सत्यमेव जयते

Government of India

Ministry of Mines

Annual Report 2024-25

GOVERNMENT OF INDIA

MINISTRY OF

MINES

ANNUAL REPORT 2024-25

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 & Consultancy 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

BEE	Bureau of Energy Efficiency
BGML	Bharat Gold Mines Limited
BISAG	Bhaskaracharya Institute for Space Applications and Geo-informatics
BSE	Bombay Stock Exchange
CGPB	Central Geological Programming Board
CHQ	Central Head Quarter
CIMFR	Central Institute of Mining and Fuel Research
CMPDI	Central Mine Planning & Design Institute
CPCB	Central Pollution Control Board
CPGRAMS	Centralized Public Grievance Redressal and Monitoring System
CSR	Corporate Social Responsibility
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
ERP	Enterprise Resource Planning
FC	Forest Clearance
FMCP	Final Mine Closure Plan
FS	Field Season
FY	Financial Year
GCM	Geochemical Mapping
GDP	Gross Domestic Product
GEM	Government e-Market
GIGW	Guidelines for Indian Government Websites
GPM	Geophysical Mapping
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
IBAAS	International Bauxite, Alumina and Aluminium Society
IBM	Indian Bureau of Mines
ICC	Indian Copper Complex
ICSG	International Copper Study Group
IEC	Information Education and Communication
IGC	International Geological Congress
IMYB	Indian Mineral Year Book
ITEC	Indian Technical Economic Cooperation
JNARDDC	Jawaharlal Nehru Aluminium Research Development and Design Centre
JWG	Joint Working Group
KABIL	Khanij Bidesh India Limited
KCC	Khetri Copper Complex
KMS	Knowledge Management System
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 & Consultancy Limited
ML	Mining Lease
MMDR Act	Mines & Minerals (Development and Regulation) Act, 1957
MoC	Ministry of Coal
MoEF & CC	Ministry of Environment, Forest and Climate Change
MoM	Ministry of Mines
MoU	Memorandum of Understanding
MPD	Mineral Processing Division
MSDE	Ministry of Skill Development and Entrepreneurship

MSS	Mining Surveillance System
MT	Magnetotelluric
MTS	Mining Tenement System
MEQ	Micro-Earthquake
NALCO	National Aluminium Company Limited
NER	North Eastern Region
NGCM	National Geochemical Mapping
NGDR	National Geoscience Data Repository
NIRM	National Institute of Rock Mechanics
NLSM	National Landslide Susceptibility Mapping
NMEP	National Mineral Exploration Policy
NMET	National Mineral Exploration Trust
NMI	National Mineral Inventory
NMP	National Mineral Policy
NRSC	National Remote Sensing Centre
NRTC	NALCO Research & Technology Centre
NSDC	National Skill Development Corporation
NSE	National Stock Exchange
NCEGR	National Centre of Excellence in Geoscientific Research
NEA	Notified Exploration Agency
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
OSPCB	Odisha State Pollution Control Board
PERC	Project Evaluation and Review Committee
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
RP	Reconnaissance Permit
RSAS	Remote Sensing and Aerial Survey
RTI	Right to Information
R&D	Research & Development
RMT	Regional Mineral Targeting
SAIL	Steel Authority of India Ltd.
SCSP	Special Component Plan for Scheduled Caste
SDF	Sustainable Development Framework
SDGs	Sustainable Development Goals
SGM	Systematic Geological Mapping
SGPB	State Geological Programming Board
S&T-PRISM	Science & Technology Programme- Promotion of Research and Innovation in Startups and MSMEs in Mining, Mineral Processing, Metallurgy and Recycling Sector
SOP	Standard Operating Procedure
SSAG	Standing Scientific Advisory Group
STM	Specialised Thematic Mapping
SU	State Unit
TCC	Technical-cum-Cost Committee
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	Video Conference
VPN	Virtual Private Network
WPI	Wholesale Price Index

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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 industrialization 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 ten 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 ensure security in minerals, including critical minerals, through enhanced domestic capacity, leverage multilateral and bilateral cooperation for resilient mineral supply chain, enhancing the participation of private sector in mineral exploration, low carbon mining and recycling of used products for minerals/metal extraction, Ease of doing business for transparent & equitable allocation and regulation of mineral resources and technology adaptation and development for efficient exploration and mining.

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 thereunder in respect of all mines and minerals other than coal, natural gas and petroleum. The Ministry also administers the Offshore Areas Mineral (Development and Regulation) Act, 2002 and rules made thereunder.

1.3 List of Subjects Allocated to the Ministry of Mines

(a) Legislation for regulation of mines and development of minerals within the territory of India, including mines and minerals underlying the ocean within the territorial waters or the continental shelf, or the exclusive economic zone and other maritime zones of India as may be specified, from time to time by or under any law made by the 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 there with or incidental thereto.

