Plan was notified in accordance with the Rule 71 of Mineral Conservation and Development Rules 2017. Refer to **Annexure 6.4**.

6.52 Till the year 2021 (January to December), Financial Bank Guarantees for a value of Rs. 25,32,35,57,735/- i.e., Rs.2532.355 crores [as per revised per hectare rate of Rule 27(1) of MCDR, 2017] have been collected.

6.53 During the year 2021 (January to December, 2021), 66 Mining Plans were approved and 22 not approved; 191 Reviews of Mining Plan were approved and 35 not approved; and 10 Final Mine Closure Plans approved and 5 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 the year 2021 (January to December)

S. No	State	Mining Plans		Review of Mining Plan		FMCP	
		Approved	Not Approved	Approved	Not Approved	Approved	Not Approved
1	Assam	0	0	2	0	0	0
2	AP	0	2	20	8	1	0
3	Jharkhand	2	0	2	3	0	0
4	Bihar	0	0	0	0	0	0
5	Chhattisgarh	3	4	20	1	1	0
6	Delhi	0	0	0	0	0	0
7	Goa	0	0	0	0	0	0
8	Gujarat	1	1	56	4	1	0
9	Himachal	0	1	3	2	0	0
10	Haryana	0	0	0	0	0	0
11	J & K	0	0	0	0	0	0
12	Karnataka	0	0	10	2	0	2
13	Kerala	0	0	0	0	0	0
14	MP	13	0	24	3	0	0
15	Maharashtra	15	2	11	1	1	0
16	Meghalaya	1	2	5	6	0	1
17	Manipur	0	0	0	0	0	0
18	Odisha	30	9	29	2	6	2
19	Rajasthan	0	0	0	0	0	0
20	Sikkim	0	0	0	0	0	0
21	Tamil Nadu	1	0	7	2	0	0
22	Telangana	0	1	1	0	0	0
23	Uttar Pradesh	0	0	0	0	0	0
24	Uttaranchal	0	0	1	0	0	0
25	West Bengal	0	0	0	0	0	0
	Total	66	22	191	35	10	5

6.54 No reconnaissance permits have been granted during the year 2021.

6.55 Preparation of Mineral Maps

Geographic information system and Remote sensing centre has been established in Indian Bureau of Mines which is functional since December 2018. The following activities have been carried out on GIS platform.

1. Multi Mineral Lease hold maps are now updated on GIS platform. Up to 31st December 2021, vectorisation of 552 topo sheets and plotting of 3765 mining leases is completed out of 3903 leases. Plotting of 138 leases is under progress. Preparation of attribute tables of all leases for Goa, Maharashtra, Andhra Pradesh, Gujarat, Karnataka, Jharkhand, Odisha, Chattisgarh, Madhya Pradesh, Kerala, Rajasthan, Tamilnadu, Bihar, Haryana, Himachal Pradesh, Jammu & Kashmir, North Eastern States, Uttarakhand, West Bengal and Telangana states are completed. Preparation for geology layers for corresponding states from Bhukosh data base of GSI is completed. All the maps viz lease boundaries, geology layer and toposheet layer have been integrated for the states of Andhra Pradesh, Goa, Gujarat, Jharkhand, Karnataka, Maharashtra, Odisha and Telangana.
2. The activity to bring granted areas of Prospecting Licences and Reconnaissance Permits from the available data has been carried out on GIS platform. Up to 31st December 2021, 402 PL and 302 RP areas have been plotted and corresponding database is attached to them. The plotting of ML areas granted

under auction is being carried out on GIS platform and so far 52 Nos. of auctioned blocks has been plotted.

3. The activity related to preparation of "Landuse Classification Map of Mining Leases" is being carried out on GIS platform. The landuse map of 917 mining leases has been prepared out of 1152 mining leases data received as on 31st December 2021.

Mineral Beneficiation

6.56 Mineral beneficiation studies including mineralogical testing and chemical analysis relates to both conservation and development of mineral resources. During the year 2021 (up to 31st December 2021), 38 ore dressing investigations, 17,631 chemical analysis, 2,543 mineralogical examinations and 02 in-plant study were completed.

Beneficiation studies of Mineral deposits set for auction

6.57 As per the amended Act, all exploration reports need to be made UNFC (2009) compliant before auctioning of mineral blocks, for which mineral beneficiation study is an important aspect. The exploration indicates only the Geological aspect.

6.58 Since the year 2016, IBM has been carrying out laboratory scale beneficiation studies on all G2 Level of exploration samples of GSI and MECL. Till date studies on total 109 nos. G2/G1 Level samples of GSI and 12 nos. G2/G1 level sample of MECL have been completed by IBM. Besides, studies on 6 blocks of GSI and 2 blocks of MECL are on progress.

6.59 National Mineral Inventory (NMI) as on 01.04.2020

Quinquennial updating of NMI as on 01.04.2020 for 46 major minerals is under progress. Correspondence to various exploration agencies i.e. Central Government (MECL, GSI, etc.) and various State & Central PSU's were made to elicit information for updation of NMI as on 01.04.2020. In this connection, the processing, generation of outputs and preparation of comparative statement for finalization of NMI as on 01.04.2020 in respect of 25 minerals was completed from 1st January 2021 to 31st December 2021.

6.60 Projections or estimates for the Period January to March 2022

Finalisation and generation of summary output of 14 minerals will be completed by March 2022.

The NMI is based on UNFC system which is being used for making decisions of investments 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

6.61 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.

6.62 The statistical publications released during the year 2021 (up to December 2021) include Statistical Profiles of Minerals 2020-21, Monthly Statistics of Mineral Production (MSMP) up to February 2021. Further, Indian Mineral Industry at a Glance 2017-18 issue completed and hoisted on website. Issue of 2018-19 is under progress. MSMP issue of March, 2021 is under progress.

Consultancy Service

6.63 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 2021, Report of Regional Mineral Development study for effective utilization of iron ore fines of M/S NMDC, Bailadila sector has been finalised.

6.64 In 2021, Regional Mineral Development study for effective utilization of Low grade Iron Ore fine in M/s SAIL, Bhilai and Rajhara sector (Chhattisgarh) has been taken up.

Technical Publications

6.65 Indian Mineral Year Book IMYB(z) is a flagship publication of IBM was decided by Ministry to bring out in three (3) volumes. It consists of Part I having as many as 11 General Chapters, Part II consists of 18 Reviews on metals and alloys and Part III consists of 30 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 as well as International.

Total 37 reviews of IMYB 2020 (Advance Release) were uploaded on IBM Website The IMYB, 2019 (Final Release) was uploaded on IBM's portal.

6.66 Preparation of IMYB, 2021, 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.

6.67 Half yearly Bulletins on mineral information (April- 2020 to September 2020 & October 2020 to March 2021) and yearly Bulletin on Mining Lease and Prospecting Licenses 2020 are released.

- (i) Bulletins on Mineral information (BMI) (April-2020toSeptember2020)isavailable at https://ibm.gov.in/writereaddata/files/02052021165835BMI__Apr_Sept_2020.pdf
- (ii) Bulletins on Mineral information (BMI) (October 2020 to March 2021) is available at https://ibm.gov.in/writereaddata/files/07192021133712BMI_OCT_MAR_2021.pdf
- (iii) Bulletin on Mining Lease and Prospecting Licenses 2020 is available at https://ibm.gov.in/writereaddata/files/11292021122720BMLPL_2020.pdf

Training

6.68 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

6.69 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.

6.70 In the backdrop of Covid Pandemic, presently the trainings are being conducted online. In last couple of years, IBM personnel had attended training programmes in outside organizations / institutes like GSITI, Kolkata National Remote Sensing Centre, Hyderabad.

Skills for which Training required for other stakeholders connected to IBM are

6.71 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. Presently online training programmes are conducted in the backdrop of COVID Pandemic. During the year 2021-22 (up to December, 2021), 10 online programmes have been conducted in which a total of 161 IBM Personnel, 228 Industry Officials and 53 State Govt Officials participated. Upto March, 2022 a total of 14 training programmes are expected to be conducted by Training Centre. IBM has imparted training and capacity building programmes to 859 numbers of its own employees and 970 numbers of Industry Officials and State Government Officials

during the years 2018-19 to 2021-2022 (up to December, 2021). Further, IBM officials are participating in various Training Programmes conducted by other Institutes. During the year officials of IBM were nominated for following programmes.

1. 28 officials of IBM were nominated to one day training programme on "Generic Online Training Course on Cyber Security" held on 5.1.2021, conducted by CDAC Hyderabad.
2. Five officials of IBM were nominated for two day "Virtual Training cum Workshop on Vigilance Matters" held on 9/10th Feb.2021, conducted by GSITI, Hyderabad in association with Dr MCRHRD Institute, Hyderabad.
3. The names of 9 officials of IBM, as approved by Competent Authority, were sent to GSITI, Hyderabad for online training on Functioning of Vigilance from 16th to 17th September,2021.
4. Two officials were nominated for "Generic Online Training of Govt Personnel of Central Govt Ministries / Departments in Cyber Security" conducted by Ministry of Electronics and Information Technology on 29th October, 2021 at New Delhi.
5. The names of 18 IBM officials for Training Programme for Inquiry/Presenting Officer (IOs/POs)- to be conducted by CVC, as approved by the competent authority were sent to Chief Vigilance Commissioner, New Delhi.

6.72 IBM had initiated its efforts to upload its training modules on iGOT platform during 2020-21 by identifying lectures under different modules and with regard to videography of

the same. However due to Covid Pandemic situation, no further work could be done during the year 2021. OIC training Centre of IBM has attended a workshop on "Mission Karmayogi- The Path ahead" organised by DoPT on 23/12/2021 at New Delhi.

6.73 BHUVISAMVAD activity was initiated by IBM in technical/engineering institutions, colleges, polytechnics and for university departments on pan India basis during the year 2020, six programmes were conducted.

Measures for Abatement of Pollution and Environmental Protection

6.74 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 is 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.

Revenue Generation

6.75 IBM generates revenue through processing of mining plans/ review of mining plans, compounding fees & fines, consultancy, training, statutory processing and sale of publications & data etc. Revenue generated during the year 2021 (January to December 2021) is Rs. 500.09 Lakhs.

Computerization

6.76 The Regional (except Raipur & Gandhinagar RO) / Zonal offices and Headquarters of IBM have been linked through a sophisticated system based on client server infrastructure established with the help of BRGM, France on NIC's knowledge Network (NICNET). 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.

6.77 The Web Portal of IBM i.e. <https://www.ibm.gov.in> provides information on IBM's history, functions, organization, divisions of IBM and its activities, jurisdiction of regional and zonal offices, services offered by IBM. The upgradation of existing web portal is going on, which facilitates stakeholders with updated and faster information.

6.78 The domain <https://ibmregistration.gov.in> and <https://ibmreturns.gov.in> are also functional for facilitating the stake holder to submit the monthly and annual returns online and for further communications with stake holders in case of refer back cases.

6.79 After introduction of online submission of returns system consequent to the

amendments 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.

6.80 The month-wise monthly returns submitted online are given in **Table 6.5**.

Table 6.5
Month-wise Returns Submitted online
(up to December, 2021)

Sl. No.	Month	No. of monthly returns received online
1	January, 2021	1997
2	February, 2021	1990
3	March, 2021	1994
4	April, 2021	2000
5	May, 2021	1999
6	June, 2021	1993
7	July, 2021	1984
8	August, 2021	1976
9	September, 2021	1962
10	October, 2021	1947
11	November, 2021	1936
12	December, 2021	1848

Mining Tenement System

6.81 Mining Tenement System (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 system (GIS) as well as information on 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 the policy of the Government.

Sustainable Development Framework

6.82 Star Rating System: The Star Rating System is a good governance initiative, designed as a tool for mapping of mining footprints from the view point of Sustainability. The Star rating has been mandated by Rule 35 of Mineral Conservation and Development Rules (MCDR), 2017. Every holder of a mining lease is required to submit online, its self-assessment report before the 1st day of July every year for the previous financial year to IBM.

6.83 All the mine operators are mandated to achieve at least three-star rating within a period of four years with effect from the date of notification of the Rules (i.e. 27th February, 2017) or four years from the date of commencement of mining operations, as the case may be, and thereafter maintain the same on year-on-year basis, failing which mining operations are liable to be suspended.

6.84 Based on evaluation of the performance of mining lease holders on the various parameters encompassed by the principals of the Sustainable Development Framework (SDF), validation of self-assessed templates is carried out by IBM and accordingly final ratings are awarded. Selected five star rated mines

are recommended for award by Technical Evaluation Committee.

6.85 The selected lease holders of five star rated mines are felicitated during National Conclave on Mines & Minerals held from time to time. The details of year wise awards given to 5 Star rated mines since 2014-15 are given below in **Table 6.6**:

Performance Year	No. of 5 Star Rated mines selected for award	Felicitations held on
2014-15	9	4-5 July, 2016, Raipur (Chhattisgarh)
2015-16	32	15 February, 2017, New Delhi
2016-17	57	20 March, 2018, New Delhi
2017-18	57	23 November, 2021, New Delhi
2018-19	52	23 November, 2021, New Delhi
2019-20	40	23 November, 2021, New Delhi

6.86 During the year 2021-22 (till 31st December 2021), 987 online templates for the performance of year 2020-21 have been filed by the lessees. Validation of the submitted templates for final evaluation is under progress and so far in 411 leases field verification has been completed. The entire process will be completed by 31st March, 2022.

Mining Surveillance System

6.87 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.

Human Resources

6.88 The total sanctioned personnel strength of IBM is 1477. The present filled-in strength is 679 as on December, 2021. The cadre-wise employment position in IBM as on December 2021 is given in **Table 6.7**.

Table 6.7
Employment of Personnel in IBM as on December, 2021

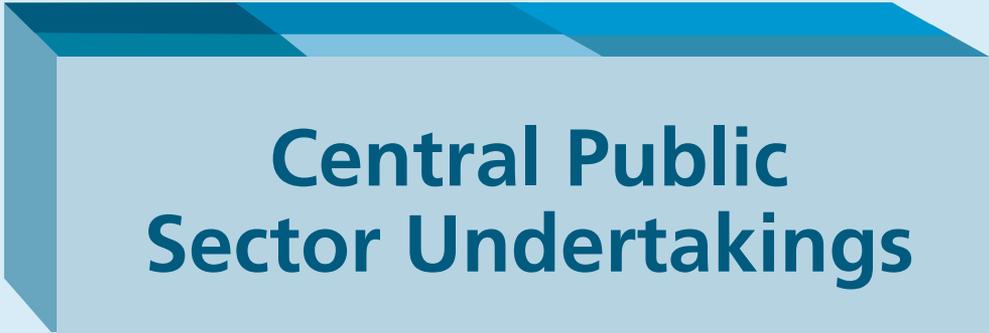
Group	Sanctioned strength	Total No. of employees in position	Number of Personnel					
			SC	ST	OBC	Minorities	Women	Physically Handicapped
A	459	143	19	06	33	07	04	00
B	502	249	28	14	42	09	48	07
C	516	287	58	19	56	12	40	06
Total	1,477	679	105	39	131	28	92	13

7

Central Public Sector Undertakings



Systematic Mining in an Iron Ore Mine



Central Public Sector Undertakings

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 - o Existing Operations & their Locations Page - 87
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National Aluminium Company Limited (NALCO)

Introduction

7.1 National Aluminium Company Limited (NALCO) is a Schedule 'A' Navratna CPSE established on 7th January, 1981 having its registered office at Bhubaneswar. It is one of the largest integrated Bauxite-Alumina-Aluminium- Power Complex in the Country. At present, Government of India holds 51.28% of paid up equity capital. The Company has been operating its captive Panchpatmali Bauxite Mines for the pit head Alumina refinery at Damanjodi, in the District of Koraput in Odisha and Aluminium Smelter & Captive Power Plant at Angul. As a part of green initiative, NALCO has installed 198 MW Wind Power Plants at various locations in India and 800 kWp roof top Solar Power Plants at its premises to join hands for carbon neutrality. From the days of first commercial operation since 1987 the Company has continuously earned profits for last 34 years. Despite the Global COVID-19 pandemic NALCO has posted an impressive net turnover and net profit of Rs.8,869.29 crore and Rs.1,299.56 crore respectively in FY20-21.

For details please visit: <https://nalcoindia.com/investor-services/annual-reports/>

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



Photo 7.1 NALCO Corporate Office, Bhubaneswar

7.3 The Company is the lowest cost producer of Alumina & Bauxite in the world as per Wood Mackenzie 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/ ISO 45001 & 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 Andhra Pradesh, Rajasthan (2 locations) and Maharashtra to reduce carbon foot print. Moving ahead, the Company has also utilised the available roof top space in Corporate Office, Township and NRTC (NALCO Research & Technology Centre) at Bhubaneswar and Alumina Refinery, Damanjodi for setting up of 800-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.



Photo-7.2 Panchpatmali mine

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.

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. 5% 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/road for export. Aluminium in the forms of ingots, sow ingots, tee ingots, billets, wire rods, alloy ingots, flat products and chequered sheets are also sold in the domestic market through its stockyards located across the country.

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 (Bharatpur) coalfields of Mahanadi Coalfield Ltd. (a subsidiary of Coal India Ltd.), located approximately 15 km from Angul. The 18.5 km captive railway system links the captive thermal power plant to the Talcher (Bharatpur) coalfields, enabling transport of the critical and bulk requirement of coal.

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.

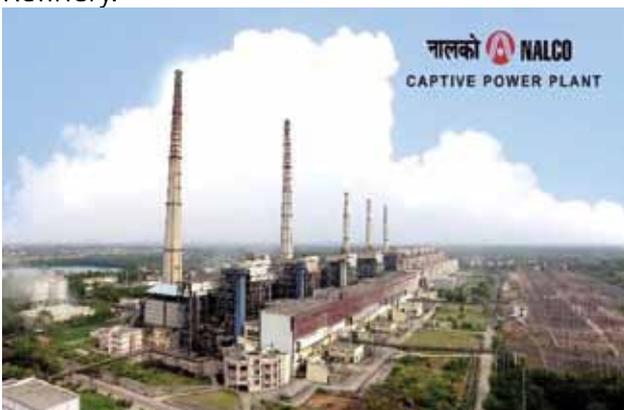


Photo -7.4 Captive Power Plant



Photo-7.5 Wind Power Plant, Jaisalmer

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.

Rooftop Solar System

7.14 NALCO utilised the entire available roof top space in Corporate Office, Township and NRTC at Bhubaneswar, Mines & Alumina Refinery, Damanjodi for setting up of 800 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



Photo -7.7 Port Facility, Vizag

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	2017-18 Actual	2018-19 Actual	2019-20 Actual	2020-21 Actual	2021-22 (Target)	2021-22 (Actual upto Dec'2021)	2021-22 (Expected)
Bauxite	Lakh tonne	70.25	72.31	73.02	73.65	74.00	55.03	74.00
Alumina Hydrate	Lakh tonne	21.06	21.53	21.61	20.86	21.20	15.41	21.20
Aluminium Metal	Lakh tonne	4.26	4.40	4.18	4.19	4.60	3.43	4.60
Net power	Million Units	6,547	6,256	6,067	6,441	6,793	4,345	5,695

*Power generation has been regulated considering constraint of coal supply by Coal India.

Table 7.2
Financial Performance of NALCO

(in Rs. crore)

Sl. No.	Particulars	2017-18 Actual	2018-19 Actual	2019-20 Actual	2020-21 Actual	2021-22 Expected achievement
1.	Income *	9,789	11,825	8,744	9,102	Shall be submitted after Annual Audit 2021-22
2.	Operating Cost**	7,268	8,607	7,983	7,173	
3.	Interest & Transaction Loss	2	2	6	7	
4.	Depreciation & Amortization	480	476	530	606	
5.	Profit before Income tax and Dividend	2,039	2,740	226	1,316	

*Income and expenditure are net of excise duty on sales.

**Operating cost includes exceptional items.

Table 7.3
Sales Performance of NALCO

Sales	Unit	2017-18 Actual	2018-19 Actual	2019-20 Actual	2020-21 Actual	2021-22 Target	2021-22 (Actual upto Dec' 2021)	2021-22 Expected achievement
Total Alumina/ Hydrate Sale	Lakh Tonne	13.37	13.18	13.04	12.28	12.70	9.63	12.70
Aluminium Export	Lakh Tonne	0.76	0.39	0.57	1.92	1.20	1.00	1.20
Domestic Aluminium Sale	Lakh Tonne	3.50	4.02	3.39	2.31	3.40	2.31	3.40
Total Aluminium Sale	Lakh Tonne	4.26	4.41	3.96	4.23	4.60	3.31	4.60

Ongoing Projects

7.17 The major activities during FY 2021-22 (till Dec'21) pertaining to various projects of NALCO are as under:

a) 5th Stream Refinery:

- As of Dec' 2021, 23 nos. of orders (out of 34 LSTK & Works packages) have been placed. Award of work for balance

project packages are under various stages of tendering & evaluation.

- Engineering, Hazop (Hazard and Operability) study, site mobilization, civil activities, soil investigation & receipt of materials/ Equipment of some of the ordered packages are already started.
- Tenders floated for 103 nos. of bought

out items out of 115 items, to be supplied to Engineering, Procurement and Construction Management (EPCM) contractors. Order have ben placed for 45 items and others are at various stages of finalization.

- GTE exemption for 9 items granted on 05.11.2021 by Gol. Tendering Process for all 09 items have been initiated.

b) Development of Pottangi Bauxite Mines:

Obtaining various statutory clearances is under progress:

- **Forest Clearance (FC):**
 - Gram Sabha conducted on 09.11.2021, FRA certificate issued by Collector, Koraput on 11.11.2021.
 - Total 1,400 Ha of Degraded forest land has been allotted for compensatory afforestation. DGPS survey work under progress for preparation of CA scheme.
- **Environment Clearance (EC):**
 - Public hearing (PH) conducted in Dec'19,
 - EIA/EMP report along with PH proceedings submitted to MoEF & CC on 05.03.2020.
 - Stage-I FC of Pottangi Mines awaited from MoEF & CC.
- **Bauxite Evacuation System:**
 - DPR preparation for Bauxite evacuation system under progress. Technology selection is under finalization.

- Land for overland conveyor: DGPS survey completed. Map prepared and certified by ORSAC.

c) Bauxite Transportation System from South Block of Panchpatmali Mines:

- So far, 06 nos. of order (out of 09 LSTK & Works packages) have been placed.

d) Utkal D Coal Mines:

- FC, EC received, Mining lease deed executed in Mar'21, Mine opening permission obtained from Coal Controller.
- PLRRC committee formed by District Administration on 24.12.2021 for Utkal-D Coal Mines.

e) Utkal E Coal Mines:

- EC available, Stage-I FC obtained, Grant order on Mining lease received from GoO.
- Forest Clearance: PCCF, Odisha forwarded the Stage-I FC compliance of Utkal-E Coal Block to MoEF & CC, Gol on 08.12.2021 and GoO recommended to MOEF & CC on 13.12.2021. MoEF has sought clarification on above.

Balance Land acquisition:

- Regarding balance Pvt land, challan for deposit approved by Court for Kundajhari Jungle and Gopinathpur Jungle and Challan has been deposited in Court after passing from treasury. Lease sanction order is under process at Collector, Angul.
- **Govt Land:** A committee has been formed by District Administration, Angul for verification of the communal land of 29 Acre. of

Utkal-E.

- f) JV with GACL for setting up of 2.7 Lakhs TPA caustic soda plant in 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. Overall project execution – 93.7% (Up to Dec' 21), Expenditure: Rs. 1,835 Cr. Project Debt financing has been arranged. Project is nearing Completion and pre-commissioning activities for Caustic Soda plant started. Caustic Soda Supply Agreement (CSSA) signed between NALCO and GNAL on 03.09.2021. Industrial water is now made available up to CPP reservoir, through GIDC supply pipeline.
- 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 completed. Construction of boundary wall and approach road have been completed. Development of internal infrastructure is in progress. The execution of the project is being carried out by the JV Company. Modalities for metal transfer from NALCO to AAPPL has been prepared. The Standard Operating Procedure (SOP) for supply of molten metal to the Units in the Park has been finalized.
- 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 use in 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. Boundary wall construction work completed. Public hearing completed and State Environmental Impact Assessment Authority (SEIAA), AP accorded Environmental Clearance for the proposed project on 08.07.2021. CFE (consent for establishment) received. GTE exemption for selection of EPCM consultant has been granted on 29.10.2021. Global Tender was invited for EPCM consultancy, two bids received by due date were opened and Techno-commercial evaluation of offers carried out. Tender Evaluation Committee recommended for opening of price bid of single techno-commercially qualified bid, which is under consideration of UADNL Board.
- i) 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. Study completed on 12 shortlisted minerals in Dec'19. MoU between JEMSE (A Govt. Company of Argentina) and KABIL was signed on 11.07.2020 to jointly explore for lithium and other mineral assets. Overseas engagements with countries like Chile and Bolivia for Lithium mineral assets are expected to resume after normalization of COVID-19 pandemic. KABIL has signed MoU with YPF, a Govt. Company of Argentina in Sept' 2020 for sourcing of lithium & other minerals. MOU between Ministry of Mines, GoI and Govt. of Australia was signed in June, 2020 for cooperation in the field of Mining and Processing of Critical and Strategic Minerals and 1st JWG meeting held on 26.11.2020. 2nd JWG meeting (Government to Government and Business to Business) with Australia was held on 10.09.2021. 2nd Annual General Meeting (AGM) of the Company was held on 17.11.2021.

- j) Brownfield Expansion of Smelter (Capacity: 0.5 million TPA):** Detailed Project Report (DPR) for the project has been prepared. Rs. 107 crore released to IDCO for land acquisition. Process for alienation of Govt. land in favour of NALCO is in progress. Contract for assistance in land acquisition has been awarded on 17.11.2021. GoO issued 4 (1) notification to conduct Social Impact Assessment (SIA) study for acquisition of private land of 82.54 acres for brownfield expansion Aluminium smelter on 13.12.2021.
- k) Captive Power Plant Expansion Project:** Consultant has been appointed

for preparation of DPR for 4 × 350 MW Captive Power Plant.

Information Technology (IT)

7.18 Information Technology (IT) plays a central role in the business functions of NALCO.

7.19 Digital enablement: Since 2010 NALCO has implemented Enterprise Resource Planning (ERP) integrating all the business functions such as sales & distribution, finance & controlling, materials management, human resource and production planning to ensure uniformity in process, improved information availability and transparency for information based decision making. For better asset utilization implementation of Plant Maintenance is in progress.

For improved transparency, speed and accountability NALCO has implemented electronic file handling system (e-Office) across all plants and offices. This is a precursor towards a paperless office.

For secure and ready access to digitized documents, the e-Office Knowledge Management System has been implemented. This system enables a secure and controlled environment for sharing of documents.

7.20 Employee self-service: NALCO has digitally enabled employee centric services such as payroll, attendance, and income tax including work flow based self-service applications like appraisal, leave, loans, perquisites, tour, medical reimbursements and probation confirmation. Computerized Hospital management system has been deployed at Company owned hospitals at Angul and Damanjodi to ensure timely medical care for employees and associates.

7.21 Digital enablement for stakeholder:

NALCO has introduced online vendor bill tracking system, Contract labour management system, and a series of mobile apps for the benefit of stakeholders:

- i. Customer mobile APP "NAGINAA" (NALCO Grahak Information and Networking App for All)
- ii. A bi-lingual mobile App for Vendors 'NAMASYA'- NALCO Micro And Small enterprise Yogayog Application.
- iii. "NISARG" (NALCO Initiatives for Social Awareness and Responsible Growth), a vibrant mobile App for Citizens at large on NALCO CSR activities.
- iv. Retired Employees mobile App "Hamesha NALCONian".
- v. "Suraksha" – A mobile App for onsite safety inspection reporting at plants.

7.22 Cloud based services: E-procurement of goods are carried out through Supplier Relationship Management (SAP SRM), Central Public Procurement Portal (CPPP) and GeM portal. e-invoice and waybills are integrated with IRN portal.

7.23 Governance: For governance and monitoring, online web-based applications such as capital expenditure monitoring, fund monitoring, compliance management system, bill tracking system, vigilance complaint management system etc. are in place. These have resulted in timely monitoring and efficient management of capital expenditure, cash flow, statutory compliances and capital proposals.

7.24 Analytics: To harness the power of data analytics and visualization dashboards are used for monitoring production, sales & Distribution and Human Resource Management.

7.25 IT Infrastructure: Following IT infrastructure are in place to ensure uninterrupted service:

- i. Primary Data Center is located at Corporate Office, Bhubaneswar. Data Center uses server virtualization technologies, and hosts all Centralized Applications including ERP and e-Office. Disaster Recovery Data Center is located in a separate seismic zone.
- ii. Plants and Offices are interconnected with dual MPLS circuits from different service providers for uninterrupted access to applications and services hosted at Corporate Data Center. The WAN bandwidth has been enhanced to cater to the increased load triggered mainly by Covid-19 practices. For increased network availability across locations a pilot testing on state-of-the-art SDWAN technology was conducted.
- iii. Each plant location and Corporate Office have Gigabit Ethernet LAN with Firewall. The Corporate Data Center has gateway protection solutions additionally.
- iv. Multichannel video conferencing solution for effective communications between all business units.

7.26 Cyber Security: The 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

7.27 NALCO as a responsible corporate citizen has given maximum thrust on environment management and pollution control ensuring a cleaner greener and safer environment at all our production units and its periphery. All production units are certified to International Standards on Environmental Management Systems (ISO14001:2015) as well as Occupational Health and Safety Management Systems (ISO 45001:2018). All our energy intensive production units i.e. Alumina Refinery, CPP & Smelter are certified to Energy Management System ISO 50001. All Production units are running with Valid Consents, licenses, authorizations under different statutes.

7.28 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 and modify its policies and strategy accordingly. Our Revision of Sustainable Development policy is an apt step in this direction. A sustainable development report is published by NALCO every year aligned with the international Global Reporting Initiatives (GRI) Standards.

7.29 In our endeavour to keep our environment clean and green we have made capital investment for upgrading our pollution control infrastructure, indulged in massive plantation & afforestation drive and have created awareness around our dwelling for a better planet. 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 etc.

The unit Specific major improvements taken up in the field of environment management at different units of NALCO during the year 2021-22 are as follows:

a) Bauxite Mines:

- 1,10,263 nos. of trees were planted in and around Mines against the target of 1,10,000. Further, 5000 nos. of fruit bearing seedlings were distributed to local villagers to improve awareness about plantation among the villagers.
- 7000 square meter of grass-turfing was carried out inside the Mines as per the target.
- Two biogas plants were established to treat the organic waste from canteen taking the total no of biogas plants to three.
- A Butterfly Garden was commissioned to improve biodiversity at Panchpatmali Bauxite Mine.

b) Refinery Plant

- Unit #4 Boiler ESP (Electro Static Precipitator) pass-B revamping job along with Unit #1 and 3 Boiler ESP (Electro Static Precipitator) revamping and additional pass

- installation jobs are in progress and expected to be completed by Dec'2022.
- Fuel additive with HFO (Heavy Fuel Oil) at Calciners and hydrate dewatering agent in hydrate filtration are being used for getting lower specific oil consumption norm and thus leaving out lesser impact on GHG (Green House Gas) emission.
 - Sewerage Treatment Plant revamping /technological up gradation work for STP-IV (for one stream) is completed and trial run is in progress.
 - Water from Ash Pond and Red mud Pond is recycled for pulp making and percentage of reclamation is more than 100%.
 - Used filter cloth (Plastic wastes) and used waste cotton generated from plant is being disposed to co-processing cement plant (M/s Shree Cement, Chatishgarh) authorized by Central Pollution Control Board (CPCB)
 - Discarded asbestos (hazardous waste) is being disposed to Common Hazardous Waste Treatment, Storage & Disposal Facility (CHWTSDF) at Sukinda, Jajpur.
 - Three rain water harvesting facilities having 6,000 cubic metre capacity are in use inside the plant premises, Jobs for another 03 nos. of rain Water Harvesting units at township is in progress.
 - During the Yr. 2021-22 total 15,424 no of plantation has been done.
 - Fly ash utilization for the year 2021-22 till December has been 39%, however, 100% utilization is expected by March'2022. Utilization has been done in brick and cement plants and for reclamation in low land areas.
 - Periodical Dam Inspection has been carried out by Internal Dam Management committee and External Dam Experts.
- c) Smelter Plant:**
- As a part of Hazardous waste management, 5342 MT of Carbon Area hazardous waste, 25503 MT of dross, 8457 MT of carbon portion of spent pot lining were disposed to the OSPCB (Odisha State Pollution Control Board) authorised parties from Jan 2021 to Dec. 2021.
 - Additional shed for storage of coke dust and hazardous waste was constructed during the year in Carbon Area.
 - To monitor fugitive emission, purchase order for online laser based fluoride gas monitoring systems have been placed on 08.11.2021 for installation in pot lines 1, 2 & 3. This monitoring system detects fugitive fluoride levels continuously inside pot rooms, so that instantaneous corrective action can be taken.
 - Mechanical Sweeping Vehicles have been engaged for maintaining good housekeeping and preventing fugitive emission in the Carbon Area.

- Supply and installation of surveillance cameras to view and monitor emission from stacks of fume treatment plants and fume treatment centres was completed in the year.
- To avoid fluoride contamination of roads, installation of mechanized wheel washing system for the material transport vehicles was completed near the exit gate and is in operation.

d) Captive Power Plant:

- To further improve stack emission, revamping of ESPs of Unit-5 & 6 has been carried out during annual overhauling of the unit.
- To achieve 100 % ash utilization target, commissioning activities of lean slurry project (LSP) of ash disposal to allotted mine void has been completed in July'2021 and is in operation.
- Reclamation & stabilization of Ash pond-IV was completed on 11.09.2021
- Construction of 4th phase ash mound by increasing the height of Ash Pond-II from 111 to 115 MRL (Meter Reduced Level) has been completed. In this process 18.00 Lakh cubic metre ash has been utilized by evacuating ash from Ash Pond-I.
- CPP, Nalco has implemented incentive scheme of Rs 150/MT to Brick manufacturer to enhance ash utilization. In the year 2021-22(Up to December, 2021) around

4.21 lakh MT of dry ash has been supplied to Brick manufacturer.

- In the year 2021-22(Up to December, 2021) around 2.25 lakh MT of pond Ash has been supplied to NH for road construction. Further follow up is being done with National highway & State high way to enhance utilization of Pond ash in upcoming project for using in road and flyover construction.
- A long term agreement has been made with M/s Shree Cement, Athgarh for supply of pond ash/fly ash.
- 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 the FY 2021-22 (Up to December, 2021), 1,25,73,100 cubic metre of ash pond overflow water was recycled and re-used.
- During FY 2021-22(Up to December 2021) 18,64,754 cubic metre of water from rain water harvesting system was recycled and re-used.
- Seepage water recycle system of 2 × 300 m³/hr recycle capacity has been constructed at Ash pond to re-use the seepage water in ash handling system.
- CPP Nalco has planted 2450 Nos. of plant in the year 2021-22 (Up to Dec'2021). So far around 12.23 lakhs Plants since its inception covering around 34.56% of total area.

- CPP, Nalco has achieved 100 % ash utilization from Nov'2021 after commissioning of Lean slurry project of ash disposal to mine void. During FY2021-22 (up to December, 2021) the ash utilization is 17,07,331 MT which is 81.25 % of total ash generated in this period.

Energy Conservation

7.30 Nalco is having Energy Management system in its energy intensive Production Units i.e. Refinery, Smelter & CPP and certified to International Standards on Energy Management System (ISO 50001). Unit wise specific energy conservation majors taken up during FY 2021-22 are as follows:

a) Mines

- On-Grid roof top PV solar power plant with 130 KWp (2 x 35 KWp + 2 x 30 KWp) capacity has been installed & commissioned over 04 nos. of buildings. Till December 2021 the plant has generated 0.067 MU of energy from renewable (solar) energy source which has thereby reduced drawl from non-renewable sources of the grid.
- A lean six sigma project has been undertaken for reduction in energy consumption in illumination along the Mine haulage roads has completed the trial phase. The implementation on the large scale is under progress. The project has a potential of annual energy saving up to 0.32 MU.
- A new Parking Lot is developed near active Mining faces so as to reduce

HSD consumption by reducing movement between active Mining faces to existing parking near SMCP, which is currently nearly 3 kms away. The same shall allow parking of light mast trucks & track mounted vehicles closer to active Mine faces. This has a potential of saving more than 10 KL of HSD per annum.

- Reduction of HSD oil by addition of fuel additives and modification in methodology & optimum selection of HEMM for bauxite generation & transportation. Approx. 225 KL of HSD oil has been saved owing to the same

b) Alumina Refinery

- Use of dewatering aid for reduction in moisture in feed hydrate to Calciners for reducing fuel oil consumption & use of Thermol (Fuel oil additive) to reduce fuel requirement in Calciner is going on as per requirement.
- Replacement of tube lights and incandescent bulbs with LED tubes and bulbs at all major roads and public buildings.
- LT Motor replacement with energy efficient IE2/IE3 class motors for old & multiple rewind motors. Quantity: 20 Nos.
- All steam leakages in new 04 area are arrested by replacement/maintenance of isolation valves, moisture traps and flanges; insulation in all the steam/process lines ensured.

- TG #1 & 5 internal steam path cleaning done.
- Addition of sodic condensate make up water at CT2 cell-4 instead of sump to reduce the temp. of cooling water was done.
- Operation of Boiler-2 ESP-B in charge ratio mode started.
- Repair/Renewal of insulation cover of Digestion tanks and connected lines.(TK-21, 708)
- In the Evaporation 52/01 area & 02/03 area 2000 Nos of 70 Watts HPSV lamps were replaced with 40 Watts LED lights.
- Evaporator Bat-D & E- one effect tube replacement in each completed.
- Alumina Refinery has over achieved the target set by Bureau of Energy Efficiency, MOP, GOI under PAT-II cycle and earned 38970 nos of ESCerts.

c) Smelter

- Graphitization of cathode to reduce specific DC energy consumption in pot line, saving @ 55kwh/MT of hot metal, is going on. Out of total 956 pots in operation, 858 pots were graphitized till end of December'2021.
- A pilot project i.e. "Development of low energy cell technology for Smelter plant (AP2XN)" had been taken up with an objective to reduce specific energy consumption under the development co-operation agreement between Rio Tinto/

Alcan, Canada and NALCO. 15 pots in Pot line -3 were under trial operation. After trial, it was found that there is an energy saving of 122 KWH/MT of hot metal compared with reference pots. Nalco has planned to go for trial of AP2XN technology in more number of pots.

- Installation of 2nd Anode Slot cutting Machine at Rodding Shop-2 is in progress, with DC Energy saving potential @140 kwh/MT of hot metal. Commissioning will be completed by March 2022.
- Energy Saving device in breaker assembly has been incorporated in 2 pots on trial basis with an objective to reduce consumption of compressed air. Further, energy saving kits were installed in the existing cylinders in 45 pots and results are to be evaluated by the OEM shortly. Once results are established, it will be standardized for implementation in all pots.
- S&P has over achieved the target set by Bureau of Energy Efficiency, MOP, GOI under PAT-II cycle and earned 23359 nos of ESCerts

d) Captive Power Plant:

- Renovation & Modernization of existing Air-Preheater in Unit-3 with advanced profile heating element and double sealing arrangement completed in December 2021. This has resulted in increase in boiler efficiency due to reduction in air leakage and increased heat transfer.

- De staging of existing Condensate Extraction Pump (CEP) from 7 stages to 6 stages completed in Unit-3 & 9, which resulted in reduction of power consumption by 40 kW per unit.
- Replacement of HP-IP rotor including inner casing with new one in Unit-8 completed in October 2021. After replacement Unit-8 heat rate reduced by 170 kcal/kWh.
- In FY 2021-22 till Dec 2021 Energy saving of 9, 23,795 kWh was achieved through replacement of total 5158 nos. LED fitting in place of conventional light fitting.

Research & Development (R&D)

7.31 Since inception 40 patents have been filed out of which 22 have been granted and 7 have been commercialized. One patent application was filed in the current financial year. Research & Scientific Advisory Committee (RSAC) meetings are being held periodically to review the R&D activities of the company.

- Under the Development Cooperation Agreement signed with RTA/ AP development of low energy cell technology for smelter plant (AP2XN) was completed previous year with an objective to reduce specific energy consumption in Smelter Plant. Activity is in progress to implement the technology in few more pots.
- NALCO in its pursuit towards organizational growth through sustained development in process, product and technology is fully functional in its new R&D Centre named as "NALCO Research and Technology Center (NRTC)" at

Gothapatana, Bhubaneswar with state of the art research and development facility, to achieve excellence in the fields of Bauxite, Alumina, Aluminium, Power and allied areas of research including down streams at national and international levels, progressively. Samples received from outside are being analyzed on chargeable basis for generating revenue and samples from Nalco's different units are being analyzed as and when required.

- Renewal of recognition by Department of Scientific & Industrial Research(DSIR), Govt Of India for In-House R&D units of Nalco Research & Technology Centre(NRTC), Bhubaneswar , Smelter & Power Complex ,Angul and Mines & Refinery Complex ,Damanjodi was obtained which is valid till March 2024 based on our submitted application
- R&D Trial with new generation grain refiner in Billet Casting Facility (BCF) was completed in Smelter Plant.
- R&D trial taken up with production of grain refined EC grade Al wire rods for Electrical Application in wire rod facility of Cast House of Smelter Plant.
- R&D Project on "Extraction of Alumina from Indian PLK ore using nitric acid process route: Phase 3 Activities at laboratory scale-Optimization of process parameter" was completed with CSIRO, Australia. A process flow sheet has been developed for extraction of alumina from Partially Lateritized Khondalite (PLK) using nitric acid and mass balance along with basic techno commercial analysis was done. The extracted alumina is not conforming to metallurgical grade

alumina fully. Further study to make use of alumina in CSIRO route may be needed.

- A bench scale study, jointly by 3 R&D institutes (JNARDDC, CSIR-NML and CSIR-IMMT) and 3 industries (NALCO, HINDALCO and VEDANTA) for 'Technology development for holistic utilization of red mud for extraction of metallic values & residue utilization' is in progress.
- Development of Bauxite CRM completed through inter laboratory comparison exercise in collaboration with NCCCM, BARC Hyderabad. Certificated are being finalized.
- Process developed in-house for making Zeolite 13X. trial. The trials conducted by CSMCRI to confirm the process has been successful in the scale up (Kg) level also. Patent is being filed.
- A novel process based on nano technology developed successfully for recovery of Al metal from dross.
- Benefits Derived as a Result of The R&D (In-House & Collaborative): Based on a completed collaborative R&D project in 2021-22 following are the expected benefits:
 - 1) AP2XNO pot technology trials in smelter plant show a reduction of 150 KWH /T DC Energy.
 - 2) New process developed for making Zeolite 13 X at Refinery Plant.
 - 3) For the first time certified reference material of Bauxite developed indigenously which can be available at a much lower cost in India.

- 4) A new process for recovery of Al metal from Al dross developed which has a commercialization potential.

Procurement

7.32 Against mandatory target of 25% procurement from MSMEs, NALCO has achieved 28.31% for the FY 2021-22 till December'21 (against 30.42% in FY 2020-21)

7.33 Total procurement by the Company from MSEs for the FY 2021-22 till December, 2021 including SC/ ST MSEs & women owned MSEs is Rs. 446.367 crore (against Rs. 536.73 crore in FY 2020-21) out of which procurement from SC/ST MSEs is Rs. 3.21 crore (against Rs. 8.22 crore in FY 2020-21) & women owned MSEs is Rs. 24.062 crore (against Rs. 16.49 crore in FY 2020-21)

7.34 Total procurement by the Company through GeM portal is Rs. 1029.93 crore in FY 2021-22 till December, 2021 (against Rs. 343.19 crore in FY 2019-20). Besides the above, orders for supply of Caustic soda of value of Rs.478.81 crs has been placed in GeM in the month of Sept'21 and Rs. 162.84 crs in the month of Dec'21 on non-MSE vendors. Hence, the total procurement made in GeM portal till Dec'21 works out as, Rs.1029.93 crs + Rs. 478.81crs + Rs. 162.84 crs = Rs.1671.58 crs. (as there are no MSE vendors for supplying Caustic Soda)

7.35 Total 35 nos. of reverse auction done in FY 2021-22 till December, 2021 (against 22 nos. in FY 2020-21) and notional cost reduction due to reverse auction is Rs. 6.76 crore (against Rs. 12.46 crore in FY 2020-21).

Industrial Relations

7.36 During FY 2021-22 the upsurge of second wave of COVID – 19 pandemic across the country continued to be a major challenge in maintaining morale of employees and a conducive Industrial Relations situation. However, regular HR interventions and continuous engagement with various employee unions and associations ensured sustained business activities of the company during the entire period. In spite of nationwide lockdowns and shutdowns to prevent the spread of COVID 19 pandemic all units were functioning with reduced manpower as per instructions from Government of India and State Governments. Continuous efforts were made for sanitization of work places including providing masks and sanitizers to protect the employees from infection. Staggered working shifts were implemented as per Government guidelines to contain the spread of Covid 19. Zero tolerance to indiscipline and worker's participation in management remained strongly rooted in the work culture. There is zero man-days loss due to IR issues during FY 2021-22 till date.

MoU rating of NALCO during the last Seven Financial years

Year	Composite Score	Grade
2014-15	1.258	Excellent
2015-16	91.19%	Excellent
2016-17	88.48%	Very Good
2017-18	91.88%	Excellent
2018-19	96.04	Excellent
2019-20	44.70	Fair*
2020-21	90.75	Excellent

**Due to abnormally low LME Aluminium Price during the year and impact of COVID-19 pandemic during last quarter of FY 2019-20 affected the financial performance of the Company.*

Aluminium Industry in India

7.37 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 tonnes. The total production of Primary Aluminium metal during FY 2020-21 was about 3.63 million tonnes and in FY21-22, it is expected to expand to 4.01 million tonnes. During 2020-21, the total domestic sales of primary metal by the major primary producers, i.e., NALCO, Hindalco and Vedanta was 1.35 million tonnes, which is likely to grow to 1.53 million tonnes during the current fiscal, as per current trend.

7.38 The growth of global aluminium market is driven by development in the transport industry, advancements in aluminium manufacturing technologies and processing equipment, and increase in usage of aluminium in various industries such as building & construction and foil & packaging. Asia-Pacific is the leading region, in terms of growth, due to massive urbanization, growth in income of people living in urban areas, and rapid industrial development. In addition, continuous advancements in transport industry and ongoing R&D activities to develop innovative, more effective and cheaper aluminium products fuel the growth of the market. Growth in demand from emerging economies such as China & India and increase in use of recycled aluminium products globally provides lucrative opportunities for the market expansion.

7.39 Aluminium is the sixth most ductile and second most malleable metal present on earth. It is exceptionally light, is impervious to dust, possesses high degree of conductivity,

and exhibits significant strength when alloyed. It is nontoxic in nature, preserves food for prolonged times and inhibits growth of micro-organisms. Aluminium is good electrical conductor and thus is used frequently in electrical transmission lines. In addition, it is used as primary propellant for solid rocket booster motor in space shuttle due to its high volumetric energy density. Corrosion resistance, reflectivity and recyclability are other characteristics of Aluminium, which makes it a favourable choice for various industrial applications.

7.40 After Covid-induced lockdowns across the world witnessed during the previous year, which led to sharp decline in demand and prices of Aluminium metal, FY 2021-22 symbolizes global recovery of Aluminium industry. With administration of Covid vaccines and the reduction in infection rates, aluminium consuming industries resumed operations to pre-Covid levels. This boosted demand and drove consumption. Aluminium prices also touched multi-year highs during the year and enhanced profitability of Aluminium producers globally.

7.41 The domestic Aluminium industry, which was severely hit by the pandemic during FY 2020-21, has shown signs of recovery during the current fiscal. Domestic aluminium producers, who had to register high export volumes last year in the absence of sizeable domestic demand, managed to enhance their domestic sales during the current year. However, full recovery in the automobiles sector, which is one of the major aluminium consuming sectors, could not be achieved due to the ensuing semiconductor/chip shortage, which has forced auto makers to operate well below their production capacity and has partially subdued the opportunities presented by the rejuvenated domestic demand. Buoyed by high Aluminium prices, all domestic Aluminium producers have registered high operating profits during the first half (Apr-Sep 2021) of the current fiscal

7.42 The total domestic production of Aluminium metal by Aluminium producers in the year 2017-18 to 2021-22 (till December, 2021) is given at **Table 7.4**.

Table 7.4
Production of Aluminium in India

(Figs. in Tonne)

Sl. No.	Producer	2017-18	2018-19	2019-20	2020-21	2021-22 (upto Dec 2021)
1	Nalco	4,25,515	4,40,242	4,18,373	4,18,522	3,43,461
2	Hindalco	12,88,351	12,96,468	13,12,541	12,40,917	9,69,182
3	Vedanta Group	16,69,741	19,58,422	18,87,965	19,70,477	16,96,964
	Total	33,83,607	36,95,132	36,18,879	36,29,916	30,09,607

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

7.43 The sales figure of Aluminium (Domestic Sales of Aluminium & Export Sales of Aluminium in India) are given in Table 7.5 and Table 7.6

Table 7.5
Domestic Sales of Aluminium

(Figs. in Tonne)

Sl. No.	Producer	2017-18	2018-19	2019-20	2020-21	2021-22 (upto Dec 2021)
1	Nalco	3,50,469	4,02,134	3,38,864	2,30,643	2,31,488
2	Hindalco	6,40,617	6,36,120	5,84,937	4,80,279	4,73,643
3	Vedanta Group	6,71,946	6,15,910	6,24,601	6,36,378	4,43,817
	Total	16,63,032	16,54,164	15,48,402	13,47,300	11,48,948

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

Table 7.6
Export Sales of Aluminium

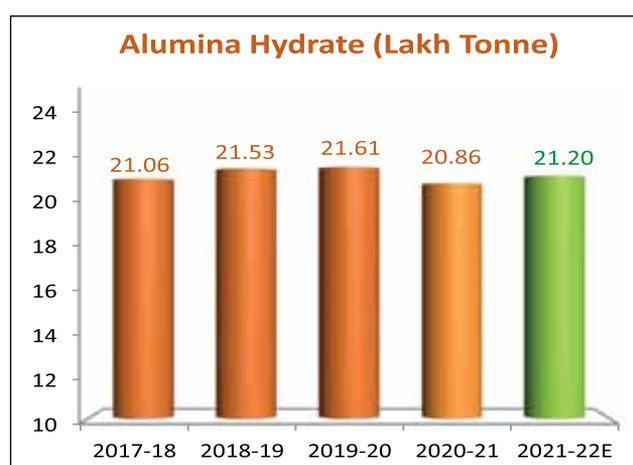
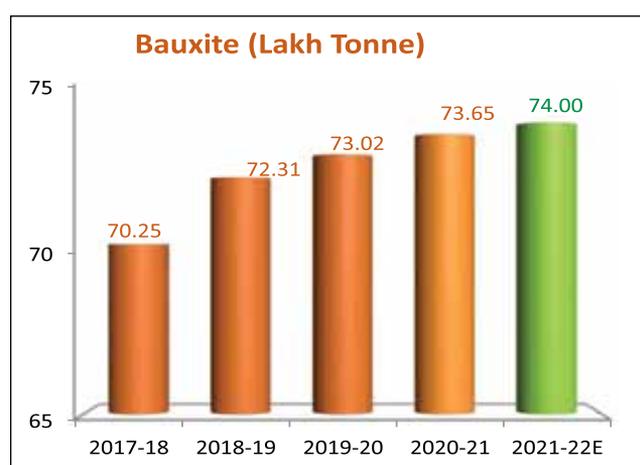
(Figs. in Tonne)

Sl. No.	Producer	2017-18	2018-19	2019-20	2020-21	2021-22 (upto Dec 2021)
1	Nalco	75,847	38,463	56,898	1,92,174	99,505
2	Hindalco	6,49,986	6,58,935	7,06,567	7,80,206	4,96,362
3	Vedanta Group	9,98,522	13,40,201	12,41,276	13,56,740	12,40,123
	Total	17,24,355	20,37,599	20,04,741	23,29,120	18,35,990

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

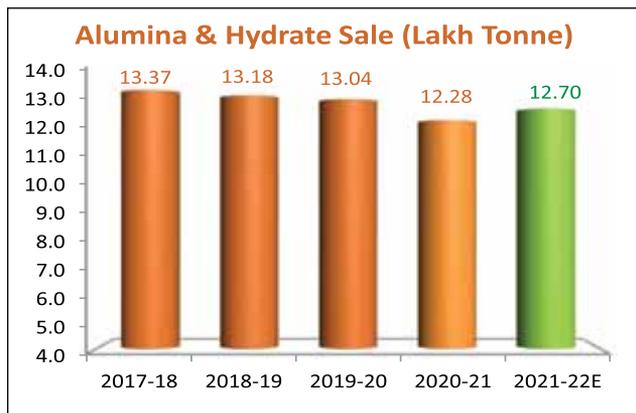
7.44 Trends of Production & Sales Parameters

Production





Sales



Hindustan Copper Limited (HCL)

Introduction:

7.45 Hindustan Copper Limited (HCL), a Miniratna Category-I, Government of India (GoI) Enterprise under the administrative control of the Ministry of Mines, was incorporated on 9th November 1967 under the Companies Act., 1956. It was established as a Govt. of India Enterprise to take over all plants, projects, schemes and studies pertaining to the exploration and exploitation of copper deposits from National Mineral Development Corporation Ltd. It 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 converting of refined copper metal into continuous cast rod (CCR) as downstream product. HCL has acquired assets of Jhagadia Copper Limited (JCL) 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 operation units -one each in the states of Rajasthan, Jharkhand, Madhya Pradesh, Gujarat and Maharashtra. HCL is a listed company on BSE and NSE, with 66.14 % equity owned by the Government of India.

7.46 Highlights of Financial year 2021 – 22

- i. HCL has been able to successfully raise fund of Rs. 500 crore from the market

- in the month of April 2021 through Qualified Institutional Placement (QIP) with wide participation from diverse and marquee investors including Mutual funds, Insurance Cos, Banks & FIs. This was the first ever fresh equity raising by a CPSE (non-bank).
- ii. CMD, HCL met Shri Ramesh Bais, Hon'ble Governor of Jharkhand to discuss Implementation of various Central Government Schemes / Guidelines by the Central PSUs on 22.12.2021 at Rajbhavan, Ranchi.
 - iii. The Govt of Jharkhand vide order dated 06.01.2022 has extended the validity of Surda mining lease till 31.03.2040 as per Mineral (Mining by Government Company) Rules, 2015.
 - iv. Secretary (Mines) visited Khetri Copper complex on 17.08.2021 & Malanjkhand copper project (MCP) on 13.11.2021 to 14.11.2021 and took review meeting there. He also seen the progress of work at MCP underground mine, tailing dam and other areas of MCP Unit and laid foundation stone for the upcoming Paste fill plant.
 - v. President of India through Ministry of Mines has sold 6.62 % share of HCL through OFS route at a price of Rs.116/ share during 16th & 17th September 2021. The Govt of India shareholding in HCL has now come down to 66.14%.
 - vi. At Malanjkhand Copper Project (MCP) underground mine achieved several milestone by interconnecting North & South underground mines at 296 MRL and connecting South ventilation shaft at 165 mRL (third level).
 - vii. Long-term rating of HCL's bank limit under Basel-II norms was upgraded from ICRA-AA to ICRA-AA+.
 - viii. HCL's long standing plea for enhancement of GST in copper concentrate from 5 % to 18 % has been approved by Ministry of Finance w.e.f. 01.10.2021.
 - ix. The Board of HCL has in their meeting dated 25.06.2021 recommended a Dividend for FY 2020-21, at 30.78 % of PAT. The total outflow on this account will be Rs. 33.85 crore.
 - x. Total 856.5 KWp Roof top solar plant implementation has been completed in HCL till date in FY 2021-2022 and further additional implementation of 4500 KWp solar plant at MCP & 800 KWp solar plant at KCC through RESCO model is under progress.

7.47 Awards and Accolades:

- i. Khetri Mine, Rajasthan of HCL adjudged as 5 stars rating mine for the year 2017-18 by Indian Bureau of Mines (IBM) and the award was received from Hon'ble Minister of Mines at 5th National Conclave for Mines and Minerals, New Delhi on 23.11.21.
- ii. Intimation has been received from DGMS, Ministry of Labour & Employment, Government of India about selection of National Safety Award (Mines)-2017(Winner) & 2018 (Runner) (LIFRM-type-6 category) for Kolihan Mine, National Safety Award (Mines) 2018 (Winner-LIFRM-type-6 category) and 2019 (Runner-LAFP -type-6 category) for Khetri Mine & National Safety Award (Mines)- 2020 (Runner) (LAFP- type - 4 category) for Malanjkhand mine.

*LIFRM – Lowest Injury frequency rate per lakh man shifts & LAFP – Longest accident free period.

- iii. Khetri copper mine received 1st prize & Kolihan copper mine received 3rd prize for category-A, underground mines at 34th Mines safety week 2020-21 under the aegis of DGMS, Ajmer region.
- iv. Celebration of Metalliferous Mines Safety Week 2020 under the aegis of Directorate General of Mines Safety Nagpur Region has been organized in the year 2021 instead of 2020 due to Covid-19 pandemic. The list of prizes won by MCP unit during the celebration of Metalliferous Mines Safety Week 2020 are as follows.
 - HCL/MCP won following prizes during the celebration of Metalliferous Mines Safety Week 2020 under the aegis of Directorate General of Mines Safety Nagpur Region.
 - 3rd Prize in overall category.
 - 1st Prize in Vocational Training & First Aid.
 - 2nd Prize in Use of Explosive (Records & Stock).
 - 2nd Prize COVID 19 Protocol & Implementation.
 - 2nd Prize in Health, Hygiene & Welfare Amenities.
 - 3rd Prize SMP & Emergency Preparedness.

7.48 Present capacities of HCL’s Mines, Smelters and Wire Rod plant are given in **Table 7.7**, **Table 7.8** and **Table 7.9**.

Table 7.7
Production Capacity of Mines of HCL

Location of Mines	Ore Capacity (million tonnes per annum) (As per Mining Plan)
Khetri Copper Complex (KCC), Rajasthan	1.9
Malanjkhand Copper Project (MCP), M.P.	2.9
Indian Copper Complex (ICC), Jharkhand	0.4
Total	5.2

Table 7.8
Refined Copper Production Capacity of HCL

Location of Smelters	Refined Metal Capacity (Tonnes per annum)
Indian Copper Complex (ICC), Jharkhand	18,500
Gujarat Copper Project (GCP), Jhagadia	50,000*
Total	68,500

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

Table 7.9
Production Capacity of Wire Rod Plant of HCL

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

7.49 The capital structure of the Company as on 30st September, 2021 is given in **Table 7.10**.

Table 7.10
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 of Rs.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. 609 crore

7.50 Physical performance details of HCL are as under:

Table 7.11
Physical Performance of HCL

Product	Actual for the previous 2 years		Target for FY 2021-22	Actual from 1 st Jan'21 to 31 st Dec'21	Projection for the period Jan-Mar'22
	FY 2019-20	FY 2020-21			
Ore Production ('000 Tonnes)	3968	3273	Not yet finalized	3822	870
Metal in Concentrate (MIC) (Tonnes)	26502	23866	Not yet finalized	26280	5800
Refined Copper (Cathode) (Tonnes)	5340	Nil	Not yet finalized	620.70	Nil *
Wire rod (Tonnes)	8443	1360	Not yet finalized	1064	500

*As per the business plan of the Company, concentrate of MCP, KCC and ICC origin are being sold directly in the market and as a result, refined copper cathode and own wire rod production will be Nil.

7.51 Financial performance details of HCL are as under:

Table 7.12
Financial Performance of HCL

(₹ in crore)

Sl No	Details	Actual for the previous 2 years		Target for FY 2021-22	For the Period Apr'21 to Sep' 21 (Limited Review)	For the Period Oct'21 to Mar'22 (Estimated)
		FY 2019-20	FY 2020-21			
1.	Turnover	803.17	1760.84	MoU not yet finalized	728.16	(*)
2.	Net Profit/(Loss) before Tax (PBT)	(538.06)	86.90	MoU not yet finalized	153.33	(*)
3.	Net Profit/(Loss) after tax (PAT)	(569.35)	109.98	MoU not yet finalized	113.14	(*)

(*) HCL being a listed Company, price sensitive data cannot be disclosed unless the audited result is published.

7.52 Sales Performance: Sales performance details of HCL are as under**Table 7.13**
Sales Performance of HCL

Product	Actual for the previous 2 years		Target for FY 2021-22	Actual from 1 st Jan' 21 to 31 st Dec21'	Projection for the period Jan' 22-Mar'22
	FY 2019-20	FY 2020-21			
Total Copper Sales (MT)	18408	32997	MoU not yet finalized	26451	8000

Mine Expansion Schemes

7.53 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.

7.54 The Company has plans to increase its mining capacity from current level of around 4.0 million tons per annum to 12.2 million tons per annum in phase –I (under implementation) and from 12.2 million tons per annum to 20.2 million tons per annum in phase-II through expansion of existing mines, re-opening of closed mines and opening of new mines. During financial year 2020-21, HCL has achieved an ore production of 3.27 million tonnes.

7.55 In spite of the COVID-19 pandemic HCL carried out surface exploration drilling in FY 2021-22 to the tune of 10776 meters (From January 2021 till December, 2021). Apart from this, Geophysical Exploration is being carried out at Kolihan Mining Leases. A new tender for surface exploration drilling at Kendadih Mining Lease is in approval stage.

7.56 Details of depth exploratory drilling in different mines of HCL for financial year 2021-22 is as under:

Sr. No.	Mining Area	Exploration in FY 2021-22 (In meter)
1.	Ghatsila	10776
2.	Khetri	Geophysical Exploration
	Total	10776 and Geophysical Exploration

Above exploration work was funded by HCL through its own resources.

7.57 R&D ACTIVITIES:

Due to Covid-19 pandemic situation there was no significant R&D projects, however following activities were carried out in FY 2021-22.

- i. Tear detector/ belt rupture switch installed in Crushing unit conveyors resulting in stoppage of belt tearing at MCP.
- ii. MCP unit has procured and installed "Surpac" software for design and planning of MCP underground mining project. Training of MCP personnel for ore body modelling and preparation of plans and sections for underground project is under progress by using this software.
- iii. Khetri Copper Complex (KCC) has adopted Geophysical Exploration techniques as new technology in

Exploration. The Geophysical Exploration work is being carried out at Kolihan Mine Lease of KCC. The technology involves use of high precision gravity meters, magnetometers, the Time Domain Electromagnetic survey tools etc. The outcome of this new technology work, will enable KCC to :-

- Plan its exploratory drilling requirement for the Kolihan Mine Lease more judiciously due to availability of strong technical indicators for location wise evidence of mineralization in depth.
- Giving pre-drilling indication in hand about possible presence of mineralization in depth, eventually helping in planning the mine expansion activities.

The work has been awarded to M/s Mineral Exploration Corporation Ltd and is likely to be completed by FY 2022-23.

- iv. Proposal for modification of mining method from track mining to trackless mining by introduction of higher capacity diesel trackless equipment at Khetri block of Khetri Mine has been initiated by unit. This will increase the production capacity to 3.6 lakh tones/year from present 1.0 lakh tones/year ore production at 0 mRL of Khetri block. Technical vetting of the proposal has been done by M/s IIT-Kharagpur and final report has been received in this regard.
- v. Procurement of screen panel of lower size i.e. 25mm × 20mm to increase throughput and grind quality in concentrator plant at KCC is under process.

7.58 Energy Conservation:

- i. High wattage conventional lights replacement by low power consuming LED lights are in progress across HCL since last 7 years. Further, Procurement of conventional lighting fixtures have been stopped across HCL.
- ii. Refurbishment of DG Cooling tower & DG exhaust chimney done at MCP. This provides better cooling of engine along with increase in DG efficiency
- iii. Procurement of energy efficient air conditioners (30 nos.) is under process to phase out high energy consuming older air conditioners at KCC.
- iv. All new procurements of ventilation fan and compressors are compulsorily with drives, to maximize energy efficiency at KCC.
- v. Replacement of Motor Generator set (MG set) for 1600 KW Service Shaft Man winder at KCC Mines with static drives will enable power savings of approximately Rs. 1 Crore per year. Tendering action has been initiated for the project.
- vi. "IE3 energy efficient motors" has been made the standard specification, for motor procurement, across all applications in the units of HCL.

7.59 Harvesting Renewable Energy:

- i. Proposal for Installation of 4500 KWp Ground based solar plant at MCP & 800 KWp Ground based solar plant at KCC has been initiated under RESCO model.
- ii. The project for design, supply and

installation of solar power plant of various capacities under RESCO model of MNRE has been carried out till date across HCL with the help of M/s REIL. Out of total 856.5 KWp solar plant implementation in HCL till date 795 KWp carried out under RESCO model and remaining under CAPEX mode.

7.60 Environment

- i. Safety zone plantation around Mining Lease boundary (Approx. area 0.5 hectare) through Madhya Pradesh Rajya Van Vikash Nigam Limited is done at MCP. Work is expected to be complete by March 2022.
- ii. Safety zone plantation was done with chain-link fencing of 1530 nos saplings belonging to plant species namely, Mango, Babul, Jamun, Karanj, Kahwa, Peltaform, Gulmohar and Kesia Samia at Malanjkhanda Copper Project.
- iii. Plantation of around 910 saplings have been completed during April'2021 to December'2021 in Khetri Copper Complex including mines, plant and township areas. A new contract is in pipeline for plantation of another 450 numbers of saplings.
- iv. Setup of environmental display board is under progress at MCP and it is expected to be completed by 5th Feb 2022.
- v. Installation of Continuous Ambient Air Quality Monitoring Station is under process at MCP and it is expected to be completed by March 2022.
- vi. As per Engineers India Limited (EIL) recommendation, heightening of tailing dam retaining wall is under progress to accommodate copper ore tailings.



Photo 7.8: Safety Zone plantation at MCP



Photo 7.9 Heightening work of tailing dam retaining wall at MCP



Photo 7.10 Improvement in lubricating oil storage facility at MCP

- vii. In addition to use of Oil Skimmers for separation of oil from contaminated waste water, to minimize oil spillage on the ground proper storage of Oil in go-down is made and oil is collected for reuse. In this way, we are able to reduce spillage and seepage of oil in the ground and its impact on the environment and thereby complying with EMS-14001 & OHSAS-18001 standards.
- viii. Khetri Copper Complex (KCC), in District Jhunjhnu, Rajasthan is located in a predominantly dusty and arid zone, with scarce vegetation and acute water shortage. KCC has adopted aggressive afforestation and water harvesting initiatives, to mitigate the adverse effects of surface soil loss and depletion of ground water.
- ix. Rain water during monsoons is coursed into the abandoned pit of Chandmari Open Cast Mine of KCC for storage and use during the dry months. This reduces our dependence on ground water resources to some extent.
- x. KCC has signed MoU with Central Water Commission (CWC) and Central Soil and Mineral Research Station (CSMRS) in Oct 2021 for consultancy and design to raise height of existing tailing dam by 7 meters. Consultancy Report expected by May 2022 and tentative completion of work by March 2023. The tailing dam will have an approx. additional volume of 98 lakh cubic m. after increase of its height by 7 m., which is equivalent to approximately 12.5 years of additional life of the tailing dam.
- xi. Online Emission Monitoring system for Stacks and Effluent monitoring system for 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.
- xii. 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 and environmentally sound manner as per the guidelines prescribed by the Pollution Control Boards.

7.61 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:

➤ Enterprise Resource Planning (ERP) implementation

Maintaining ERP (Oracle eBiz Suite R12.1.3) implementation has enabled HCL to adopt a centralized business management platform based on which the entire company has been thoroughly unified, increased real-time visibility of critical business parameters, thereby strengthening financial management & spares control, supply chain management, customer service and HR functions. Audited financial results have been finalized within scheduled planned time.

➤ On-Line Performance Management System

On-Line Performance Management system implemented full-fledged to record the KPA,

KPA Approval, ACR Marking up to Two level and final Scoring as per APAR up to the level of E-7.

➤ **E-Procurement/EPS**

Procurement of Stores & Spares items above ₹ 2.0 lakh continues to be done through Enterprise Procurement System (EPS), conducted by third party namely National Informatics center (NIC). E-reverse auction for procurement of high value item is in place.

➤ **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.

➤ **On-line Recruitment**

On-line recruitment module developed and is in operation at HCL. It is well-integrated with payment gateway to accept the online forms for recruitment. Through the module HCL can operate multiple online recruitment processes in parallel.

➤ **VIDEO Conferencing**

Video Conferencing implemented throughout HCL, to reduce the TA & DA bills against executive tours. Also, Executives facilitated to interact with external agencies from their place.

➤ **Bill Tracking and Payment Status for Vendors**

On-line Bill tracking and Payment status system implemented through our website for vendors to track their bills and payment released against their bills as on date against various contracts.

7.62 Sustainable Development

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 2021-22:

- i. Covering top soil & plantation at the waste rock dump.
- ii. Significant progress has been done towards implementation of roof top solar plant across the organization. Total 856.50 KWp solar plant implementation completed till date under RESCO & CAPEX model and further proposal is under finalization for Installation of additional 4500 KWp Ground mounted solar plant at MCP and 800 KWp Ground mounted solar plant at KCC under RESCO model.
- iii. Water conservation by recycling of mine water and adoption of water harvesting system across the Units.
- iv. Waste management initiatives including waste reduction.
 - I. The sale process of over-burden waste rock at MCP which has been accumulated during the course of open cast mining in last 40 years has been started after taking due approval from Govt. of Madhya Pradesh. This will be used as substitute of aggregate and hence will reduce the pollution load of the project.
 - II. New underground (u/g) mine at MCP which is under development below the existing open cast mines will have special features like

backfilling of voids by using copper ore tailings (Known as paste fill technology). The basic engineering report of the plant is completed and HCL is in the stage of floating tender for finalization of contractor for carrying out erection and commissioning works. The backfilling operation of u/g void will avoid the surface disposal of copper ore tailings reducing thereby the pollution load due to solid waste generated by the project.

- III. Electronic waste, Spent Oil and Hazardous waste are disposed through parties authorized by Pollution Control Board.
- IV. At MCP Reuse of worn out Bucket teeth of Excavators by rebuilding with suitable electrodes- new procurement could be stopped.
- V. At MCP, worn out track pads of Dozers used as protecting liners of dump bodies.

7.63 MoU Ratings Achieved by HCL

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	Very Good
2019-2020	Poor
2020-2021	Very Good

Reserves & Resources

7.64 India has very 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 tonnes with about 12.16 million tonnes of copper metal. Of these 207.77 million tonnes (13.74%) fall under Reserve category containing 2.73 million tonnes of copper metal and the balance 1303.73 million tonnes (86.25%) are 'Remaining Resources' containing 9.42 million tonnes of copper metal.

7.65 Rajasthan is credited with 813.33 million tonnes ore (53.81%) containing 4.48 million tonnes of copper metal, Jharkhand 295.39 million tonnes ore (19.54%), containing 3.28 million tonnes of copper metal, Madhya Pradesh 283.43 million tonnes ore (18.75%), containing 3.42 million tonnes copper, 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 around 0.31% only. According to United States Geological Survey (USGS), total global copper reserves amount to 870 million tonnes (Mt) of copper (The World Copper Factbook 2021). Globally, Chile has the largest reserves of copper accounting for about 23% of the total world reserves followed by Australia 10%, Peru 10%, Russia 7%, Mexico & USA 6% each, Indonesia and China 3%, Zambia 2% each and other countries 25% (Indian Minerals Yearbook 2019).

7.66 The mean undiscovered totals for porphyry and sediment-hosted deposits are 3,100 million tons and 400 million tons

respectively, resulting in a global total of 3,500 million tons of copper. With identified copper resources currently estimated at 2,100 million tons, total copper resources (undiscovered + identified) are estimated at 5,600 million tons (Source: The World Copper Factbook 2021). HCL hold around two-fifths of the copper ore reserves in India. HCL as on 1.4.2021 has reserves (proved & probable) of 166.98 million tonnes ore (average grade 1.32%) and total reserve and resources of 623.91 million tonnes ore (average grade 0.99 %) spread over seven mining leases.

7.67 Price of Copper

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.

The year wise average LME price per tonne of copper is as indicated below:

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	5859
2020-2021	6879
2021-2022 (Upto Dec'21)	9593

7.68 HCL is the only Company having captive mines, whereas private producers have to depend on import of copper concentrate to operate their smelter & refining plants and their profitability is dependent on the international variation in Treatment Charges and Refining Charges but they offset the risk of LME copper price volatility through hedging.

Copper Industry In India

7.69 Copper finds widespread use in a wide range of application in all major sectors namely, construction, electric & electronic products, industrial machinery & equipment, transportation equipment & consumer and general products.

7.70 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.

7.71 Currently, three major players dominate the Indian copper industry. Hindustan Copper Limited (HCL) in Public Sector (Annual Refining Capacity: 0.68 lakh tonnes), M/s Hindalco Industries Ltd. (Annual Refining Capacity: 5.00 lakh tonnes) and M/s Vedanta in private sector (Annual Refining Capacity: 4.60 lakh tonnes), having current total installed refined copper capacity in the country is 10.28 lakh tonnes. It is reported that M/s Kutch copper limited promoted by M/s Adani Group has planned to install a port based custom smelter plant near Mundra port, Gujarat. Current year production is given below.

Commodity	Number of Factories	Installed Capacity (tonnes per annum)	Production during FY 2020-21	Production during the period (Jan'21 to Nov'21)
Cathode Production				
a) HCL	3	68,500	Nil	476
b) Sterlite Industries Ltd.	1	4,60,000	1,01,435	1,15,414
c) Hindalco Ind. Ltd. (Unit: Birla Copper)	1	5,00,000	2,62,203	3,26,539
Total >>>	5	10,28,500	3,63,638	4,42,429

#Source: Monthly Summary on Non – Ferrous minerals & Metals, Ministry of Mines

Refined Copper Consumption

7.72 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, Atmanirbhar Bharat Abhiyan and Make in India spells good news for copper industries. The per capita copper consumption in India is expected to increase from the current level of 0.6 Kg to 1 kg in coming years. The average per capita copper consumption in the world is 3.2 kg.

7.73 Copper is essential to EV technology and its supporting infrastructure, and the increase in the electric vehicles in the market will have a substantial impact on copper demand. If India's per capita copper consumption moves towards the per capita copper consumption levels in the rest of the world, India's copper market has the potential for significant growth.

7.74 ICSG reported that World copper mine production after three years is expected to increase by about 2.1% during the CY (Calendar Year)-2021 and 3.9% in CY 2022.

Despite the ramp up of new capacity, Global mine production in 2021 is being restricted by a slower than expected recovery. After increasing by 2% in CY 2020, world refined copper production is expected to rise by about 1.7% in CY 2021 and 3.9% in CY 2022.



Photo 7.11 Shri Arun Kumar Shukla, CMD, receiving the Five Star Rating Award from Shri Pralhad Joshi, Hon'ble Minister of Parliamentary Affairs, Coal & Mines in New Delhi on 23.11.2021.

7.75 The global demand for copper continues to grow, world refined usage has more than tripled in the last 50 years, thanks to expanding sectors such as electrical and electronic products, building construction, industrial machinery and equipment, transportation equipment, and consumer and general products.

7.76 Demand of copper is increasing due to progress of implementation of electric vehicle worldwide with associated charging infrastructure, decarbonization policy push by US and EU and more and more emphasis on green energy to mitigate climate change. The antimicrobial properties of copper are finding newer application in view of global pandemic situation. Copper being the green metal has been considered as a core driver for moving the global economy toward net zero emissions. Copper has been termed as new oil.

Mineral Exploration Corporation Limited (MECL)

Introduction:

7.77 MECL, carved out of the Geological Survey of India (GSI) in 1972; is a Miniratna I CPSE under the aegis of Ministry of Mines. With an impeccable credential of over 49 years, as a notified exploration agency MECL undertakes detailed exploration of mineral acreages on behalf of state governments / directorate of geology & mines and also for major mining companies. MECL currently operates pan India with a portfolio of all the major minerals offering integrated mineral exploration services including preparation of Geological Reports and consultancies to Central Govt, State Govts and CPSEs etc.

7.78 MECL has been undertaking detailed exploration of Energy Minerals, Base Metals, Ferrous and Non-ferrous, precious minerals, Fertilizer and industrial Minerals including several other poly-metallic deposits etc. MECL has state-of-the-art facilities under one roof in areas like;

- All ground exploration facilities including diamond core drilling up to a depth of 1500 m,

- Advance software for interpretative geological & 3D ore body modelling and all exploration related activities,
- Surface geophysical equipment
- Borehole geophysical logging facilities
- Environmental & remote sensing studies
- Advance chemical laboratory for both energy and non-energy minerals

7.79 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.

7.80 MECL on behalf of DMGs / DGMs of State Government prepares mineral exploration proposal for submission to National Mineral Exploration Trust (NMET), the funding mechanism created under MMDRA Act, 2015. MECL also undertakes detailed mineral exploration activities for various major mining companies such as NALCO, HCL, MOIL, SCCL, SAIL, HGML and other CPSEs and State Government PSUs through MoU for a concerted effort towards exploration.

7.81 With respect to exploration of Coal and Lignite, MECL is engaged in regional exploration of Coal & Lignite on behalf of Ministry of Coal. MECL undertakes the detailed exploration of Coal blocks through a long-standing MoU with CMPDIL / Ministry of Coal. With respect to Lignite, MECL has signed a MoU with Neyveli Lignite Corporation of India Ltd. (NLCIL) for carrying out regional and detailed exploration activities for Lignite in the state of Tamil Nadu and Rajasthan. For the year 2021-22, CMPDIL awarded around 1.70 lakh metres of exploratory drilling for Coal exploration.

7.82 So far MECL has added 189 billion tonnes of mineral resources to National Mineral Inventory up to December '2021.

7.83 The authorised share capital and paid-up equity of the company are Rs.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. The pan India operation involving exploration of minerals at remote location are controlled & monitored from Nagpur. The details of other establishments are; Ultramodern Geochemical Laboratory at Utility Centre, Nagpur.

1. Advance geophysical unit for downhole and surface geophysical survey Unit at Utility Centre, Nagpur

2. Regional Maintenance Centre for in-house facility for repairing and maintenance of conventional and hydrostatic drill rig at Nagpur & Ranchi.

3. Central Manufacturing Centre for manufacturing of drilling accessories at Utility Centre, Nagpur

7.84 The pan India operation involving exploration of minerals at remote location through field project unit are controlled & monitored from Nagpur.

Physico-Financial Performance 2019-20, 2020-21 and 2021-22 (Anticipated)

7.85 The physical performance in for 2019-20, 2020-21 and 2021-22 (up to December 2021) is given in **Table-7.14** and the financial performance is given in **Table-7.15**.

Table – 7.14
Physical Performance of MECL

Particulars	2021-22 (Upto Dec'21)	2020-21	2019-20
Mineral Acreages Auctioned	6	-	-
Geological Reports of NMET	9	18	16
Completed Projects (G4, G3 and G2)	23	35	37
Borehole Geophysical Logging (lakh metres)	1.25	4.05	3.84
Geophysical Investigations Gravity & Magnetic Survey (sq.km)	410.54	528	150
Resistivity, IP & SP survey (line km)	81.17	54.45	218
Chemical Analysis (lakh samples)	0.59	1.30	1.18
Exploratory Drilling (Lakh metres)	1.55	6.39	6.39

Table No. 7.15
Financial Performance of MECL

(Rs. in crore)

Details	2019-20	2020-21	2021-22		
	Actual	Actual	MoU Target (Proposed)	Achievement (Up to December, 2021)	Anticipated Up to March'2022 (2021-22)
Total Revenue #	447.03	449.26	215.00	137.06	199.57
Operating Cost*	238.99	237.06	162.58	128.01	169.73
Depreciation Write-off (DRE)	9.42	11.13	12.00	8.60	11.60
Net profit After Taxes	146.13	149.79	29.32	0.20	13.52

Including other income

*Excluding Depreciation and DRE

Dividend Paid

7.86 MECL has paid a dividend of Rs. 44.83 crore to Government of India for the year 2020-21.

MoU Performance

7.87 MoU rating of MECL during last 3 years is given in **Table 7.16**.

Table 7.16

Year	Composite Score	Rating
2018-19	61.31	Good
2019-20	95.99	Excellent
2020-21	88.24*	Very Good*

*Anticipated

Status of Ongoing projects

7.88 As on 31st December, 2021, 18 numbers of exploration projects are in progress in 8 states across India, including exploratory drilling in 12 nos. of projects enumerated as under:

State	Mineral	Projects	Remark	Client
Chhattisgarh	Coal	3	Exploratory Drilling	CMPDIL
Madhya Pradesh	Coal	1	Exploratory Drilling	CMPDIL
Rajasthan	Potash	1	Exploratory Drilling	NMET
	Potash	1	Geological Sampling	NMET
	Lignite	1	Exploratory Drilling	NLC
	Copper	1	Geophysical Survey	HCL
	Copper	2	Geological Sampling	NMET
Jharkhand	Coal	1	Exploratory Drilling	CMPDIL
	Copper	1	Exploratory Drilling	NMET
	Copper	1	Exploratory Drilling	HCL
Odisha	Graphite & Manganese	1	Exploratory Drilling	NMET
Tamil Nadu	Lignite	2	Exploratory Drilling	NMET
Karnataka	Copper	1	G-4 stage	NMET
Telangan	Molybdenum	1	Geophysical Survey	TSMDC

MECL Achievements during 2021-22

7.89 MECL during the FY 2020-21 witnessed a superlative performance and we have been able to set a new benchmark for ourselves surpassing all the previous records of last 49 years. With below 1000 human resources comprising of 300 executives including 100+ Geoscientists.

7.90 MECL celebrated its 50th foundation Day on 21st October, 2021 as Golden Jubilee Celebration.

7.91 During the year 2021-22 (Till Dec-21), MECL has submitted 23 nos. of Geological Reports of different minerals commodities e.g. Coal, Lignite, Copper, Limestone, Iron ore, Manganese, Magnesite, Graphite etc. and added 4,218 million tonnes of resources to National Mineral Inventory out of which 9 Geological Reports have been submitted to NMET.

7.92 Completed exploration of fertilizer mineral – Phosphorite in Lalitpur, Uttar Pradesh and Copper Blocks in Giridih, Jharkhand, Manganese in Balangir, Odisha as well as Magnesite in Rajasthan. Exploratory drilling completed for Potash in Lakhasar, Rajasthan.

7.93 MECL has signed MoUs with

- I. Odisha Mineral Exploration Corporation Limited (OMECL), Bhubaneshwar for carrying out detailed exploration and allied works in the state of Odisha.
- II. Department of Mines & Geology (DMG), Rajasthan and Rajasthan State Mines and Minerals Limited (RSMML) for taking up feasibility study for solution mining of potash and pilot plant construction in Rajasthan.

- III. Central Mine Planning and Design Institute (CMPDIL), Ranchi for detailed Energy & other minerals to be offered by CMPDIL in various states.
- IV. Directorate of Mines & Geology (DGM), Goa to expedite assessment of mineral resources and take-up exploration of mineral acreage for carrying out mineral block for its auction.
- V. Directorate of Geology and Mining (DGM), Madhya Pradesh and Madhya Pradesh State Mining Corporation Limited (MPSMCL) for carrying out exploration and allied works for Mineral Acreages in the state of Madhya Pradesh.
- VI. Directorate of Geology & Mining (DMG), Assam for exploration of coal and other minerals in the state.

Modernization & Diversification

7.94 Under strategic diversification program, to increase sustainability and profitability MECL has taken steps on advent of Technological Innovations and adoption of advanced software and equipment. A Digital Core Scanner System has been acquired, which is a reliable system for capturing of exploratory drill core images at very high resolutions providing a unique 360° processing capability.

7.95 MECL is diversifying its activities in both areas viz. business level and corporate level diversification. Few major interventions are as detailed below;

Providing Consultancy:

- I. Engaged as a Program Manager for carrying out various activities at BGML including appointment of Consultant for its techno-commercial feasibility

studies and future action plan of BGML. A comprehensive report on valuation and monetization of assets of BGML has been completed.

- II. MECL has been engaged by Government of Rajasthan as a Program Manager to carry out feasibility study for solution mining of the Potash.
- III. Technical support to State Governments to study the feasibility of mineral block for its auction purpose. MECL has deputed nodal officers for various states and posted its geological officials in the state of Madhya Pradesh, Jharkhand, Rajasthan, Karnataka and Goa.