(c) All other metals and minerals not specifically allotted to any other Ministry/ Department, such as aluminum, 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 (GSI), Headquarters at Kolkata is an attached office and the Indian Bureau of Mines (IBM), 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 and Consultancy Limited (MECL), Nagpur

Autonomous Bodies

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

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

Organizational Structure

1.7 The Ministry of Mines is headed by Shri G. Kishan Reddy, Hon'ble Minister of Coal and Mines who assumed the charge, after the formation of new Government, on 11th June, 2024.

1.8 Shri Satish Chandra Dubey has assumed the charge of Hon'ble Minister of State for Coal and Mines on 11th June, 2024.

1.9 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 Eleven Directors / Deputy Secretaries, one Joint Director (Economic Service), two Deputy Directors (OL & IES), one Assistant Director (IES) and one Assistant Director (OL). Sanctioned strength and present incumbency of officers/officials in the Ministry of Mines is given at **Table 1.1**.

Organizational 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, 2024

Group	Sanctioned Strength	Total Number of present incumbents	No. of SC/ST/OBC/Women/PH Candidates in present incumbents				
			SC	ST	OBC	Women	PH
Group-A Gazetted	36	34	04	03	05	07	01
Group-B Gazetted	34	25	09	04	05	01	00
Group-B Non- Gazetted	56	40	08	04	15	06	01
Group-C	87	52	09	03	06	07	02
Total	**213**	**151**	**30**	**14**	**31**	**21**	**04**

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

1.10 As per the first advanced estimates of National Income for 2024-25 released by the National Statistical Office, Ministry of Statistics and Program Implementation, the 1st AE of GVA of mining and quarrying sector during 2024-25 at 2011-12 prices is Rs 3,47,271 crore, which shows a growth of 2.9% as compared to PE of GVA during 2023-24 at Rs 3,37,623 crore. The contribution of mining and quarrying sector is 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	**2024-25 (FAE)**	**2023-24 (PE)**
Mining and quarrying	5,39,567	5,25,881
Total	**2,92,63,609**	**2,67,62,147**
Contribution in %	1.84	1.96

FAE: First Advanced Estimate; PE: Provisional Estimate;
Source: MoSPI, Press Note on First Advanced Estimates of National Income for the year 2024-25.

1.11 Major Highlights/ Achievements and Events

National Events/ workshops

1.11.1 The 2nd State Mining Ministers' Conference was held on 23.01.2024 at Bhopal, Madhya Pradesh, presided over by the Hon'ble Union Minister of Parliamentary Affairs, Coal and Mines. The Chief Minister of Madhya Pradesh graced the occasion as Chief Guest. The Conference focused on strategic exploration, sustainable practices & technological advancements, besides opportunities in offshore mining and the importance of exploration and auction of critical minerals. The State Governments shared best practices followed by their States in area of mining with delegates of the Conference. On the sidelines of the said Conference, the 'Mining & Beyond' exhibition was also organized with mining companies, both from the public and private sector, notified private exploration agencies as well as start-ups from the mining sector. During the event Hon'ble Minister also launched the new regime of Exploration License for critical and deep seated minerals by unveiling the booklet containing four rules which were notified on 21.01.2024

1.11.2 The 63rd Central Geological Programming Board Meeting was held on 22.01.2024 at Bhopal, Madhya Pradesh under the Chairmanship of the Secretary, Mines..

1.11.3 A workshop on Critical Raw Materials for Low Carbon Technologies was organized from 30.01.2024 to 31.01.2024 in New Delhi by CEEW, CSEP, ICRIER, IISD and Shakti Sustainable Energy Foundation. Ministry of Mines highlighted key actions taken by the Government to strengthen India's position in securing Critical Raw Materials for a sustainable energy transition and to meet India's Net Zero targets. The Ministry's efforts in enhancing India's critical mineral sector through Policy Reforms, Global Partnerships were emphasized.

1.11.4 To meet the Nation's sustainable development goals for the coming decades and to fulfill the Hon'ble Prime Minister's vision of Aatmanirbhar Bharat, the 2nd Tranche of Auction of Critical and Strategic Minerals was launched by Shri Pralhad Joshi, Hon'ble Minister of Parliamentary Affairs, Coal & Mines on 29th February, 2024 at Scope Complex, New Delhi.

1.11.5 In the 2nd Tranche of auction, 18 blocks were launched consisting of 17 composite licence and 1 mining lease. These blocks consisted of critical and strategic minerals such as Tungsten, Vanadium, Graphite, REE, Glauconite, Phosphorite, Nickel, PGE, Chromium, Cobalt and Potash in 8 states viz., Andhra Pradesh-1, Arunachal Pradesh-4, Chhattisgarh-3, Karnataka-2, Madhya Pradesh-3, Maharashtra-2, Rajasthan-2 and Tamil Nadu-1.