Enhancement of capacity:

- I. **Ultra-Modern Chemical Lab:** Enhanced utilisation of the ultra-modern chemical laboratory facilities by providing geochemical analysis services as a referee agency to various State Governments, CPSEs and other agencies.
- II. **Rig maintenance and Central Manufacturing Centre:** Developed in-house facility for repairing & maintenance of hydrostatic drill rig and converted Central Manufacturing Centre from cost centre into profit centre. MECL has received its first supply order of NQ

induction hardened drill rod from M/S CMPDIL valuing Rs. 65.32 Lakh. Few more supply orders are in pipeline from state Government and DGMs.

Perspective on mineral Exploration through NMET

7.96 During the year 2021-22 exploration for various minerals has been carried out by MECL in 20 blocks on behalf of National Mineral Exploration Trust (NMET). Out of these, Geological Report of 9 blocks has been submitted and work is in progress in remaining 11 blocks. A total of 35.15 million tonnes of mineral resources has been added to National Mineral Inventory.

Environmental & Remote Sensing Studies

7.97 Baseline Environmental Studies has been carried out in three blocks and final report has been submitted:

- I. Baraganda Copper Block, District: Giridih, Jharkhand,
- II. Sonrai Phosphorite Block, Tori-Pisnari Area, Tehsil- Mehrauni, District: Lalitpur, Uttar Pradesh
- III. Selu Magnesite Block, District: Udaipur, Rajasthan

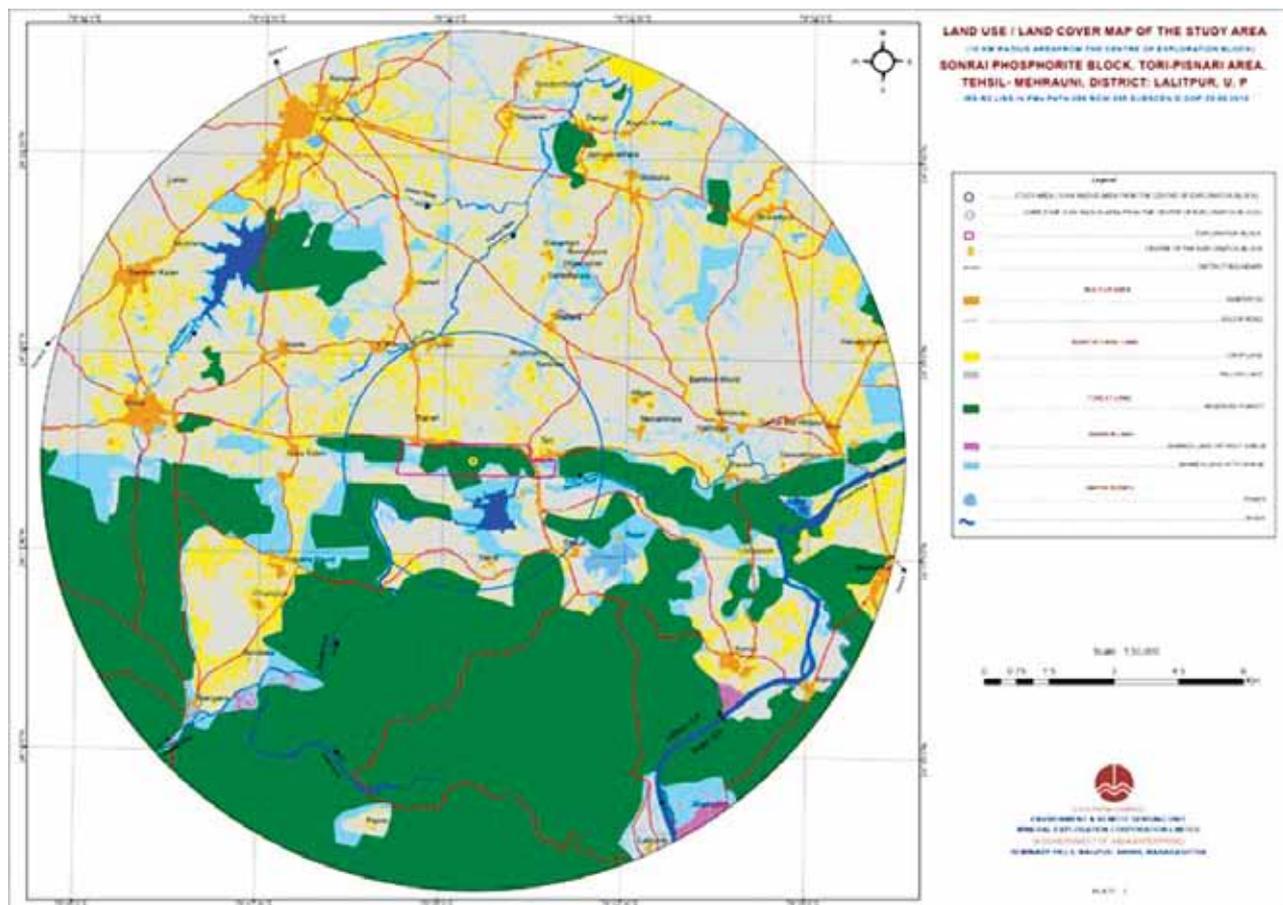


Photo 7.12 Land Use Land Cover Map Of The (10 Km Radius Area) from The Center of Exploration Block) Sonrai Phosphorite Block, Tori-Pisnari Area, Tehsil- Mehrauni, District: Lalitpur, Uttar Pradesh

Action Taken on Abatement of Pollution and Environment:

7.98 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 per the guidelines of MoEFCC, 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. These reports are annexed with all the Geological Reports and submitted to State

Govt. along with Geological Reports. This data is used for Environmental Impact Assessment (EIA) studies during and/or after mining to plan measures for abating possible pollution and Environmental Impact Assessment (EIA).

7.99 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.

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

Research & Development Activities

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

- I. With objective of advancement in drilling production and productivity, various drilling fluid technology has been implemented in order to increase penetration rate and core recovery while drilling in potash. MECL is upgrading its drilling fluid technology by generating and analyzing the drill fluid consumption data for various minerals exploration work i.e. Coal, Lignite, Potash and Base metals to increase the drilling efficacy and productivity.
- II. MECL has recently procured one digital drill core scanner. It provides reliable system for high resolution scanning of drill cores for mineral assemblage study and assessment. Foreseen to provide important docket for digital core library and application of Machine Learning and Artificial Intelligence for mineral exploration.

- III. MECL has also procured 10 No. of Handheld XRF analyser. It is very useful to directly make on-site geochemical analysis of mine face, drill core or prepared samples. On-site real time analysis will boost productivity by reducing turnaround times for results from days to seconds comparing to laboratory analysis.

Information Technology (IT)

7.101 MECL being a service and consultancy organization has a well-equipped Information Technology Centre to support the access, analyse and process the enormous amount of technical data.

7.102 Data processing for 23 Nos. of exploration blocks has been carried out during FY 2021-22 (up to December, 21). Out of these 23 GRs, 9 GRs. were submitted to NEMT, 5 were submitted to other CPSEs and 9 GRs were submitted to CMPDIL. Further data processing and interpretation work is continued to support the timely submission of GRs.

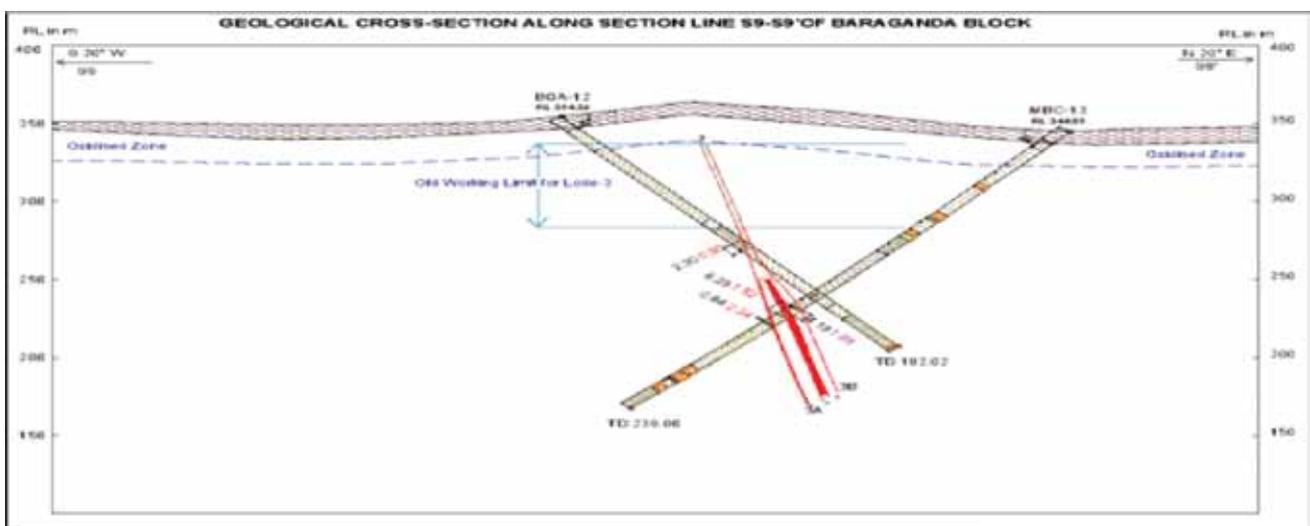


Photo 7.13 Geological Cross Section Along Section Lines S9-S9' of Baraganda Block, Dist. Giridih, Jharkhand

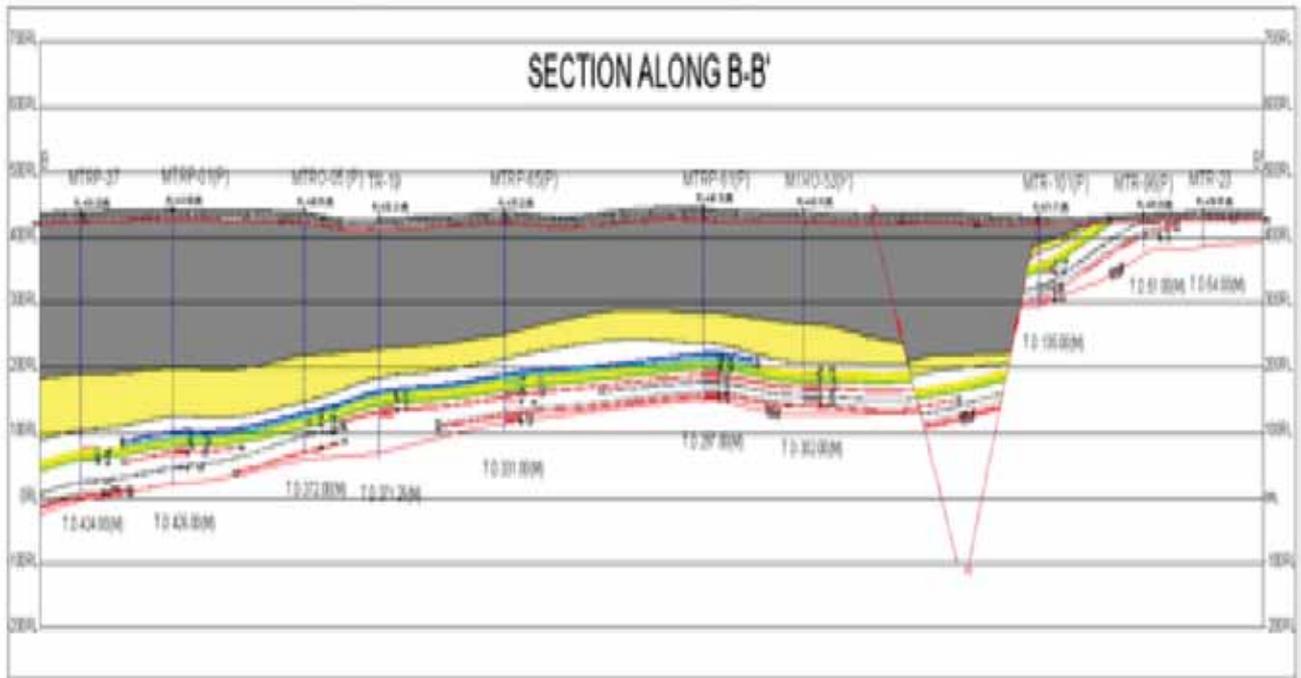


Photo 7.14 Geological Cross Sections Along Section Line B-B' Tatapani-II Block, Tatapani Ramkola Coalfield, District Balrampur, Chhattisgarh

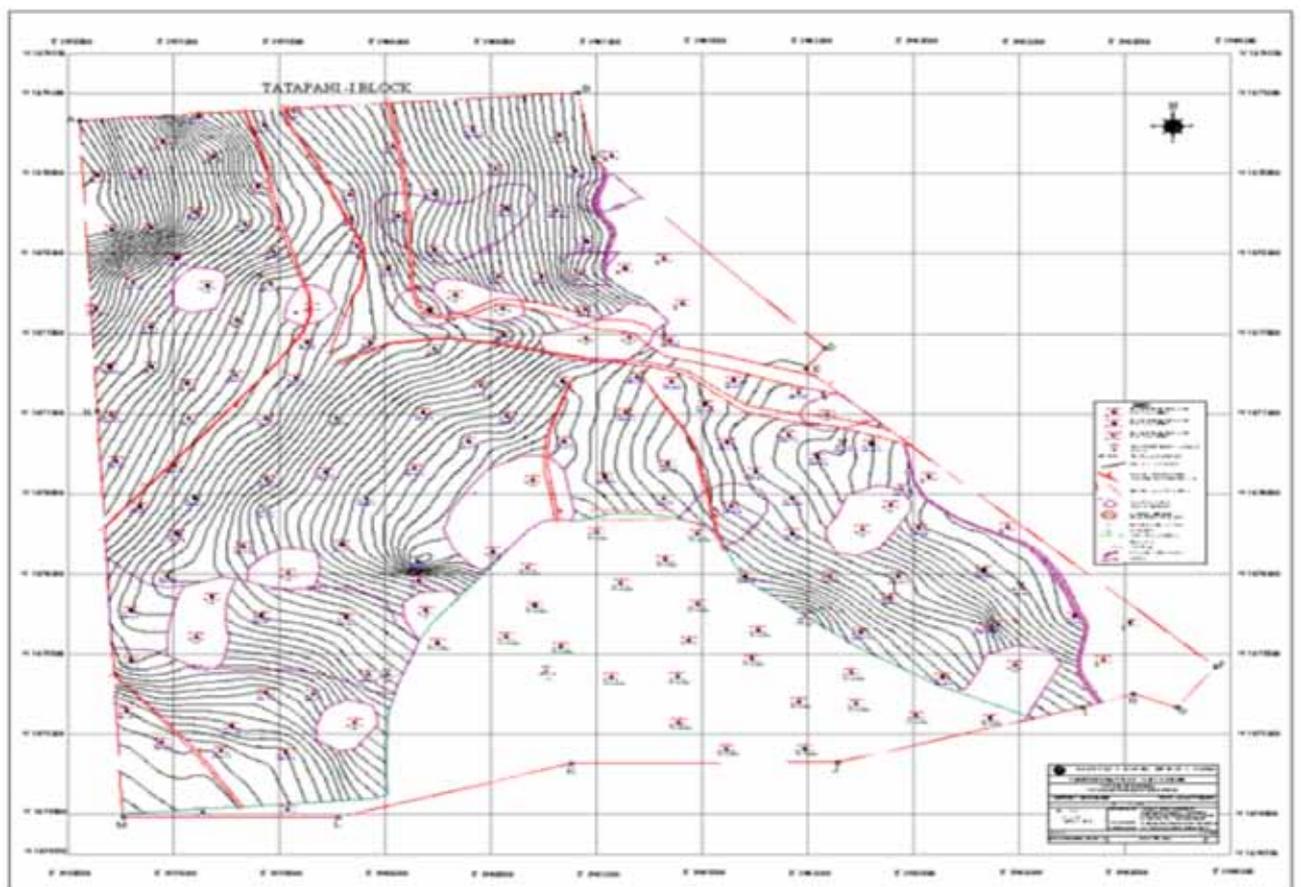


Photo 7.15 Floor Contour Plan : IV-B + IV-Comb, Tatapani-II Block, Tatapani Ramkola Coalfield

SAP ERP - "Khanij Sanjeevani" Implementation in MECL:

7.103 ERP (Enterprise Resource Planning) solution of SAP is fully implemented in MECL to enable the automation of workflows and makes processes streamlined. To facilitate the access to the ERP solution and ensure business continuity, a latest state of the Data Centre for hosting the ERP solution has been installed, connected all offices and project sites and provided the necessary client side hardware to all the users of the ERP solution with the following business benefits objectives.

- I. Enhancing Customer focus in terms of timely completion of drilling/exploration activities, accuracy in billing and reconciliation
- II. Improving the Efficiency of operations – efficient usage of machines, tools and accessories
- III. Proactively Ensuring Transparency/ compliance to all the stake holder requirements and government regulations.

MECL has conceptualized a plan for implementing a Business continuity process for the ERP solution. Installation and commissioning of Disaster Recovery (DR) system is in progress.

Virtual Meeting Solutions

7.104 With the rapidly evolving workplace and considering the restriction during COVID-19 pandemic, most of the meetings are now days are being organized in virtual mode. In MECL the virtual meeting solution are implemented effectively. Most of the review meetings with all Central Ministry, State Govt., all Government Agencies, PSU's and clients are being organized through VC.

7.105 Provided information to Ministry of Mines, regarding IT related queries on Networking Security, Website security, Quarterly submission of IT-Security Report, CERT-In Guidelines, Cyber Security and Crisis Management Plan, Roadmap of IPV6, etc

Technical Support for Geological Modelling and Resource Estimation

7.106 The exploration/ geological software's like GDM, MINEX, and SURPAC were upgraded during the year to facilitate the resource estimation and ore body modelling work. The DATAMINE Software, was upgraded by taking up its AMC and is being used for carrying out 3D Geological Model for non-stratified deposits. Training was provided to officials of Exploration and IT for the new software's purchased like, BrisCAD, and GeoTools. New Antivirus Server Licenses and standalone Licenses were procured for CHQ and other offices in Nagpur.

Web Application

7.107 Several in-house customized software was developed to improve data processing and interpretation thereof.

7.108 Security Audit from CERT-In empanelled vendor is in progress for in-house developed software's like, File Tracking Software, CLIP Software and employee portal called "MECL Connect" Software. This software's will be later hosted on NIC Cloud server. "MECL Connect" is online HRMS activity of MECL and is accessible to all employees from MECL Website. It has been upgraded and made bilingual.

7.109 The in-house developed browser-based package "MyPlot" has been upgraded. Upgradation in all in-house developed packages

is carried out timely as per requirement. Currently this Myplot package is used for Coal GR processing and Management.

7.110 Upgraded the Graphic Correlation Plate generation program wherein plotted

seams gets correlated based on correlated seam 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.

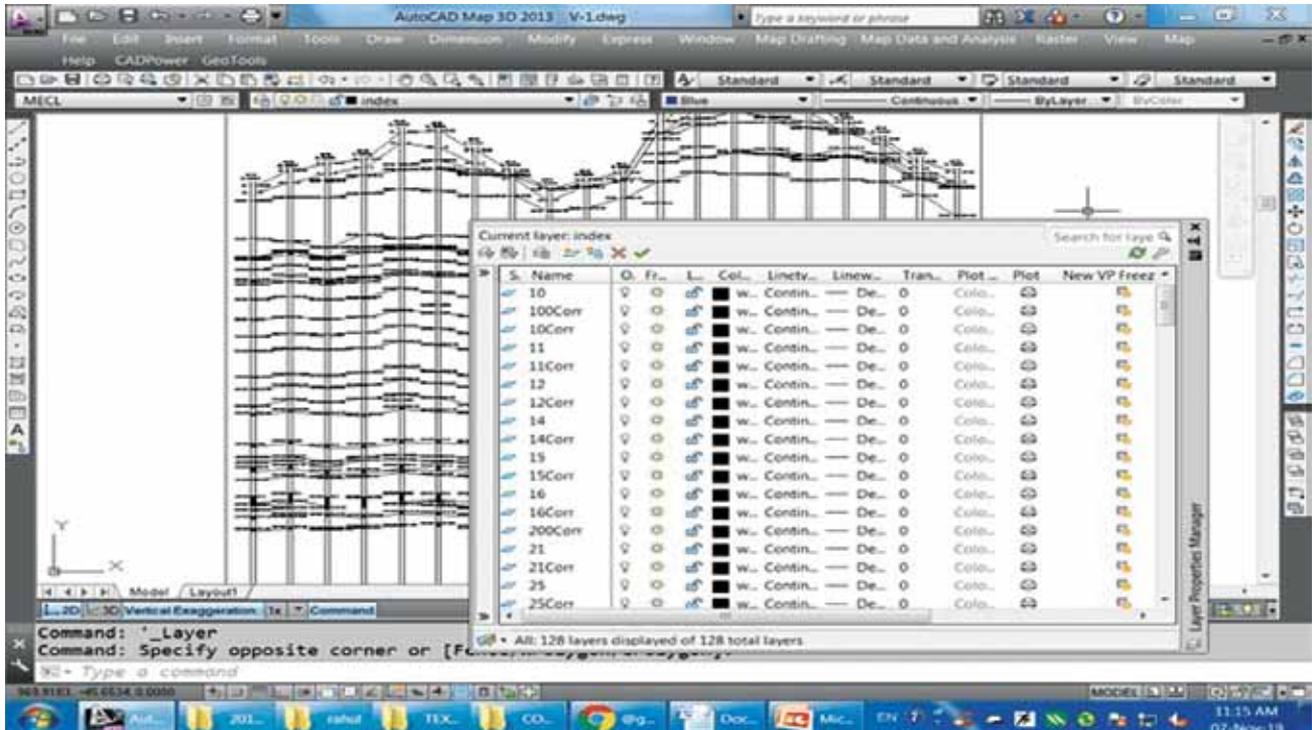


Photo 7.16 Correlation Chart with Layer Control

7.111 Developed In-house File Tracking System to track the official files routed through various divisions. This application is integrated with MECL-Connect. Software for QR-Code Asset management is under development.

7.112 Migrated old resource calculation package into Oracle & currently resource calculation is being carried out in Oracle only. New macro is developed for Recruitment Cell, HR Division for faster processing of applications.

7.113 A customised software for "Vigilance Clearance System" is successfully developed and integrated with MECL-Connect.

Business Development Activity

7.114 Through Business Development & Commercial Division, rigorous efforts are being continued to generate/obtain more works from both private and public sectors through competitive Techno-commercial offers and MoU route as well as bilateral negotiations. As a result, during the financial year 2021-22, the total value of order book stood provisionally at Rs. 296.38 Cr upto 31.12.2021. This includes contractual work of various clients such as CMPDI, RSMML, HCL, MOIL, NMDC, Adani etc. and NMET funded work and promotional coal exploration work on behalf of Ministry of Coal (MOC).

During the year MECL has participated in various exhibitions/events related to Exploration and Mining. MECL also organised various activities under “Azadi Ka Amrit Mahotsav” such as Blood donation camps etc.



Photo 7.17 MECL stall was awarded “Best Stall” in Destination Himachal Pradesh 2021

Manufacturing Unit

7.115 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 2021-22 (up to December 2021) a total of 5087 items were manufactured, which include 19 TC bits and 5068 other drill accessories. The inhouse manufacturing of above accessories has resulted in timely supply of item required for drilling operations well in time. There by reducing the idle hours of drill rigs. This adds to MECL’s cost optimization and enhanced operational profit. During this financial year rigorous efforts were taken to convert the CMS from cost Centre to Profit Centre. MECL has received its first supply order of NQ induction

hardened drill rod from M/S CMPDIL valuing Rs. 65.32 Lakh. Few more supply orders are in pipeline from state Government and DGMs.

7.116 Efforts were made to reach out to all prospective clients viz. Government, PSU and private sector for securing business for the company for sustainable growth. The efforts are ongoing and perpetual. The new diversified areas are given below:

- Provided services as Program Manager for valuation of assets of BGML and appointed as Program manager for RSMML for feasibility study of solution mining of Potash deposits of Rajasthan state through engagement of consultants.
- Efforts are in progress to supply drilling accessories manufactured in-house by CMC, Nagpur to external agencies across India in support of “Make in India” and “Atmanirbhar Bharat” mission of Govt. of India.
- Deployment of officers of MECL to state DMG’s/DGM’s for providing technical support for Mineral Auctioning Regime.
- MECL was appointed as “Referee laboratory” by CIMFR and QCI for analysis of Referee Coal samples for various power companies.
- MECL has acquired Digital Core Scanner System, which is a reliable system for capturing of exploratory drill core images at very high resolutions providing a unique 360° processing capability. MECL is approaching state Govts & Mining companies for providing its services which will be beneficial for creating digital core library and sustainable mining in future.

Participation in exhibitions/events related to Exploration and Mining:

- Alluring Rajasthan 2021: at Udaipur from 04.08.2021 to 06.08.2021
- Destination Himachal Pradesh 2021: at Solan from 25.09.2021 to 02.10.2021
- Shining Uttar Pradesh 2021: at Varanasi from 16.10.2021 to 24.10.2021
- Ujjwal Uttar Pradesh 2021: at Gorakhpur from 24.12.2021 to 26.12.2021



Photo 7.17 MECL stall was awarded "Best Stall" in Destination Himachal Pradesh 2021

Organising various activities under "Azadi Ka Amrit Mahotsav":

- Poetry Competition: at CHQ premises on 29.06.2021.
- Display of Posters, Banners and Standees: in MECL offices at strategic locations on 01.07.2021.
- Organized Covid-19 vaccination Camp on the occasion of Birth Anniversary of Hon'ble Prime Minister
- Slogan Competition: at CHQ premises on 06.07.2021.
- Tree plantation: carried out in CHQ premises on 09.07.2021.
- Essay Competition: at CHQ premises on 13.07.2021.

- Organizing webinar on "Modern Mineral Exploration Practices" on 16.07.2021.
- Poster Competition: at CHQ premises on 20.07.2021.
- Organizing Blood Donation Camp on 09.08.2021.
- Organizing Health Camp from 09.11.2021 to 10.11.2021.
- Celebrating Swachhta Pakhwada from 16.11.2021 to 30.11.2021.
- MECL foundation day celebration on 21.10.2021.
- Organizing training on "Sexual Harassment of Woman (Prevention, Prohibition and Redressal)" on 09.12.2021.



MECL officials donating blood in **Blood donation camp** organised on 09.08.2021

- Sponsoring RTMNU Nagpur Department of Geology on their Platinum Jubilee from 20.12.2021 to 25.12.2021.



D, MECL planting tree in **Tree Plantation Program** organised on 09.07.2021

Manufacturing Unit

7.117 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 2021-22 (up to December 2021) a total of 5087 items were manufactured, which include 19 TC bits and 5068 other drill accessories. The inhouse manufacturing of above accessories has resulted in timely supply of item required for drilling operations well in time. There by reducing the idle hours of drill rigs. This adds to MECL's cost optimization and enhanced operational profit. During this financial year rigorous efforts were taken to convert the CMS from cost Centre to Profit Centre. MECL has received its first supply order of NQ induction hardened drill rod from M/S CMPDIL valuing Rs. 65.32 Lakh. Few more supply orders are in pipeline from state Government and DGMs.

Energy Conservation

7.118 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 significantly with respect to productivity. The company has also set up POL Norms for all types of drilling machineries and is 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.

Bharat Gold Mines Limited (BGML): -

7.119 Bharat Gold Mines Limited (BGML) has been closed since 1st March, 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.

7.120 Meanwhile, MM (DR) Act was amended during 2015 and many changes had taken place. As per the amended Act lease which was acquired through auction can only be transferred, hence the Cabinet decision of 2006 could not be implemented; it was decided to explore the possibilities of revival of BGML after Techno-Economic Feasibility Study (TEFS). A Monitoring Committee was constituted for supervising all the work regarding suggesting a way forward for BGML by doing legal review, asset Valuation, TEFS, Techno-Economic Feasibility Report (TEFR) etc.

7.121 Accordingly, Mineral Exploration Corporation Limited (MECL) was given the tasks of exploration of dumps and & two unmined blocks in KGF, MECL submitted its report in 2018. During the year of 2020-21

the work of exploring Bettraswamy block of BGML was assigned to MECL. This Ministry had also assigned "Non-Ferrous Technology Development Center (NFTDC) for study of extraction of gold from tailing dumps of BGML. The Techno Economic Feasibility Study Report (TEFR) for tailing dumps of BGML and The geological report of MECL were received and given to Management Consultant hired for reviewing the legal status, undertake valuation of the assets and financial due diligence for recommending possible alternatives for BGML. The Management Consultant has submitted its report. Accordingly, Ministry of Mines is exploring future course and other viable options in respect of BGML.

7.122 There has been a long pending issue of Record of Rights, Tenancy and Crops (RTC) and Mutation of the 12109 acres and 28 Guntas of BGML land in Kolar Gold Fields. So far, BGML has received RTC and Mutation over an area of 8029.91 acres. Besides, around 1882.34 acres of land is in process for mutation/RTC in favour of BGML.

7.123 Alongside, Ministry is considering for transfer of 49 acres and 28 "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**



Science, Technology and Autonomous Bodies

- Science & Technology Programme R&D component Page - 135
- Jawaharlal Nehru Aluminium Research Development & Design Centre Page - 136
- National Institute of Rock Mechanics Page - 139
- National Mineral Exploration Trust (NMET) Page - 141

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 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, which 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. Ministry of Mines has launched SATYABHAMA (Science and Technology Yojana for Aatmanirbhar Bharat in Mining Advancement) Portal for Science and Technology Programme Scheme of Ministry of Mines. The SATYABHAMA Portal can be accessed at <https://research.mines.gov.in/>.

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 2021-22, 20 project proposals have been recommended by PERC for approval of SSAG. Those projects which are considered as relevant to the identified priorities will be approved by SSAG for grant-in-aid by the Ministry under S&T programme. The details are available at <https://research.mines.gov.in/>. The funds released under the scheme including IEC component (as on 31.12.2021) amounts to Rs.312.05 lakh.

Information Education and Communication (IEC) Component

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. During 2021, a grant of Rs. 5 lakhs was given to Jawaharlal Nehru Aluminium Research Development & Design Centre (JNARDDC), Nagpur for organizing 25th International Conference on Non-Ferrous Metals– 2021 (ICNFM – 2021) 03-04 Sept 2021, New Delhi.

8.6 The detailed guidelines are available at <https://research.mines.gov.in/>.

“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-the-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 two autonomous bodies functioning under Ministry of Mines i.e. (i) Jawaharlal Nehru Aluminium Research Development & Design Centre (JNARDDC), Nagpur, and(ii) National Institute of Rock Mechanics (NIRM), Bengaluru. During the financial year 2021-22 (till 31.12.2020), grant to the tune of Rs. 350 lakhs has been released to JNARDDC and Rs. 250 lakhs has been released to NIRM 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 two autonomous institutions under Ministry of Mines is given in Table 8.1 and Table 8.2 respectively.

Table 8.1
Grants for Creation of Capital Assets

Institute	Amount (Rs.in crore)
JNARDDC	3.50
NIRM	2.50

Table 8.2
Grant-in-aid-Salaries (upto 31.12.2021)

Institute	Amount (Rs.in crore)
JNARDDC	5.54
NIRM	5.23

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 an ISO/IEC-17025:2017 NABL accredited lab and 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 kind in 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 three projects in the field of aluminium and 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: -

- **NITI Aayog -**
 - o REE (Rare earth element) extraction from red Mud and coal fly ash
 - o Strategy paper on Resource efficiency in aluminium sector
- **Bureau of Energy Efficiency (BEE), Ministry of Power –**
 - o Sector expert for “National Mission for Enhanced Energy Efficiency” - PAT 2/3 cycle
<https://beeindia.gov.in/content/nmee-1> and <https://beeindia.gov.in/sites/default/files/Aluminium.pdf>
- **Bureau of Indian Standards (BIS) for standards-**
 - o Guidelines for Al-scrap

- o Standard for aluminium alloys

- **MoM (Ministry of Mines) –**

- o Techno-economic study of aluminium scrap
- o Resource efficiency in aluminium sector
- o IMC for import substitutes in Al-industry
- o AIMS (Aluminium import monitoring system)
- o Carry out the ground work for giving effect to National Non-Ferrous Metal Scrap Recycling Framework, 2020

8.15 JNARDDC has diversified its activities by entering the area of coal characterization. The Coal Characterization and Research Laboratory (CCRL) was set up in record time and inaugurated by Additional Secretary (Mines). JNARDDC has been nominated as a referee lab for coal characterization and is delivering high quality time bound results to CIMFR.



8.16 JNARDDC conducted the following seminars / webinars.

- National Extruders Meet on 30th April 2021; www.jnarddc.gov.in/Extruders_Meet.aspx



- 25th International symposium Non-ferrous Minerals & Metals (ICNFMM-2021), New Delhi (3-4 Sept 2021); www.nonferrousmeet.net/gallery.php



- Bauxite Miner’s Meet (BMM-2021)- Virtual Organized on 29th Sept 2021; www.jnarddc.gov.in/Programs_and_Events.aspx



8.17 Patent

One patent was granted vide Patent no. 378743 dated 06.10.2021 (Inventor – Dr Md Najar PA, JNARDDC and NALCO team) for “Determination of calcium in alumina hydrate, calcined alumina and process liquor”. This is in-situ instantaneous determination of calcium (impurity) in hydrate, alumina and liquor. It is being successfully utilized by NALCO in their refinery.



8.18 Finances

The Centre is likely to surpass the Internal revenue generation target of Rs. 2.50 crore

in 2021-22. A revenue budgetary grant of Rs. 7.40 crore for salary component and Rs. 3.50 crore for creation of capital assets was allocated by Ministry of Mines in 2021-22 for the Centre.

National Institute of Rock Mechanics

8.19 National Institute of Rock Mechanics (NIRM) carries out various investigations in the area of rock engineering and rock mechanics. The high-quality services provided by NIRM have found wide acceptance in the industry. With modern equipment and a coherent team of experienced and dedicated Scientists, NIRM combines research activities and consulting services to provide solutions for a wide range of rock engineering problems. 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. Over 40% of the revenue budget of the Institute is earned as Internal and Extra Budgetary Resources (IEBR) from industry sponsored projects

8.20 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 involves 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 is available at its website www.nirm.in.

- As a part of commemoration of 75 years of Indian Independence, (Aazadi ka Amrut Mahotsav) NIRM had been organising a series of Technical lectures since 12-March-2021. So far 28 lectures have been completed with average participation of 70-80 scientists/academicians/industrialists during each lecture which has stimulated deep technical discussions among the participants.
- NIRM has made significant contributions to the development of safe and economic practices for coal, metal and opencast mines under difficult geomining conditions. Significant projects have been oriented to reduce the risk and hazard by modifying/monitoring the mining methods and adopting best safety practices, while enhancing/sustaining the rate of production.
- NIRM is extending the expertise by providing consultancy services to the power sector in solving the site specific problem related with the wide spectrum of rock engineering and rock mechanics and carried out crucial investigations for the design and development.
- NIRM is exclusively involved in solving various critical and complicated issues encountered in the hydroelectric project PHEP II, which is being implemented jointly by the Royal Government of Bhutan and the Government of India.

As a part of human resource development and human resource augmentation, NIRM has been organising workshops and training

programs for the industry and deputing its employees to various training programs and international/national conferences.

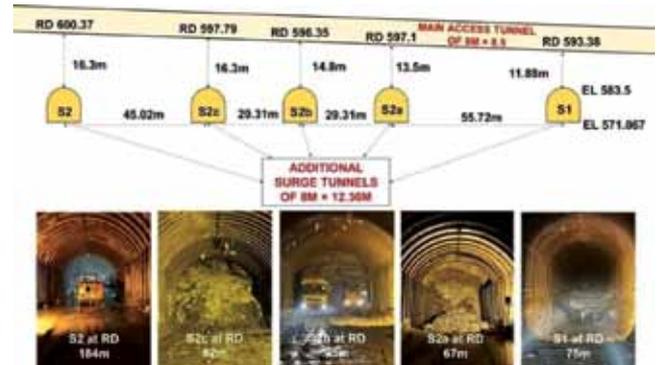


Photo 8.1: Different tunnel faces during the progress of excavation - Puntsangchhu II Hydroelectric Project, Bhutan.

8.21 During the current reporting period, many innovative techniques were used to solve the industry problems. Some of the important contributions are below:

- Detailed numerical modelling studies were carried out to optimize crown and rib pillars at Central and North Baroi mine (HZL, Rajasthan) with and without cemented rock fill and stand-off distances for footwall drives, ramps and other large excavations from stope boundary was reviewed. Various cases were simulated and the optimized stoping configuration along with the safest stope sequence.
- NIRM is providing blast design for extracting armour rock for constructing Varsha Inner Harbour Project.
- For the design of the dam and its auxiliary components of the proposed Lower Kopili HEP, Assam in-situ deformability and shear parameters of rock mass are being carried out.

8.22 Some of the major ongoing projects that were executed by the Institute during Jan - Dec 2021 include:

1. Engineering geological investigations of cut slopes for intake pool, upstream and downstream hillock above pressure tunnels and powerhouse area and tailrace pool of Indira Sagar Polavaram Hydro Electric Project;
2. Cross-hole Seismic Tomography at bridge locations in Bhanupali-Bilaspur-Beri Rail Link Project
3. Geophysical investigation to study the rock mass condition around the sinkholes and abandoned coal working in the Umariya District, MP;
4. Determination of in-situ stress parameters for the design of stopes at Mochia-Balaria and Baroi- Zawarmala mines;
5. Assessment of pit slope stability and evaluation of monitoring data & analysis of Redi Iron Ore Mine, Sindhudurg Dist., Maharashtra;
6. Determination of in-situ stress tensor for the design of stopes below -338 mRL, to -850 mRL, at Rampur Agucha mines, Rajasthan;
7. Deformation monitoring of U/G powerhouse cavern of Sardar Sarovar project, Gujarat;
8. 3D numerical modelling of Powerhouse Complex & Surge Tank for Vishnugad Pipalkoti HEP;
9. Optimisation of blast design for Mangampet Dolomite mine AP;
10. Cap Rock Stability at Central Baroi Mine, HZL vis-a-vis Depillaring of Remnant Pillars - A Critical Appraisal;
11. Blast Design for Graded Material to Construct Break Water for Vizhinjam, Thiruvananthapuram, HOWE Engineering Projects (India) Pvt Ltd.;
12. Ground vibration and air overpressure studies at Zuari limestone mine, Zuari Cement Limited, Yerraguntla, Kadapa Dist., Andhra Pradesh;
13. Monitoring of Blast induced vibrations at two identified locations (Phase-III) Darlipalli Super Thermal Power Project, Odisha;
14. Seismotectonic Evaluation of the Proposed Nuclear Power Plant within 50 Km of Radius, Jaitapur, Maharashtra;
15. QA support for the On-going Geological/ Geotechnical investigations at Mahi Banswara Rajasthan Atomic power project.

8.23 From 1st Jan 2021 to 31st Jan 2021, NIRM completed 52 projects worth 16.18 crores and secured 51 new sponsored projects worth 18.23 crores. With this, NIRM has at present 72 ongoing industry-sponsored projects.

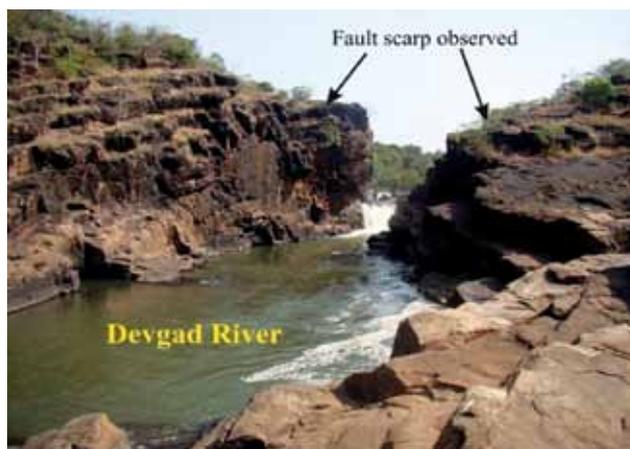


Photo 8.2: The fault scarp and associated water fall observed in the Devgad River Maharashtra

National Mineral Exploration Trust (NMET)

8.24 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 Mines and Minerals (Development & Regulation) Amendment Act, 2015 with the objective to expedite 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 shall pay to the Trust, a sum equivalent to 2 percent of the royalty paid in terms of the Second Schedule of the Act to the State Government, simultaneously with payments of royalty.

8.25 The total NMET fund accrued as on 31st December, 2021 is ₹ 3306.82 Cr. and total expenditure of NMET till 31st December 2021 is ₹ 377.90 Cr., out of which ₹ 58.13 Cr. has been incurred during the year 2021-22 (till 31st December, 2021).

8.26 NMET has two-tier structure. The overall control, periodical reviews and policy directions of the Trust vest with the Governing Body (GB) and the Executive Committee (EC) is managing, administering and supervising the day-to-day activities of the Trust. The GB is chaired by Hon'ble Minister of Mines and the EC is chaired by the Secretary, Ministry of Mines. Besides, a Technical-cum-Cost Committee (TCC) has also been constituted to evaluate the technical as well as cost parameters of the project proposals submitted by Notified Exploration Agencies (NEAs) for NMET funding. The TCC recommends the suitable proposals to EC for approval.

8.27 During the year, a total of 12 meetings of TCC, 05 meeting of EC and 1 meeting of GB were held. A total of 23 projects including 17 no. of mineral exploration projects, 05 no. base line geosciences projects and 01 NGDR were approved by the EC with estimated cost of ₹ 823.69 Cr. After inception of NMET, a total of 204 projects have been approved by EC for NMET funding, out of which 185 projects are for mineral exploration, 18 projects for baseline

geosciences data generation and one of National Geoscience Data Repository (NGDR). Out of 185 exploration projects carried out by Notified Exploration Agencies (NEAs), 116 projects have been completed so far. Among these, 5 Blocks (2 Limestone Blocks, one each of Madhya Pradesh and Chhattisgarh and 3 Iron Blocks of Odisha) have been auctioned.

8.28 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 areas of Obvious Geological Potential (OGP) followed by coverage of whole country by engaging Project Implementing Agencies (PIA) with an objective to (1) Acquire high resolution baseline aero-geophysical data, (2) Identify new target areas for mineral prognostication, (3) Understanding subsurface geological and structural set up. The OGP area has been divided into Blocks-1 to 12 and Block-13-22 for acquisition of baseline geosciences data.

8.29 Under NAGMP, the survey and data acquisition work of OGP Blocks-1, 2, 3, 4 and 11 have been completed. The final reports and all deliverables data for OGP Blocks 1, 2, 3, 4 and 11 have been reviewed and submitted to NMET Secretariat. Based on integration of these aero-geophysical data with archived geophysical, geological and known mineralization data, a total of 110 potential blocks have been identified for follow up action. The Survey work and data acquisition over OGP Blocks-6, 8, 9, 10 and 12 are in progress. The objective of aero-geophysical survey is to cover the whole OGP areas at a short time span and to quickly identify areas to be taken up for more detailed airborne surveys with the ultimate aim of prognostication of high mineral potential areas. This will serve as an important tool for

enhancing exploration work for mineral sector and also make available the aero-geophysical data for various stake holders through the National Data Repository to provide aid to exploration activities.

8.30 For regional exploration projects in obvious geological potential areas, specialized surveys projects of Heliborne Surveys [Heliborne magnetic and Time Domain Electromagnetic (TDEM) surveys], Deep Seismic Reflection Survey (DSRS) & Magneto Telluric (MT) Survey have been approved to acquire baseline geosciences data. The Heliborne survey projects will collect detailed ground and/or Magnetic Gradiometry/ Heliborne Electromagnetic (TDEM) surveys for precisely delineating concealed mineral potential targets over OGP blocks.

8.31 National Geoscience Data Repository (NGDR) project has been approved by EC and Geological Survey of India (GSI) has been declared as nodal agency for implementation of the project. The National Geoscience Data Repository (NGDR) creation project was conceptualized by the Ministry of Mines (MoM) as part of the National Mineral Exploration Policy (NMEP), 2016. The vision of the project is to conceptualize a comprehensive, multi-purpose program in order to make available all geological, geochemical, geophysical and mineral exploration data in the public domain on a digital geospatial platform. This will include baseline geo-science data and collate all mineral exploration information generated by various central and state government agencies and mineral concession holders and maintain these on a single point of truth (SPOT). The geospatial database will be made available to the interested stakeholders through an appropriate mechanism. Thus, the NGDR will function as a single window system for on-demand mineral exploration

and baseline geosciences data repository over an interoperable platform. The greater goal of this initiative is to increase the investment attractiveness of the mining sector in India.

8.32 The National Geophysical Mapping Program (NGPM) was initiated in 2002-03 by GSI, which is systematically generating gravity and magnetic data in a station density (one station/2.5 sq.km) to cover the entire country with preference to Obvious Geological Province (OGP) areas. The OGP area was taken on priority with a view to identify potential zones for mineral occurrences. This will pave way to target concealed/ deep seated deposits to augment mineral resources. The mapping will lead to the preparation of 1mGal gravity and 50nT magnetic anomaly contour maps of the country. One NGPM project has been approved by EC to carry out gravity and magnetic survey over priority areas.

8.33 National Mineral Exploration Trust, as a part of its Outreach Program, is organizing a series of workshops, on 'Enhancing Exploration through NMET', to assist and empower states in harnessing the mineral potential of the states utilizing NMET fund. The workshops are being organized in collaboration with GSI and MECL. A total of four workshops were held during the year. The first workshop was organized for Gujarat and Rajasthan at Jaipur on 18th January 2021. The second workshop was organized for Uttar Pradesh, Uttarakhand, Himachal Pradesh, UT Jammu & Kashmir and UT Ladakh at Lucknow on 22nd January, 2021. The third workshop was organized for Madhya Pradesh, Chhattisgarh and Maharashtra at Bhopal on 2nd March, 2021. The forth workshop was organized for Bihar, Jharkhand, West Bengal and Odisha at Bhubaneswar on 16th September, 2021.

To incentivise States for auction of mineral blocks, the following provisions have been

made for the State Governments; (i) a sum of ₹ 20 lakh will be released to each state where mineral blocks are available for auction for FY 2021-22, (ii) ₹ 20 lakh incentive for each successful auction of mineral block, (iii) 50% of amount paid to Transaction Advisor, subject to a maximum of ₹ 5 lakh for each block which was put up for auction but could not be successfully auctioned. Initially an amount of ₹ 1.70 crore has been paid in this regard to five states (Andhra Pradesh, Chhattisgarh, Gujarat, Madhya Pradesh Odisha) where 17 mineral blocks have been auctioned. Further payment will be released after receiving the updated information regarding auction of mineral blocks.

Further, for faster implementation of NMET approved projects, release of funds to DMGs/DGMs of State Governments, Central PSEs and State PSEs has been initiated and fund will be released in three instalments viz, 1st instalment of 40% of the approved project cost along with sanction order, 2nd instalment of 40% and 3rd and final instalment.

National Non-ferrous Metal Scrap Recycling Framework, 2020

8.34 India is one of the fastest growing economies in the world. Strong domestic demand coupled with several reforms that the government has undertaken are on track to maintain the economic growth momentum going forward. As non-ferrous metals find widespread applications across the economy, the current policy measures provide a tremendous opportunity for the development of the Indian non-ferrous metals industry in the future.

8.35 One of the key challenges faced by the non-ferrous metals industry is its heavy dependence on import of metal scrap. A major

share of metal scrap demand is served by imports owing to the underdeveloped metal scrap collection, segregation and processing infrastructure in the domestic market. The material recycling rates in India are well below global standards and is mostly conducted in the informal sector. Thus, strengthening material recycling, including metal recycling, under the formal sector can provide a good opportunity to cut down scrap imports.

8.36 At the core of an effective material recycling eco system is a systematic, organized and user-friendly collection, segregation and sorting process. Strengthening this value chain by segregating waste at source through appropriate policy interventions would earn rich dividends.

8.37 In this context, Ministry of Mines has published the National Non-Ferrous Metal Scrap Recycling Framework, 2020 in January, 2021 to promote a formal and well-organized recycling ecosystem by adopting energy efficient processes for recycling leading to lower carbon footprints and to work towards sustainable development and intergenerational equity. Major objectives of the framework include: to minimize the effect of end-of-life products on landfills and environmental pollution by promoting an environmentally sound processing and recycling system for secondary industry; to work towards economic wealth creation, job creation and increased contribution to GDP through metal recycling; to shift towards a circular economy in the coming years for base metals, critical raw materials and other essential materials, etc. The framework can be accessed at:

<https://mines.gov.in/writereaddata/UploadFile/NFMScrapRecyclingFramework3.pdf>.

9

Corporate Social Responsibility





Corporate Social Responsibility

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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 2021-22, CSR expenditure of the company amounts to Rs. 2465.08 lakhs till end December'2021 against mandated amount of Rs. 2860.00 lakhs.

9.2 Highlights on CSR activities for the financial year 2021-22 are furnished below:

i) Health Care:

(a) Initiative on COVID-19 Management:

- The Company has set up a 200 bedded exclusive COVID-19 hospital with 10 bedded ICU with 24-hour diagnostic facility at Nabrangapur, Odisha in collaboration with Govt. of Odisha. This hospital is catering to the need of tribal dominated district of Nabarangpur and other adjoining districts of southern Odisha, viz Rayagada, Koraput, Malkangiri and Kalahandi. Till December'2021 more than one thousand patients have been availed the treatment facility.
- NALCO in convergence with Government of Odisha funded for 150 bedded District Covid Hospital

at ESI Hospital premises, Banarpal in Angul district of Odisha.

- Financial support for infrastructure development for 70 bedded Covid Hospital at Saheed Laxman Nayak Medical College & Hospital at Koraput (an aspirational district), Odisha.
- Apart from the above, two 50 bedded COVID Care Centres were set up at S&P complex, Angul and M & R Complex, Damanjodi to facilitate treatment to the people of nearby villages of operational area during this difficult time. Similarly, 20 bedded COVID-19 Care Centre was set up at Corporate Office, Bhubaneswar.
- Vaccination camps are ongoing in the operational districts of Angul and Koraput (7 villages of Angul and 29 Villages of Koraput) targeting to administer 50000 doses of COVID-19 vaccines.
- Supported the State Administration with DG sets at the oxygen filling stations with a financial implication of Rs 31 Lakh.
- Rapid Antigen Test (RAT) kits are supported to the District Administration, Angul and test were organised.
- Supply of medical oxygen cylinder to District Administration, Visakhapatnam.
- Supply of medical oxygen plant in the state of Karnataka.
- Financial support for digital X-Ray machine to BMC Hospital, Bhubaneswar.

(b) Other Health Care initiatives:

Financial support for a 600 bedded Night Shelter at AIIMS, Bhubaneswar to facilitate short stay for outdoor patients & attendants of Indoor patients at AIIMS, Bhubaneswar for people of Odisha & nearby states.

(c) Primary Health Care service at door step:

During FY 2020-21 till 31st December '21, more than 50 thousand patients of peripheral villages of Angul, Damanjodi & Pottangi area have given medical consultancies through mobile health units & 1 OPD.

ii) Education:

9.3 Quality education have been provided to more than 5000 students of nearby villages of operational area in company aided School at Angul & Damanjodi.

(a) Indradhanush: Under residential education program, till the academic year 2021-22, 1003 tribal students from Maoist dominated periphery villages of Koraput district sponsored in 3 reputed residential schools i.e. Kalinga Institute of Social Sciences (KISS), Bhubaneswar, Bikash Vidyalaya and Adarsha Vidyalaya, Koraput in Odisha. During the current Academic year, 485 students have been continuing their education in above three residential schools. COVID-19 has affected the enrolment of students in the current academic year. Students are supported for the online education looking at the need of the time.

Apart from this, 42 students are continuing intermediate in different

discipline & ITI after completing their School education.

(b) NALCO-ki-Ladli: Till date, financial support has been extended to 734 meritorious girl students of BPL category under 'Beti Bachao Beti Padhao' programme, initiated by Government of India.

(c) Doubt Clearing Classes and support to Students in Lockdown Period:

Doubt clearing classes were conducted in the pandemic period by interacting with students and their parents. Also Officers and employees of the company contributed their skill, knowledge and time after their duty period in clearing doubts of students and encouraging them in studies.

(d) Encouragement to Meritorious Students:

Twenty-three meritorious students from company funded residential Schools were felicitated on their successful results in HSC Exams.

(e) Community led transformation of High Schools in Ganjam district:

To promote and make quality education accessible to all Company made the contribution of Rs 2.00 crores towards strengthening the educational ecosystem. Towards this, infrastructure creation like building classrooms, hostels, toilets, setting up labs, libraries, providing electronic equipment, internet, furniture, clean drinking water, boundary walls, wheelchair ramps sports infrastructure and coaching support etc. are being developed under the project.

(f) Financial Assistance to SEBAGHAR:

The organisation has been supported for undertaking repair & maintenance of

Creche-cum School & Sewing Training Centre for slum children.

iii) **Safe Drinking Water & Sanitation:**

(a) **Drinking water Supply:**

Besides, uninterrupted pipe water supply projects were taken up for 12 periphery villages of S&P Complex, Angul.

(b) **ODF Village:**

Construction of individual household latrines in 5 villages of S&P Complex, Angul has been taken up to make those villages Open Defecation Free (ODF)

iv) **Rural infrastructure building:**

Construction of roads, culverts, drains, renovation and revamping of community centres and water bodies in the periphery areas has been taken up by the Company.

v) **Promotion of Livelihood Program:**

50 Self Help Group (SHG) were encouraged for strengthening & initiating new livelihood activities in Pottangi periphery areas of M&R Complex. Keeping aim to develop employability and generation of livelihood .SHGs were facilitated to mobilize resources to initiate livelihood activities. In the recent times, growing number of SHGs have been facilitated to avail loan from bank and Odisha Livelihood Mission (OLM) to initiate livelihood activities like, ginger, cabbage, carrot, millet cultivation, mushroom, fish and poultry farming. For setting up of ginger processing unit, a ginger cleaning machine has been mobilized resulting in enhanced productivity and income for SHGs. The renovation of pond has been made in Kasuguda village of M&R complex to enable pisci-culture.

Besides above, a wide number of SHG meetings were conducted for strengthening &

initiating of new livelihood activities in Pottangi periphery. Seven SHGs have started jackfruit chips making and generating additional income by selling them. More than 15 SHGs have already adopted Mushroom cultivation after getting training and handholding. Two SHGs have started making vegetable pickle and broomstick. Ten number of SHGs succeeded in mobilizing Mushroom Spawn to start mushroom cultivation.

(vi) **Iconic City Projects:**

(a) **Development of Gandhi Park:**

Gandhi Park has been established in the religious city of Puri to make the city more attractive and to attract more number of visitors. The Park has an open gym, children's corner musical water fountain and pathways for jogging and other facilities. The security and safety of the visitors and park equipment is ensured by the security guards

(b) **Battery Operated Vehicles:**

Ten numbers of BOVs are being plied from Jagannath Ballav Math to Shree Jagannath Temple for the elderly, pregnant women and sick. Similarly, 2 nos. of BOVs are running each at Puri and Bhubaneswar railways station and one at Cuttack railway station for the easy communication of elderly, pregnant women and sick passengers.

9.4 Training & Development

In order to enhance the functional and behavioural competency of its employees and to align the individual need with the business objective of the organization towards increasing production and productivity as well as to improve business culture in the

organization, there has been an unstinting effort by NALCO to impart skill and behavioural training to its employees. In its commitment for corporate social accountability and good corporate governance, the company also imparts skill development training to contract workers, apprentices, students from managerial and technical institutes as well as for local populations.

As regards regular employees, the company has imparted training to 2383 employees with 4852.5 training man-days during the year 2021-22 (upto December 2021) in spite of the covid pandemic lockdown scenario existing during first & second quarter of FY 2021-22. Further, 222 executives were given virtual external training from MDI(Gurgaon), ASCI-Hyderabad, IIM-Ahmadabad, IIT- Kharagpur, C-DAC-Pune, Institute of Directors(IOD), CII, IICA, Ne-MSME, SP Jain School of Global Management, Mumbai, SCOPE, NPC, DPE, etc. on management development programme during 2021-22 during covid pandemic scenario.

There were 1051 apprentice trainees were engaged during the year 2021-22 (upto December 2021) which is 18.71% of employees (i.e. employee strength is 5616) of the company. As a part of corporate responsibility and industry academic interface, 91 students from different technical and management institutes across the country had undergone summer internship programme in various functional disciplines at corporate office during the pandemic through virtual mode.

Hindustan Copper Limited (HCL)

9.5 HCL’s CSR Policy revolves around the principles laid down in the Sustainable Development Goals (SDGs), Companies

Act, 2013, Company (Corporate Social Responsibility) Rules, 2014 and Department of Public Enterprise Guidelines on CSR.

9.6 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 Spent (2 % of average net profit (PBT) of last three FYs)	Spent
2019-20	297.26	331.01
2020-21	-*	73.69
2021-22	-*	43.37#

#As on 31.12.2021

*HCL is required to spend 2%, as average profit during last three years [FY 2018-19, 2019-20 & 2020-21] which is negative.

9.7 For FY 2021-22, an amount of Rs 106.53 Lakhs inclusive of carry forward [the unspent amount of Rs 15 Lakhs of FY 2020-21] has been allocated for CSR Projects. The allocation has been done for important ongoing projects having direct impact on communities around company’s operation. Major projects planned are as under.

- Drinking Water
- Health Camps and Nutrition
- Livelihoods
- Plantation and Sports
- Conservation of Environment
- Biennial Third Party Impact Assessment.

9.8 The projects are being implemented in the target communities with the help of State government, NGO and other agencies.

9.9 During the period (April to December 2021) - (FY 2021-22), an amount of Rs. 314.13 Lakhs have been spent under CSR towards Health & Education for improving the living condition of needy & poor people of the society of all category. The details of CSR programmes under progress are given below:

9.9.1 Promoting Healthcare

Providing medical equipment i.e., Posterior Vitrectomy -Galaxy Turbo Orbit Equipment to Mahatme Hospital, Nagpur.

Distribution of Hindustan Insecticides Limited (HIL) medicated mosquito nets to poor and needy persons at Gadchiroli district, Maharashtra.

Provisioning of Telemedicine Support System - a start-up innovation kit for measuring of Vitals remotely at Maharashtra.

9.9.2 Promoting Education

a. Implementation of better communication software at NMC, Nagpur.

9.9.3. Promoting Rural Development

Solar Water Pumps procured from Rajasthan Electronics & Instruments Limited (REIL) is being provided to the remotest parts of the country where our projects are Functioning, such as at Korba and Raichur Districts.

9.9.4. Animal Welfare

a. Distribution of Poultry Cages - Integrated Poultry Development to Zilla Parishad, Nagpur

9.9.5. COVID-19 related CSR Activities

a. MECL has contributed an amount of Rs. 20.00 Lakhs to District Administration,

Kolar District, Government of Karnataka, Rs. 80.00 Lakhs to District Administration, Dharwad, Karnataka, Rs. 50.00 Lakhs to Collector & District Magistrate, Nagpur for Vidarbha region.

b. Oxygen Concentrators with UPS and battery has been supplied to various Hospitals at Nagpur and Vidarbha Region of Maharashtra.

c. Surgical Masks and stitched cloth masks through self-help groups has been distributed in Rural areas of Nagpur, Maharashtra.

d. Small Oxygen Cylinder sets, Jumbo Oxygen Cylinder sets with flow meters & trolley, Pulse-Oxy meters, Glucometers with additional active strips and Liposomal Ambhotericin Injections has been distributed in various Hospitals at Nagpur & Vidarbha Region of Maharashtra.

f. Oxygen Plants is being installed at various locations where our project is functioning such as Karnataka's region i.e. Gadag, Haveri, Chikballapur and Chamarajanagar District.

9.10 CSR Activities Likely to be completed during IVth quarter of FY 2021-22

a. Providing skill development training to disabled persons (Hearing & Speech Impaired) in collaboration with Centurion University of Technology & Management (CUTM), Odisha will be completed before 31.03.2022.

b. Classroom desks will be provided at schools in Dharwad District, Karnataka before 31.03.2022

- c. It is expected that another amount of Rs. 65 Lakhs will be spent till 31.03.2022 for ongoing different CSR Activities.

9.11 Other Activities

- a. Health awareness program was conducted for Women employees on 09th & 10th Nov, 2021. No. of beneficiaries 62.
- b. 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.
- c. 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 creche facility. The women employees in the Company are provided Maternity benefits as per rules.
- d. 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 16:1 in the financial year 2021-22 (data as on 31.12.2021)
- e. 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 31.12.2021.

- f. 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.
- g. Dr. Ch. Sreerama Murthy, General Manager (HR) has been nominated as the Nodal Officer w.e.f. 01.06.2014 for Citizen Charter and the same has been intimated to the Ministry along with the required details.

9.12 Public Grievances Redress Mechanism

In MECL, Public Grievances are being dealt based on the guidelines received from the Ministry of Mines from time to time. Shri Ghanshyam Sharma, Director (Finance) is nominated as the Director (Public Grievances). For further information on Public Grievances related to MECL, the same is made available at website <http://pgportal.gov.in>.

Details of Grievances	No. of Cases
Opening Balance of Grievance Cases as on 01.01.2021	00
New cases received during the period from 01.01.2021 to 31.12.2021	09
Total No. of Cases	09
Cases disposed-off during 01.01.2021 to 31.12.2021	09
PG Cases pending as on 31.12.2021	00

The monthly/quarterly reports on Public Grievances and Staff Grievances are being regularly sent to the Ministry.

10

**Progressive Use
of Hindi**



Progressive Use of Hindi

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Introduction

10.1 The Ministry of Mines continues to take steps to ensure compliance of the Official Language Policy of the Government of India in the Ministry of Mines as well as in its attached / subordinate offices and PSUs. The compliance of Section 3(3) of the Official Languages Act, 1963 is ensured. As per rule 5 of Official Languages Rules, 1976, during the year out of the 905 letters received in Hindi (up to Dec. 2021), 171 letters were for information only and reply was not required and remaining 734 letters were replied to in Hindi.

Hindi Salahkar Samiti

10.2 Hindi Salahkar Samiti is a high level committee to administer the implementation of official language policies. This committee is constituted under the chairmanship of Hon'ble Minister of Mines. Apart from the Honorable Members of Parliament, many linguists are also included in the committee. This committee oversees the official language policies of the Government and its implementation in the Ministry and the offices under its administrative control and gives due assurance to the concerned offices for necessary action. After the term of the previous Hindi Salahkar Samiti of the Ministry ended in 2019 and the formation of the new Lok Sabha, the draft resolution for the reconstitution of the committee in 2020 was sent to the Department of Official Language, Ministry of Home Affairs for approval and nomination of non-official members. Formal approval has been obtained from the Department of Official Language and the Ministry of Mines is in the process of issuing resolution for constitution of a new committee.

Official Language Implementation Committee (OLIC)

10.3 Official Language Implementation Committee (OLIC) has been constituted in the Ministry under the chairmanship of Economic Adviser. Meeting of the Official Language Implementation Committee is required to be organized every quarter in which the quarterly progress reports of the sections and attached / subordinate offices of the Ministry are reviewed and also the measures to encourage the progressive use of Official Language Hindi are discussed meaningfully. In the last meeting of Official Language Implementation Committee (OLIC) held under the chairmanship of Economic Adviser, the progress of use of Hindi in official work in various sections 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 to achieve other targets set by the Department of Official Language in the Annual Program for the year 2021-22.

10.4 Official Language Implementation Committee has been constituted under the chairmanship of the administrative heads of all the offices of GSI as per the directions of the Government of India, Ministry of Home Affairs, Department of Official Language. Organizing regular meetings every three months, necessary decisions are taken after discussion on the status of official language in the office are taken and its minutes are sent to the concerned Regional Implementation Office, Department of Official Language. During the period this meeting was held on 23.03.2021, 25.08.2021 and 23.12.2021 at Central Headquarters, Kolkata.

10.5 The meeting of the Official Language Implementation Committee is held regularly in HCL. In addition, Hindi workshop is also organized. Nomination of participants from Hindustan Copper Limited was ensured for various competitions organized by various undertakings for promotion of Official Language under the aegis of Town Official Language Implementation Committee.

Town Official Language Implementation Committee (TOLIC).

10.6 As per the instructions issued by the Department of Official Language, Ministry of Home Affairs, Town Official Language Implementation Committee (TOLIC) is constituted in every city having 10 or more central government offices. In this context the Geological Survey of India, Central Headquarters is designated as the head of the Town Official Language Implementation Committee, Kolkata and the Director General, GSI is the ex-officio Chairman of this committee. 62 offices of Kolkata are included in this committee.

10.7 Under the office memorandum issued by the Secretary, Department of Official Language, Ministry of Home Affairs, Geological Survey of India, Central Headquarters, Kolkata and Northern Region, Lucknow office has been made the Chairman of City Official Language Implementation Committee. These committees organize half yearly meetings as per the prescribed calendar, during which the implementation of official language in the member offices is reviewed. During this period half yearly meeting was organized by Central Headquarters, Kolkata on 27.10.2021.

Official Language Inspection

10.8 According to the annual program for the year 2021-22, of the Department of Official Language, Ministry of Home Affairs, the Ministry/Departments are required to conduct official language inspection of at least 25% of the offices located outside the headquarters. Official language inspection of two subordinate/attached offices of the Ministry of Mines-National Aluminum Company Limited (NALCO) and Hindustan Copper Limited (HCL) has been done by the Ministry till December 2021. During these inspections, the status of progressive use of official language Hindi in both the above offices was reviewed and suitable suggestions were given in the context of achieving the target set in the annual programmes 2021-22.

10.9 Official language inspection of subordinate offices is carried out by all the Regional Headquarters of Geological Survey of India with a view to evaluating the progress in the use of Hindi in various offices. During this period, official language inspection of 10 subordinate offices was carried out by the Geological Survey of India, Central Headquarters, Kolkata. Official language inspection of 14 offices is proposed in the month of January to March, 2022.

Inspection by Parliamentary Committee on Official Language

10.10 Parliamentary Committee on Official Language inspected NALCO Regional Office, New Delhi on 20th January 2021, Regional Controller's Office, Bureau of Mines, Gandhinagar on 21st September, 2021 and Geological Survey of India, State Unit, Sikkim, Northeast region, Gangtok office on 31st December, 2021. While appreciating the status

of correspondence in Hindi in this inspection, 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 Office.

10.11 Official language inspection of State Unit: Sikkim, Gangtok Office was done by the Hon'ble Parliamentary Committee on 31.12.2021. The committee, expressed satisfaction over the status of official language implementation in the office and appreciated our achievements.

Implementation Measures of Official Language Policy

10.12 In order to ensure the compliance and implementation of the Official Language Policy, in addition to various incentive schemes, workshops are also organized from time to time in the Ministry. In view of the convenience of working in Hindi, all the computers of the office have been made Unicode enable and commonly used administrative terminology, abbreviations, dictionary etc. have been made available bilingual on the ministry website.

Training, Workshops and Seminars

10.13 Geological Survey of India, Central Headquarters organized "All India Scientific and Technical Rajbhasha Seminar and All India Annual Rajbhasha Review Meeting and Hindi Workshop" from 16 to 18 November 2021 in Northern Region, Lucknow under the aegis of 'Azadi Ka Amrit Mahotsav'. The event was presided by the Director General, GSI. Prof. B. P. Singh, Banaras Hindu University, Prof. Santosh Kumar, Kumaon University and Prof. Sadanand Gupta, President, Hindi Sansthan, Uttar Pradesh graced the occasion. A total of

52 research papers from all the offices of GSI were presented in this seminar, out of these 06 best research papers were awarded. 04 keynotes were presented during the seminar by Professors of Banaras Hindu University, Kumaon University, Lucknow University and retired Deputy Director General of GSI. Along with this, Annual Rajbhasha Review Meeting and Hindi workshop were organized in parallel session, in which Annual Report of Hindi for the year 2020-21 of all GSI offices as well as quarterly reports of regional offices ending September 2021 were reviewed. 04 lectures were delivered during All India Hindi Workshop by professor of Nava Nalanda University and retired officers of Dept. of Official Language and GSI.

10.14 Hindi workshops are being organized regularly by the Geological Survey of India in compliance with the guidelines issued by the Government of India, Ministry of Home Affairs, Department of Official Language. The details of the workshops organized at the Geological Survey of India, Central Headquarters during the period are as follows:

- Hindi Workshop was organized by CHQ, Kolkata on 22.01.2021 and a total of 50 personnel were trained.
- All India Hindi workshop was organized by CHQ, Kolkata on 26.02.2021 and officials from various offices of GSI participated.
- Hindi Workshop was organized by CHQ, Kolkata on 20.09.2021 and a total of 34 personnel were trained.
- All India Hindi workshop was organized by CHQ, Kolkata on 17.11.2021 and officials from various offices of GSI participated.

10.15 To provide Hindi training to all personnel of GSI within the time-limit prescribed by the Department of Official Language, Ministry of Home Affairs, officials are being nominated for Prabodh, Praveen, Pragya and Parangat classes under Hindi Teaching Scheme. These classes are held twice a year i.e. January-May and July-November. In addition, 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.

Organizing Official Language Fortnight/Month

10.16 Hindi Prayog Protsahan Maah (Hindi usage promotion month) is being organized every year in the Ministry of Mines, in which various competitions are being organized with the aim of promoting Hindi as the official language. In this Hindi usage promotion month, competitions like Hindi essay, Noting/ Drafting, Hindi calligraphy and dictation, Quiz competition, Hindi typing, Ashuvak, Maximum Work in a month in Hindi are being organized and cash prizes are given to the winning contestants. In the year 2021-22 also, Rajbhasha Hindi Prayog Protsahan Maah was organized from 1st to 30th September, 2021. During this, the message of Hon'ble Mines Minister Shri Prahlad Joshi was also circulated on the occasion of Hindi Diwas to promote and encourage the use of Hindi in official work and cash prizes and certificates were awarded to 44 winners of various competitions organized during Hindi month.

10.17 Hindi day was celebrated on 14th September, 2021 in the department in which the message of Honorable Minister of Home Affairs and Minister of Mines were read.

Hindi fortnight/week was organized in various offices of Geological Survey of India during the month of September, 2021, during which competitions like Hindi essay writing, Hindi noting and drafting, Hindi poetry recitation, Hindi song singing, quiz, debate, etc. were organized. In the valedictory ceremony, the participants were honored and certificates were given. Along with this, the officers and divisions/sections having excellent contribution in the promotion of official language Hindi were also honored by awarding citation and memento on this occasion.

10.18 In year 2021-22, from 14th to 28th September, 2021 Hindi Diwas/ Week / Fortnight was organized in all the Units / offices including the corporate office of HCL. During this period, various programs were organized to promote the propagation of the official language. In HCL, Hindi Essay, Hindi noting-drafting, Translation, typing in Hindi on computer competitions were organized separately for Hindi speaking and non-Hindi speaking employees. The competition of Hindi passage dictation was also organized for non-Hindi speaking employees. All the winning participants of the competition were given prizes and certificates.

Translation work

10.19 Translation work done for the Meetings of Standing Committee, Audit Paras, Cabinet Notes, Annual Report, Parliament Questions, Outcome Budget, Materials relating to Demand for Grants, Memorandum of Understanding with various countries for International Cooperation in the field of Mines and Minerals during the year. About 2,74,581 words were translated in Hindi excluding regular translation work during the year 2021-22 (till December 2021) as against 2,45,732 words translated in 2020-21.

10.20 Gazette Notifications, Summaries, Office Orders, Circulars, Tender Notices, RTI Materials, documents to be presented in the house or houses of Parliament and other correspondence of GSI were translated from English to Hindi and vice versa as per the requirement. Thus the Implementation of Section 3(3) of Official Language Act and Official language rule 5 were ensured. In addition to that, Abstracts of reports related to various survey programs of the Geological Survey of India were also translated into Hindi.

In-House magazine

10.21 News papers/magazines are regularly published by the subordinate/attached offices of the Ministry. Out of which the Hindi In-house magazine "Bhoomanthan" of Central Headquarter Kolkata, State Unit: Odisha, Bhubaneshwar Hindi In-house Magazine "Dhauli", State Unit: Bihar, Patna In-house Magazine "Lichchavi", GSITI, Hyderabad's "Chetna", along with "Akanksha" of Southern region, Hyderabad and "Prayas" of IBM Office, Goa, the In-house magazine of NALCO, Akshar and Tamralipi of HCL are prominent. The magazines can be accessed on the website of the Ministry <https://mines.gov.in/UserView/index?mid=1684>. In addition, monthly e-news related to training institute, course material on geology for geochemist and Hindi format of course material on remote sensing and digital image processing, compilation of activities related to earth communication, institute calendar is published in official language Hindi.

10.22 Hindi Magazines are being published by most of GSI offices for the promotion of official language Hindi and to encourage Hindi writing. During this period, a total of 11 Hindi magazines were published by different

offices of GSI, namely, In-House Hindi magazine "**Bhoomanthan**" from Central Headquarters, Kolkata, edition 08; "**Dhauli**" from State Unit: Odisha, Bhubaneswar, edition 15; "**Akanksha**" from Southern Region, Hyderabad, edition 05; "**Vihang**" from Remote Sensing and Aerial Survey, Bangalore, edition 11; "**Bhauma Kairali**" from State Unit: Kerala and Lakshadweep Thiruvananthapuram, edition 01; "**Vasudha**" from State Unit: Karnataka and Goa, edition 01; "**Bhusandesh**" from Northern Region, Lucknow; "**Sahyadri**" from State Unit: Maharashtra, Pune, edition 01; "**Sabarmati**" from State Unit: Gujarat, Gandhinagar, edition 03; "**Markandeya**" from State Unit: Punjab, Haryana and Himachal Pradesh, Chandigarh, edition 2; and last but not the least "Lichchavi" from state unit: Bihar, Patna, edition 06 published. Also, **E-news** in Hindi is being published every month by GSI, Training Institute. Besides, **Geological Survey of India - Ek Amrit Gatha** (Hindi version of 'Story of GSI') book, Abstracts Volume of research papers presented in Scientific and Technical Rajbhasha Seminar 2021, **Bilingual Compendium on Vigilance Awareness and Bilingual Civil List and Consolidated Employee List of GSI** were also published by CHQ, Kolkata.

Special initiative taken by attached/ Sub-ordinate Offices and PSUs of the Ministry for promoting use of Hindi in Office Work

10.23 Implementation of Hindi Incentive Schemes in Geological Survey of India (GSI):

To promote the use of Hindi in the Official work the following Incentive schemes are being implemented in all the offices of Geological Survey of India.

- Cash award and personal pay on passing the examinations after completing Hindi language trainings like Pragya, Praveen, Hindi Typing and Hindi Stenography training under the Hindi Teaching Scheme of the Government of India, Ministry of Home Affairs.
- Cash award to the officers and employees for Hindi noting and drafting by the officers and employees.
- Officers and divisions/sections having excellent contribution in the promotion of official language Hindi are honored by giving citation and memento on the occasion of Hindi Day program.

10.24 Portal of GSI in Bilingual Form :

Necessary efforts are being made to make the Geological Survey of India's web portal bilingual as per the policy of the Government of India. A sub-folder has been provided to display the activities of Hindi related works in the department. The work is in progress.

10.25 Review of Quarterly Progressive Report (QPR) of Regions :

Hindi QPRs of all subordinate offices of Geological Survey of India were reviewed and the attention was drawn to the relevant points for taking appropriate action. The quarterly progress reports of the concerned subordinate offices were reviewed by all the Regional Offices as well. After every quarter, the Deputy Director General and Rajbhasha Adhikari review the quarterly progress report and the status of the official language through video conferencing with the officers and officials of Hindi cadre of various offices of GSI. During this period video conferencing was organized on 23.03.2021 and 15.07.2021.

10.26 Participation in All India Rajbhasha Conference and Regional Rajbhasha Conference:

Representatives of various offices of GSI participated in the All India Rajbhasha Conference organized by the Department of Official Language, Ministry of Home Affairs at Varanasi. In addition, the concerned offices participated in the Regional Rajbhasha Conference. In the Joint Regional Official Language Conference of East and Northeast Region held at Dibrugarh on 18.12.2021. During the regional conference State Unit: Sikkim, Gangtok Office was awarded the first prize of Regional Official Language Award for the year 2019-20.



10.27 Award for Original Noting and Drafting Hindi Encouragement Plan by Indian Bureau of Mines (IBM):

Under the Original Noting and Drafting Hindi Encouragement Plan, 61 persons of 14 Offices of IBM were awarded.

10.28 National Aluminium Company Limited (NALCO) :

- Progressive use of Hindi is being implemented as per provision of Official Language Act, 1963 and Official Language rules 1976.
- Hindi Fortnight 2021 was observed at Corporate Office, Production Units and Regional Offices of the company Office to encourage the use of Hindi in official work and various competitions were organised among employees and students.
- During the Hindi Day celebrations held on 14 September 2021 at corporate office, June 2021 issue of in-house Hindi magazine ' Akshar' was released.
- 5 Hindi workshops were organised to enable officers and employees for doing official work in Hindi.
- The website of the company is being regularly updated in bilingual; Hindi and English.
- Faculty assistance on Unicode and tools and techniques of Hindi computing was provided to the member offices of TOLIC, Bhubaneswar.
- A workshop was organized on 02 December 2021 as the office of the Chairman (TOLIC), Bhubaneswar. As the keynote speaker of the workshop, Sh. Nirmal Dubey, Office In-charge of Regional Implementation Office (East) Kolkata highlighted on various aspects of implementation to the participants.
- Meeting of OLIC for December 2021 quarter held under the chairmanship of CMD.

- Hindi news letter of Mines & Refinery complex 'Daman Varta' is being published.
- Half yearly meeting of TOLIC (undertaking), Bhubaneswar held on 02 December 2021 under the chairmanship of CMD.
- Half yearly meeting of TOLIC (undertaking), Angul held on 27 Nov 2021 under the chairmanship of Executive Director (S&P).

10.29 Hindustan Copper Limited (HCL)

- The progressive use of Hindi is being reviewed regularly at the Board meetings of Company.
- The Company's in-house journal "Tamralipi" is published in Hindi and English and distributed among employees regularly and also mailed to the members of the Hindi Advisory Committee.
- The recruitment advertisement is also published bilingual. "One Hindi Word Every Day" scheme is operational for improving the Hindi vocabulary of employees.
- At the time of superannuation, all the employees are given Service Certificate in Hindi.
- The Hindi translation of Annual Report, MoU, Outcome Budget, Annual Report of Ministry of Mines and various other jobs of the Company were done in year 2021-22.

10.30 Mineral Exploration Company Limited (MECL):

- As per the orders of Ministry of Home Affairs, Rajbhasha Vibhag, Unicode

Encoding “Smarthit’ font has been installed in all computers / Laptops also in MECL to facilitate the employees for working in Hindi.

- In order to encourage employees to do official work in Hindi, 72 cash awards were given to employees during the year (till December, 2021).
- During the year 2021-22, Four online Hindi workshops were conducted thorough which 60 executives
- In addition, ‘MEC Samachar’ and internal newsletter of MECL has also been published in Hindi only.

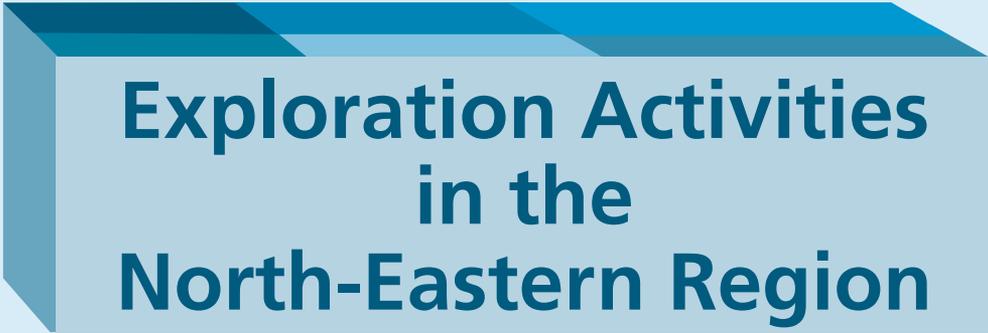
- MECL Samachar has been awarded the 1st prize by Nagar Rajbhasha Karyanvayan Samiti-I (NARAKAS-I). MECL also received the third prize for implementation of Hindi as the working language at the corporate office.

10.31 Jawaharlal Nehru Aluminium Research Development and Design Centre (JNARDDC): JNARDDC continued its efforts to promote the progressive use of Hindi. The Centre celebrated Hindi Pakwhada during 14-28 September 2021 which included several competitions. Director, JNARDDC emphasized the need for further use of hindi in day to day official use of the Centre’s activities.

11

Exploration Activities in the North-Eastern Region





Exploration Activities in the North-Eastern Region

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- Landslide hazard studies Page - 170
- Work done by IBM in North-Eastern Region Page - 172
- Work Carried Out by MECL in North Eastern Region Page - 173

Introduction

11.1 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.

Work done by Geological Survey of India (GSI) in North Eastern Region

11.2 The major activities of North Eastern Region (NER), Geological Survey of India (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) of the representative samples of the DGMs.

Geological Mapping on 1:25,000 scale

11.3 During FS 2020-21, a total of twelve items of Systematic Thematic Mapping (STM) on 1:25000 scale, including two Research Projects (RP) and one Integrated Thematic Mapping (ITM) items were taken up in NER of which two projects were taken up in Arunachal Pradesh, four in Assam, three in Meghalaya and two projects in Manipur & Nagaland and one in Sikkim. A total of 1627 sq. km and 197 Line km (RP) had been covered during the period from 1st January, 2021 to 31st March, 2021.

11.4 During FS 2021-22, a total of ten items of Systematic Thematic Mapping (STM) on 1:25,000 scale, including two RP items have been taken up in NER of which two items are taken up in Arunachal Pradesh, one in Assam, three in Manipur-Nagaland, three in Meghalaya and one in Sikkim. During the period from 1st April 2021 to 31st December, 2021, an area of 778 sq. km and 165 Line km in RP items have been covered (**Annexure 11.1**).



Photo 11.1:

*Leaf imprint in Kimin Formation.
(Loc.-Balemu, Arunachal Pradesh)*



Photo 11.2:

Intrafolial F1 folds preserved in sheared quartzite. (Loc. Umbir, Meghalaya)



Photo 11.3:

*Hand specimen of tinguaitite rock.
(Loc.- Harlac-Langsang section, Karbi Anglong
west district, Assam).*



Photo 11.4:

*Phoscorite composed of hematite, magnetite,
automorphic crystals of apatite, Jashora Igneous
Complex (Loc.-North of Krawgaon)*

Geochemical Mapping (GCM)

11.5 Geochemical Mapping (GCM) is carried out by GSI in different parts of NER to generate the baseline regional geochemical data with elemental distribution identifying the targeting areas for search for mineral deposits and detailed studies on the societal concerns viz. environmental, agricultural and human health.

11.6 A total of ten items of Geochemical Mapping on 1:50,000 scale with collection of samples in grid pattern have been taken up during the FS 2020-21 in parts of Arunachal Pradesh, Assam, Meghalaya Tripura & Mizoram and Manipur-Nagaland. An area of 5196 sq. km has been covered during the period from 1st January 2021 to 31st March 2021.

11.7 Total 17 items of Geochemical Mapping on 1:50,000 scale with collection of samples in grid pattern have been taken up during the FS 2021-22 in parts of Arunachal Pradesh, Assam, Nagaland, Meghalaya, Sikkim and Tripura & Mizoram. An area of 4400 sq. km has been covered during 1st April 2021 to 31st December 2021 (**Annexure 11.2**).

Geophysical Mapping (GPM)

11.8 Geophysical Mapping (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.

11.9 Two GPM items in South Garo Hills, North Garo Hills, West Khasi Hills and South West Khasi Hills districts of Meghalaya and Goalpara, district of Assam has been taken up during FS 2020-21. During FS 2020-21, an area of 2400 sq. km have been covered during the period 1st January 2021 to 31st March 2021.

11.10 Two GPM items in North & West Garo Hills districts, Meghalaya and Goalpara district, Assam and East, West & South Garo Hills Districts, Meghalaya has been taken up during FS 2021-22 and an area of 1420sq. km have been covered during the period from 1st April 2021 to 31st December, 2021(**Annexure 11.3**).

Photo Geology and Remote Sensing (PGRS)

11.11 One item of Photo Geology and Remote Sensing (PGRS) is taken up on 1:50,000 Scale during FS 2020-21 in parts of East and West Garo Hills and West Khasi Hills District Meghalaya using ASTER and Landsat 8 OLI data.

11.12 One item of Photo Geology and Remote Sensing (PGRS) is taken up on 1:50,000 Scale during FS 2021-22 in parts of West Garo Hills District Meghalaya using ASTER and Landsat 8 OLI and an area of 700 sq. km has been covered during the period from 1st April 2021 to 31st December 2021 (**Annexure 11.4**).