1.11.6 In the same event Shri Pralhad Joshi, Hon'ble Minister of Parliamentary Affairs, Coal & Mines on 29.02.2024 handed over letters of Financial Grants of Rs. 5.96 Crore to five Start-Ups and MSME. Further, on the sidelines of these events, as a part of the Mission Karmayogi Bharat, the Annual Capacity Building Plan (ACBP) for the Geological Survey of India (GSI) was also formally released by Shri Pralhad Joshi, Hon'ble Minister of Parliamentary.

1.11.7 Ministry of Mines launched the third tranche of E-auction of Critical & Strategic Minerals on 14th March 2024 in New Delhi. A total of 7 critical mineral blocks were put up for auction as composite license in this Tranche. These 07 blocks pertain to critical minerals such as Glauconite, Graphite, Nickel, PGE, Potash, Lithium, and Titanium and are spread across the States of Bihar, Jharkhand, Tamil Nadu, Uttar Pradesh and Union Territory of Jammu and Kashmir.

1.11.8 To foster collaboration and innovation in critical minerals beneficiation and processing, this Ministry, in collaboration with the Shakti Sustainable Energy Foundation (SSEF), the Council on Energy, Environment and Water (CEEW) and the International Institute for Sustainable Development (IISD), organised a highlevel conference 'The Critical Minerals Summit: Enhancing Beneficiation and Processing Capabilities', on April 29th & 30th, 2024, at the India Habitat Centre in New Delhi. On the sidelines of this event, a MoU was signed between Ministry of Mines and SSEF for providing knowledge support in the field of critical minerals.

1.11.9 Under the chairmanship of Secretary, Ministry of Mines a Workshop/Webinar was conducted on 15.05.2024 at Dr. Ambedkar International Centre, New Delhi on pre-auction discussion with stakeholders on offshore mining and draft rules made under the Offshore Areas Mineral (Development & Regulation) Act, 2002. The workshop was attended by industry associations; academia; Ministries and Departments, institutions working in ocean technology, oceanography; CISR and few international firms working in Deep-sea mining.

1.11.10 A Workshop on Granite & Marble Mining was jointly organized by Ministry of Mines along with State Government of Karnataka on 29.05.2024 at Bangaluru which was inaugurated by Secretary (Mines) along with Additional Chief Secretary and Development Commissioner, Government of Karnataka. The workshop was attended by State Governments and Industry Associations.

1.11.11 Hon'ble Minister of Coal and Mines, Shri G. Kishan Reddy and Hon'ble Minister of State for Coal and Mines, Shri Satish Chandra Dubey launched the 4th tranche of auction of critical and strategic minerals at a ceremony held on 24.06.2024 at Scope Convention Centre, CGO Complex, New Delhi. The occasion witnessed string of other events like announcement of preferred bidders for the 6 blocks auctioned in the 1st Tranche, presentation of certificates to 02 newly Notified Private Exploration Agencies (NPEAs), issuance of sanction letters to different R&D institutes and introduction of a scheme for partial reimbursement of exploration expenses for exploration license holders. The 4th tranche of auction comprised 21 blocks of Critical Minerals, encompassing 11 new blocks and 10 "second attempt" blocks from previous tranches.

1.11.12 Shri G. Kishan Reddy, Hon'ble Minister of Coal & Mines inaugurated DMF Gallery in Shastri Bhawan on 02.07.2024 in the presence of Hon'ble Minister of State, Shri Satish Chandra Dubey. The DMF Gallery showcase the products of Self Help Groups (SHGs) formed under District Mineral Foundation/ Pradhan Mantri Khanij Kshetra Kalyan Yojana & SHGs supported by Mining Companies under their Corporate Social Responsibility in the premises of Shastri Bhawan, New Delhi.

1.11.13 Shri G. Kishan Reddy, Hon'ble Minister of Coal & Mines inaugurated National Landslide Forecasting Centre (NLFC) at GSI, Dharitri Campus, Salt Lake City, Kolkata on 19.07.2024. Hon'ble Minister also launched the Bhusanket Web portal and Bhooskhalan Mobile App. The NLFC is a pioneering initiative aimed at landslide hazard mitigation in India & will issue an early warning bulletin for all landslide prone states, operationalising the Landslide Early Warning System by 2030. Integrated with the Bhusanket Web Portal, the userfriendly Bhooskhalan Mobile app will enable quick dissemination of daily landslide forecasts and allow stakeholders to share and update spatial and temporal information on landslide occurrences.

1.11.14 Shri G. Kishan Reddy, Hon'ble Minister of Coal and Mines along with Shri. Vijay Kumar Sinha, Deputy Chief Minister, Bihar inaugurated the mineral exploration hackathon organized by Geological Survey of India in association with Ministry of Mines on 20.07.2024 at Hyderabad.