Mineral Exploration in NER

11.13 Mineral Exploration in NER includes exploration of minerals like gold, graphite, vanadium, REE, molybdenum, nickel, shale gas and tungsten carried out through Large

Scale Mapping on 1:12,500 scale (LSM), Detailed Mapping on 1:1000/5000 scale (DM) and Drilling. During FS 2020-21, a total of twenty items (5 G3, 14 G4 and 1 Regional Mineral Targeting Item) have been taken up in the states of Arunachal Pradesh, Assam, Meghalaya, Manipur, Sikkim and Nagaland. During the period from 1st January 2021 to 31st March 2021, an area of 472.5 sq. km of LSM, 4.68 sq. km of DM and 406.1 m of Drilling were carried out. During FS 2021-22, a total of 18 mineral investigation items (7 G3 and 11 G4 stage Item) were taken up in the States of Arunachal Pradesh, Assam, Meghalaya, Nagaland and Manipur. During the period from 1st April, 2021 to 31st December, 2021, an area of 206 sq. km has been covered by large scale geological mapping (1:12,500 scale) and 3.28 sq. km by detailed mapping. Total 961.41 m drilling has been done during the period from 1st April, 2021 to 31st December, 2021 (**Annexure 11.5**).

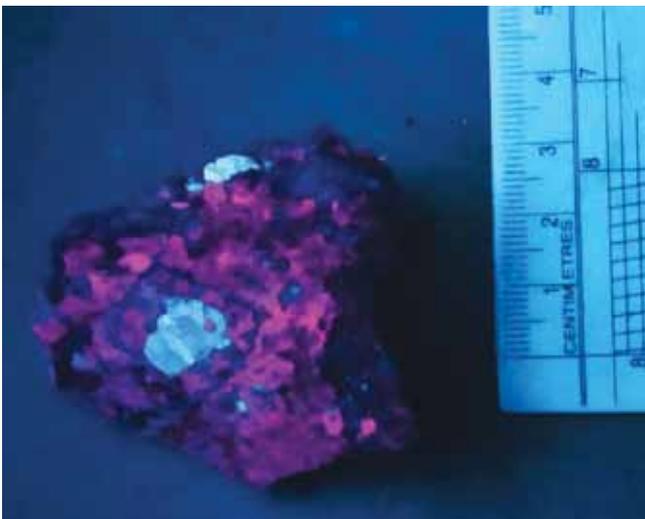


Photo. 11.5.

Scheelite in 25 cm thick quartz vein in foliated granite, under UV light. (loc. Mairang, Meghalaya)



Photo. 11.6.

Gold flake in heavy mineral concentrations. Sample collected from a 8m-12m thick Pebble, Cobbles, Boulders Horizon of Corramore Formation (T4 terrace) at right bank of Dirpai River, Dirpai Adigaon



Photo.11.7.

Flakes of molybdenite associated with biotite patches in molybdenite bearing pegmatite vein (marked in red line) exposed in Khaloibari quarry, Assam.



Photo.11.8.

Oxidized pits / boxwork in ferruginous zone within carbonaceous phyllite, Kalamati block, Arunachal Pradesh.

Publications

11.14 During FS 2021-22, the following items on publications have been taken up:

- Geology and Mineral Resources of Sikkim (Miscellaneous Publication No. 30, Pt. IV, Vol. XIX, Revised Edition).
- Publication of GSI Records, Vol. 155, Part 4, Extended Abstracts of Progress Reports for FS: 2020-21 of North Eastern India.
- Manual of Geology of India, Special Publication No. 77, Volume III: Economic Geology of North Eastern India.
- Geology and Mineral resources of Manipur, Mizoram, Nagaland and Tripura [Miscellaneous. Publication No. 30, Pt. IV. Vol.1 (ii), 3rd edition).
- Compilation of District Resources Maps on 1:250,000 scale for Kohima, Dimapur and Peren Districts, Nagaland.
- Compilation and preparation of district resource maps (DRMS) of East & South Sikkim district.

- Creation of stratigraphic database for North Eastern Region by revisiting the existing discrepancies in 1:50K map and updation in Bhukosh.
- Preparation of geological quadrangle map of degree sheets 83A, 78M, 82D.

Research and Development

Petrological Studies

11.15 During FS 2020-21, two Research items have been taken up as (a) Comprehensive petrological, petrochemical and geochronological studies of the Abor & Lichi Volcanics of Arunachal Himalaya to understand their significance in the tectonic evolution of North Eastern India and (b) Petrological characterization and petrogenesis of Chromite and associated ultramafic rocks of ophiolite in Manipur.

11.16 Two Research items have been undertaken during FS.2021-22 (a) Petrogenetic evolution of Mayodia ophiolite with special reference to the subduction tectonics of Indian plate in Eastern Arunachal

Himalaya to understand detailed petrological and geochemical characterization of different litho units of Mayodia Ophiolite and to correlate Mayodia ophiolite with other Tethyan ophiolites for evolutionary mechanism and (b) Petrological characterization and petrogenesis of Chromite and associated ultramafic rocks of ophiolite in Manipur to comprehend petrological and mineralogical characterization of the ophiolitic suits of rocks and to re-evaluate the tectonic setting of Manipur ophiolite belt in the light of modern concepts.

Paleontological Studies

11.17 During FS 2020-21, two Research items have been taken up (a) Faunal diversity and palaeoenvironment of the Upper Cretaceous Mahadek Formation of Meghalaya plateau and (b) Palaeontological studies of Oceanic Pelagic sediments, Disang and Barail Group sediments in Ukhrul and Chandel Districts of Manipur and its implication on constraining the stratigraphic age.

11.18 During FS 2021-22, two Research items have been taken up (a) Study of the mega-invertebrate fauna from the Surma Group in Garo Hills Meghalaya and North Cachar Hills of Assam and their paleoenvironmental and palaeobiogeographical significance and (b) Palaeontological studies of Oceanic Pelagic sediments, Disang and Barail Group sediments in Ukhrul and Chandel Districts of Manipur and its implication on constraining the stratigraphic age.

Geotechnical Investigations

11.19 NER may be termed as the 'power house' of India as it possesses hydropower potential, which is 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.

11.20 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. Northeastern states of India's, with their mountainous topography and perennial streams, have the largest hydropower potential of our country. Together, Arunachal Pradesh, Sikkim, Assam, Meghalaya, Manipur, Mizoram, Nagaland and Tripura account for almost 40 percent of the total hydropower potential of the country. The North East is located at a crossroads between three major economies—East Asia, South Asia and Southeast Asia. Therefore, development of transport and communication system is quite important for the development of our country.

11.21 During the FS 2020-21, Engineering Geology Division, GSI, NER, Shillong has taken up 5 DPR stage Geotechnical Investigation of Katakhal Irrigation Project, Cachar District, Assam, Myntdu-leshka stage-II Hydroelectric Project, West Jaintia Hills District, Meghalaya, Umngot Hydroelectric project, East Khasi Hills and West Jaintia Hills District, Meghalaya, Haora and Champaicherra Irrigation Project, West Tripura District, Tripura and Selim H.E. Project, Meghalaya along with one Feasibility stage geotechnical investigation of Umngi

Hydroelectric project, East Khasi Hills District, Meghalaya.

11.22 During the FS 2021-2022, Engineering Geology Division, GSI, NER has taken 3 DPR stage geotechnical investigations of Katakhal Irrigation Project, Hailakandi District, Assam, Haora & Champaicherra Irrigation Project, West Tripura District, Tripura and Tlawng Hydroelectric Project, Aizawl District, Mizoram. Slope stability study along Joram-Koloriand Road, Kurung Kumey District, Arunachal Pradesh is also investigated during the period.

Landslide Hazard Studies

11.23 In North-Eastern Region, during FS 2020-21, Six National Landslide Susceptibility Mapping (NLSM) items, eight Mesoscale Landslide Susceptibility Mapping items and three Site Specific landslide studies are being taken up out of which eight items have been taken up on the request of State Government.

11.24 During FS.2021-22, Six National Landslide Susceptibility Mapping (NLSM) items, ten Mesoscale Landslide Susceptibility Mapping items and two Site Specific landslide studies are being taken out of which eight items have been taken up on the request of State Government and one item falls under vulnerable sites identified/prioritized in National Landslide Risk Mitigation Strategy Document of NDMA 2019.

Earthquake Studies

11.25 Two regular items have been taken up in NER on seismic and earthquake studies in FS 2020-21 on the request of the State government of Arunachal Pradesh and Assam. The Seismic Microzonation of two

cities Pashighat and Silchar 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.

11.26 Two regular items have been taken up in NER on Seismic Microzonation and earthquake studies during FS 2021-22 on the request of the State government of Tripura and Mizoram. The Seismic Microzonation of two towns of Dharmanagar and Champhai 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.

Environmental Geology

11.27 In FS 2020-21, five projects have been taken up on environmental Geology. The items are:

- Geo-environmental hazard study of flood and erosion-prone river banks areas in Majuli River Island of Brahmaputra River in Assam.
- Chemical, Mineralogical and lead isotopic characterization of road dust of Guwahati city in different seasons.
- Geo-environmental appraisal of Haora River Basin, Tripura.
- Geo-environmental appraisal to ascertain the impact of erosion caused by the Gumti River along Dumboor, Kurmachhara Amarpur, Udaipur, Telkajila and Sonamura subdivisions of Tripura.



Photo.11.9

Shark Tooth from Baghmara Formation, Lower Miocene age, Panda village, South West Garo hills, Meghalaya.



Photo.11.10

Broken and disarticulated shells fragments, Baghmara Formation, Lower Miocene age, Panda village, South West Garo hills, Meghalaya



Photo.11.11

Exploratory drift on the right bank of Myntdu River (EL248.0m), Myntdu-Leshka stage-II Hydroelectric Project



Photo.11.12

Alternation bands of sandstone and shale of Disang formation near Imphal-Kohima road section, Senapati District, Manipur.

- Geo-environmental studies to constrain the extent of arsenic, metal contamination in water around Dimapur and Kohima city, Nagaland.
 - Geo-environmental hazard study of flood and erosion-prone river banks areas in Morigaon District of Brahmaputra River in Assam.
 - Integrated geo-environmental appraisal of Guwahati city to assess the causes and remedies of urban flood.
 - Geo-environmental studies to constrain the extent of arsenic, fluoride and other associated heavy metal contamination in
- 11.28** During FS.2021-22, the following five projects have been undertaken on environmental Geology:
- Chemical, Mineralogical and lead isotopic characterization of road dust of Guwahati city in different seasons.

water around Dimapur and Kohima city, Nagaland.

Kurmachhara Amarpur, Udaipur, Telkajila and Sonamura subdivisions of Tripura.

- Geo-environmental appraisal to ascertain the impact of erosion caused by the Gumti River along Dumboor, **11.29** Budget and expenditure of the North Eastern Region for the Financial Year 2021-22 is given in **Table-11.1** (Rs. In crore)

Sl. No.	Name of Activities	BE (2021-22) for NER	Additional fund allocation to NER for F.Y. 2021-22	Total BE, NER for F.Y 2021-22	Actual Expenditure in NER (F.Y. 2021-22 up to December, 2021)
1	Survey & Mapping (M-I)	0.60	0.29	0.89	0.55
2	Mineral Exploration (M-II)	1.15	2.62	3.77	2.45
3	Information & Dissemination (-III)	1.04	2.36	3.40	1.90
4	Research & Development (M-IVA)	0.37	0.17	0.54	0.34
5	Investigation (M-IVB)	0.45	0.01	0.46	0.39
6	Human Resource Development (M-V)	0.08	0.02	0.10	0.07
7	Tribal Area Sub Plan (TSP)	0.00	1.07	1.07	1.04
8	Modernisation & Replacement (MV & ME)	0.60	3.00	3.60	1.55
9	Direction & Administration / ASA / Other Exp.	59.61	4.35	63.96	58.60
	Total	63.90	13.89	77.79	66.89

Indian Bureau of Mines

Work done by Indian Bureau of Mines in North Eastern Region

11.30 The Regional Office of Indian Bureau of Mines (IBM) at Guwahati continued to

undertake inspection of mines and studies on development of resources in North-Eastern Region. During the year 2021 (1st January to 31st December 2021), 34 nos. of inspections were carried out for enforcement of provisions of MCDR, 2017 and for processing and

disposal of mining plan/review of mining plan. The details of inspections, results and follow up actions there of are given below:-

Parameter	Details
No. of inspections	Total - 34 Nos. MCDR- 15 Nos. MP/RoMP/FMCP- 19 Nos. Check-up/ Others- 00 Nos.
No. of violations issued	13 Nos.
No. of rules violated	31 Nos. [Rule 11(1), 11(4), 24(1), 26(2), 33, 35(2) & 45(5) of MCDR 2017]
No. of show cause notices issued	01 Nos. (incl. notices issued on the basis of office scrutiny)
No. of mines where violations not complied even after issue of show cause notice	9 Nos. (In process of its compliance) - 10 Nos.
Action taken:	
Court case –	0 Nos.
Suspension –	0 Nos.

Work Carried Out by MECL in North Eastern Region

11.31 MECL 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, Meghalaya

11.32 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.

11.33 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 and completed the exploration of Coal in Khota Arda block, Dima Hasao district.

11.34 During 2021-22, MECL has signed MOU with Directorate of Geology & Mining, Govt. of Assam (DGM, Assam) in December, 2021

for exploration of non-energy minerals. MECL is actively pursuing possibility of exploration of non-energy minerals in the State. One block for Sillimanite in Karbi Anglong District in Assam is already approved by NMET and proposal are in pipeline for other minerals.

11.35 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**

Welfare Activities for SCs/ STs, Women, Minorities & Persons with Disabilities

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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.

Welfare of Women and other Sections

12.3 A complaint committee 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 Backward 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.

12.7 SC/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 and the representation of SC/ST/OBC and other weaker sections during the year 2021 may be seen at **table 1.1**.

National Aluminium Company Limited (NALCO)

12.9 The Company follows the Presidential Directives issued from time to time on reservation of SC/ST persons in employment. The Company has constituted cells exclusively for the welfare of SC/ST employees at its Corporate Office and Units. Periodic meetings are held at Complex level and Corporate level to discuss issues related to SC/ ST employees. 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-imburement 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 rank 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 19th Apr' 17 onwards, 4% of vacancies are being reserved for persons with disabilities as provided in the Act. As on 31st December, 2021, there are 101 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, 2021 has 335 nos. of women employees at different levels and categories.

12.13 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.

Manpower Strength in NALCO

12.14 Employment of SC/ST/Ex-SM/PWD/LDP/Minorities in the Company as on 31st December, 2021 is given in **Table 12.1**.

Table 12.1

Group	Total no of Employees	SC	ST	EX-SM	PWD	LDP	Minority
Executives	1684	251	158	0	34	25	69
Non-executives	3932	657	934	9	67	1535	142
Total	5616	908	1092	9	101	1560	211
		35.61%					

It may be seen from above that every third employee of the organization belongs to SC or ST Community.

Hindustan Copper Limited (HCL)

Welfare Activities

Employees Participation in Management

12.15 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

12.16 Internal Committees have been constituted and amended from time to time in all the Units/Offices of the company for the prevention of sexual harassment of women in work place, the details of the Committees and their members are available in the employee section of HCLs website. A provision in this regard has also been incorporated in the Conduct, Discipline and Appeal Rules of HCL.

Representation of SC/ST and OBC

12.17 The representation of SC, ST and OBC employees out of the total manpower of 1516 as on 01.01.2022 is 19.72%, 12.40% and 16.89% respectively.

12.18 Other Welfare Measures:

- HCL has renewed the Contributory Post-Retirement Medical Scheme (CPRMS) for eligible Retired Employees (including Spouse) / Surviving Spouse of retired / deceased employees and is operational for a period of 01 (one) year w.e.f 01.01.2022. The willing employees retiring in the year 2022 can also join the CPRMS-2022 scheme.
- The retired employees of the Company and their spouses are extended medical treatment at the Company's Hospitals at the Projects.
- The Company also extends support to 'Mahila Samity' 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.

Industrial Relations :

12.19 Industrial Relations situation in all the Units of the Company continued to be harmonious and peaceful during the year 2021-22.

Redressal of public grievances

12.20 All grievances are received from Centralized Public Grievance Redress and Monitoring System's (CPGRAMS) website of <https://pgportal.gov.in>. The grievances are being regularly monitored and are suitably disposed off. During April-Dec 2021, 80 public grievances were received and there was previous carry forward of 3 grievances as on 1st April 2021. Total 78 cases were disposed-off during the year and as on 31.12.2021.

12.21 Status of implementation of the Rights of Persons with Disabilities Act, 2016

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 01.01.2022 is as under:-

Table 12.2

Group	Number of Persons with Disabilities (PwDs)
A	16
B	0
C	6
D	7
Total	29

Human Resource Development

12.22 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 in HCL

12.23 The manpower strength of the Company as on 01.01.2022 is 1516, details of which are given in **Table 12.3**.

Table 12.3

Category	SC	ST	OBC	General	Total
Executives (Nos.)	87	22	103	316	528
Non-Executives (Nos.)	212	166	153	457	988
Total (Nos.)	299	188	256	773	1516

Mineral Exploration Corporation Limited (MECL)

Welfare of SC/ST, Women and Weaker section

12.24 The category wise employment position including General /SC /ST /OBC /Minorities / Women (As on 31.12.2021) in the company is given in **Table-12.4**.

Table – 12.4
Employment of Personnel as on 31.12.2021

Group	Total No. of employees	General	SC	ST	O.B.C	EWS	Minorities	Women
A	276*	151	36	14	71	04	14	23
B	19	07	05	01	06	00	00	00
C	636	227	116	37	251	05	20	33
D	-	-	-	-	-	00	-	-
Total	931*	385	157	52	328	09	34	56

*Excluding Directors & CVO.

12.25 Employment under all categories (Group-wise) including General/ EWS/ SC/ ST/ OBC/ Minority/Women from 01.01.2021 to 31.12.2021 are as detailed below;

Group	Gen	SC	ST	OBC-NCL	EWS	Total	Minority	Women
A	4	3	-	2	-	9	-	-
B	-	-	-	-	-	0	-	-
C	1	5	1	17	1	25	1	-
D	-	-	-	-	-	0	-	-
Total	5	8	1	19	1	34	1	0

12.26 MECL is an equal opportunity employer for women employees where the service rules are uniformly 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.

12.27 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 31.12.2021.

12.28 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.

Indian Bureau of Mines (IBM)

Reservation of Vacancies for persons with Disabilities

12.29 IBM is strictly following the various instructions of the Government issued from time to time regarding reservation of vacancies for PWDs in respect of Group A, B and C posts. As on 31st December 2021, 13 physically handicapped persons were under employment in IBM.

Welfare activities for SC/ST, Women, Minorities and PWD's

12.30 Women employees constitute about 13.55 per cent. Training is imparted to women employees in the field of technical as well as administrative matters.

12.31 An Internal Complaints Committee constituted under the provisions of Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013 is active in Indian Bureau of Mines to redress the complaints, if any, of the victims of sexual harassment at work place in a time bound manner with proactive approach strictly within the stipulations of the Act.

Jawaharlal Nehru Aluminium Research Development and Design Centre

12.32 The Centre is following the various government guidelines w.r.t PWD, SC, ST and OBC reservation.

Geological Survey of India (GSI)

12.33 The Geological Survey of India, an attached office of the Ministry of Mines, has undertaken a number of activity for welfare

of the SCs/STs/OBCs/PWDs & other weaker sections and is following the rules and regulations as issued by the DoP&T time to time so far the employment through SSC and UPSC is concerned.

12.34 SC/ST Cells have been set-up under the direct control of the Liaison Officers at different Regional offices of the Department including CHQ to secure their representation in employment, to address difficulties faced by them and also for their welfare measure. The Liaison Officers designated for the purpose are acting as Nodal Authority in this regard. The Meetings are being arranged time to time at different offices. The Reservation Rosters are also being maintained properly at the end of each and every Cadre Controlling Authority. The yearly inspection of rosters are being carried out by the concerned Liaison Officers of the different Regional offices to ensure prescribed representation of the SC/ST/OBC/PWD & other weaker sections in employment/promotion, wherever applicable.

Women's Welfare

12.35 Internal Complaint Committee (ICC) has been constituted in different Regional offices of GSI including CHQ to look into the cases of sexual harassment of women at workplace.

12.36 The total strength of employees in the GSI and the representation of SC/ST/OBC and other weaker sections during the year 2021 is given in **Table 6.1**.



13

**Budget and
Audit Paras**



Budget and Audit Paras

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- IBM Budget Allocation Page - 189
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Budget Allocation for the year 2020-21 and 2021-22

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 (2022-23) is given in the **Table 13.1**.

Table 13.1
Summary of demands for Grants

(Rs. in crore)

Sl. No.	Name of the Organisation	2020-21		2021-22		2022-23
		BE	RE	BE	RE	BE
1	Secretariat (Proper)	42.43	41.89	41.50	43.96	43.64
2	Geological Survey of India	1349.98	1115.01	1181.58	1174.78	1205.17
3	Indian Bureau of Mines	128.31	94.00	110.00	103.14	113.00
4	Grants to MECL	0.00	0.00	0.00	0.00	10.00
5	Bharat Gold Mines Limited- Grants	5.50	7.00	5.84	5.84	6.00
6	S&T Programme/ Other Programme (6.1 to 6.6)	25.18	22.78	27.90	27.28	30.19
6.1	NIRM	8.21	8.21	9.95	9.95	9.42
6.2	NIMH	1.00	0.30	0.00	0.00	0.00
6.3	JNARDDC	9.92	9.92	10.90	10.90	12.70
6.4	IC	0.40	0.35	0.40	0.43	0.35
6.5	NMA	0.65	0.00	0.65	0.00	0.70
6.6	Other Research Programme	5.00	4.00	6.00	6.00	7.02
7	NMET	150.00	90.00	100.00	125.00	100.00
	Total	1701.40	1370.68	1466.82	1480.00	1508.00

Geological Survey of India (GSI)

13.2 For FY 2022-23, GSI has been allotted an outlay of Rs. 1205.17 crore (Rev. - Rs. 1147.67 Cr. & Capital- Rs. 57.50 Cr.) in BE stage. Out of this total allotted budget grant of Rs.1205.17 crore, Rs. 64.50 crore has been allotted for all activities of NER. The allotted outlay for Establishment Expenditure is

Rs.768.61 crore with major salary component of Rs.735.00 crore and Rs. 99.86 crore for administrative support activities & other expenditure. The allotted outlay for GSI Mission (I to V) activities is Rs.279.20 crore and Capital outlay is Rs.57.50 crore for modernization & replacement activities of GSI. Activity-wise details of budget provision are summarized below-

- a) Under 'Survey & Mapping' head (Mission-I) an amount of Rs. 108.92 crore has been allocated for operation and maintenance of three GSI vessels for 2022-23 to Shipping Corporation of India (SCI), operation & maintenance of the TOASS airborne Survey System, execution of ground survey projects e.g. Specialized Thematic Mapping (STM), Geochemical Mapping (GCM), Geophysical Mapping (GPM) etc.
- b) Under 'Mineral Exploration' (Mission-II), Rs 52.70 crores has been allocated for execution of the mineral exploration programmes of GSI including payment towards the outsourced drilling. Every year GSI is taking up G4, G3 and G2 stage exploration programmes (as per UNFC) with a view to augment resources for various mineral commodities including energy minerals (coal & lignite) in different parts of the country. The budget provision has been marginally enhanced due to enhancement in operational cost for execution of field activities.
- c) Under 'Information & Dissemination' (Mission-III), Rs 45.50 crores has been allocated for publication and IT office expenses, out of which Rs. 42.00 crore has been allocated for Information Technology (IT) - OE head which includes payments related the operation / maintenance of OCBIS,CAMC of seismological instruments, procurement of IT hardware & software and other miscellaneous activities under IT in all offices of GSI. Further, an amount of Rs. 3.50 crore has been allocated under Publication head for printing of publications / e-journals of GSI, procurement of hard copy journals etc.
- d) Under Mission-IV, Rs. 15.50 crore has been allotted for 'Research & Development' activity; Rs. 3.40 crore has been allotted for multidisciplinary 'Specialized investigations' and Rs. 0.08 crore has been allotted for polar studies in Antarctica.
- e) Under 'Research & Development' head fund has been provisioned for taking up fundamental 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, landslide studies, seismological studies, environmental studies, climatology, glaciology etc. and expedition to Antarctic, Arctic regions, miscellaneous expenditure related to AMC and maintenance of seismic and Geo-technical laboratories.
- g) Under 'Training (Human resource development)' head (Mission-V), Rs. 2.00 crore has been allocated 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.
- h) As per the mandatory guidelines of Government of India, Rs. 20.00 crores has been allocated under 'Tribal area Sub Plan (TSP)' head and Rs. 31.10 crore has been allocated under 'Scheduled

Caste Sub Plan (SCSP) head for welfare service to the ST/SC people indirectly by utilization of the funds under mandated Mission-I, II, IV & V field activities falling in scheduled tribe and Scheduled cast dominated areas in different parts of the country.

- i) Under 'Modernisation & Replacement' head, capital grant of Rs. 57.50 crore has been allocated, out of which Rs. 2.50 crore has been provisioned for procurements related to motor vehicles, water tanker etc. required for field activities and Rs. 55.00 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.
- j) Under the Administrative Support Activities, Rs. 99.86 crore has been allocated out of which Rs 62.00 crore has been allocated to meet the expenditure on domestic & foreign travel expenses, office expenses, rent, rates and taxes & professional services and Rs. 37.86 crore has been kept under 'Other Expenditure' head which includes minor works for maintenance of different GSI buildings, supply & material, clothing & tentages and advertisement & Publicity.
- k) Under 'Establishment Expenditure' Rs.768.61 crore has been allocated out of which Rs. 735.00 crore has been allocated under Salary head and remaining fund has been allocated for various establishment expenditures such as wages, Over Time Allowances (OTA), medical treatment, office expenses (Voted), Other Administrative Expenses (OAE), Swachchhata Action Plan (OC). The distribution of outlay for the allotted budget grant for 2022-23 is given in **Table 13.2**.

Table 13.2
Final Allotted Total Grant 2022-23 (Rs. In Lakhs)

Geological Survey of India			
Head	GSI	NER	Total
Establishment Expenditure			
Direction & Administration (Administrative Support)			
Salary	67900.00	5600.00	73500.00
Wages	1650.00	0.00	1650.00
Over time Allowances(OTA)	1.00	0.00	1.00
Medical treatment	750.00	0.00	750.00
Office Expenses [OE (V)]	600.00	0.00	600.00
Other Administrative Expenses (O. A. E.)	300.00	0.00	300.00
Swachchta Action Plan (Other Charges)	60.00	0.00	60.00
Total	71261.00	5600.00	76861.00

Geological Survey of India			
Head	GSI	NER	Total
Administrative Support Activities (ASA)			
Domestic Travel Expenses (DTE)	3600.00	200.00	3800.00
Foreign Travel Expenses (FTE)	50.00	0.00	50.00
Office Expenses (OE)	1550.00	200.00	1750.00
Rents, Rates and Taxes (RRT)	460.00	40.00	500.00
Professional Services	98.00	2.00	100.00
Total	5758.00	442.00	6200.00
Other Expenditure			
Supply & Material	80.00	5.00	85.00
Clothing & Tentages	1.00	0.00	1.00
Advertising & Publicity	196.00	4.00	200.00
Minor Works	3500.00	0.00	3500.00
Total (Other Exp)	3777.00	9.00	3786.00
Total ASA + Other Expenditure	9535.00	451.00	9986.00
Activities / Mission			
Survey & Mapping (Mission-I)			
Ground, Aerial and Marine Survey			
Wages	474.00	26.00	500.00
POL	72.00	8.00	80.00
OC	10286.00	26.00	10312.00
Total	10832.00	60.00	10892.00
Mineral Exploration (Mission-II)			
Economic Mineral			
Wages	1345.00	55.00	1400.00
POL	600.00	20.00	620.00
OC	3190.00	60.00	3250.00
Total	5135.00	135.00	5270.00
Information Dissemination (Mission-III)			
Publication	346.00	4.00	350.00
IT	4150.00	50.00	4200.00
Total	4496.00	54.00	4550.00

Geological Survey of India			
Head	GSI	NER	Total
Spl. Investigation (Mission-IV)			
Geo-Tech, Seismic, Environment(Mission-IV)			
Wages	125.00	15.00	140.00
POL	30.00	10.00	40.00
OC	140.00	20.00	160.00
Total	295.00	45.00	340.00
Antarctica (Mission-IV)			
Other Charges (OC)	8.00	0.00	8.00
Total Spl. Investigation + Antarctica (Mission-IV)	303.00	45.00	348.00
Research & Development (Mission-IV)			
Laboratory Research			
Wages	110.00	10.00	120.00
Supply & Material	638.00	12.00	650.00
POL	30.00	0.00	30.00
Other Charges (OC)	735.00	15.00	750.00
Total	1513.00	37.00	1550.00
Training (Mission-V)			
Human Resource Development			
Other Administrative Expenses	192.00	8.00	200.00
Total	192.00	8.00	200.00
Tribal Sub Plan (TSP) OE	2000.00	0.00	2000.00
Scheduled Caste Sub Plan (SCSP) OE	3110.00	0.00	3110.00
Total (Revenue)	108377.00	6390.00	114767.00
Capital Expenditure			
Motor Vehicle	240.00	10.00	250.00
Machinery & Equipment	5450.00	50.00	5500.00
Total (Capital)	5690.00	60.00	5750.00
GRAND TOTAL (Revenue +Capital)	114067.00	6450.00	120517.00

Indian Bureau of Mines (IBM)

13.3 The Demands for Grants i.e. sanctioned Budget Estimates for the Financial Year 2021-22 is Rs.110.00 crores including Rs.14.69

crores under IBM Activities and Rs. 95.31 crores under Establishment. Head-wise cum Scheme-wise breakup of Activities & Establishment Budget is **Table 13.3**.

Table 13.3

(Rupees in Lakhs)

SL.No.	Object Heads	Establishment	Scheme No. 1	Scheme No. 2	Scheme No. 3	Scheme No. 4	Sch.No.5	Other Heads	NER	Total Activities	Total BE for 2021-22
1	2	3	4	5	6	7	8	9	10	11	12
Revenue Section :-											
1	Salary	7990.00	5.00	5.00	5.00	5.00	-	-	90.00	110.00	8100.00
2	Wages	16.00	1.00	1.00	1.00	1.00	-	-	0.50	4.50	20.50
3	Overtime Allowance	0.10	0.00	0.00	0.00	0.00	-	-	0.00	0.00	0.10
4	Medical Treat.	150.00	0.00	0.00	0.00	0.00	-	-	0.00	0.00	150.00
5	Domestic Travel Expenses	160.00	10.00	10.00	10.00	10.00	-	-	2.00	42.00	202.00
6	Foreign Travel Expenses	5.00	0.00	0.00	0.00	0.00	-	-	0.00	0.00	5.00
7	Office Expenses	230.00	20.00	10.00	10.00	10.00	-	-	2.00	52.00	282.00
8	Rent, Rates & Taxes	130.00	20.00	0.00	0.00	0.00	-	-	7.00	27.00	157.00
9	Publications	0.00	0.00	0.00	10.00	0.00	-	-	0.00	10.00	10.00
10	Other Administrative Expenses	0.50	0.00	0.00	0.00	0.00	-	-	0.00	0.00	0.50
11	Supplies & Materials	6.00	1.00	0.00	0.00	0.00	-	-	0.00	1.00	7.00
12	P.O.L.	0.00	5.00	1.00	2.00	2.00	-	-	0.00	10.00	10.00
13	Advertising & Publicity	0.00	3.00	0.00	0.00	0.00	-	-	0.00	3.00	3.00
14	Minor Works	550.00	20.00	20.00	10.00	0.00	-	-	0.00	50.00	600.00
15	Professional Services	12.00	2.00	0.00	1.00	0.00	-	-	0.00	3.00	15.00
16	Subsidies	0.40	0.00	0.00	0.00	0.00	-	-	0.00	0.00	0.40
17	Other Charges	281.00	20.00	10.00	10.00	10.00	-	-	2.50	52.50	333.50
18	Mining Tenement System (OAE)	-	-	-	-	-	600.00	-	0.00	600.00	600.00
19	Information Technology (OE)	-	-	-	-	-	-	50.00	1.00	51.00	51.00
20	Swachhta Action Plan (OC)	-	-	-	-	-	-	10.00	-	10.00	10.00
21	Training (OAE)	-	-	-	-	-	-	15.00	-	15.00	15.00
22	Tribal Area Sub Plan (OC)	-	-	-	-	-	-	63.00	-	63.00	63.00

SL.No.	Object Heads	Establishment	Scheme No. 1	Scheme No. 2	Scheme No. 3	Scheme No. 4	Sch.No.5	Other Heads	NER	Total Activities	Total BE for 2021-22
1	2	3	4	5	6	7	8	9	10	11	12
23	Special Component Plan for Scheduled Castes (OC)	-	-	-	-	-	-	122.00	-	122.00	122.00
Total (Revenue) :-		9531.00	107.00	57.00	59.00	38.00	600.00	260.00	105.00	1226.00	10757.00
Capital Section :-											
24	Works Outlay (Major Works)	-	-	-	-	-	-	1.00	-	1.00	1.00
25	Motor Vehicles	-	-	-	-	-	-	100.00	-	100.00	100.00
26	Machinery & Equipments	-	-	-	-	-	-	100.00	-	100.00	100.00
27	Other Capital Expenditure (NER)	-	-	-	-	-	-	-	42.00	42.00	42.00
Total (Capital) :-		0.00	0.00	0.00	0.00	0.00	0.00	201.00	42.00	243.00	243.00
GRAND TOTAL: -		9531.00	107.00	57.00	59.00	38.00	600.00	461.00	147.00	1469.00	11000.00

Note:

1. Scheme No. 1 - Inspection of mines for scientific and systematic mining, mineral conservation and mines environment
2. Scheme No. 2 - Mineral beneficiation studies utilization of low grade and sub grade ores and analysis of environmental samples
3. Scheme No. 3 - Technological upgradation and modernisation.
4. Scheme No. 4 - Mines and minerals through various publications.
5. Scheme No. 5 - Computerization online register on mining tenement system.

13.3.1 The Revised Estimates for the Financial Year 2021-22 is Rs.103.14 crores including Rs.11.03 crores under IBM Activities and Rs.92.11 crores under Establishment.. Head-wise cum Scheme-wise breakup of Activities & Establishment is furnished below :-

SL. No.	Object Heads	Establishment	Scheme No. 1	Scheme No. 2	Scheme No. 3	Scheme No. 4	Sch.No.5	Other Heads	NER	Total Activities	Total BE for 2021-22*	Approved BE for Year 2022-23*
1	2	3	4	5	6	7	8	9	10	11	12	13
Revenue Section :-												
1	Salary	7640.00	5.00	5.00	5.00	5.00	-	-	90.00	110.00	7750.00	8700.00
2	Wages	16.00	1.00	1.00	1.00	1.00	-	-	0.50	4.50	20.50	16.50
3	Overtime Allowance	0.10	0.00	0.00	0.00	0.00	-	-	0.00	0.00	0.10	0.10
4	Medical Treat.	180.00	0.00	0.00	0.00	0.00	-	-	0.00	0.00	180.00	170.00

SL. No.	Object Heads	Establishment	Scheme No. 1	Scheme No. 2	Scheme No. 3	Scheme No. 4	Sch.No.5	Other Heads	NER	Total Activities	Total BE for 2021-22*	Approved BE for Year 2022-23*
1	2	3	4	5	6	7	8	9	10	11	12	13
5	Domestic Travel Expenses	160.00	10.00	10.00	10.00	10.00	-	-	2.00	42.00	202.00	161.00
6	Foreign Travel Expenses	5.00	0.00	0.00	0.00	0.00	-	-	0.00	0.00	5.00	5.00
7	Office Expenses	230	20	10	10	10	-	-	2	52	282	302.00
8	Rent, Rates & Taxes	130	20	0	0	0	-	-	7	27	157	77.00
9	Publications	0	0	0	10	0	-	-	0	10	10	10.00
10	Other Administrative Expenses	0.5	0	0	0	0	-	-	0	0	0.5	0.50
11	Supplies & Materials	6	1	0	0	0	-	-	0	1	7	5.00
12	P.O.L.	0	3	1	1	1	-	-	0	6	6	15.00
13	Advertising & Publicity	0	2	0	0	0	-	-	0	2	2	3.00
14	Minor Works	550	20	20	10	0	-	-	0	50	600	350.00
15	Professional Services	12	2	0	1	0	-	-	0	3	15	30.00
16	Subsidies	0.4	0	0	0	0	-	-	0	0	0.4	0.40
17	Other Charges	281	20	10	10	10	-	-	2.5	52.5	333.5	301.50
18	Mining Tenement System (OAE)	-	-	-	-	-	435.00	-	0	435	435	500.00
19	Information Technology (OE)	-	-	-	-	-	-	50	1	51	51	57.00
20	Swachhta Action Plan (OC)	-	-	-	-	-	-	10	-	10	10	10.00
21	Training (OAE)	-	-	-	-	-	-	5	-	5	5	10.00
22	Tribal Area Sub Plan (OC)	-	-	-	-	-	-	0	-	0	0	70.00
23	Special Component Plan for Scheduled Castes (OC)	-	-	-	-	-	-	0	-	0	0	135.00

SL. No.	Object Heads	Establishment	Scheme No. 1	Scheme No. 2	Scheme No. 3	Scheme No. 4	Sch.No.5	Other Heads	NER	Total Activities	Total BE for 2021-22*	Approved BE for Year 2022-23*
1	2	3	4	5	6	7	8	9	10	11	12	13
Total (Revenue) :-		9211.00	104.00	57.00	58.00	37.00	435.00	65.00	105.00	861.00	10072.00	10929.00
Capital Section :-												
24	Works Outlay (Major Works)	-	-	-	-	-	-	0.00	-	0.00	0.00	1.00
25	Motor Vehicles	-	-	-	-	-	-	100.00	-	100.00	100.00	1.00
26	Machinery & Equipments	-	-	-	-	-	-	100.00	-	100.00	100.00	350.00
27	Other Capital Expenditure (NER)	-	-	-	-	-	-	-	42.00	42.00	42.00	19.00
Total (Capital) :-		0.00	0.00	0.00	0.00	0.00	0.00	200.00	42.00	242.00	242.00	371.00
Grand Total: -		9211.00	104.00	57.00	58.00	37.00	435.00	265.00	147.00	1103.00	10314.00	11300.00

1. Scheme No. 1 - Inspection of mines for scientific and systematic mining, mineral conservation and mines environment
2. Scheme No. 2 - Mineral beneficiation studies utilization of low grade and sub grade ores and analysis of environmental samples
3. Scheme No. 3 - Technological upgradation and modernisation.
4. Scheme No. 4 - Mines and minerals through various publications.
5. Scheme No. 5 - Computerization online register on mining tenement system.

* RE for 2021-22 & BE for the Year 2022-23 approved vide Ministry's Letter no F.No.01/07/2021-IF(539)dated 05/01/2022

Audit

13.4 There is no pending CAG para pertaining to GSI and IBM as on 31.12.2021.

13.5 C&AG observation pertaining to Ministry of Mines:

Unfruitful investment in acquisition and loss from operation of Gujarat Copper project

Hindustan Copper Limited (HCL) was approached by the Asset Reconstruction company (India) Limited, Mumbai (ARCIL) seeking the interest of the company in the acquisition of the plant of Jhagadia copper Limited (JCL), Gujarat which was closed since September 2009 for want of working capital.

Through appraisal of the threats regarding operational aspects as well as constraints for availability of raw materials for the plant, HCL acquired (February 2015) JCL plant at a price of 210 crore from ARCIL as a single bidder and renamed it as Gujarat Copper project (GCP). The capacity utilization of GCP was only 20 percent of the total capacity of the plant during the period from November 2016 to March 2019 primarily due to non-availability of raw materials. As a result, HCL suffered a loss of 102.49 crore during the above period by operating GCP. In the company made a total investment of 303.18 crore in GCP (including acquisition cost) till March 2019.

13.6 Reply for the Audit Observation:

During January 2015 as per approval of Board of Directors of Hindustan Copper Ltd (HCL), the company had entered into an agreement of acquiring Plant & Machinery including Leasehold Land of Jhagadia Copper Limited (JCL) from Asset Reconstruction Company (India) Ltd. (ARCIL) through auction process and thereafter refurbished for production. The JCL Plant had facilities for manufacture of 50,000 tonnes per annum of LME 'A' grade Copper Cathodes by secondary smelting process. The commercial operation of Gujarat Copper Project (GCP) was suspended since August 2019 due to non-availability of feed material at economical price. The matter was apprised to the Board of Directors of HCL in its 412th meeting held on 02.07.2021 and the

Board has approved the Asset Monetization plan (AMP) of the company for FY 2021-22 including the Assets of GCP (Land, Machineries, Building etc.) valuing ₹ 247 .36 crore.

13.7 The Status of Internal Audit Paras of GSI (as on 31.12.2021) is given in **Table 13.5**.

Table 13.5

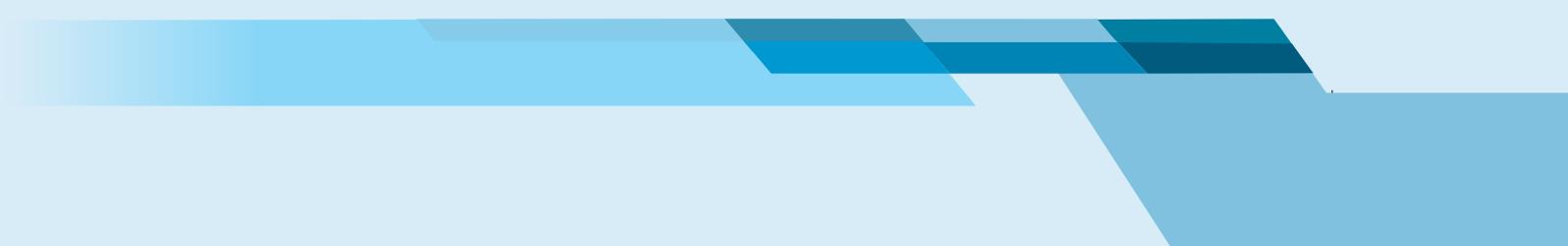
	No of Paras
Outstanding Paras at the beginning of the year	768
Para raised /settled during the year	180
Para still outstanding	588

Follow up action with Regions has been taken up to settle the paras.



14

Miscellaneous





Miscellaneous

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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 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 and increase overall efficiency by promoting 'self-service'. The computerization has been done in the area of Science and Technology Schemes, Mineral Concession Information and Data Repository, Registration under Rule 45 of MCDR, Revision Applications, Information on Mining blocks auctioned/to be auctioned along with revenue generated, e-Indent, Conference Hall Booking and Video Conference Request Booking.