1.11.15 Union Budget 2024-25 annnounced setting up of Critical Mineral Mission for domestic production, recycling of critical minerals, and overseas acquisition of critical mineral assets. In the budget, cutoms duties have been eliminated on 25 critical minerals and reduced on 2 critical minerals.

1.11.16 Dr. Veena Kumari Dermal, Joint Secretary addressed the 'Govt and Industry Interaction on Critical Minerals & Emerging Renewable Energy Technologies' as the chief guest at roundtable discussion on "Quad Cooperation on Critical Minerals and Renewable Energy Technologies" on July 1, 2024, at the India Habitat Center, New Delhi organised by USIBC, NSEFI and Smart Energy Council.

1.11.17 Hon'ble Minister of Coal & Mines Shri G. Kishan Reddy in the presence of Hon'ble Minister of State for Coal & Mines, Shri Satish Chandra Dubey awarded top–performing mines for 2022-23 in a ceremony hosted by

the Indian Bureau of Mines (IBM) and Ministry of Mines at New Delhi on 07.08.2024. During the event, 68 mines which have attained five star rating during the FY 2022-23 were honoured. Hon'ble Minister of Coal & Mines Shri G. Kishan Reddy launched two new modules of the Mining Tenement System (MTS) Application – the final Mine Closure Plan module and Exploration Licence/Composite Licence/Prospecting Licence module at the event.

1.11.18 Hon'ble Minister of Coal & Mines Shri G. Kishan Reddy addressed the national seminar on challenges and opportunities in the mines and minerals sector organized by the Mining, Geological, Metallurgical Institute of India, in New Delhi on 08.08.2024. The seminar was attended by several key dignitaries and senior officers from the Ministry of Coal and Ministry of Mines along with a spectrum of coal and mines stakeholders from Government. Hon'ble Minister also engaged in a constructive discussion with CEOs from both private and public sector companies involved in the mining and exploration industries during the event.

1.11.19 Hon'ble President of India, Smt. Droupadi Murmu, conferred the prestigious National Geoscience Awards (NGA) for the year 2023 at a grand ceremony held on 20.08.2024 at the Rashtrapati Bhavan Culture Centre, New Delhi. The event was graced by presence of Hon'ble Minister of Coal & Mines, Shri G. Kishan Reddy and Hon'ble Minister of State for Coal & Mines Shri Satish Chandra Dubey. This year, a total of 12 awards to 21 Geoscientists, including academicians and professionals from across the country, were honoured under three categories: National Geoscience Award for Lifetime Achievement (01 award), National Geoscience Award (10 awards) and National Young Geoscientist Award (01 award) in various specialised fields of geosciences.

1.11.20 In a landmark move to strengthen India's position in the global green technology sector, the Ministry of Mines successfully hosted the Budget Seminar on the National Critical Minerals Mission on 14.08.2024 in New Delhi. The seminar underscored the Government's unwavering commitment to advancing India's selfreliance in essential raw materials critical for economic growth and the transition to net-zero emissions.

1.11.21 UNESCO & GSI unites for a collaborative training cum workshop at New Delhi, commenced with the gracious presence of Shri V.L. Kantha Rao, Secretary, Ministry of Mines, DG, GSI, Mr. Tim Curtis, Director, UNESCO & Ms. Neeta Prasad, JS, Ministry of Higher Education. The 4-day event, from 23-26 September 2024, aims to promote the UNESCO Global Geoparks philosophy in India, combining lecture sessions with a field visit. A status on geoheritage site in India was presented by GSI.

1.11.22 Hon'ble Minister of State for Coal and Mines, Shri Satish Chandra Dubey inaugurated the resumption of Surda Mine operations at Ghatsila, Jharkhand on 5.10.2024 the resumption of Surda Mine operation is a significant step towards making the nation self-reliant in copper.

1.11.23 Ministry of Mines conducted an event on Launch of 1st Tranche of Auction of offshore areas mineral blocks under Chairmanship of Hon'ble Union Minister of Coal & Mines, Shri G. Kishan Reddy on 28.11.2024 at New Delhi, with the different stakeholders. The event was attended by different Departments of the Central Government, Foreign Delegates, State Government, Government organizations/ Institutions, Public Sector Undertakings, Industry associations, academia, institutions working in ocean technology, oceanographers, CISR and a few international firms working in Deep- sea mining and private companies.

International Events / Cooperations

1.11.24 An Indian delegation from the Ministry of Mines participated in the 'Future Minerals Forum 2024' held at Riyadh, Saudi Arabia from 9th to 11th January, 2024. The delegation highlighted Reforms introduced in the Indian Mining Sector and shared key insight on exploration and spotlighting 20 critical mineral blocks for auction.

1.11.25 Khanij Bidesh India Limited (KABIL) signed an Exploration and Development Agreement with CAMYEN, a state-owned enterprise of Catamarca province of Argentina, for Exploration & mining for 5 Lithium Blocks in Argentina on 15.01.2024. The signing ceremony was virtually attended by the Hon'ble Minister of Parliamentary Affairs, Coal and Mines and Secretary (Mines). From Argentinean side H. E. Shri. Raul Jalil, Governor of Catamarca Province, Argentina and other senior officials of CAMYEN attended the ceremony. This strategic move not only strengthens the bilateral ties between India and Argentina but also contributes to the sustainable development of the mining sector.

1.11.26 The 7th India-US forum was held from 27th to 29th January, 2024 at New Delhi. This event was attended by the Secretary, MoM on 28.01.2024. During the event Secretary, MoM, stated that both countries would take up joint projects on Geoscientific Data Processing, R & D in the processing of Critical Minerals, opportunities for Junior Mining Companies and the recycling of Critical Minerals

1.11.27 A meeting of the Secretary, Ministry of Mines with a US delegation headed by Mr. Geoffrey Pyatt, Assistant Secretary for Energy Resources, USA was held on 29.01.2024. Objective of the meeting was to have deliberation on exploring opportunities for collaboration in the realms of clean energy and critical minerals, with a focus on leveraging the iCET, MSP, and IPEF platforms for enhanced cooperation.

1.11.28 An India Delegation led by Additional Secretary, M/o Mines participated in Mining Indaba-2024 event held at Cape Town, South Africa from 5th to 8th February, 2024. An Indian Pavilion was also set up to showcase capability and opportunity in Indian mining and mineral sector. Further, an MoU between Ministry of Mines, Government of India and Government of Republic of Cote d'Ivoire for collaboration in the field of Geology and Mineral Resources has been signed on the sideline of Mining Indaba-2024.

1.11.29 A Bilateral meeting held on 21st February, 2024 in Ministry of Mines, between Shri Pralhad Joshi, Hon'ble Minister of Parliamentary Affairs, Coal & Mines with Canadian delegation led by Mr. Scott Moe, Hon'ble Premier of Saskatchewan, a province of Canada to explore opportunities for collaborative efforts in joint research and development programs in the realm of critical minerals value chain and the clean energy sector.

1.11.30 Secretary, Mines led an Indian delegation to participate in Prospector Developers Association of Canada (PDAC)-2024 event held at Toronto, Canada from 3rd to 6th March, 2024. An Indian Pavilion was set up to showcase capability and opportunity in Indian mining and mineral sector. An India Day Session was also held on 4th March, 2024 at PDAC-2024.

1.11.31 Secretary, Mines conducted a bilateral meeting through VC with Dr. Sethuraman Panchanathan, Director, NSF, USA on 22.03.2024 to discuss about taking Collaborative Projects on Critical Minerals under the initiative on Critical and Emerging Technology (iCET) platform

1.11.32 In order to improve the supply chain in metal sector specially Critical Minerals and to enhance cooperation between India and Australia in mining sector, Secretary, Mines met

with Shri Gopal Baglay, High Commissioner-Designate to Australia on 5th April, 2024 in New Delhi. On the same day, Secretary, Mines virtually attended inaugural event of the 'Mineral Security Partnership (MSP) Forum' held in Leuven, Belgium

1.11.33 Secretary (Mines) led an Indian delegation during 14th to 18th April, 2024 to Santiago, Chile to participate in 105th International Organizing Committee Meeting of the World Mining Congress, CRU World Copper Conference and visit of associated Copper mines.

1.11.34 Secretary (Mines) chaired a meeting on 20.05.2024 with Asian Development Bank (ADB) to discuss Critical Minerals and supply chains, in Ministry of Mines regarding collaborations on Technical Assistance programme, Critical Mineral Fund and Green Mining Initiatives

1.11.35 An Indian delegation led by Shri Vivek Kumar Bajpai, Joint Secretary, Ministry of Mines participated in the 2nd Joint Working Group (JWG) for cooperation in the field of Geology and Mineral Resources between India and Zambia held during 10th to 11th June, 2024 in Lusaka, Zambia.

1.11.36 An Indian delegation led by Shri Vivek Kumar Sharma, Director, Ministry of Mines visited the Democratic Republic of Congo to participate in the DRC Mining Week Expo & Conference, held from 12th to 14th June, 2024, in Lubumbashi, Congo.

1.11.37 Secretary (Mines) led an Indian delegation to participate in BRICS Round Table on "Prospects for Cooperation in BRICS in the Sphere of Exploration and Management of Mineral Resources", Site visit to Nickel production facilities in Murmansk and Other Bilateral Meetings held in Moscow, Russia during 15th to 18th July, 2024. Secretary (Mines) also visited Kola Mining and Metallurgical Company production facilities, a subsidiary of MMC Norilsk Nickel, in the Murmansk region of Russia on 15.07.2024 to explore cooperation in Nickel/Cobalt Mining in India.