- a) Dashboard of Ministry of Mines (<http://dashboard.mines.gov.in>)
- b) Satyabhama – a Web Portal for Science and Technology Schemes (<https://research.mines.gov.in>)
- c) Mineral Concession Information and Data Repository System (<https://mcas.nic.in>)
- d) Revision Application System (RAS) (<https://ras.nic.in>)
- e) Registration under Rule 45 of MCDR Rules 2017 (<https://ibmreg.nic.in>)

- f) Website of the Ministry of Mines (<https://mines.gov.in>)
- g) TAMRA (Transparency, Auction Monitoring and Resource Augmentation) Portal (<https://tamra.gov.in>)
- h) Intra-mines 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) Non-Ferrous Metal Import Monitoring System(NFMIMS)
- j) Comprehensive Dashboard of Ministry of Mines (Under Development)
- k) New IBM Registration System under Rule 45 of MCDR Rules 2017 based on Form 'K'

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
- eOffice and SPARROW
- eVisitor System
- ACC Vacancy Monitoring

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 Shastri Bhawan Network Centre.

Wi-fi Support

14.5 Ministry of Mines has been made wi-fi enabled by NIC-Mines team. Form processing for wi-fi connection and device configuration is done by NIC Mines Team. As on date, more than 14 wi-fi access points are installed in the Ministry covering 'A' and 'D' Wings. Trouble shooting of wi-fi related problems is done on regular basis.

Videoconferencing Support

14.6 Videoconferencing of the Ministry Officials with the State Governments, Subordinated Offices, PSUs and PRAGATI VC is being facilitated by the NIC-Mines team. During the Covid-19 pandemic, most of the meetings are taking place through video conferencing and support is being provided by NIC-Mines team. There are 9 VC studios operational in Ministry of Mines. To cater the excessive demand of VC, 5 exclusive Web VC rooms (Links) have been created for Ministry of Mines to organise VC from any remote location having internet connectivity. Approximately over 300 VC meetings have been conducted over the video conferencing system of NIC.

Email/VPN Support

14.7 Email requests of the Ministry Officials are processed by NIC Mines Team 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 the Ministry (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:

- eFile (File Management System) - Efile has undergone 2 major versions revisions. Earlier version was eFile v5.6_x . It has been Rolled out to eFile v6.0 on 6.07.2021. Later, the Version now has been upgraded to eFile v7.x on 14.11.2021. eFile v7.x has been designed and developed by adopting latest tools and technologies. Along with e-Sign option ,Ink Sign option is also being introduced in the new version efile v.7.x. eFile MIS Reports has been upgraded to version eFileMIS_Ver.7.0.3. All the Reports such as VIP Pendency, eFile usage detailed report can be generated under this tab. Total Number of eFiles created up to 31.12.2021 are 21256.

- eHRMS (Human Resource Management System) - eHRMS was implemented in the Ministry from 01/Aug/2019. Latest Version Of eHRMS running in this Ministry is 1.9.9.
- eHRMS project is an initiative of the Department of Personnel and Training (DOPT) and is being designed, developed and implemented by National Informatics Center (NIC), Ministry of Electronics and Information Technology (MeitY). eHRMS aims at creating a comprehensive and integrated system through adoption of principles of e-Governance that would serve as a single authentic source of employee information to the Govt. of India. It aims at providing a generalised human resource management solution to all Government employees. The project aims to create infrastructure and mechanisms to ensure the easy management of human resources.

14.11 In the Ministry of Mines several modules like Digitalize service book, Personal Accounts/Services, Leave module and two categories of Reimbursement module (e.g. Newspaper, Children Education Allowance), eHRMS help Desk, Dashboard, Performance Appraisal, Generated Salary slip through Payment-PFMS module, Transfer of Employees from one Ministry/Department to another Ministry/Department has successfully been implemented. Currently testing of Telephone Reimbursement and LTC modules is in process.

14.12 Website of the Ministry

Website of Ministry of Mines is developed and maintained by third 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. Website of the Ministry (<https://mines.gov.in>) is "Guidelines for Indian Government Websites" (GIGW) compliant.

E- Samiksha

14.13 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 issues, observations made by Cabinet, recommendations made by 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 the issues raised by the Ministries/Departments and State Governments are taken up on priority basis and status is uploaded on e-samiksha portal every month. Ministry of Mines has been regularly monitoring the follow-up action in respect of e-samiksha portal.

Skill Development

14.14 The Ministry of Mines (MoM) with cooperation of the Ministry of Skill Development and Entrepreneurship (MSDE) has undertaken steps for skill development for increasing productivity and accelerated, sustainable and inclusive growth in the mining sector. The process of skill development started with signing of Memorandum of Understanding

(MoU) by MoM, along with its PSUs (NALCO, HCL and MECL), with MSDE and the National Skill Development Corporation (NSDC). The apprenticeship training initiative undertaken by the CPSEs for the last 3 years is given in **Table 14.1**.

Table 14.1
Apprenticeship Training

Name of CPSE	No. of apprentices engaged in 2018-19	% of total manpower	No. of apprentices engaged in 2019-20	% of total manpower	No. of apprentices engaged in 2020-21	% of total manpower	No. of apprentices engaged in 2021-22 (upto Dec'2021)	% of total manpower
NALCO	890	13.70%	808	12.51%	895	15.41	1051	18.71%
HCL	290	4.7%	308	4%	168*	2.39%	140*	1.98%
MECL	46	2.5%	68	3.6%	51	2.59%	4**	0.16%**

* Due to COVID pandemic there was constraints in engaging Apprentice trainee.

**Since, Apprentices were engaged in March 2021, the next Apprenticeship engagement cycle is scheduled for Feb-March 2022, where approximately 60 Apprentices are to be engaged at 2.5% of manpower strength

Status of Centre of Excellence

14.15 National Aluminium Company Limited (NALCO)

In a move to create skilled manpower and make unemployed youth job ready, Centre of Excellence for Skill Development i.e. NALCO Center of Excellence of Mining (NCEM) with heavy mining equipment simulator facility and training which was initially planned at Bhubaneswar is being reviewed to shift to Mines & Refinery Complex, Damanjodi. The shifting of the NCEM from Bhubaneswar to M&R Complex Damanjodi is being considered due to constraints at Bhubaneswar NRTC centre. The establishment of NCEM at Mines & Refinery Complex, Damanjodi will cater to the need of fresh skill development and also provide simulator based training to drivers and operators of HEMM at Mines Division, Mines & Refinery Complex, Damanjodi.

14.16 Hindustan Copper Limited (HCL)

HCL has signed MoU with Skill Council for Mining Sector (SCMS) for training program at Skill Development Institute (SDI), Khetri for mining related trades. The duration of the training programs is for 18 months including classroom training, and on-the-job training. 56 students have completed training in two Batches in the trade of Mine Surveyor Assistant. Another, 26 students have completed their training in the trade of Winding Engine Driver in August, 2020.

Skill Plan for the next 5 years

14.17 The skill development initiative of Ministry of Mines has focus on following:

- 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)

14.18 Employees of GSI need skill development and capacity enhancement through field and hands-on training in the domains of Geological, Geophysical and Geochemical Mapping; techniques of Mineral Investigation and 3D-Statistical Modelling of Mineral Resources; Geo-scientific data handling techniques and integration; Fundamental and Advanced Research Methodologies in Geo-sciences and Public-Good Geosciences; Processing and interpretation of Aero geophysical data as well as Multi-seismic marine data; Techno-administration including Grievance and Vigilance, HR Management and Financial Management, Gender Sensitization etc.

14.19 Methods envisaged for carrying out training are Field demonstration at relevant geological sites; Hands-on training at geo-scientific laboratories; Classroom

training on Geoscientific techniques and their advancements; Classroom trainings on Administration and Management; Domain-specific (Basic, Refresher and Advanced) training through classroom lectures, at field sites as well as in the laboratories; Training in collaboration with reputed agencies/academic institutes.

14.20 Skills for which training required for other stakeholders connected to GSI are Geoscientific investigations, Mineral Investigation techniques and 3D-Modelling of Mineral Resources; Operation of geo-scientific equipment and relevant software in domain of geosciences; Imparting Basic, Refresher and Advanced training in a specific domains through lectures, laboratory demonstrations and field sites demonstration.

14.21 Between January and December 2021, 6145 personnel from GSI and 3916 personnel from stakeholder organizations connected to GSI like State DGMs, State and Central Organizations engaged in geoscientific investigations have been trained mainly through online/offline/blended mode. In addition, 16873 participants from different academic institutions across the country are trained under different outreach programmes like BHUVISAMVAD and Azadi ka Amrit Mahotsav.

Indian Bureau of Mines (IBM)

14.22 Indian Bureau of Mines (IBM), according to its charter of functions, needs to enhance its skills in various advanced technologies for mine regulation and development.

14.23 The IBM personnel are imparted trainings at Headquarter for 2-3 days and at its regional offices as well as at two skill development

centres located at Udaipur and Kolkata. Training is given through Classroom lectures / presentation by the faculties drawn from IBM as well as Industry. In the backdrop of Covid Pandemic, presently the trainings are being conducted online. In last couple of years, IBM personnel had attended training programmes in outside organizations / institutes like GSITI, Kolkata National Remote Sensing Centre, Hyderabad, CDAC, Hyderabad, Accordingly, 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.

14.24 Skills for which training required for other stakeholders connected to IBM:

IBM has imparted training and capacity building programmes to 859 numbers of its own employees and 970 numbers of industry personnel and State Government officers during 2018-19 to December, 2021. IBM makes its presence in the meetings as organized by GSI/ MECL for its active participation, towards synergic approach. Further, IBM officials are participating in various Training Programmes conducted by other Institutes. During the year officials of IBM were nominated for following programmes.

1. 28 officials of IBM were nominated to one day training programme on "Generic Online Training Course on Cyber Security" held on 5.1.2021, conducted by CDAC Hyderabad..
2. Five officials of IBM were nominated for two day "Virtual Training cum Workshop on Vigilance Matters" held

on 9/10th Feb.2021, conducted by GSITI, Hyderabad in association with Dr MCRHRD Institute, Hyderabad.

3. The names of 9 officials of IBM, as approved by Competent Authority, were sent to GSITI, Hyderabad for online training on Functioning of Vigilance from 16th to 17th September,2021.
4. Two officials were nominated for "Generic Online Training of Govt Personnel of Central Govt Ministries / Departments in Cyber Security" conducted by Ministry of Electronics and Information Technology on 29th October, 2021 at New Delhi.
5. The names of 18 IBM officials for Training Programme for Inquiry/Presenting Officer (IOs/POs)- to be conducted by CVC, as approved by the competent authority were sent to Chief Vigilance Commissioner, New Delhi.

14.25 IBM had initiated its efforts to upload its training modules on iGOT platform during 2020-21 by identifying lectures under different modules and with regard to videography of the same. However due to Covid Pandemic situation, no further work could be done during the year 2021. OIC training Centre of IBM has attended a workshop on "Mission Karmayogi- The Path ahead" organised by DoPT on 23/12/2021 at New Delhi.

14.26 BHUVISAMVAD activity was initiated by IBM in technical/engineering institutions, colleges, polytechnics and university departments on pan India basis during the year 2020 when six programmes were conducted. However due to Covid Pandemic, during the year 2021 no programme was conducted.

Mineral Exploration Corporation Limited (MECL)

14.27 Employees of MECL need training for skills in areas of Drilling & Exploration, Diamond Core Drilling Skill Enhancement, 3D ore body modelling through Surpac and datamine, Mud Technology, use of software like Minex, Surpac, AutoCAD, Datamine, Exploration for REE & Rare Earth Metals, use of high-end equipment DGPS-(PPK) system, Advanced Drilling Technology, Advances in Geosciences for Exploration of Minerals, JORC for Estimation of Mineral Resources, etc.

14.28 Methods for imparting training are Classroom training, Lectures, Seminars, Conferences and on-job trainings. It is envisaged to train 400 employees of MECL in the next five years.

National Aluminium Company Limited (NALCO)

14.29 Skills for which training is required for employees of NALCO are Behavioural skills– Leadership, Labour Laws, EQ, legal drafting skill, etc.; Functional skills- (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.

14.30 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, e-procurement, inventory management.

14.31 Method for imparting training: In house

through internal faculties, external faculties of national repute, from premier management/ technical institute etc, and through equipment provider.

Hindustan Copper Limited (HCL)

14.32 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, etc.

14.33 Method for imparting training: Training by own faculty at the Vocational Training Centers in Khetri Copper Complex (KCC), Malanjkhand Copper Complex (MCP), Indian Copper Complex (ICC). Training imparted In-House through Internal and External Faculties as well as sending employees to various Centre of Excellence.

14.34 Skills for which training required for other stakeholders connected to HCL are Loader & hauling operation, Blasters, Winding engine operators for underground shaft, Electrician, Mechanical, Fitter, Welder, General Technician, Machinist, Crane Operator, Carpenter, Plumber, Draftsman, Turner.

National Institute of Rock Mechanics (NIRM)

14.35 Skills for which training required for employees of NIRM are Destructive Testing – Reverse Bend Testing, Torssion Testing, Impact Testing, Compression Test, Tensile Strength (Vertical and Horizontal), Non-Destructive

Testing (NDT) – Visual Testing, Dye- Penetrant Test, Magnetic Particle Test, Ultrasonic Testing, Vibration Test, Noise Annalysis, IR Thermography, Wire Rope Defectograph, Soil/ Rock Testing.

14.36 Method for Imparting Training:

On the Job Training, Certification course training viz., ISNT/ASNT Level-I & II Course, Participation in Conference, Seminar, Workshop, Symposium, Short Term courses. The concerned employees are trained at site with the In-Situ Testing methods. Different types of testing techniques were taught and trained them to perform the tests.

14.37 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, etc.

Redressal of Public Grievances

14.38 Department of Administrative Reforms & Public Grievances (DAR&PG) has implemented a web based Centralized Public Grievance Redressal and Monitoring System (CPGRAM) vide which grievances pertaining to concerned Ministries / Department are forwarded for redressal. An Economic Advisor has been designated as the Nodal Officer of Public Grievances. During the period 1st January, 2021 to 31st December, 2021, 1902 Public Grievances were received and 101 pending cases were brought forward from the year 2020. A total of 1979 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.

14.39 Details of action taken on the public grievances of this Ministry and its attached / subordinate offices during the year 2020 (from 01st January 2021 till 31st December, 2021) are given in **Table 14.2**.

Table 14.2

Organization	No. of public grievances pending as on 31.12.2020	Public grievances received during 01.01.2021 to 31.12.2021	Disposed cases during 01.01.2021 to 31.12.2021	Pending cases as on 31.12.2021
Ministry of Mines	100	376	473	3
Geological Survey of India (GSI)	0	1337	1327	10
Indian Bureau of Mines (IBM)	1	34	32	3
National Aluminium Company Limited (NALCO)	0	39	36	3
Hindustan Copper Limited (HCL)	0	107	102	5
Mineral Exploration Corporation Limited (MECL)	0	6	6	0
JNARDDC	0	1	1	0
NIRM	0	0	0	0
NIMH	0	1	1	0

Vigilance Cases

Ministry of Mines

14.40 Details pertaining to Vigilance Division of this Ministry and its attached / subordinate

offices during the year 2021 (from 01st January, 2021 till 31st December, 2021) are given in **Table 14.3**.

Table 14.3

Organization	No. of complaints pending as on 31.12.2019	Complaints received during 01.01.2020 to 31.12.2020	Disposed cases during 01.01.2020 to 31.12.2020	Pending cases as on 31.12.2020
Ministry of Mines, New Delhi	21	12	19	14
Geological Survey of India	04	43	42	05
Indian Bureau of Mines	01	31	30	02

14.41 The details of disciplinary cases arising from vigilance complaints received during the year 2021 (from 01st January, 2021 till 31st December, 2021) is given in **Table 14.4**.

Table 14.4

Organization	No. of Disciplinary cases	Nature of the penalty recommended	Status (as on 31.12.2021)
Ministry of Mines, New Delhi	5	Major: 5 Minor: 0	Disciplinary proceedings underway
Geological Survey of India	NIL	NIL	NIL
Indian Bureau of Mines	NIL	NIL	NIL

14.42 Vigilance Awareness Week was observed from 27th October, 2021 to 1st November, 2021 in the Ministry as well as in its subordinate / attached offices of the Ministry. During the week, essay competition related to vigilance activities was organized in Ministry.

Geological Survey of India (GSI)

14.43 A glimpse of vigilance activities carried out at GSI are as under:

- To enforce Preventive Vigilance, total 09 CTE type inspections, and 134 nos inspections of potentially sensitive sections

were carried out. To promote awareness in vigilance, 21 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 for wider dissemination amongst the employees. GSI is in the process of introducing an e-office premium software package. Once implemented it would digitally record the movements of files/documents on real time basis, which may be preserved for future and retrieved if required. In GSI,

provision exists 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. For faster processing, an online system for generating provision of 'Exception Report in AIPR' has been developed in GSI. GSI has appointed two Independent External Monitors (IEMs) to oversee the implementation of Integrity Pact as per SOP circulated by CVC. Meetings with the IEMs are held on a periodical basis.

- b. During the Vigilance Awareness Week – 2021, various workshops / discussions and competitions amongst the employees on pertinent topics were organised. GSI also held 09 Awareness Gram Sabha in remote villages to percolate the messages of vigilance awareness amongst the larger sections of the society. Grievance Redressal Camp, Vendors' Meet were also arranged in GSI offices.

Indian Bureau of Mines (IBM)

14.44 During the period, CVO, IBM inspected 02 mining plans viz. (a) Manikgarh Limestone Mines of M/s K.C. Jhanwar, District Chandrapur, Maharashtra and (b) Panihar Iron Ore Mines, of Smt. Kunwarani Ayodhya Singh, Gwalior (M.P.). 06 Mining Plans under various Regional offices of IBM were scrutinized under CTE type inspection. In total 171 Annual Immovable Property returns for the year ending 31.12.2020 in respect of employees of IBM were scrutinized by this office, no adverse observations were made.

14.45 During the period Agreed List / ODI list were prepared for the year 2021. 05 Training Programs for New Entrants as well as Mid Career Training for the officers and Staff of IBM were organized. 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. As per standard procedure guidelines issued by GOI on Covid-19 pandemic, various programs such as Essay, Debate, Quiz, Poster, Slogan, Speech competitions were organized in all the Zonal / regional / Sub-Regional Offices of IBM on the occasion of Vigilance Awareness Week, 2021.

Swachh Bharat Abhiyan

Ministry of Mines

14.46 Ministry of Mines and PSUs/attached offices under the Ministry of Mines organized the following Swachhta 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 to 31.12.2017
- vi) 16.10.2018 to 31.10.2018
- vii) 16.11.2019 to 30.11.2019
- viii) 16.11.2020 to 30.11.2020.
- viii) 16.11.2021 to 30.11.2021.

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 ensured all those items which were old/ unserviceable to keep specific space marked by CPWD. 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/dish antenna 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 Instruction has been issued to ensure that all electrical points are switched off after closing of the office.

Daily Sanitization of Premises of Ministry of Mines

14.52 Ministry of Mines has ensured that daily sanitization of corridors, rooms and lift

lobby in premises of Ministry of Mines, Shastri Bhawan is conducted.

14.53 JNARDDC undertook special campaign for cleanliness of all labs and office premises, toilets etc. Swachathapakhwara was observed in Nov 2021 with a view to encourage the zeal of the above program.

14.54 For the year 2021-22, JNARDDC has undertaken the following activities under Swachta Action Plan

- i. Re-carpeting of office road of technical complex
- ii. Plantation programs
- iii. Review and disposal of files of record room
- iv. Renovation of sanitation facilities
- v. Disposal of scrap

Right to Information Act, (RTI)

Ministry of Mines

14.55 Ministry of Mines, Attached Office, Subordinate Office and Public Sector Undertakings (PSUs) under the charge of the Ministry had appointed Central Public Information Officers (CPIO) 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 Facilitation Counter for applicants and constituted a 'Public Information Cell' for processing of the requests and their monitoring in the Ministry. The Ministry along with its Attached Office, Subordinate Office and PSUs has been receiving various requests under RTI Act, which are properly and timely responded to. During the year 2021 (1st January, 2021 to 31st Dec, 2021), the Ministry received 636

applications under the RTI Act, which were timely responded. 33 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 Applications, First Appeals and Second Appeals w.r.t. the 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, 2021 to 31st December, 2021)**

Organizations	Previous Pendency as on 01/01/2021	No. of cases				Pendency			
		No. of RTI / Requests / Applications received during the period	Disposal	Information denied under section 8 (1), 9, 11, 24 & other of RTI Act	Balance	0-3 Months	4-6 Months	7-9 Months	10-12 Months
Ministry of Mines (Sect.)	20	636	614	Nil	42	42	Nil	Nil	Nil
GSI	17	478	468	Nil	27	27	Nil	Nil	Nil
HCL	5	84	89	Nil	Nil	Nil	Nil	Nil	Nil
IBM	8	415	398	Nil	25	25	Nil	Nil	Nil
JNARDDC	0	26	26	Nil	Nil	Nil	Nil	Nil	Nil
MECL	2	39	41	Nil	Nil	Nil	Nil	Nil	Nil
NALCO	19	544	546	Nil	17	17	Nil	Nil	Nil
NIRM	0	17	15	Nil	2	2	Nil	Nil	Nil

Table 14.6**RTI Appeals Status (w.e.f. 1st January, 2021 to 31st December, 2021)**

Organizations	Previous Pendency	No. of cases				Pendency			
		No. of 1 st Appeals received during the period	Disposal	No. of Appeals rejected/ information denied under Section	Balance	0-3 Months	4-6 Months	7-9 Months	10-12 Months
Ministry of Mines (Sect.)	1	33	32	Nil	2	2	Nil	Nil	Nil
NALCO	4	45	48	Nil	1	1	Nil	Nil	Nil
HCL	Nil	12	12	Nil	Nil	Nil	Nil	Nil	Nil
MECL	Nil	7	7	Nil	Nil	Nil	Nil	Nil	Nil
IBM	2	31	32	Nil	1	1	Nil	Nil	Nil
GSI	3	56	55	Nil	4	4	Nil	Nil	Nil
NIRM	Nil	6	6	Nil	Nil	Nil	Nil	Nil	Nil
JNARD-DC	Nil	11	11	Nil	Nil	Nil	Nil	Nil	Nil

Table 14.7
CIC 2nd Appeals Status (w.e.f. 1st January, 2021 to 31st December, 2021)

Organizations	No. of Cases				
	Previous Pendency	No. of 2 nd Appeals filed in CIC	Decided		
			In favour of Appellant	In favour of Organization	Balance
Ministry of Mines	Nil	Nil	Nil	Nil	Nil
NALCO	Nil	Nil	Nil	Nil	Nil
HCL	Nil	Nil	Nil	Nil	Nil
MECL	Nil	Nil	Nil	Nil	Nil
IBM	Nil	Nil	Nil	Nil	Nil
GSI	Nil	Nil	Nil	Nil	Nil
NIRM	Nil	Nil	Nil	Nil	Nil
JNARDDC	Nil	Nil	Nil	Nil	Nil

Government e-Market (GeM) Portal

14.56 Ministry of Mines has been procuring various items it needs through GeM portal those which are available on GeM. During Financial Year 2020-21 the Ministry procured items worth Rs.2.83 crore. Total 613 orders were placed on the GeM portal during financial year 2020-21 by the Ministry of Mines.

Azadi ka Amrut Mahotsav

Jawaharlal Nehru Aluminium Research Development and Design Centre

14.57 The Hon'ble Prime Minister Shri Modi Ji launched the Azadi ka Amrut Mahotsav which is a series of events organized by the Government of India to commemorate the 75th anniversary of Independence. The mahotsav will be celebrated as a peoples' movement across the country.

JNARDDC

- **Online lecture series to 75 colleges (12.03.2021)**

JNARDDC, Nagpur is conducting an

online lecture series on "Aluminium - From Mine to Metal" to selected departments of NITs, IITs, regional and reputed colleges (75 colleges). The lecture series commenced from the week starting from 12th March 2021 with VNIT, Nagpur. JNARDDC is also in the process of making a 3-5 minutes video film, factsheets, leaflets on the growth of Aluminium Industry of India covering all segments and sectors.

Days observed in the Ministry

- **Fit India Freedom Run 2.0 (13.08.2021)**

"Fit India Freedom Run 2.0 - Azadi Ka Amrit Mahotsav" was launched on 13.08.2021 from the JNARDDC technical complex. Around 55 employees and staff participated in the inaugural run of 3 kms.

- **Drawing competition (15.08.2021)**

A drawing competition was organized on 15.08.2021 for children of all employees and staff with the theme-

“Azadi Ka Amrit Mahotsav”. The 75 participants were awarded participation prizes by Director, JNARDDC during the independence day celebrations.

- **National sports day (30.08.2021)**

JNARDDC, Nagpur celebrated the National Sports Day to honour the legacy of the wizard - Major Dhyhan Chand and acknowledge the importance of sports in our life. It included a brief lecture about the legend on 30th August 2021 as a part of the “Azadi Ka Amrit Mahotsav” celebration. This was followed by a badminton and a table tennis exhibition matches between the last year winners and runners up with a view to highlight the significance of sports for physical and mental fitness.

- **Blood donation phase-1 (16.08.2021)**

A blood donation camp was organized in JNARDDC premises on 16th August 2021. Around 31 employees and staff donated blood in the camp conducted by the State Government Medical College & Hospital (IGGMCH).

- **Plantation program (02.10.2021)**

A Plantation Program was undertaken in JNARDDC premises on the eve of Mahatma Gandhi birth anniversary wherein employees and staff planted 75 nos of saplings on 1st & 2nd Oct 2021.

- **Inter-School Quiz Contest (12.11.2021)**

An Inter-School Quiz Contest was organized on 12th Nov 2021 for school children between Class 8 to 10. The quiz covered the topics of science and

India’s independence. The top 3 winners were awarded cash prizes along with trophy and certificates. Around 75 school children from the top 19 schools of Nagpur and Wardha participated. BHAVAN’s school Trimurti Nagar emerged the winners followed by Kendriya Vidyalaya, Ambazari and Sacred Heart Academy, Patansaongi.

- **75kms Cycling event (12.12.2021)**



A “75 kms Cycling Event” was conducted on 12th December 2021 at 05:30 hours from the office of JNARDDC, Nagpur to Kondhali which was flagged by renowned internationalist cyclist Dr Amit Samarth who is the only man in Asia to have completed the two longest cycling races in the world — Race Across America (RAAM) and Trans Siberian Extreme (TSE). 130 cyclists including Director, JNARDDC participated in the mega event. Others included Shri Sachin Shirbawikar and Shri Pannalal Sevak both of whom have completed deccan cliff-hanger (Pune to Goa).

- **Inter-office Rangoli competition (17.12.2021)**

An “Inter-office Rangoli competition” was held on 17th December 2021 in the office of JNARDDC, Nagpur. Around

50 participants from SBI, IDBI, Bank of Baroda, MECL, LIC, Social Forestry, Army, IBM, JNARDDC etc. prepared spectacular and colourful rangoli. All the participants covered the theme of Azadi ka Amrit Mahotsav ranging from patriotism to festival and different culture of India.

Blood donation phase-2 (07.01.2022)

The phase-2 of blood donation camp was organized in JNARDDC premises on 7th Jan 2022 was highly successful with 54 employees and staff donating blood in the camp conducted by the State Government Medical College & Hospital (IGGMCH).



National sports day



Plantation program

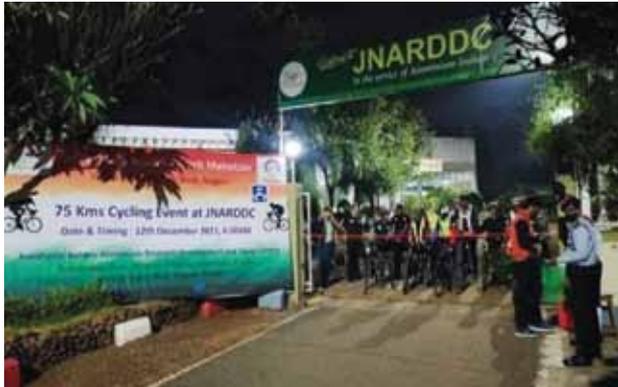


Blood donation camp



Inter-school quiz competition





75 kms Cycling event



Inter-office Rangoli competition

Mineral Exploration Corporation Limited (MECL)

14.58 Organising various activities under "Azadi Ka Amrit Mahotsav":

- Poetry Competition: at CHQ premises on 29.06.2021.
- Display of Posters, Banners and Standees: in MECL offices at strategic locations on 01.07.2021.
- Organized Covid-19 vaccination Camp on the occasion of Birth Anniversary of Hon'ble Prime Minister.
- Slogan Competition: at CHQ premises on 06.07.2021.
- Tree plantation: carried out in CHQ premises on 09.07.2021.
- Essay Competition: at CHQ premises on 13.07.2021.
- Organizing webinar on "Modern Mineral Exploration Practices" on 16.07.2021.
- Poster Competition: at CHQ premises on 20.07.2021.
- Organizing Blood Donation Camp on 09.08.2021.
- Organizing Health Camp from 09.11.2021 to 10.11.2021.
- Celebrating Swachhta Pakhwada from 16.11.2021 to 30.11.2021.
- MECL foundation day celebration on 21.10.2021.
- Organizing training on "Sexual Harassment of Woman (Prevention, Prohibition and Redressal)" on 09.12.2021.
- Sponsoring RTMNU Nagpur Department of Geology on their Platinum Jubilee from 20.12.2021 to 25.12.2021.



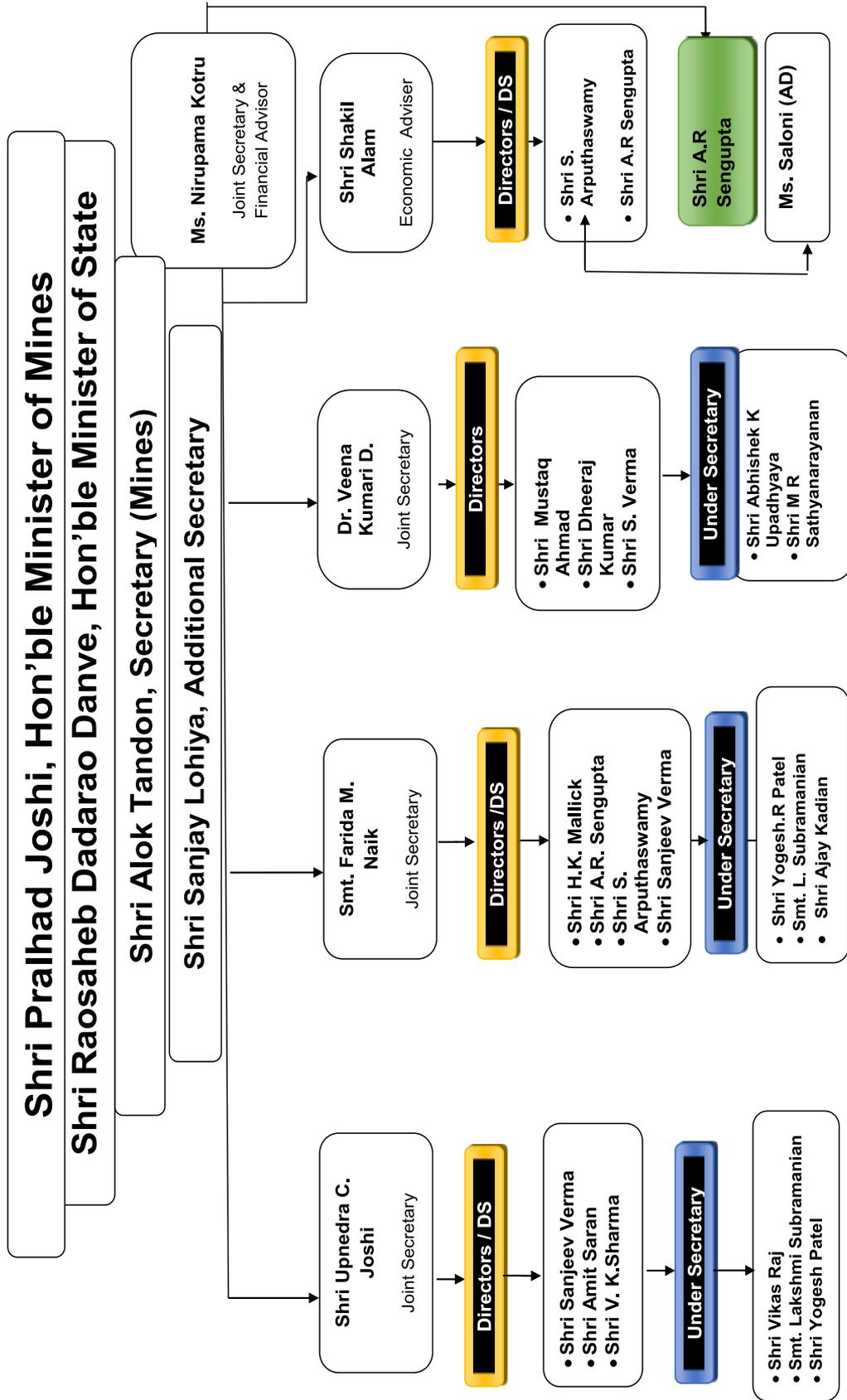
ANNEXURES

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Annexure 11.2	Total 17 items of Geochemical Mapping on 1:50,000 scale with collection of samples in grid pattern have been taken up during the FS 2021-22 in parts of Arunachal Pradesh, Assam, Nagaland, Meghalaya, Sikkim and Tripura & Mizoram. An area of 4400 sq. km has been covered during 1st April, 2021 to 31st December, 2021.
Annexure 11.3	Two GPM items in North & West Garo Hills districts, Meghalaya and Goalpara district, Assam and East, West & South Garo Hills Districts, Meghalaya has been taken up during FS 2021-22 and an area of 1420sq. km have been covered during the period from 1st April 2021 to 31st December, 2021.
Annexure 11.4	One item of Photo Geology and Remote Sensing (PGRS) is taken up on 1:50,000 Scale during FS 2021-22 in parts of West Garo Hills District Meghalaya using ASTER and Landsat 8 OLI and an area of 700 sq. km has been covered during the period from 1st April 2021 to 31st December 2021.
Annexure 11.5	Total 406.1 m drilling has been done during the period from 1st January, 2021 to 31st March,2021.
Annexure 14.1	List of Nodal Officers, CPIOs and Appellate Authorities in Ministry of Mines

Annexure 1.1

ORGANIZATIONAL STRUCTURE OF MINISTRY OF MINES



Annexure 1.2

Details of the work done by PSUs to tackle COVID pandemic

1. National Aluminium Company Limited (**NALCO**) has made a contribution of Rs.1.16 crore to Saheed Laxman Naik Hospital, Koraput Odisha for exclusive Covid Care Centre. It has also contributed towards a Covid Care Centre at ESI HOSPITAL, Banarpal in Angul District of Odisha incurring a monthly expenditure of about Rs. 30 lakhs.
2. NALCO is also undertaking massive sanitization drives carried out at its units and residential & nearby areas. It has donated a refrigerated truck having a capacity of 25,70,000 Covid vaccine (in doses) to the state immunization cell for smooth transportation of COVID-19 vaccines across Odisha.
3. It has supported the State Health Department by Rs.1.16 crore for procurement of two Ventilator Ambulances. It has also provided financial support to Bhubaneswar Municipality Corporation (BMC) Hospital for purchase of Digital X-ray machines. NALCO is continuously depicting COVID appropriate behaviour on its website, social media platforms, digital displays, banners and hoardings. It has also distributed dry rations and other materials for the benefit of people like migrant workers, daily earners etc.
4. Hindustan Copper Limited (**HCL**) unit hospitals are equipped with multi-bedded COVID Centres with oxygen support and medicines (curative, emergency and preventive). Malanjkhand Copper Project (MCP), HCL's plant in Madhya Pradesh, has provided 10 Oxygen Concentrators to the COVID Centre at Kendatola to help the State Administration combat the shortage of Oxygen and record surge of cases.
5. Khetri Copper Complex, HCL's Unit in Rajasthan, has donated oxygen-filled cylinders with flow meter, tubes and masks along with pulse oximeters to the Block Chief Medical Officer of the State Govt. recently. A 30-bedded COVID Care Centre with oxygen support has been established for employees and the local population at Indian Copper Complex, HCL's Unit in Ghatsila, Jharkhand.
6. HCL extends the knowledge base among individuals about COVID-19 prevention. Banners are displayed and pamphlets/advisories/circulars are distributed on a regular basis at work locations and market areas in HCL Units to make the employees, contract workers, township residents and the local communities aware of COVID-19 appropriate behaviour. Thermal Screening, hand sanitization and wearing of face mask is mandatory for entering HCL workplaces including plants, mines and offices. Norm of social distance of six feet (Do Gaj Ki Doori) is being strictly maintained and monitored. Sanitization with Sodium Hypochlorite is carried out on a regular basis in HCL plants, offices and residential areas.

7. Mineral Exploration Corporation Limited (**MECL**), under its CSR program, has given financial contribution to the Dharwad district (Karnataka) for the acquisition of Oxygen concentrators. It has also displayed banners & flexes on its office premises and nearby localities. COVID-19 appropriate behaviour and vaccination banners, standees & flexes have been put on the Nagpur, Ajni & Itwari Railway stations and IIM, Nagpur. Notably, the Mines PSUs were also at the forefront in their respective operational areas in the fight against COVID-19 during the first wave. NALCO had made a total contribution of Rs.10.2 crore towards COVID-19 relief fund which includes Rs.5 crore & one-day salary of employees amounting to Rs.2.6 crore to PM CARES Fund and one-day salary of employees amounting to Rs.2.6 crore to CM's Relief Fund, Odisha. Company had also funded a 200 bedded exclusive COVID-19 hospital at Nabarangpur for the patients of undivided Koraput district, Odisha. It had also set up two exclusive COVID Care Centres, one each at M&R Complex, Damanjodi and S&P Complex, Angul, Odisha.
8. MECL employees had contributed their one-day salary to the PM National Relief fund and Rs. 2.0 Crores to the PM CARES fund for COVID-19. MECL had handed over an ambulance to the District Collectorate, Ranchi. In alliance with various institutions and dignitaries, it had distributed food packets to the marginalized community in and around Nagpur city. The company had procured 5000 liters of sanitizers & 2000 masks from Ordnance Factory Board, Bhandara and distributed them to the healthcare professionals through Collector & District Administration, Nagpur and to the mining workers through MOIL Ltd., Nagpur. The PSU had also donated an ambulance to the District Health Officer of Nagpur District for use at the Public Health Centre, Dhanla, Nagpur district.

Annexure 1.3**Activities of Field Formations for celebrations in commemoration of 75 years of Indian Independence (Bharat ka Amrut Mahotsav)****1 Geological Survey of India (GSI)**

- o As a part of 75 week-long celebrations in commemoration of 75 years of Indian Independence (Bharat ka Amrut Mahotsav), GSI conducted lectures and interactive webinars attended by different universities / colleges / academic institutes pursuing geology and other related disciplines.

2 Indian Bureau of Mines (IBM)**• Display of Logo of Azadi Ka Amrit Mahotsav**

- o The Advisory received from the Ministry has specified that the official logo of Azadi Ka Amrit Mahotsav (AKAM) be an accompaniment feature in all official correspondences / stationeries / Advertisements / commercials etc. put out / released by every Government Department. Concerned divisions of IBM have been informed for necessary action.

• 75th Independence Day Celebrations at IBM

- o Indian Bureau of Mines, on 15th August 2021, celebrated India's 75th Independence Day with fervor by evoking the National spirit with energetic participation of all its serving employees in the premises of its Headquarters in Nagpur. Shri P.N. Sharma, Chief Controller of Mines (I/C)—MDR, hoisted the National Flag which was followed by singing of the National Anthem. Addressing the august assembly of senior officers, staff members, guests & children, Shri Sharma narrated the glorious pathways adopted by the country in marking this remarkable feat of celebrating India's 75th Independence Day. The events of the day despite the restrictions followed on account of Covid protocols in place, was organised with spirited enthusiasm.

• Fit India Freedom Run 2.0

- o Fit India Freedom Run 2.0 to commemorate Azadi Ka Amrit Mahotsav was organised by Indian Bureau of Mines on 13th August 2021. The event was organised as per the prescribed guidelines issued by Government of India and as part of "Jan Bagidari Se Jan Andolan" theme observed from 13th August 2021 to 02nd October 2021 to encourage public participation. The programme was launched by Shri P.N. Sharma, Chief Controller of Mines (I/C)—MDR in the presence of Shri Pankaj Kulshrestha, Chief Controller of Mines (I/C) —MES, the Head of Office, Dr Y.G. Kale and the Technical Secretary, Shri Abhay Agarwal and other senior officers and officials of IBM. The event organised included a one-kilometer walk with hand-held banners. Several

participants, officers & staff, from the Bureau willing took part in the event with vigour and enthusiasm.

3 National Aluminium Company Limited (NALCO)

- o NALCO joined the Nation in celebrating India's 75 years of Independence on 15.08.2021 adhering to COVID guidelines in Corporate office, all its production units & offices.
- o As part of Azadi Ka Amrit Mahotsav, Company donated saplings to people residing in nearby villages of Mines & Refinery Complex, including Kutudi, Mundagadati, Upergadati & Talagadati in Koraput District, Odisha.
- o NALCO continues to celebrate Azadi Ka Amrit Mahotsav by organizing a number of activities to mark India's 75 years of Independence. Following activities involving its employees, family members and contractual workers were organized during the month:
 - (a)** Best out of Waste competition among school children, **(b)** Elocution competition among school children, (c) Fabric painting amongst ladies and **(d)** 'Ama Desha Ame Gadhira', a motivational programme for contractual workers.

Annexure 1.4**Daily expenditure report for COVID-19 – DMF funds**

S. No.	Name of State	DMF fund available as on 28th March 2020 (Rs. in crore)	DMF fund available as on 31st March 2021 (Rs.in crore)**	Cumulative amount spent on activities related to COVID-19 since 28 Mar 2020 (Rs. in crore)
1.	Andhra Pradesh	623.12	278.68	135.82
2.	Assam	77.50	-	0.65
3.	Bihar	84.50	-	0.00
4.	Chhattisgarh	1190.04	1707.59	63.58
5.	Goa	187.89	-	30.53
6.	Gujarat	153.52	83.68	25.68
7.	Haryana	20.24	-	0.00
8.	Himachal Pradesh	135.66	-	0.43
9.	Jharkhand	2056.85	-	22.85
10.	Karnataka	1281.64	-	183.38
11.	Kerala	2.00	-	0.00
12.	Madhya Pradesh	1297.65	1185.56	9.24
13.	Maharashtra	687.99	-	59.50
14.	Odisha	3274.18	6418.90	378.62
15.	Punjab	26.16	-	0.65
16.	Rajasthan	2020.08	-	60.03
17.	Tamilnadu	98.93	99.60	17.92
18.	Telangana\$	1001.20	-	334.08
19.	Uttar Pradesh	383.22	423.22	5.87
20.	Uttarakhand	74.39	110.62	10.16
21.	West Bengal	17.70	-	0.46
Total		14694.47	10307.85	1339.45

Note: Total balance available in DMF as on 28 March is 14694.47 cr. and 30% of this comes as approx. 4408 cr.

** As per D.O. No. 7/2/2020-MIV dated 25th August 2021 relaxation has been given for expenditure related to COVID-19 from DMF funds such that it does not exceed thirty (30) percent of the balance funds available with DMF as on 31.03.2021.

Annexure 1.5**Increasing Efficiency in Decision Making in Government**

Sr. No.	Reform	Status	Remarks
1.	Channel of Submission and delegation of powers	Implemented	Ministry of Mines has reviewed its channel of submission vide its O.O. A-50/8/2021-Estt. dated 09.06.2021 while delegating the power of final disposal authority to lower functionaries, wherever deemed feasible.
2.	Digitization of Central Registration Units	Implemented	Ministry of Mines has fully digitized CRU with adequate technology and manpower.
3.	Adoption of e-office version 7.0	Implemented	Ministry of Mines has implemented e-office 7.0 on 15.11.2021 and is currently running all its file related work on the said platform.
4.	Operationalization of Desk Officer system	Implemented	Ministry of Mines has implemented Desk Officer System by converting two of its erstwhile sections in to desks and designating the head of sections as desk officers.

Annexure 2.1

Production of selected minerals, 2017-18 to 2021-22
(excluding Atomic & Fuel Minerals)

	Unit	2017-18		2018-19		2019-20 (P)		2020-21 (P)		2021-22 (UPTO DEC'21) (P)		2021-22 (E)	
		Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value
All Minerals			131313		148713		154155		158589		161757		190392
Metallic			53095		66799		69412		73802		78819		105095
Bauxite	TONNE	22786106	1578	23689619	1784	21837183	1579	20379556	1667	13667914	1451	18223885	1935
Chromite	TONNE	3480941	3204	3970691	3685	3929260	3333	2863869	2291	2487603	2946	3316804	3928
Copper Concentrate	TONNE	141988	771	143668	885	124692	845	108719	863	77943	690	103925	920
Gold Primary	KG	1650	477	1672	527	1742	650	1126	548	744	351	992	468
Iron Ore	THT	201424	34713	206495	45347	246081	48107	204482	49396	162653	65206	216870	86942
Lead Concentrate	TONNE	306398	1143	358369	1632	351271	1807	376924	2042	242139	1479	322852	1972
Manganese Ore	TONNE	2599814	1991	2832314	2164	2904372	1942	2688038	1794	1781110	1431	2374813	1908
Zinc Concentrate	TONNE	1539657	4980	1456804	5608	1446823	6023	1513996	6667	997734	5263	1330312	7018
Other Metallic Minerals			2119		2584		2563		4267		1	0	2
Copper Ore	TONNE	3678002	0	4134702	0	3952418	0	3377850	0	2539327	0	3385769	0
Gold Ore	TONNE	549683	0	567291	0	596058	0	450611	0	303661	0	404881	0
Lead & Zinc Ore	TONNE	12613866	0	13752295	0	14479032	0	15455343	0	10437504	0	13916672	0
Silver	KG	557691	2118	679386	2582	609340	2562	705795	4266	76	0	102	1
Tin Concentrate	KG	16758	1	21212	1	15546	1	16865	1	9133	1	12177	1
Non Metallic			8855		9740		8882		8926		7077		9436
Diamond	CARATS	39699	37	38437	54	28816	40	13917	22	138	0.25	184	0.30
Garnet	TONNE	158276	162	123404	175	552	0	9307	3	3453	1	4604	2
Limeshell	TONNE	14765	5	7534	3	4600	2	0	0	0	0	0	0
Limestone	THT	340417	8100	379975	8958	359331	8312	349170	8266	268229	6557	357639	8742
Magnesite	TONNE	195055	59	146875	41	97684	35	78144	29	69658	28	92877	37
Phosphorite	TONNE	1515645	367	1421086	388	1400186	432	1455627	544	885657	453	1180876	604
Sillimanite	TONNE	81638	67	69919	56	13236	4	11110	3	2505	1	3340	1
Wollastonite	TONNE	153049	13	184063	17	124757	12	103902	10	72814	7	97085	9
Other Non Metallic Minerals			45		47		45		49		31		42
Minor Minerals			69363		72174		75861		75861		75861		75861

(P): Provisional; (E) Estimation
Source: (a) MCDR minerals: MCDR returns; (b) Minor minerals: state governments (data repeated in case of non-availability)

Annexure 2.2

Export of Ores & Minerals from 2016-17 to 2020-21(P)

(Value in ₹ '000)

Commodity	Unit	2016-17		2017-18		2018-19		2019-20		2020-21(P)	
		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Abrasive (Natural)	Ton	4772	66649	49815	427973	80436	1380074	92241	1568206	23411	376713
Alabaster	Ton	20	240	4	41	12	129	27	256	4	184
Alumina	Ton	1509461	30030432	1361379	32961498	1389105	46982487	1330038	30900409	1265941	28280781
Andalusite	Ton	150	2063	6	327	100	2659	19	1240	9	476
Antimony Ores & Conc.	Ton	46	9646	4	290	++	6	--	--	--	--
Arsenic Sulphide (Natural)	Ton	--	--	25	280	25	212	++	69	277	1697
Asbestos	Ton	100	962	132	943	1112	33914	1001	31011	299	11991
Ball Clay	Ton	92688	233666	157737	357087	213999	497944	153658	398714	170915	410109
Barytes	Ton	1067313	7669142	1652974	9308879	2114610	11781173	2221693	12896670	1010894	6261470
Bauxite	Ton	2790675	5105331	1529308	2705037	1509738	3045300	524229	1421269	240841	951442
Bentonite	Ton	1538134	4798152	1599605	4825168	1693046	5846662	1647485	5674970	1557484	5215656
Borax	Ton	2477	164050	3130	261790	2353	238103	2977	359860	2996	414601
Building And Monumental Stones Nes	Ton	8211179	12089816	8073663	10402292	9137308	10806105	12612479	15692854	13134116	24200968
Calcite	Ton	26981	202616	38637	289088	39251	303449	36433	273950	23867	155049
Chalk	Ton	658	4550	682	4295	1199	7736	1317	8022	1104	6155
Chromite	Ton	230531	3657700	81835	1743015	39273	1337693	33898	867910	2872	71979
Clay (Others)	Ton	40342	459495	37615	367334	44195	428742	50365	476744	45346	402787
Coal(Ex Lignite)	Tht	1772	9669602	1504	8783039	1305	9500065	1045	5929549	2943	5736794
Coal, Gas Water Etc. (Except Gaseous Hydrocarbons)	Ton	++	95	37	1121	++	100	--	--	--	--
Coal Lignite	Tht	2	251598	1	263660	2	254653	3	319838	2	234709
Cobalt Ores & Conc.	Ton	++	20	++	4	1	4496	2	9478	--	--
Coke	Ton	77641	992815	90400	1624502	101863	2205464	111507	2383337	207412	4771075
Copper Ores & Conc.	Ton	22711	1054322	61005	3805458	181642	16627621	212659	20450948	82463	7689376
Corundum (Natural)	Ton	--	--	--	--	101	2149	--	--	62	137
Diamond	Ton	**	1627066256	**	1620221004	**	1758167200	**	1400336074	**	1258209200

Commodity	Unit	2016-17		2017-18		2018-19		2019-20		2020-21(P)	
		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Diatomite	Ton	38427	362900	52235	456663	27893	273001	4302	72842	3240	69439
Dolomite	Ton	61023	234401	73424	377097	78010	308053	91431	349684	95892	349090
Earth Clay	Ton	5792	61644	5827	63589	3650	38825	2652	18037	3881	22220
Emerald (Cut & Uncut)		**	20340187	**	17756469	**	23026249	**	17387875	**	5316603
Felspar (Cut & Uncut)		**	239664	**	303032	**	338518	**	203185	**	198059
Felspar (Natural)	Ton	481456	2495592	544666	2708371	655913	3310611	640709	3225696	705280	3931135
Fire Clay	Ton	4322	14884	4115	30574	4665	40928	5172	41898	5324	43606
Flint	Ton	652	6619	824	7683	790	10393	1195	8014	406	2953
Fluorspar	Ton	608	21579	468	15317	533	23410	1368	51562	474	22436
Garnet(Cut and Uncut)		**	241716	**	416710	**	494842	**	366806	**	280824
Garnet(Abrasive)	Ton	387276	4691843	157223	2346630	104344	1783920	74697	1254539	76799	1265586
Granite	Ton	6094314	93368582	6524816	92485124	6811728	102014060	6678131	102248504	7522159	113279766
Graphite (Natural)	Ton	402	30316	907	77567	402	22960	607	32629	716	42994
Gypsum	Ton	194490	523393	161245	593845	175269	684490	151722	578922	213061	723888
Iron Ore	Tht	30727	102929253	24204	94901382	16149	92626090	36625	186092710	57723	362556021
Kaolin	Ton	232866	1136298	214470	1010904	446358	1709970	431536	1929478	287260	1610489
Kieselguhr	Ton	39	931	124	2577	61	1341	113	2399	27	917
Kyanite	Ton	153	3052	166	3404	283	4872	143	2627	252	9033
Lead Ores & Conc.	Ton	1	33	++	52	37	2007	3	202	9	1076
Limestone	Ton	4330813	4990068	2812253	4102283	3883757	4947503	3760402	4656567	3528973	42939083
Magnesite	Ton	8061	135150	9575	188589	6268	204287	5453	147073	5477	171020
Manganese Ore	Ton	244	12377	44167	508784	55845	138120	58198	254643	82363	974940
Marble	Ton	326961	7048200	355888	7669802	385241	8757384	310613	9010909	295085	10082272
Mica	Ton	135153	4555652	155095	6193290	152494	6200102	116854	4909143	144121	57333785
Molybdenum Ores & Conc.	Ton	22	1005	7	1922	6	81	3	3023	45	43181
Natural Gas	Ton	37072	1521059	179552	6315313	73574	3802681	52408	2202387	17992	658242
Nickel Ores & Conc.	Ton	--	--	++	19	50	1619	++	++	--	--
Ochre	Ton	3358	78711	4515	69098	3491	65042	2934	72045	4126	71626
Other Minerals Nes	Ton	757359	1663190	1670505	2298250	3817136	5538145	3643829	4587040	3842874	4244574
Precious & Semi-Precious Stones (Cut & Uncut):Total		**	11080272	**	12656407	**	14493857	**	12083066	**	23463605

Commodity	Unit	2016-17		2017-18		2018-19		2019-20		2020-21(P)	
		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Precious Metal Ores & Concentrates	Kg	5743	71	116000	792	50001	484	--	--	260175	5435
Quartz And Quartzite	Ton	488794	3579271	556434	4305607	793394	5702081	944041	6087293	772127	6213690
Rock Phosphate	Ton	5914	8616	395	598	1651	46794	257	2015	825	5602
Salt (Other Than Common Salt)	Ton	7897932	7450785	9969597	9402723	12755381	14627311	11681705	13681149	8260913	10571743
Sand (Excl. Metal Bearing)	Ton	17284	369426	32444	419870	3390	24451	1894	32610	1178	13630
Sandstone	Ton	710394	9071313	933456	12329001	1032376	13570942	795763	10434171	7944445	11220825
Silica Sand	Ton	1096	8668	2745	22157	3152	27793	2391	14934	43061	63008
Sillimanite	Ton	14064	114678	16193	171835	9984	111874	1025	14961	4998	94359
Slate	Ton	122089	2343209	86295	1954266	80536	2180250	61143	1983349	66335	2453970
Steatite	Ton	251543	3456140	244757	3580880	259520	3764807	250649	3583316	283303	4364076
Sulphur (Exc. Sub-limed Precipitated & Colloidal)	Ton	616471	3469352	573855	4254428	479650	4332470	802175	3872834	802713	4328627
Tin Ores & Conc.	Ton	--	--	++	3	++	54	++	1	--	--
Titanium Ores & Conc.	Ton	532202	5716719	355474	6010133	359971	6566847	246203	4995763	246534	5348323
Tungsten Ores & Conc.	Ton	8	6064	30	29880	34	43180	--	--	--	--
Vanadium Ores & Conc.	Ton	++	25	--	--	10	2320	10	10801	--	--
Vermiculite	Ton	756	8312	454	5092	583	7251	634	7902	853	11573
Witherite	Ton	++	216	8	319	++	87	++	156	++	104
Wollastonite	Ton	16700	293524	12478	224919	13786	279115	14582	298591	13716	311809
Zinc Ores & Conc.	Ton	53912	3990176	1206	31460	2078	71169	317	15828	399	20716
Zirconium Ores & Conc.	Ton	1692	95182	308	31130	89	4469	1	78	++	21
Total		**	2001306813	**	1994690178	**	2191682036	**	1896831578	**	1966539540

Source: DGCIS, Kolkata P: Provisional, --: Nil, ++: Negligible ** : Not additive

Annexure 2.3

Import of Ores & Minerals from 2016-17 to 2020-21(P)

(Value in ₹ '000)

Commodity	Unit	2016-17		2017-18		2018-19		2019-20		2020-21(P)	
		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Abrasive (Natural)	Ton	5298	63748	4716	54480	5386	68022	4942	74317	4235	59874
Alabaster	Ton	4714	54480	5386	68021	4941	74317	4234	59872	3221	55212
Alumina	Ton	1056	28668	1145	28996	1378	39474	1040	32801	826	27872
Andalusite	Ton	1403569	33417508	2224197	60483412	2856524	102946453	1844483	49829384	2334786	57491719
Antimony Ores & Conc.	Ton	10909	222534	14374	318253	14263	355232	17618	425962	15217	428831
Arsenic Sulphide (Natural)	Ton	4756	752103	5257	1093067	7496	1609649	7656	1265983	5977	1072406
Asbestos	Ton	12	811	20	1155	7	557	7	995	4	570
Ball Clay	Ton	310592	11279370	357182	11603678	364107	12253121	361163	12432333	308506	11851124
Barytes	Ton	173359	1368666	197847	1514693	175253	1579468	126794	1115239	65828	765439
Bauxite	Ton	8818	202526	10983	237166	11498	266740	15436	427967	11691	313860
Bentonite	Ton	1894927	7785093	1461494	7727096	2254595	13364136	2246681	10817757	3034041	13709540
Borax	Ton	28615	477964	48964	657246	57232	868080	72618	882272	90933	1019395
Building And Monumental Stones Nes	Ton	129408	4359797	160134	4753975	181625	5886234	176421	5644322	194448	6337254
Calcite	Ton	147855	506699	103826	418406	201754	850408	47971	523956	16327	360034
Chalk	Ton	54563	264364	74152	353344	71713	346401	63458	302799	67643	374975
Chromite	Ton	8211	48111	6988	36764	254	6143	105	4131	66	2661
Clay (Others)	Ton	154226	2105121	160504	2981860	162663	3154448	124693	2065047	156211	2257733
Coal(Ex Lignite)	Tht	18997	261133	24338	302247	17482	319967	20961	317309	12562	241521
Coal, Gas Water Etc. (Except Gaseous Hydrocarbons)	Tht	191014	1003162923	208254	1384845577	235355	1709323903	248545	1527478152	215260	1160506410
Coal: Lignite	Tht	--	--	2	30	--	--	--	--	--	--
Cobalt Ores & Conc.	Ton	++	652	++	1335	1	8171	1	5170	1	5746
Coke	Ton	--	54356104	--	91542188	1	4476	2	9253	++	325
Copper Ores & Conc.	Ton	4368062	182986972	4589015	278344776	4933340	120756969	2912775	61067396	2463036	44821773
Corundum (Natural)	Ton	1143216	182986972	1488163	278344776	823938	121462018	821555	86675247	415136	59071579
	Ton	++	18	1	29	--	--	--	--	1	79

Commodity	Unit	2016-17		2017-18		2018-19		2019-20		2020-21(P)	
		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Diamond		**	1296740702	**	1902035830	**	1779709897	**	1487354319	**	1283511854
Diatomite	Ton	3142	113035	2426	88318	3647	139462	4950	152229	7099	212766
Dolomite	Ton	2010664	2999704	5360752	5636083	5869534	6743265	5539814	6555288	3505151	5075300
Earth Clay	Ton	598	3525	42	1844	18	4254	2	343	3	450
Emerald (Cut & Uncut)		**	113428795	**	77934749	**	36592287	**	24403510	**	7997796
Felspar (Cut & Uncut)		**	46896	**	48136	**	96750	**	83631	**	8094
Felspar (Natural)	Ton	35582	161647	16752	147951	9490	100613	8198	101216	13187	78978
Fire Clay	Ton	1829	60726	1765	110852	1293	88521	1896	100241	2326	100595
Flint	Ton	1712	24263	4431	56232	6886	76018	6279	62362	9209	85170
Fluorspar	Ton	190445	2992257	221816	3958979	265443	7281833	239589	7225937	220573	6090596
Garnet (Cut And Uncut)		**	222296	**	335897	**	169836	**	184466	**	97335
Garnet (Abrasive)	Ton	2286	22193	2256	21243	422	6410	391	6189	345	14712
Granite	Ton	51419	1683156	60340	1760531	61960	1940629	56169	1846960	37304	1320021
Graphite(Natural)	Ton	37043	1391092	39861	1487949	47057	2328880	41405	1863220	40153	1808218
Gypsum	Ton	4423814	6051112	5740955	8254201	6186253	9473416	5460746	8415195	4762012	7372934
Iron Ore	Tht	4607	21615219	8706	42293972	12807	59136708	1245	9409772	766	8445221
Kaolin	Ton	142927	2393945	192539	2787449	229733	3581700	231662	3933899	237144	4431804
Kieselguhr	Ton	++	139	++	98	42	3994	66	9247	10	1543
Kyanite	Ton	748	16618	620	17806	997	27590	1112	33476	1238	42080
Lead Ores & Conc.	Ton	6217	318697	2220	149369	1499	85468	3283	166725	5473	325104
Limestone	Ton	18300357	24384182	20827698	29016419	24397169	36665171	25639508	37429909	22797801	32911759
Magnesite	Ton	142598	3089947	229629	5268653	464365	11120844	365053	9468163	364577	7657838
Manganese Ore	Ton	1943815	24028138	3627741	50633965	2784473	48484512	4316572	41282100	4058590	55242138
Marble	Ton	882257	26142987	1164244	22696789	997194	20190596	951361	17923694	645253	12032307
Mica	Ton	3257	944981	4311	1079666	3684	1172720	3645	1280925	2987	1252020
Molybdenum Ores & Conc.	Ton	7137	5442498	9169	8149457	11028	13606784	7901	9809780	9177	8848441
Natural Gas	Ton	17783327	402490252	20176813	523664504	21544664	738878610	24416607	684667281	25054872	583289424
Nickel Ores & Conc.	Ton	1062	818094	--	--	++	169	++	204	37	6404
Niobium Or Tantalum Ores & Conc.	Ton	169	284038	185	228699	156	264455	16	21764	2	489
Ochre	Ton	122	19061	58	14580	38	11796	188	35754	391	82224
Other Minerals Nes	Ton	299437	1590854	536327	2082743	683347	2821858	641544	2995670	544580	2325905
Petroleum (Crude)	Tht	214886	4742189329	218104	5630977106	226452	7981583190	220869	7281122511	188182	4396561618

Commodity	Unit	2016-17		2017-18		2018-19		2019-20		2020-21(P)	
		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Precious & Semi-Precious Stones (Cut & Uncut): Total		**	24660620	**	46165230	**	48292001	**	41191154	**	47935435
Precious Metal Ores & Concentrates	Kg	83322	19423078	15298	3363976	201	159	273	736	10743	48509
Quartz And Quartzite	Ton	382	12001	976	22059	1662	54632	1155	40682	1098	50333
Rock Phosphate	Ton	7511445	49513135	7702634	45457006	7519155	56379205	7654867	54205952	7781423	53709109
Salt (Other Than Common Salt)	Ton	52900	173687	67555	291750	78712	472879	65263	466170	98042	645494
Sand (Excl. Metal Bearing)	Ton	31666	140867	361956	530106	390328	843983	198862	502131	57812	400291
Sandstone	Ton	++	21	203	4161	48	973	28	693	16	480
Silica Sand	Ton	102430	516409	130184	475197	60896	400142	21392	218841	21356	238740
Sillimanite	Ton	24	3029	17	1028	99	2403	609	10781	606	11571
Slate	Ton	18	5323	138	9621	225	6867	111	3818	49	3784
Steatite	Ton	3592	204908	4546	249142	7028	324573	5809	325939	5332	344649
Sulphur (Exc. Sublimed Precipitated & Colloidal)	Ton	1345520	8751428	1206432	10628791	1346775	15219696	1235102	8239656	1463291	10948268
Tin Ores & Conc.	Ton	68	37334	57	56979	6	1259	++	206	2	899
Titanium Ores & Conc.	Ton	39444	867776	163690	3297466	97307	3013231	138042	3965292	78747	3440562
Tripoli Earth	Ton	19	817	++	8	8	238	19	1116	--	--
Tungsten Ores & Conc.	Ton	283	29630	350	23609	461	64520	447	69234	121	9104
Vanadium Ores & Conc.	Ton	268	15868	491	89745	2658	451825	7006	349104	999	77967
Vermiculite	Ton	551	14412	321	7415	610	16154	416	11024	696	17234
Witherite	Ton	--	--	--	--	++	96	7	263	++	10
Wollastonite	Ton	3482	73052	11461	156397	26483	331612	22616	294800	24049	370375
Zinc Ores & Conc.	Ton	1771	86640	--	--	1422	38776	101	2667	804	9530
Zirconium Ores & Conc.	Ton	73932	4569039	83781	6202746	76077	8084381	56166	6073420	68675	6993378
Total		**	8094451069	**	10285285816	**	12991864206	**	11515303006	**	7913202918

Source: DGCI&S, Kolkata; P: Provisional; -- :Nil; ++ : Negligible; **: Not additive

Annexure 2.4

Reserves/Resources of Minerals as on 1.4.2015

Mineral	Unit	Reserves			Remaining Resources							Total Resources (A+B)	
		Proved	Probable	Total	Feasibility	Pre-feasibility	Measured	Indicated	Inferred	Reconnaissance	Total		
		STD111	STD121	STD122	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Andalusite	000' tonnes	0	0	0	0	0	0	0	0	4000	24201	28201	28201
Antimony	tonnes												
Ore	tonnes	0	0	0	0	0	0	0	0	10588	0	10588	10588
Metal	tonnes	0	0	0	0	0	0	0	0	174	0	174	174
Apatite	tonnes	27715	0	1680	1385734	491818	1225345	2281521	11481250	6132768	1017646	24016082	24045477
Asbestos	tonnes	20016	0	4617	2488167	3114728	4064178	100687	2527959	10569233	57800	22922751	22947384
BallClay	tonnes	33526297	11182801	4784522	11045214	4286560	13437994	624977	2497880	53357091	0	85249716	134743337
Barytes	tonnes	50449000	49358	848467	410466	323345	1258521	205834	1284390	31735548	105721	35323825	86670650
Bauxite	000 'tonnes	434043	18599	203780	254378	132633	382369	710878	430890	1209706	119588	3240442	38968664
Bentonite	tonnes	13926227	50000	609406	6838864	2721697	68632472	26519818	225744237	212115692	25730000	568302781	582888414
Borax	tonnes	0	0	0	0	0	0	0	0	0	74204	74204	74204
Calcite	tonnes	928119	798170	1722578	1332076	217790	3339239	9122696	1241494	4204311	97476	19555082	230039949
Chalk	000' tonnes	4215	529	319	741	331	151	196	0	269	0	1687	6751
China Clay	000' tonnes	140456	36144	52869	107176	42220	98627	289723	415703	1685730	72599	2711777	2941247
Chromite	000' tonnes	64465	12815	24930	67618	15780	33506	26914	33076	44458	20452	241806	344016
Cobalt Ore	mill. tonnes	0	0	0	0	0	0	30.63	2	0.28	12	44.91	44.91
Copper Ore													
Ore	000' tonnes	162972	0	44796	44925	31090	59209	158300	232654	772912	4640	1303730	1511498
Metal	000' tonnes	2127.9	0	606.72	382.18	324.55	585.42	1950.87	2050.98	4100.36	29.17	9423.53	12158.15
Corundum	tonnes	200	0	0	70844	1073	63060	13	38	105794	52675	293497	293697
Diamond	Carats	959500	0	159	0	0	304601	0	1524317	29047514	0	30876432	31836091
Diaspore	tonnes	3242363	884525	3755546	114789	498756	480663	14241	110358	1045944	46068	2310817	10193251
Diatomite	000' tonnes	0	0	0	634	0	0	0	0	2251	0	2885	2885
Dolomite	000' tonnes	431750	107364	138770	372515	323183	537932	307103	757005	5215075	224194	7737007	8414891
Dunite	000' tonnes	10848	18	1901	436	1925	108887	25202	1087	23832	13680	175049	187818
Emerald	Kgs	0	0	0	0	0	0	0	0	0	55869	55869	55869
Feldspar	tonnes	173383004	103054634	43403974	45903221	42467787	40160373	13882441	17928113	150012330	3371567	313725831	633567443
Fireclay	000' tonnes	13295	5035	8707	13878	30155	18260	49290	54093	524011	6104	695791	722829
Fluorite	tonnes	224824	63860	0	4976749	745390	571311	1713833	6218421	3522537	145183	17893423	18182107

Mineral	Unit	Reserves				Remaining Resources								Total Resources (A+B)		
		Proved	Probable		Total (A)	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total (B)			
			STD111	STD121			STD122	STD121							STD221	STD222
Fuller's Earth	tonnes	3941000	0	0	3941000	0	0	58200	0	0	912340	0	256467419	0	257437959	261378959
Garnet	tonnes	9917936	278493	2587427	12783856	84320	1643412	3287667	121099	10247428	27992906	333	43377166	333	43377166	56161022
Gold																
Ore (Primary)	tonnes	10404349	6401725	422100	17228174	1925669	1303000	1968176	30333248	70136727	233608305	145336333	484611458	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	61.12	584.65	654.74
Ore (Placer)	tonnes	0	0	0	0	0	0	0	0	2552000	23569000	0	26121000	0	26121000	26121000
Metal (Placer)	tonnes	0	0	0	0	0	0	0	0	2.29	3.57	0	5.86	0	5.86	5.86
Granite	th.cu.m	35741	201377	26574	263692	38462	51990	8234	837325	2063964	42543908	512216	46056098	512216	46056098	46319790
(Dimension Stone)	th.cu.m	35741	201377	26574	263692	38462	51990	8234	837325	2063964	42543908	512216	46056098	512216	46056098	46319790
Graphite	tonnes	4229675	1204423	2526694	7960793	9571933	3825575	3593404	741377	7368340	22361229	139464128	186925987	139464128	186925987	194886779
Gypsum	000' tonnes	35141	311	1169	36621	10826	93127	33419	9071	713834	428097	4518	1292892	4518	1292892	1329513
Iron Ore (Haematite)	000' tonnes	4053032	449917	918801	5421751	3444103	1573822	1496674	1762741	1798557	4498142	2491176	17065214	2491176	17065214	22486965
Iron Ore (Magnetite)	000' tonnes	30352	2311	20037	52699	223388	15494	64091	1513195	1984566	6351286	584436	10736455	584436	10736455	10789155
Kyanite	tonnes	639121	0	48958	688079	1505114	568205	2193427	579619	3577402	95869713	0	104293480	0	104293480	104981559
Laterite	000' tonnes	98598	12527	13608	124733	49655	8960	22724	3532	2626	243535	250787	581819	250787	581819	706552
Lead & Zinc Ore																
Ore	000' tonnes	31662	68687	5767	106116	5564	17411	31297	37055	192083	355403	4530	643343	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	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	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	22.37	143.13	143.13
Limestone	000' tonnes	9438939	3015917	3880897	16335753	4870440	4852713	8623172	7111337	22629060	130787772	8014504	186888998	8014504	186888998	203224752
Magnesite	000' tonnes	77867	165	4244	82276	6210	9345	45574	59010	59652	131707	213	311711	213	311711	393988
Manganese Ore	000' tonnes	62982	19715	10778	93475	70742	44606	73823	18189	42803	135722	16513	402399	16513	402399	495874
Marble	000' tonnes	0	0	4551	4551	104236	202003	72387	0	107129	1453386	2200	1941341	2200	1941341	1945891
Marl	tonnes	117115856	4650000	2090000	123855856	11704870	0	0	0	0	0	0	11704870	0	11704870	135560726
Mica	Kgs	82187635	20035595	12209547	114432777	38252500	10605400	124089303	143353477	56528016	144446953	3593715	520869364	3593715	520869364	635302141
Molybdenum																
Ore	tonnes	0	0	0	0	0	1500000	0	36000	569304	17098594	167800	19371698	167800	19371698	19371698
Contained MoS2	tonnes	0	0	0	0	0	1050	0	83	287	11198.03	50.34	12668.37	50.34	12668.37	12668.37

Annexures

Mineral	Unit	Reserves				Remaining Resources							Total Resources (A+B)	
		Proved STD111	Probable		Total (A)	Feasibility STD211	Pre-feasibility		Measured STD331	Indicated STD332	Inferred STD333	Reconnaissance STD334		Total (B)
			STD121	STD122			STD221	STD222						
Nickel Ore	mill. tonnes	0	0	0	0	0	21	21	21	31	53	63	0	189
Ochre	tonnes	21959552	4448341	10525912	36933805	44924890	13936202	31896176	2559245	3560819	1612607	32369262	1612607	130859201
Perlite	000' tonnes	0	0	0	0	140	683	595	0	0	0	0	988	2406
Platinum Group of Metals (PGM)	In tonnes of Metal content	0	0	0	0	0	0	0	0	0	0	6.5	1.5	15.71
Potash	mill. tonnes	0	0	0	0	0	0	0	0	0	18142	3660	707	22508
Pyrite	000' tonnes	0	0	0	0	27129	0	32597	9590	77729	1527356	0	0	1674401
Pyrophyllite	tonnes	16575493	4322386	4035079	24932958	9539407	8301411	4240016	1118943	3589624	7533340	360006	34682745	
Quartz & Silica Sand	000' tonnes	433014	93339	121169	647522	354566	368216	362128	36872	219180	1897899	21436	3260298	
Quartzite	000' tonnes	47758	2016	33698	83472	120723	141437	160355	119953	152715	868850	11293	1575325	
Rare Earth Elements	tonnes	0	0	0	0	0	0	0	0	6353	19140	0	0	25493
Rock Phosphate	tonnes	43832936	5179	1969370	45807485	10679080	36271671	25008353	2912633	3549750	185771368	2678275	266871130	
Rock Salt	000' tonnes	0	0	0	0	10035	0	5990	0	0	0	0	0	16025
Ruby	Kg	0	0	0	0	0	429	3296	0	0	1623	0	0	5349
Sapphire	Kg	0	0	0	0	0	0	0	0	0	450	0	0	450
Shale	000't onnes	15027	171	274	15472	495	0	2022	0	0	1175	90	0	3781
Sillimanite	tonnes	323231	5728868	450016	6502115	1020187	135278	20257525	4580083	17790664	16068690	3849600	63702027	
Silver	tonnes	69277075	8413000	72753828	150443903	0	1484543	46726460	29632000	64946000	218721729	0	361510732	
Ore Metal	tonnes	430978	22077	264139	717194	0	4285	25962	203799	323639	1723303	0	2280988	
Slate	000' tonnes	19619	667	0	20286	0	0	1075	0	0	1511	0	0	2586
Sulphur (Native)	000' tonnes	0	0	0	0	0	0	0	0	0	210	0	0	210
Talc / Steatite / Soapstone	000' tonnes	72172	8067	26251	106490	18178	13020	32221	2994	8126	128620	6275	209434	
Tin	tonnes	2067	897	1455	4419	22594200	2653	31330072	168457	561080	29064288	0	83720749	
Ore Metal	tonnes	4456	9402	1562	1542	3313945	8428	5404965	81329	23163	1318234	0	10225916	

Mineral	Unit	Reserves					Remaining Resources							Total Resources (A+B)
		Proved	Probable		Total (A)	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total (B)	
			STD111	STD121			STD122	STD211						
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
Contained 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
(Excluding Atomic, Fuel Minerals & Minor minerals)**

Sl. No.	Name of the State	Value of mineral production in 2020-21 (Rs. crore)	No. of reporting mines in 2020-21	Share of the State in country's production of MCDR minerals
1	ORISSA	27997	149	Chromite (100%), Iolite (100%), Bauxite (76%), Iron Ore (51%), Graphite (42%), Manganese Ore (18%), Limestone (2%)
2	RAJASTHAN	16097	83	Selenite (100%), Garnet (100%), Lead concentrate (100%), Siliceous earth (100%), Wollastonite (100%), Zinc concentrate (100%), Silver (100%), Phosphorite (93%), Copper concentrate (39%), Limestone (21%), Iron Ore (1%)
3	CHHATTISGARH	14441	98	Moulding sand (100%), Tin concentrate (100%), Iron Ore (18%), Limestone (12%), Graphite (6%), Bauxite (4%)
4	KARNATAKA	9922	144	Gold primary (99%), Kyanite (77%), Iron Ore (17%), Manganese Ore (14%), Limestone (10%), Magnesite (8%)
5	JHARKHAND	2752	47	Graphite (19%), Iron Ore (10%), Bauxite (7%), Copper concentrate (1%), Gold primary (1%)
6	MADHYA PRADESH	2588	251	Diamond (100%), Copper concentrate (60%), Manganese Ore (34%), Limestone (13%), Phosphorite (7%), Bauxite (3%), Iron Ore (2%)
7	MAHARASHTRA	1192	71	Fluorite (100%), Silimanite (100%), Manganese Ore (24%), Kyanite (23%), Limestone (4%), Bauxite (2%), Iron Ore (1%)
8	ANDHRA PRADESH	1003	105	Vermiculite (60%), Limestone (12%), Manganese Ore (9%)
9	GUJARAT	643	145	Marl (58%), Bauxite (7%), Limestone (6%)
10	TAMIL NADU	591	92	Magnesite (61%), Marl (42%), Vermiculite (40%), Graphite (33%), Limestone (6%)
11	TELANGANA	481	36	Limestone (7%)

Source: MCDR Returns

Annexure 6.1

Details of Elements Analysed in NGCM

Packages	Instruments	Elements to be detected
A	XRF (24 elements)	SiO ₂ (1000 ppm), Al ₂ O ₃ (1000 ppm), Fe ₂ O ₃ (1000 ppm), TiO ₂ (100 ppm), CaO (1000 ppm), MgO (1000 ppm), MnO (30 ppm), Na ₂ O (1000 ppm), K ₂ O (1000 ppm), P ₂ O 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)
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 (Fusion Method)	ICP-MS (23 elements)	14 REE viz. La (1 ppm), Ce (2 ppm), Pr (0.5 ppm), Nd (0.5 ppm), Sm (0.5 ppm), Eu (0.5 ppm), Gd (0.5 ppm), Tb (0.5 ppm), Dy (0.5 ppm), Ho (0.5 ppm), Er (0.5 ppm), Tm (0.5 ppm), Yb (0.5 ppm), Lu (0.5 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	FA – ICPMS/GFAAS	Pt (0.3 ppb) & Pd (0.2 ppb) (LLD not achievable)
J (Acid Digestion method)	ICP-MS (9 elements)	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).
Water (A)		pH, EC, HCO ₃ ⁻ , Cl ⁻ , SO ₄ ⁻² , NO ₃ ⁻ , Ca ⁺² , Na ⁺¹ , K ⁺¹ , PO ₄ , SiO ₂ (up to ppm level)
Water (B)	ICP-MS	Li (10 ppb), Be (0.1 ppb), Al (25 ppb), Sc (10 ppb), Ti (5 ppb), V (5 ppb), Cr (5 ppb), Mn (0.5 ppb), Co (0.05 ppb), Ni (1 ppb), Cu (0.5 ppb), Zn (2 ppb), Ga (0.1 ppb), As (1 ppb), Rb (0.1 ppb), Sr (0.1 ppb), Y (0.01 ppb), Mo (0.5 ppb), Ru (0.02 ppb), Rh (0.01 ppb), Ag (0.02 ppb), Cd (0.01 ppb), Sn (0.3 ppb), Sb (0.02 ppb), Cs (0.02 ppb), Ba (1 ppb), La (0.03 ppb), Ce (0.04 ppb), Pr (0.01 ppb), Nd (0.03 ppb), Sm (0.03 ppb), Eu (0.03 ppb), Gd (0.02 ppb), Tb (0.01 ppb), Dy (0.01 ppb), Ho (0.01 ppb), Er (0.01 ppb), Tm (0.01 ppb), Yb (0.01 ppb), Lu (0.01 ppb), Hf (0.05 ppb), Ta (0.03 ppb), W (0.5 ppb), Ir (0.01 ppb), Pt (0.03 ppb), Au (0.01 ppb), Tl (0.01 ppb), Pb (0.5 ppb), Bi (0.02 ppb), U (0.02 ppb) Fe (100 ppb).
Water (C)		Hg, F (upto ppb level)

Presently analysis under package C is not carried out, instead **Li**, which was earlier analysed under Package C is included in Package J.

Annexure 6.2

Year wise / activity-wise financial performance of gsi against the approved budget outlay during F.Y. 2020-21 and BE grant and expenditure till December, 2021 and projection of expenditure in last quarter (January, 2022 to March, 2022) of F.Y. 2021-22 and fund utilization during calendar year 2021

(In crore)

	F.Y. 2020-21					F.Y. 2021-22					Calendar Year 2021		
	Total BE Grant	Total RE Grant	Expenditure (April, 20 to Dec, 20)	Available RE Grant from Jan,21 to Mar, 2021	Expenditure from Jan, 21 to Mar, 2021	Total Expenditure	Total BE Grant	Total RE Grant	Actual Expenditure (April, 21 to Dec,21)	% of expenditure till Dec. 2021 against RE	Projection of expenditure for last quarter (Jan,22 to Mar,22)	Budget from Jan, 2021 to Dec, 2021	Expenditure from Jan, 2021 to Dec, 2021
	1	2	3	4 (2-3)	5	6 (3+5)	7	8	9	10 (9/8*100)	11 (8-9)	12 (4+9)	13 (5+9)
Activities													
Survey & Mapping (Mission-I)	149	132.85	122.63	10.22	9.65	132.28	131.4	95.00	77.42	81.49	17.58	87.64	87.07
Mineral Exploration (Mission-II)	43	32.05	27.24	4.81	4.67	31.91	51	56.00	36.2	64.64	19.80	41.01	40.87
Information Dissemination (Mission-III)	77.26	48.85	44.31	4.54	4.42	48.73	56.6	53.20	29.28	55.04	23.92	33.82	33.7
Spl. Investigation & Other Exploration (Antarctica) (Mission-IV)	2.5	1.99	1.68	0.31	0.23	1.91	2.4	3.05	1.99	65.25	1.06	2.3	2.22
Research & Development (Mission-V)	17.8	8.95	7.85	1.1	0.86	8.71	12.6	10.55	7.51	71.18	3.04	8.61	8.37
Human Resource Development (Mission-VI)	3.3	0.6	0.55	0.05	0.05	0.6	2	8.30	0.68	8.19	7.62	0.73	0.73
Tribal Area Sub Plan (TSP)	22	23.23	15.68	7.55	7.46	23.14	14.4	17.50	14.73	84.17	2.77	22.28	22.19
Schedules Caste Sub Plan (SCSP)	42.2	42.2	24.53	17.67	16.16	40.69	27.6	31.56	27.76	87.96	3.80	45.43	43.92
Administrative Support Activities (ASA)	111.9	84.5	74.83	9.67	7.95	82.78	94.97	88.61	75.75	85.49	12.86	85.42	83.7
Establishment Expenditure	772.72	688.6	568.44	120.16	120.03	688.47	722.71	759.71	627.8	82.64	131.91	747.96	747.83
Total Revenue Fund	1241.68	1063.82	887.74	176.08	171.48	1059.22	1115.68	1123.48	899.12	80.03	224.36	1075.20	1070.60
Capital (Modernization & Replacement)	108.3	52.42	37.54	14.88	14.18	51.72	65.9	51.30	34.87	67.97	16.43	49.75	49.05
Total (Rev + Capital)	1349.98	1116.24	925.28	190.96	185.66	1110.94	1181.58	1174.78	933.99	79.50	240.79	1124.95	1119.65
% of Utilisation of Fund against RE			82.98%			99.53%				79.50%			99.53%

*In FY 2020-21, An amount of Rs. 1.23 crore has been provided under TSP head over and above RE 2020-21 vide Re – appropriation Order No. 8 dated 2nd March 2021.