1.11.38 Secretary (Mines) met Shri Sanjuy Sudhir, Indian Ambassador, UAE, on 24.07.2024 in Ministry of Mines and discussed about possibilities of UAE's investment in India in mining sector.

1.11.39 Secretary (Mines) met HE Philip Green, Australian High Commissioner to India on 29.07.2024 in, Ministry of Mines, Shastri Bhawan, New Delhi to discuss on how we can take practical steps in our partnership on Critical Minerals and broader mining interests.

1.11.40 Dr. Veena Kumari Dermal, Joint Secretary addressed the diplomats from Colombia, Chile, Mexico, Moldova, and Peru on "Critical Minerals: Opportunities and Challenges" in the Sushma Swaraj Institute of Foreign Service, Ministry of External Affairs, New Delhi on 15.07.2024.

1.11.41 Secretary (Mines) held a meeting with the delegation of Burikina Faso on August 22, 2024 in Shastri Bhawan, New Delhi where representatives from Burkina Faso discussed about collaboration in field of artisanal mine modernization, mining technology, and cutting/polishing of building stone

1.11.42 For seeking the potential investors for Hindustan Zinc Limited (HZL), an Indian delegation led by Shri Vivek Kumar Bajpai, Joint Secretary, Ministry of Mines visited Hong Kong and Singapore to attend the Non-Deal International Road Shows for Hindustan Zinc Ltd. (HZL) from 26.08.2024 to 28.08.2024.

1.11.43 Secretary (Mines) led a delegation for International Non- Deal Roadshows (NDR) organized by DIPAM for seeking the investors interest in Hindustan Zinc Limited shares during 09-13 September in UK (London) &

USA (New York).

1.11.44 An Indian delegation led by Shri Sanjay Lohiya, Additional Secretary, Ministry of Mines attended the Mineral Security Partnership (MSP) Principals meeting and MSP Forum Meeting on 26.09.2024 in New York

1.11.45 Secretary (Mines) had a virtual meeting with Indian Mission in Australia on 27.09.2024 to discuss about the International Minerals and Resources Conference (IMARC) 2024 to be held in Sydney, Australia in October, 2024

1.11.46 The Ministry of Mines has signed a Memorandum of Understanding (MoU) with the International Energy Agency (IEA) On cooperation in the area of Critical Minerals by Secretary (Mines) and Dr. Faith Biro, Executive Director, IEA On 13th November, 2024. This collaboration marks a significant step towards securing India's Critical Mineral resources while aligning with global best practices in the critical mineral sector.

Legislative Reforms

1.11.47 During the 2nd State Mining Ministers' Conference held on 23.01.2024 in Bhopal, amendment to following rules were notified to enable the auction of newly introduced exploration licence:

i. The Mineral (Auction) Amendment Rules, 2024 have been notified vide G.S.R. 49(E) dated 21.01.2024 to implement the provision of exploration licence which was introduced through the MMDR Amendment Act, 2023.

ii. The Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Amendment Rules, 2024 have been notified vide G.S.R. 50(E) dated 21.01.2024 to implement the provision of exploration licence, to clarify provisions regarding disposal of minerals below threshold value and for rationalization of penalty for small miners having lease area up to 25 hectares and approved production up to 2.0 lakh tonnes.

iii. The Mineral Conservation and Development (Amendment) Rules, 2024 have been notified vide G.S.R. 51(E) dated 21.01.2024 for implementing provision of exploration licence, for rationalization of penalty for small miners having lease area up to 25 hectares and approved production up to 2.0 lakh tonnes and to relax the requirement of submission of mining plan for its review and for submission of self-assessment report for star rating, for mines where mining or mining operations have been discontinued and such discontinuance has been duly reported.

1.11.48 The Minerals (Evidence of Mineral Contents) Amendment Rules, 2024 have been notified vide G.S.R. 52(E) dated 21.01.2024 to implement the provisions of the MMDR Amendment Act, 2023

1.11.49 In exercise of the powers conferred by sub-section (3) of section 9 of the Mines and Minerals (Development and Regulation) Act, 1957 (MMDR), the Second Schedule to the MMDR Act, 1957 has been amended to specify the rates of royalty of certain critical & strategic minerals vide Notification No. G.S.R. 152 (E) dated 01.03.2024.

1.11.50 Union Cabinet on 29.02.2024 approved the proposals of the Ministry of Mines to amend the Second Schedule of the Mines and Minerals (Development and Regulation) Act, 1957 to rationalise the royalty rate of 12 critical and strategic minerals, viz., Beryllium, Cadmium, Cobalt, Gallium, Indium, Rhenium, Selenium, Tantalum, Tellurium, Titanium, Tungsten, and Vanadium.