Annexure 6.3**Performance related to various regulatory and development functions of IBM during the year 2021 (as on 31.12.2021)**

Sl. no.	Item	Annual Target	Achievement
1	Inspections (MCDR/MP/RMP/FMCP)	977	1431
2	Updating of National Mineral Inventory (NMI) adopting UNFC.	Release of NMI for all the minerals	Quinquennial updating of NMI as on 01.04.2020 for 46 major minerals has been initiated. The processing, generation of output and preparation of comparative statement for finalization of NMI as on 01.04.2020 in respect of 25 minerals was completed and 14 minerals are under progress, and will be completed by March 2022.
3	Preparation of multi-mineral maps with forest overlays and	Transfer of all legacy data of MMLM to GIS format	Multi mineral leasehold maps which were earlier prepared in Autocad, now updated on Arc GIS Platform . Vectorization of 79 toposheets and plotting of 345 M.L completed
4	OD Investigations	46	38
5	Chemical Analysis (No. of radicals)	26,305	17,631
6	Mineralogical Studies	2,000	2,543
7	In Plant Studies/ Plant visits	---	2
8	Technical Consultancy & Mining Research Activity	---	One Regional Mineral Development study was taken up. Report for effective utilization of iron ore fine dump of NMDC, Bailadila was prepared and report has been finalised.
9	Training programmes by IBM.	12	10

Annexure 6.4

Mineral Wise Mining Lease
(Other than Atomic, Hydro Carbons Energy and Minor Minerals)
as on 31/03/2020(P) (All India)

Sl. No.	Mineral	No. of Leases	Lease area (Hect.)
1	Amethyst	3	6.63
2	Apatite	1	13.47
3	Aquamarine	1	24.29
4	Bauxite	363	30083.94
5	Borax	1	159.00
6	Chromite	27	7687.85
7	Copper ore	12	4179.73
8	Diamond	2	275.96
9	Emerald	1	46.32
10	Epidote	1	4.05
11	Flint stone	2	11.78
12	Fluorite	10	326.24
13	Garnet	28	175.35
14	Garnet(gem)	1	4.27
15	Gold	11	6972.29
16	Graphite	38	1627.36
17	Iolite	5	61.79
18	Iron ore	431	66061.08
19	Kyanite	24	1394.03
20	Lead & zinc ore	8	7098.20
21	Limeshell	21	1557.82
22	Limestone	1959	163932.88
23	Magnesite	39	2289.85
24	Manganese ore	270	12302.53
25	Marl	6	1111.14
26	Moulding sand	4	24.75
27	Perlite	1	144.88

Sl. No.	Mineral	No. of Leases	Lease area (Hect.)
28	Phosphorite	4	1893.38
29	Rock phosphate	6	163.87
30	Rock salt	1	8.12
31	Ruby	1	27.66
32	Sapphire	1	673.40
33	Semi-precious stones	17	276.85
34	Siliceous earth	45	319.03
35	Sillimanite	1	4.64
36	Stibnite	1	40.47
37	Tin	15	319.17
38	Vermiculite	56	892.75
39	White shale	4	146.18
40	Wollastonite	15	302.72
	Total	3437	312645.72

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

(P): Provisional

Annexure 8.1**Detailed time lines and outcomes of ongoing and completed projects of JNARDDC, Nagpur****Completed projects:**

S. No.	Project Title	Outcomes
1.	N-45: Development of ceramic proppant from low grade materials (Partially Lateritised Khondalite -PLK, Fly ash, etc.) - Phase-II-Scale up studies (NALCO, Bhubaneswar) (Feb 2018: 3 yrs)	Successfully established demo plant for the production of 15 kgs per batch of ceramic grade proppants from unutilised/low grade materials (Partially Lateritised Khondalite -PLK, Fly ash, etc.) which will help in utilisation of waste/dump material and improved availability of high grade bauxite ore which is used in production of proppant
2.	S-26: Fabrication of Advanced Ceramic Nano-coatings for Automotive Applications with Christ University. & (S&T Mines) (Dec 2018: 2 yrs)	Developed 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 findings of the project will lead to overall import substitution in the field of automotive sector applications.
	S-29: Techno-economic Survey of Aluminium Scrap Recycling in India with MRAI & (S&T Mines) (Oct 2018: 3 yrs)	<p>Current recycling rate in India is only 25% compared to the world average of 45%.</p> <p>India 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.</p> <p>This project was undertaken to address one of the key concern areas of aluminium recycling in the country viz complete lack of structure for aluminium scrap handling and secondary metal recovery.</p> <p>The detailed technical survey report of aluminium scrap recycling in India 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.</p>

Ongoing projects :

S. No.	Project Title with timeline	Outcomes / Remarks	Completion target
1.	<p>S-31: Bench scale study on extraction of pure Silica and smelter grade Aluminium Fluoride from Coal Fly Ash (CFA) S&T (Mines) (March 2019: 3 yrs)</p>	<p>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 (Al₂O₃), 57-60% silica (SiO₂) and 9-13% oxides of elements (Ca, Mg, Na, Fe, Ti etc.).</p>  <p>Completed Lab scale studies (1-2g CFA). Presently experiments are being conducted with 50g CFA by utilizing the specially fabricated equipment (shown in figure) for recovery of high purity fumed silica and precipitation of aluminium fluoride. Designing of full bench scale setup for processing 0.5-1.0 kg CFA is in progress</p> <p>Outcome of the study is eagerly awaited since the positive outcome can help in addressing not only national but internationally burning issue while improving global environment.</p>	Mar-2022
2.	<p>N-46 : 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” .</p>	<p>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.</p>	Mar-2022

S. No.	Project Title with timeline	Outcomes / Remarks	Completion target
	<p>NALCO, Bhubaneswar (Jointly with IIMT Bhubaneswar & Esavaya Tech, Pvt Ltd. Telangana) (Sept 2019: 2 yrs)</p>	<p>Red mud sample received from NALCO alumina plant was subjected for reduction roasting studies at 1000 - 1200 oC using 50 – 250g of carbon while keeping red mud to carbon ratio and contact time constant. The reduced mass was crushed and sieved into suitable size fractions which were subjected to wet low intensity magnetic (LIM) separation /at 1500-2500 gauss. The studies confirmed recovery of about 65% Fe. The low iron fraction of red mud (LIRM) leftover was converted into mix designs for making building materials. Binding properties of LIRM were assessed by both geopolymerization and firing processes respectively.</p>	
3.	<p>S-33: Utilization of aluminium dross to achieve zero waste – A bench scale study S&T (Mines) (Dec-2019: 2 yrs)</p>	<p>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.</p> <p>Fabrication of reactor for the processing of PAC is completed.</p>  <p>Bench scale trial was carried out on this unit with 5 kg dross which was successfully converted into PAC using fabricated unit. So far 10-15% Al₂O₃ content in liquid PAC and basicity up to 83% has been achieved. Further experiments are in progress for the optimization of process parameters</p>	June-2022

S. No.	Project Title with timeline	Outcomes / Remarks	Completion target
4.	<p>S-34: Production and certification of certified reference materials (CRMs) for the analysis of aluminium alloy</p> <p>S&T (Mines) (Dec-2019: 2 " yrs)</p>	<p>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.</p> <p>AA6063 candidate reference material was produced in-house through extrusion. Statistical analysis of discs (prepared from candidate material) carried out as per ISO guide 35 confirmed that they are chemically homogenous and suitable for next step in CRM manufacturing.</p> <p>Process of acquiring ISO 17034 Accreditation has been initiated. Inter-Laboratory comparison of AA6063 candidate discs is in progress.</p> <p>For developing CRMM for other alloys, a prototype casting set up, designed and fabricated in-house, for casting of defect free material suitable for CRM manufacturing has been installed. Casting trials and optimization of parameters are in progress. This will be an import substitute to high quality CRMs for aluminium sector.</p>	June-2022
5.	<p>N-49: Demonstration cum heat treatment, leaching-recycling and liming study of JNARDDC-NALCO process (by utilizing 50-60 kg batch of 1st cut SPL)</p> <p>NALCO, Bhubaneshwar (Dec 2021 : 9 months)</p>	<p>Based on the success of bench scale studies (1 kg) with NALCO for detoxification of 1st cut SPL and recovery of caustic and fluoride this project has been undertaken for heat treatment of hazardous waste (1st cut SPL) for destruction of leachable cyanide using 50-60 kg batch. The successful completion of the project will lead to set up of mass balance for safe disposal of toxic waste and its gainful utilization.</p>	Sep-2022

S. No.	Project Title with timeline	Outcomes / Remarks	Completion target
6.	<p>P-61: TPN:59025 Instrument for Realtime measurement of anode current distribution of aluminium electrolysis cell, DST, New Delhi (Mar 2021 : 2 yrs)</p>	<p>The aim of this project is to develop a system which is capable to of measuring the current of all the anodes of an aluminium electrolysis in a potline and transfer the data through Wi-Fi in the control room. The system will incorporate master unit which will capture the current data through radio frequency from the slave data acquisition units installed in all the sixteen anodes of a pot. The system will be designed to accomplish uninterrupted monitoring by eliminating the use of batteries and introducing the induced power supply for individual data acquisition unit. Development of this instrument will be a major breakthrough as online anode current distribution measurement will help to observe changes in current distribution with changing conditions in the cell for a period and in turn will help in understanding the cell phenomena and troubleshooting the problems, which will lead to improved cell efficiencies and reduction in cell instabilities.</p>	Mar-2023
7.	<p>P-62 : TPN:59031 Instrument for Instantaneous and onsite measurement of aluminium electrolysis bath parameters : DST, New Delhi (Mar 2021: 2 yrs)</p>	<p>JNARDDC is mandated to develop the equipment capable of simultaneous measurement of vital bath parameters (Operating temperature, Superheat temperature, % Free alumina, Liquidus temperature, % Excess AlF₃ and Bath ratio/Cryolite ratio) which will be robust, automated, safe, user friendly and will provide accurate measurement data. The real time bath parameters information made available instantly (against traditional long time required) will be useful in controlling and enhancing the cell performance.</p>	Mar-2023

S. No.	Project Title with timeline	Outcomes / Remarks	Completion target
8.	<p>N-47: Development of Process for 4N High Pure Alumina (HPA) and Substrate Making for its Validation in LED applications, NALCO Bhubaneswar (Jointly with IIT Bhubaneswar & Anna University) (Mar 2021 : 2 yrs)</p>	<p>Objective of the project is to optimize the suitable process for preparation of 4N high pure alumina, processing of HPA for sapphire, wafer preparation (through crystal growth, cutting and polishing) for subsequent validation in LED. The demand for LED lighting in India is mostly driven by its adoption in metro cities, mainly because of better awareness and higher socio-economic growth. In order to deal with the problem, the government has listed the electronics industry as a priority sector under its Make in India campaign. Preliminary study on cost economics of the process to evaluate its further commercialization will also be carried out.</p>	Sep-2023
9.	<p>N-48 : Development of DC cast Al Alloy for Yoke in automobile applications, NALCO Bhubaneswar (Jointly with ARAI Pune) (Jan 2022 :2 yrs)</p>	<p>Under this project it is proposed to develop a modified AA6xxx (Al-Mg-Si based) alloy which can be commercially produced using DC casting. Further, it is proposed to develop the alloy with specific reference to the aluminium yoke (also called weld-yoke or end yoke) which connects to the propeller shaft for transmission of power. In India steel is majorly used for yoke or shaft in SUVs. Hence it is proposed to replace steel with aluminium based material for light weighting of the automobiles. JNARDDC will develop the material suitable for the weld yoke and ARAI will do the prototype production by forging, testing, validation and we both will jointly approach OEMs for adaption/approval of the same before tier-1 manufacturers can start manufacturing.</p>	Jan-2024

S. No.	Project Title with timeline	Outcomes / Remarks	Completion target
10.	<p>P-63: Technology Development for Holistic Utilization of Red Mud for Extraction of Metallic Value & Residue Utilization [NML, Jamshedpur, IMMT, Bhubaneshwar, JNARDDC, Nagpur, NALCO, HINDALCO & VEDANTA] under aegis of NITI Aayog (Mar 2021 : 3 yrs)</p>	<p>Under the NITI Aayog initiative the primary industries and 3 R&D labs have joined hands for development of feasible processing options for all metal extraction from red mud and for further research, development and commercialization to other industries. R&D organizations (CSIR-IMMT, CSIR-NML and JNARDDC) and Aluminium Industries- (NALCO, HINDALCO Industries Ltd and Vedanta Ltd.) have joined hands to deal with issues related to holistic utilization of red mud for extraction of metallic values and residue utilization. Bauxite residue (red mud) is produced in the process of alumina extraction from bauxite. Bayer's process is the principal industrial means of processing bauxite to produce alumina (aluminium oxide). Statistically, production of 1-ton alumina generates 1-1.5 tons of red mud depending upon the mineralogical composition of the bauxite and extraction efficiencies. India is the fourth-largest producer of aluminium in the world with a share of around 5.3% of the global aluminium output, hence, the development of red mud's effective handling, storage, usage and management is necessary for the welfare of the global community. Further, bauxite mining and subsequent aluminium production is concentrated in Odisha with ~67% of the total annual production of alumina and ~64% of annual production of aluminium in the country. There have been scattered efforts across India on red mud's utilization. However, a holistic utilization hasn't been quite dealt with. Rare Earth Elements (REEs) are strategic elements crucial for sustainable energy systems. NITI Aayog has identified red mud to be one of rich secondary source of REEs and has recommended adopting a holistic approach for the utilization of red mud. Thus, apart from extraction of REEs, attempts will also be made to extract iron, alumina and titania present in red mud.</p>	Mar-2024

Annexure 11.1

During FS 2021-22, a total of ten items of Systematic Thematic Mapping (STM) on 1:25,000 scale, including two RP items have been taken up in NER of which two items are taken up in Arunachal Pradesh, one in Assam, three in Manipur-Nagaland, three in Meghalaya and one in Sikkim. During the period from 1st April 2021 to 31st December, 2021, an area of 778 sq. km and 165 Line km in RP items have been covered.

FS: 2020-21

Sr. No.	Item Type	Title of the Item	State	Achievement between 1 st January, 2021 and 31 st March, 2021
1	RP	Characterization of Proterozoic Shillong Group of rocks in Meghalaya its tectonics and depositional environment.	Meghalaya	62 L. km
2	RP	Specialized Thematic Mapping of Assam Meghalaya Gneissic Complex (AMGC) in parts of Rongram-Agalgre-Jengjal, West Garo Hills district, Meghalaya to unravel the tectono-metamorphic evolution of the western part of AMGC.	Meghalaya	135 sq. km
3	STM	Specialized Thematic Mapping to establish the nature of eastern boundary of Shillong Basin and to classify the granite gneisses and granitoids of Assam Meghalaya Gneissic Complex (AMGC) in and around Nongbah, Namdong, Nartiang & Mynso areas, West Jaintia & East Khasi Hills Districts.	Meghalaya	178 sq. km
4	STM	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 Karbi Anglong and Nagaon districts of Assam.	Assam	190 sq. km
5	STM	Specialised Thematic Mapping in and around Silimkhowa, Bura Langpho & Naga Langso areas of Karbi Anglong District, Assam to decipher the contact relationship between Assam Meghalaya Gneissic Complex and Shillong Group of rocks with special emphasis on their tectono-metamorphic history	Assam	170 sq. km

Sr. No.	Item Type	Title of the Item	State	Achievement between 1st January, 2021 and 31st March, 2021
6	STM	Specialized Thematic Mapping around Langhin and Karkok areas in Karbi Anglong (East) District, Assam to establish the tectonic setup of Assam Meghalaya Gneissic Complex (AMGC)	Assam	143 sq. km
7	STM	Specialized Thematic Mapping in and around Baitha Langso and Donka Mokam, Karbi Anglong district, Assam to elucidate the evolution of Shillong basin, metamorphic history of basement Gneissic complex and Shillong Group of rocks	Assam	140 sq. km
8	STM	Specialized Thematic Mapping in and around Purr-Pungro-Chipur areas of Kiphire and Tuensang Districts, Nagaland to characterize ophiolite suite of rocks and delineate the associated mineralization	Nagaland	130 sq. km
9	STM	Specialized Thematic Mapping in and around Tengnoupal area to study Ophiolite suite along with associated mineralization, Oceanic Pelagic and associated sediments, Tengnoupal and Chandel District, Manipur	Manipur	133 sq. km
10	STM	Specialised Thematic Mapping in Guntung-Lumdung-Seppa-Pachi area for establishment of litho-tectonic interrelationship among various lithounits and economic potentiality in East Kameng and parts of Pakke-Kessang Districts of Arunachal Pradesh.	Arunachal Pradesh	198 sq. km
11	STM	Specialized Thematic Mapping in Bhairobkunda-Kalaktang to study lithostratigraphy and structure of Siwalik, Gondwana and Bomdila Group of rocks in parts of West Kameng District, Arunachal Pradesh	Arunachal Pradesh	205 sq. km
12	STM	Specialized Thematic Mapping (1:25,000) along Gangtok - Changu - Kupuk - Zuluk - Rongli in parts of East Districts, Sikkim	Sikkim	140 sq. km

FS: 2021-22

Sr. No	Item Type	Title of the Item	State	Target Achieved from 1st April, 2021 to 31st December, 2021
1	STM	Specialised Thematic Mapping in Guntung-Lumdung-Seppa-Pachi area for establishment of litho-tectonic interrelationship among various lithounits and economic potentiality in East Kameng and parts of Pakke-Kessang Districts of Arunachal Pradesh.	Arunachal Pradesh	108 sq. km
2	STM	Specialised Thematic Mapping in Koloriang-Sarli-Sakehugu-Damin areas to establish tectonic setting, geochemistry and geochronology of Se La and Bomdila groups and to precisely constrain the age of metamorphism of both the Groups in KurungKumey District, Arunachal Pradesh and to assess the economic potentiality of the study area.	Arunachal Pradesh	76 sq. km
3	STM	Specialised Thematic Mapping in and around Silimkhowa, Bura Langpho & Naga Langso areas of Karbi Anglong District, Assam to decipher the contact relationship between Assam Meghalaya Gneissic Complex and Shillong Group of rocks with special emphasis on their tectono-metamorphic history.	Assam	47 sq. km
4	STM	Specialised thematic mapping to decipher the tectono-stratigraphy and constrain the age of the Naga Metamorphic rocks around Nimi-Saramati area, Nagaland.	Nagaland	110 sq. km
5	STM	Specialized Thematic Mapping for delineation and characterization of Main Central Thrust (MCT) by traverse mapping in parts of Sheyam-Lachen-Lachung section, North District, Sikkim	Sikkim	106 sq. km
6	STM	Specialized Thematic Mapping in and around Purr-Pungro-Chipur areas of Kiphire and Tuensang Districts, Nagaland to characterize ophiolite suite of rocks and delineate the associated mineralization.	Nagaland	136 sq. km

Sr. No	Item Type	Title of the Item	State	Target Achieved from 1st April, 2021 to 31st December, 2021
7	RP	Specialized Thematic Mapping of Assam Meghalaya Gneissic Complex (AMGC) in parts of Rongram-Agalgre-Jengjal, West Garo Hills district, Meghalaya to unravel the tectono-metamorphic evolution of the western part of AMGC.	Meghalaya	120 L km
8	STM	Specialized Thematic Mapping to establish the nature of eastern boundary of Shillong Basin and to classify the granite gneisses and granitoids of Assam Meghalaya Gneissic Complex (AMGC) in and around Nongbah, Namdong, Nartiang & Mynso areas, West Jaintia & East Khasi Hills Districts.	Meghalaya	105 sq. km
9	RP	Specialized thematic mapping to establish the depositional environment of Mahadek Formation around Ranikor, Lawbah, Mustoh and Dawki areas in South West and East Khasi Hills, East and West Jaintia Hills districts of Meghalaya.	Meghalaya	45 L km
10	STM	Specialized thematic mapping in and around Tengnoupal area to study Ophiolite suite along with associated mineralization, Oceanic Pelagic and associated sediments, Tengnoupal and Chandel District, Manipur	Manipur	90 sq. km

Annexure 11.2

Total 17 items of Geochemical Mapping on 1:50,000 scale with collection of samples in grid pattern have been taken up during the FS 2021-22 in parts of Arunachal Pradesh, Assam, Nagaland, Meghalaya, Sikkim and Tripura & Mizoram. An area of 4400 sq. km has been covered during 1st April, 2021 to 31st December, 2021.

FS: 2020-21

Sr. No.	Item Type	Title of the Item	State	Achievement between 1 st January, 2021 and 31 st March, 2021
1	GCM	Geochemical Mapping in Toposheet No. 78K/13 in Golpara District of Assam and Garo Hills District, Meghalaya.	Assam	450 sq. km
2	GCM	Geochemical Mapping in Toposheet No. 78K14 in East Garo Hills & West Khasi Hills District, Meghalaya.	Meghalaya	379 sq. km
3	GCM	Geochemical mapping in Toposheet No. 78K/5 covering parts of North Garo Hills Districts of Meghalaya and Goalpara District of Assam.	Assam	439 sq. km
4	GCM	Geochemical Mapping in Toposheet No. 78K/15 in East Garo Hill and West Khasi Hills Districts, Meghalaya.	Meghalaya	436 sq. km
5	GCM	Geochemical mapping in Toposheet No. 78K/1 covering parts of Goalpara & Dhubri Districts of Assam and West Garo Hills District of Meghalaya	Meghalaya	432 sq. km
6	GCM	Geochemical mapping in Toposheet no. 78K/9 covering parts of Goalpara District of Assam and East Garo Hills district of Meghalaya.	Meghalaya	428 sq. km
7	GCM	Geochemical mapping in parts of Toposheet Nos. 83L/9 & 10 in Kamjong District of Manipur	Manipur	486 sq. km
8	GCM	Geochemical mapping in Toposheet No. 79M/13 covering parts of Khowai, Dhalai and Unakoti districts of Tripura.	Tripura	600 sq. km
9	GCM	Geochemical mapping in Toposheet No. 82L/12 covering parts of West Siang district of Arunachal Pradesh.	Arunachal Pradesh	596 sq. km
10	GCM	Geochemical mapping in Toposheet Nos. 83B/2 and 83B/6 covering parts of Darrang, Sonitpur, Morigaon and Nagaon Districts of Assam	Assam	950 sq. km

FS: 2021-22

Sr. No.	Item Type	Title of the Item	State	Target Achieved from 1 st April, 2021 to 31 st December, 2021
1	GCM	Geochemical Mapping in toposheet no. 78K/7 in West Garo Hills District, Meghalaya.	Meghalaya	304 sq. km
2	GCM	Geochemical Mapping in toposheet no. 78K10 in East Garo Hills District, Meghalaya.	Meghalaya	260 sq. km
3	GCM	Geochemical mapping in Toposheet No. 83G/02 covering parts of Nagaon, Karbi Anglong and Dima Hasao Districts of Assam.	Assam	160 sq. km
4	GCM	Geochemical mapping in Toposheet no. 83J/13 covering parts of Mon, Longleng districts, Nagaland, Charaideo, and Sivasagar districts of Assam.	Manipur	268 sq. km
5	GCM	Geochemical mapping in Toposheet nos. 83N/1 & 2 in parts of Mon District of Nagaland.	Nagaland	316 sq. km
6	GCM	Geochemical mapping in toposheet no. 79M/10 covering parts of Udaipur, Jampuijala in South Tripura and Gomati districts of Tripura.	Tripura	402 sq. km
7	GCM	Geochemical mapping in toposheet no. 79M/11 covering parts of Matabari, Bagafa in Gomati and South Tripura districts of Tripura	Tripura	348 sq. km
8	GCM	Geochemical mapping in toposheet no. 79M/14 and 79M/15 covering parts of Karbuk, Pilak, Purba Raima in South Tripura district of Tripura.	Tripura	304 sq. km
9	GCM	Geochemical mapping in toposheet no. 79M/5 and 78P/8 covering parts of Agartala and Khowai districts, Tripura.	Tripura	184 sq. km
10	GCM	Geochemical mapping in toposheet no. 83G/3 covering areas of parts of Dima Hasao District of Assam.	Assam	136 sq. km

Sr. No.	Item Type	Title of the Item	State	Target Achieved from 1 st April, 2021 to 31 st December, 2021
11	GCM	Geochemical mapping in toposheet no. 83G/4 covering parts of Cachar, Dima Hasao Districts of Assam and Tamenglong District of Manipur. (Only 1 sq. km. falls in Tamenglong District, Manipur.)	Assam	80 sq. km
12	GCM	Geochemical mapping in toposheet no. 83I/09 covering parts of Lepa Rada and Upper Subansiri districts of Arunachal Pradesh.	Arunachal Pradesh	288 sq. km
13	GCM	Geochemical mapping of part of toposheet 78A/10 covering parts of North District, Sikkim.	Sikkim	152 sq. km
14	GCM	Geochemical mapping in Toposheet no. 83 J/14 in parts of Longleng, Mon & Mokokchung Districts of Nagaland.	Nagaland	220 sq. km
15	GCM	Geochemical Mapping in toposheet no. 78K/02 in West Garo Hills District, Meghalaya and a small part of Goalpara District, Assam.	Meghalaya	310 sq. km
16	GCM	Geochemical mapping in toposheet number 78K/6 in parts of West and East Garo Hills districts of Meghalaya.	Meghalaya	376 sq. km
17	GCM	Geochemical mapping in Toposheet No. 78K/11 covering parts of East and South Garo Hills districts, Meghalaya.	Meghalaya	292 sq. km

Annexure 11.3

Two GPM items in North & West Garo Hills districts, Meghalaya and Goalpara district, Assam and East, West & South Garo Hills Districts, Meghalaya has been taken up during FS 2021-22 and an area of 1420sq. km have been covered during the period from 1st April 2021 to 31st December, 2021.

FS. 2020-21

Sr. No.	Item Type	Title of the Item	State	Achievement between 1 st January, 2021 and 31 st March, 2021
1	GPM	Geophysical Mapping in Toposheet Nos. 78K/15 and 78O/3 covering parts of South Garo Hills, West Khasi Hills and South West Khasi Hills districts of Meghalaya.	Meghalaya	1350 sq. km
2	GPM	Geophysical mapping in Toposheet Nos. 78K/13 and K/14, covering parts of East, South & North Garo Hills & West Khasi Hills districts of Meghalaya and Goalpara, district of Assam.	Meghalaya and Assam	1050 sq. km

FS: 2021-22

Sr. No.	Item Type	Title of the Item	State	Achievement between 1 st April, 2021 and 31 st December, 2021
1	GPM	Geophysical mapping in toposheet nos. 78K/5 & 78K/9 covering parts of North & West Garo Hills districts, Meghalaya and Goalpara district, Assam.	Meghalaya and Assam	900 sq. km
2	GPM	Geophysical mapping in Toposheet nos. 78 K/6 & 78 K/10 covering parts of East, West & South Garo Hills Districts, Meghalaya.	Meghalaya and Assam	520 sq. km

Annexure 11.4

One item of Photo Geology and Remote Sensing (PGRS) is taken up on 1:50,000 Scale during FS 2021-22 in parts of West Garo Hills District Meghalaya using ASTER and Landsat 8 OLI and an area of 700 sq. km has been covered during the period from 1st April 2021 to 31st December 2021.

FS: 2021-22

Sr. No.	Item Type	Title of the Item	State	Achievement between 1st April, 2020 and 31st December, 2020
1	PGRS	Delineation of high altitude Bauxites and associated minerals developed over AMGC in toposheets no. 78K/01 West Garo Hills District Meghalaya using ASTER and Landsat 8 OLI data.	Meghalaya	700 sq. km

Annexure 11.5

**Total 406.1 m drilling has been done during the period from
1st January, 2021 to 31st March, 2021.**

FS: 2020-21

Sl. No.	Title	UNFC Stage	Commodity
1	Reconnaissance survey for orogenic Gold mineralization in upper reaches of Siyom valley, West Siang district, Arunachal Pradesh.	G4	Gold
2	Preliminary Exploration for Graphite and Vanadium mineralisation in Radhpu block, Lower Subansiri District, Arunachal Pradesh	G3	Graphite and Vanadium
3	Reconnaissance survey for graphite and Vanadium mineralisation in Kalaktang-Amatulla area, West Kameng district, Arunachal Pradesh.	G4	Graphite and Vanadium
4	Reconnaissance survey for Graphite and Vanadium mineralisation in Kalamati area, West Siang district, Arunachal Pradesh.	G4	Graphite and Vanadium
5	Reconnaissance survey for orogenic Gold mineralisation in Siyom valley, West Siang district, Arunachal Pradesh.	G4	Gold
6	Preliminary Exploration for Vanadium and associated minerals around saiya area, Lower Subansiri district, Arunachal Pradesh.	G3	Vanadium
7	Preliminary exploration for gold, vanadium and associated minerals in Phop area, Lower Subansiri district, Arunachal Pradesh	G3	Gold and Vanadium
8	Preliminary Exploration for REE and associated precious and basemetal in Lodoso East Block, Papum Pare District, Arunachal Pradesh.	G3	REE
9	Reconnaissance survey for REE mineralisation in Panbari-Geleki area, Karbi Anglong District, Assam.	G4	REE
10	Preliminary exploration for molybdenum and associated mineralization in the area between Helagog-Khaloibari, Kamrup Metropolitan District, Assam.	G3	Molybdenum
11	Reconnaissance survey for placer gold in Subansiri basin, North Lakhimpur district, Assam.	G4	Gold

Sl. No.	Title	UNFC Stage	Commodity
12	Reconnaissance survey for nickeliferrous laterite, chromium, PGE and associated base metals around Mollen-Washelo in ultramafic-mafic rocks in part of Ophiolite Belt, Phek District, Nagaland	G4	Nickel, Chromium, PGE
13	Reconnaissance survey for Ni, Cu, and PGE in Moreh to Minau areas, Manipur Ophiolite Belt, Tengnoupal and Chandel Districts, Manipur	G4	Nickel, Cu, PGE
14	Reconnaissance survey for shale gas around Chedema-Dihoma area, Kohima District, Nagaland	G4	Shale Gas
15	Reconnaissance survey for Tungsten and associated mineralisation in Nengker block, East Garo Hills District, Meghalaya	G4	Tungsten
16	Reconnaissance survey for Tungsten mineralisation in Tura area, West Garo Hills District, Meghalaya	G4	Tungsten
17	Reconnaissance survey for REE and other associated minerals in parts of East Khasi Hills, West Khasi Hills & Ribhoi districts, Meghalaya.	G4	REE
18	Reconnaissance survey for Tungsten mineralisation in Manai-Mairang Block, West Khasi Hills district, Meghalaya	G4	Tungsten
19	Regional Mineral targeting over the Pan-African Granitic plutons of Shillong Plateau	RMT	REE
20	Reconnaissance Survey for graphite and base metal mineralisation around Chitre-Dhareli-Kalijhar areas, West district, Sikkim (G4)	G4	Graphite

Total 961.41 m drilling has been done during the period from 1st April, 2021 to 31st December, 2021.

FS: 2021-22

Sl. No.	Title	UNFC Stage	Commodity
1	Preliminary Exploration for Vanadium, and associated minerals around Sito-Sikhe areas, Lower Subansiri District, Arunachal Pradesh.	G3	Vanadium

Sl. No.	Title	UNFC Stage	Commodity
2	Reconnaissance Survey for vanadium, graphite, REE, and base metals, in and around Kaying Village, West Siang district, Arunachal Pradesh	G4	Vanadium, Graphite, REE, Base metal
3	Reconnaissance survey for vanadium, graphite and associated elements in Talangriang-Pakba-Jamin areas of Kra-Daadi District, Arunachal Pradesh	G4	Vanadium, Graphite
4	Reconnaissance survey for Lithium, tin & tungsten minerals in Nafra area, West Kameng District, Arunachal Pradesh.	G4	Lithium, Tin, Tungsten
5	Preliminary Exploration for Graphite and Vanadium mineralisation in Radhpu block, Lower Subansiri District, Arunachal Pradesh	G3	Graphite, Vanadium
6	Reconnaissance survey for Tantalum and Caesium in Seppa area, East Kameng District, Arunachal Pradesh	G4	Tantalum, Caesium
7	Preliminary Exploration for Vanadium, Graphite and associated minerals around Pakro block, Pakke Kessang district, Arunachal Pradesh	G3	Vanadium, Graphite
8	Reconnaissance survey for Graphite and Vanadium mineralisation in Kalamati area, West Siang district, Arunachal Pradesh.	G3	Graphite, Vanadium
9	Reconnaissance survey for REE mineralisation in and around Lakhojan area, Karbi Anglong district, Assam.	G4	REE
10	Preliminary exploration for molybdenum and associated mineralization in the area between Helagog-Khaloibari, Kamrup Metropolitan District, Assam.	G3	Molybdenum
11	Reconnaissance survey for phosphatic nodules in shales of Kopili Formation in Siju Block, South Garo Hills District, Meghalaya.	G4	Phosphorite
12	Reconnaissance survey for basemetal mineralization in Jalwagiri and Gambil area, East Garo Hills district, Meghalaya	G4	Basemetal

Sl. No.	Title	UNFC Stage	Commodity
13	Reconnaissance survey for basemetal and polymetallic mineralisation along Barapani Shear Zone in and around Mawlyndep-Mawmin-Nongbsap villages, East Khasi Hills District, Meghalaya	G4	Base metal
14	Reconnaissance survey for tungsten and associated mineralization around Kyrdem area, in parts of East Khasi Hills district, West Jaintia Hills District and Ri-Bhoi District, Meghalaya.	G4	Tungsten
15	Preliminary exploration for nickeliferous laterite in Manipur-Nagaland Ophiolite Belt exposed at Chalwa-Kwatha area, Tengnoupal District, Manipur	G3	Nickel
16	Preliminary exploration for nickeliferous laterite in Naga-Manipur Hills Ophiolite around Champhai-Hermon area, Manipur	G3	Nickel
17	Reconnaissance survey of chromite around Phangrai-Lunghar area, Naga Hills Ophiolite Belt, Ukhrul District, Manipur	G4	Chromite
18	Reconnaissance survey for shale gas around Chedema-Dihoma area, Kohima District, Nagaland	G4	Shale Gas

Annexure 14.1

List of Nodal Officers, CPIOs and Appellate Authorities in Ministry of Mines

Nodal Officer (RTI)	CPIO (RTI)	ACPIO (RTI)
<p>Shri A. R. Sengupta, Deputy Secretary</p> <p>Room No.: 309-D Wing, III Floor, Shastri Bhawan, New Delhi - 110001</p> <p>Tel No. :23381172 E-mail : ar.sengupta@nic.in</p>	<p>Shri Yogesh R. Patel, Under Secretary</p> <p>Room No.: 303, D Wing, III Floor, Shastri Bhawan, New Delhi – 110001 Tel No.: 23383946 E-mail: yogesh.patel77@nic.in</p>	<p>Ms. Preetha Sacheendran, Section Officer</p> <p>Room No.: 301-D Wing, III Floor, Shastri Bhawan, New Delhi – 110 001</p> <p>Tel No.: 23382715 Email: preetha.sachin@nic.in</p>

Sl. No.	CPIO	Subject matter dealt (Section)	Appellate Authority
1.	<p>Sh. Yogesh R. Patel, Under Secretary</p> <p>Room No.: 303-D Wing, III Floor, Shastri Bhawan, New Delhi - 110001</p> <p>Tel No. : 23383946 E-mail : yogesh.patel77@gov.in</p>	Establishment	<p>Sh. H. K. Mallick, Deputy Secretary</p> <p>Room No.: 307-D Wing, III Floor, Shastri Bhawan, New Delhi - 110001 Tel No. : 23388061 E-mail : hk.mallick@nic.in</p>
		Revision Cell	
		Administration (including Cash, Library & Records), R & I	<p>Shri A.R. Sengupta, Dy. Secretary</p> <p>Room No.: 309-D Wing, III Floor, Shastri Bhawan, New Delhi – 110001 Tel No. :23381172 E-mail : ar.sengupta@nic.in</p>
		Public Grievance	
2.	<p>Smt. Lakshmi Subramanian, Under Secretary</p> <p>Room No.: 303-D Wing, III Floor, Shastri Bhawan, New Delhi - 110001 Tel No. : 23387223 E-mail : lakshmi.s@nic.in</p>	Vigilance	<p>Shri Amit Saran, Director</p> <p>Room No.: 310-D Wing, III Floor, Shastri Bhawan, New Delhi - 110001 Tel No. : 23381136 E-mail : amit.saran@nic.in</p>
		Metal-III (Copper & related matters), (HCL, etc.)	<p>Sh. Sanjeev Verma, Director</p> <p>Room No.: 315-D Wing, III Floor, Shastri Bhawan, New Delhi – 110001 Tel No. : 23070260 E-mail : sanjeev.verma79@gov.in</p>
		Metal-II (Other Metals related matters), (BGML, HZL etc.)	

Sl. No.	CPIO	Subject matter dealt (Section)	Appellate Authority
3.	Sh. M.R. Sathyanarayanan, Under Secretary Room No.: - Tel No. : - E-mail : s.narayanan@nic.in	Mines IV Section: (RAKIA) Matter related to RAKIA Arbitration	Shri Mustaq Ahmad, Director Room No.: 313-D Wing, III Floor, Shastri Bhawan, New Delhi - 110001 Tel No. : 23383576 E-mail : mustaqahmad.dad@gov.in
		Mines IV Section: Sand Mining & Auctions Monitoring (Including 2020 MLs), DMF, PMKKKY	
		Mines V Section: Policy, DGFT matters, Illegal Mining (all cases except Beach Sand Minerals), Royalty Study Group	
4.	Shri Ajay Kumar Kadian, Under Secretary Room No.: 314-D Wing, III Floor, Shastri Bhawan, New Delhi - 110001 Tel No. : 23070376 E-mail : ajay.kadian@nic.in	Coordination	Shri S Arputha Swamy, Director Room No.: 311-D Wing, III Floor, Shastri Bhawan, New Delhi - 110 001 Tel No.: 23073046 E-mail: arputhaswamy.s@gov.in
		National Conclave of Mines and Minerals Conference/ Workshops/ Meetings	Shri Vivek Kumar Sharma Director Room No.: -308 D Wing III Floor, Shastri Bhawan, New Delhi - 110001 Tel No.: - 23388345 E-mail: vksharma.ofb@gov.in
		Parliament	Shri A. R. Sengupta, Deputy Secretary Room No.: 309-D Wing, III Floor, Shastri Bhawan, New Delhi – 110001 Tel No. :23381172 E-mail : ar.sengupta@nic.in
		International Cooperation (including KABIL)	Sh. Sanjeev Verma, Director Room No.: 315-D Wing, III Floor, Shastri Bhawan, New Delhi – 110001 Tel No. : 23070260 E-mail : sanjeev.verma79@gov.in
		Information Technology/ Website/ Social Media & Advanced technology (AI/ Robotics) etc.	

Sl. No.	CPIO	Subject matter dealt (Section)	Appellate Authority
5.	Shri Vikas Raj, Under Secretary Room No.: 303-D Wing, III Floor, Shastri Bhawan, New Delhi - 110001 Tel. No: 23070375 E-mail : Vikas.raj@nic.in	Mines I: (Exploration Matters) (MECL, GSI), All Technical matters including exploration and Survey, National Geoscience Award, Budget, FSP etc. and IGC	Shri Pradeep Singh, Director Room No.: 306-D Wing, III Floor, Shastri Bhawan, New Delhi - 110001 Tel No. : 23384741 E-mail : pradeep.singh.gsi@gov.in
		Mines II: (GSI Establishment matters)	Shri Amit Saran, Director Room No.: 310-D Wing, III Floor, Shastri Bhawan, New Delhi - 110001 Tel No. : 23381136 E-mail : amit.saran@nic.in
		Metal-I (Aluminium & Bauxite matters), (NALCO, KABIL etc.)	Sh. Sanjeev Verma, Director Room No.: 315-D Wing, III Floor, Shastri Bhawan, New Delhi - 110001 Tel No. : 23070260 E-mail : sanjeev.verma79@gov.in
		Metal- IV (S & T) (Science and Technology projects & institutions) including NIRM, & JNARDDC	Shri Vivek Kumar Sharma Director Room No.: -308 D Wing III Floor, Shastri Bhawan, New Delhi - 110001 Tel No.: - 23388345 E-mail: vksharma.ofb@gov.in
6.	Shri Abhishek Kumar Upadhyaya, Under Secretary Room No.: 314-D Wing, III Floor, Shastri Bhawan, New Delhi - 110001 Tel No. : -23384743 E-mail: ak.upadhyaya@nic.in	Mines VI Section: (Act, Legislation & Policy issues) Legislation & legal matters, All Rule & Policy related work	Shri. Dheeraj Kumar, DS (DK-Lateral) Room No.: -101 A Wing III Floor, Shastri Bhawan, New Delhi - 110001 Tel No.: - 23384886 E-mail: dkvaisya@gmail.com

Sl. No.	CPIO	Subject matter dealt (Section)	Appellate Authority
		Mines VI Section: LIMBS (All Legal cases)	
		Monitoring and Coordination of all legal matter.	
		Mines VI Section: Offshore Mining, OAMDR related work and Illegal mining of Beach Sand Minerals	Shri Mustaq Ahmad, Director Room No.: 313-D Wing, III Floor, Shastri Bhawan, New Delhi - 110001 Tel No. : 23383576 E-mail : mustaqahmad.dad@gov.in
		Mines III Section: (IBM Matters), IBM Estt. & Budget Matters, MTS, MSS, Star Rating etc.	Shri Vivek Kumar Sharma, Director Room No.: -308 D Wing III Floor, Shastri Bhawan, New Delhi - 110001 Tel No.: - 23388345 E-mail: vksharma.ofb@gov.in
7.	Section Officer Room No. : 338 'A' - Wing III Floor, Shastri Bhawan, New Delhi – 110 001 Tel. No. – 23384985 Email – prasenjit. dey49@nic.in	Integrated Finance	Shri A.R. Sengupta, Dy. Secretary Room No.: 309-D Wing, III Floor, Shastri Bhawan, New Delhi – 110001 Tel No. :23381172 E-mail : ar.sengupta@nic.in
8.	Shri Rajendra Prasad, Deputy Director Room No.: 114-F Wing, I Floor, Shastri Bhawan, New Delhi – 110 001 Tel No.: 23384741 E-mail:rajendraprasad. gsi@gov.in	NMET Cell	Shri Amit Saran, Director Room No.: 310-D Wing, III Floor, Shastri Bhawan, New Delhi – 110 001 Tel No.: 23381136 E-mail: amit.saran@nic.in

Sl. No.	CPIO	Subject matter dealt (Section)	Appellate Authority
9.	<p>Sh. Ashok Kumar Prasad Assistant Director</p> <p>Room No.: 305-D Wing, III Floor, Shastri Bhawan, New Delhi - 110001 Tel No. : 23383085 E-mail: ashokk.prasad@nic.in</p>	Official Language Section Hindi	<p>Ms. Pushpalata, Deputy Director</p> <p>Room No.: 303-D Wing, III Floor, Shastri Bhawan, New Delhi - 110001 Tel No. : 23073046 E-mail : pushpa.lata@nic.in</p>
10.	<p>Ms. Saloni, Assistant Director</p> <p>Room No.: 304-D Wing, III Floor, Shastri Bhawan, New Delhi – 110001</p> <p>Tel No.: 23387919 Email: saloni@gov.in</p>	Economic, Statistical and Planning Section: Mining sector growth analysis and Economic scenario building, Trade issues (FTAs) & Economic inputs on all matters concerned, GST matters, Production, import, export data and its analysis, Public Procurement (Preference to Make in India), Skill Development, SGOS matters, Statistical Publications of the ministry related to metal and mineral and statistical inputs for policy formulation and Vision document, Mineral / Metal wise vision plan.	<p>Shri S Arputha Swamy, Director</p> <p>Room No.: 311-D Wing, III Floor, Shastri Bhawan, New Delhi - 110 001 Tel No.: 23073046 E-mail: arputhaswamy.s@gov.in</p>