1.11.51 In exercise of the powers conferred

by section 35 of the Offshore Areas Mineral (Development and Regulation) Act, 2002 (17 of 2003), the central Government made the rules, namely the Offshore Areas Mineral Conservation and Development Rules, 2024 vide G.S.R. 731(E) dated 31.12.2024

Miscellaneous Events

1.11.52 Secretary, M/o Mines held a meeting with Secretary, Department of Science & Technology (DST) on 08.02.2024. A Memorandum of Understanding (MoU) was signed between Geological Survey of India (GSI) and Survey of India (SOI) during the meeting fostering cooperation in Continuously Operating Reference Station (CORS) network utilization, data sharing, and more.

1.11.53 A big stride towards employment generation, Hon'ble Minister of State for Railways, Coal and Mines on the occasion of Rozgar mela handed over the appointment letters to the newly inducted recruits of GSI and HCL in a function organized by MoM, GoI in Kolkata on 12.02.2024. A total of 110 appointment letters were issued in the Rozgar Mela.

1.11.54 Southern Regional Chemical Laboratory becomes the first Chemical Laboratory of GSI accredited by NABL for the testing of Coal for proximate analysis as per IS 1350 Part I of Indian Standard methods formulated under Solid Mineral Fuels & Solid Biofuels Sectional Committee (PCD 07). On 12/03/2024, the Coal Testing Laboratory was granted accreditation in accordance with ISO/IEC 17025:2017 in the discipline of chemical testing (Certificate no. TC- 12917) by the National Accreditation Board for Testing and Calibration Laboratories (NABL), with issue date 13/01/2024 valid till 12/01/2026.

1.11.55 To give boost to Ministry of Mines programme "Promotion of Research and Innovation in Start-ups and MSMEs in mining, mineral processing, metallurgy and recycling sector (S&T-PRISM)", a Special Webinar on 10th April, 2024 with the gathering of more than 200 participants was organised for Start-ups, MSMEs and Individual Innovators working in the Mining & Metallurgical sector to explore avenues for advancing research and innovation in mining and mineral processing.

1.11.56 To discus and finalize the indicators of performance, a one-day workshop in collaboration with the Indian Institute of Technology- Indian School of Mines (IIT-ISM), Dhanbad on State Mining Index has been organized under chairmanship of Secretary (Mines) on 8th May, 2024. The Index would serve as a tool for stakeholders of the mining sector to understand various aspects related to the Ease of Doing Mining.

1.11.57 In order to push forward the goal of Atmanirbhar Bharat, Registered Office of Khanij Bidesh India Limited (KABIL) at PTI Building, Sansad Marg, New Delhi has been inaugurated by the Secretary (Mines) on 11 May, 2024. With a steadfast commitment to excellence, KABIL is poised to play a crucial role in driving India's growth and selfsufficiency in the realm of critical & strategic minerals aligning with the objectives of "Make in India" and "Viksit Bharat" and India achieving the Net Zero Emission Goal.

1.11.58 Secretary (Mines), along with officers/ officials of this Ministry, participated in the celebration of 10th International Yoga Day with the theme of 'Yoga for Self and Society' in New Delhi on 21.06.2024. In the event, while highlighting the importance of International Day of Yoga, all the participants were encouraged to practice Yoga daily to enrich their lives.

1.11.59 Hon'ble Minister of State for Coal and Mines, Sh. Satish Chandra Dubey and other officers visited several Geo-Heritage and Geo-Tourism sites across India to promote and

participate in the SHS -2024 campaign.

1.11.60 Ministry of Mines along with its field organisations has actively participated in the Swachhata Hi Sewa (SHS) Campaign 2024 from 17th September to 2nd October 2024. During campaign while adopting a 'Whole of Government' approach Ministry of Mines achieved notable success in promoting cleanliness, transforming Cleanliness Target Units (CTUs) and recognizing the vital contributions of Safai Mitras. A total of 510 events were successfully organized including transformation of 51 CTUs

1.11.61 Further in order to gear up for SHS-2024 campaign, under "Ek Ped Maa Ke Naam" drive Ministry of Mines planted 100 trees in New Delhi on 16.09.2024 and subsequently on 17.09.2024 all officers and officials took 'Swacchata Pledge' to reinforce their commitment to a cleaner environment. On 26.09.2024, Ministry in collaboration with Ministry of Health and Family Welfare organized a special TB screening camp for Safai Mitras and other staff

1.11.62 On the occasion of Maiden National Space Day celebrations at Bharat Mandapam, New Delhi, on 23.08.2024, Hon'ble President of India, Smt. Droupadi Murmu paid a visit to the Ministry of Mines stall evincing keen interest in the captivating array of rocks, meteorites, and other exhibits on display. Senior officers of the Indian Bureau of Mines were also present on the occasion.

1.11.63 Ministry of Mines and its agencies are among the top performer under Mission Karamyogi IGot. During the National Learning Week on 21st October,2024 Hon'ble Minister of Coal and Mines felicitated 13 employees in Delhi who have done more than 100 courses each through iGot platform.

1.11.64 The Ministry of Mines Pavilion has been awarded the First Position (Gold) for excellence in display in India International Trade Fair (IITF), 2024 out of 49 Ministries. The theme of Ministry's pavilion was 'Minerals to Milestones'. The pavilion highlighted the Ministry's contributions toward achieving Prime Minister's vision of a Viksit Bharat by 2047. The pavilion offered a dynamic blend of innovation, heritage, and sustainability, captivating visitors of all ages. Over 80,000 Visitors Explored Innovation, Technology, and Heritage at the Mining Pavilion.

1.11.65 "Under Mission Karmayogi, Ministry of Mines had implemented the Annual Capacity Building Plan (ACBP) for Secretariat Office w.e.f. 01.01.2024. Subsequently, ACBPs for all the seven field organizations of this Ministry were implemented w.e.f. 01.04.2024. Further, during the National Leaning Week (19.10.2024 to 27.10.2024), the Ministry emerged on top with three its field organizations i.e. HCL, MECL and JNARDDC securing their places within top three in various categories and were felicitated by Minister of State (PP) in the valedictory program of NLW held on 14.11.2024 for achieving this feat. Capacity Building Commission (CBC) has consistently ranked Ministry of Mines as one of top performing Ministries throughout the year".

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 Presently the base year of index of industrial production covering mining sector is 2011-12. Based on the overall trend so far the index of mineral production (base 2011-12) for the year 2024-25 (up to Nov-24) is estimated to be 124.9 as compared to 128.9 of previous year showing a negative growth of 3.1%. 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 and minor minerals) during 2024-25 has been estimated at ₹141061 crore, which shows a decrease of about 0.47% over that of the previous year.

During 2024-25, estimated value for metallic minerals is ₹128261 crore or 91% of the total value and non-metallic minerals is ₹12800 crore or 9% of the total value.Information on production and value of selected minerals from 2020-21 to 2024-25 (Estimated) is given in **Annexure 2.1**. The details of Export and Import of Minerals during the period 2019-20 to 2023-24 are given at **Annexure 2.2** and **Annexure 2.3**. The trend of value of mineral exports and imports for last five years is depicted in **Figure 2.2**. The value of Minerals by groups for the last five years is given in **Figure 2.3**.

(Value in crore)

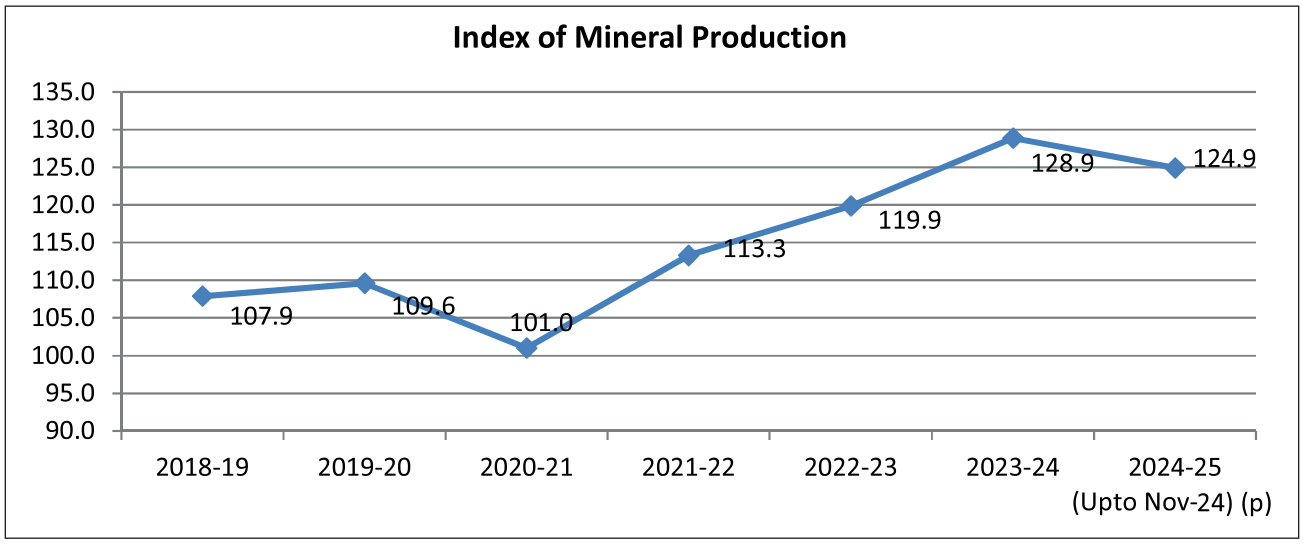

Figure 2.1:Indexofmineralproduction(Base2011-12=100)

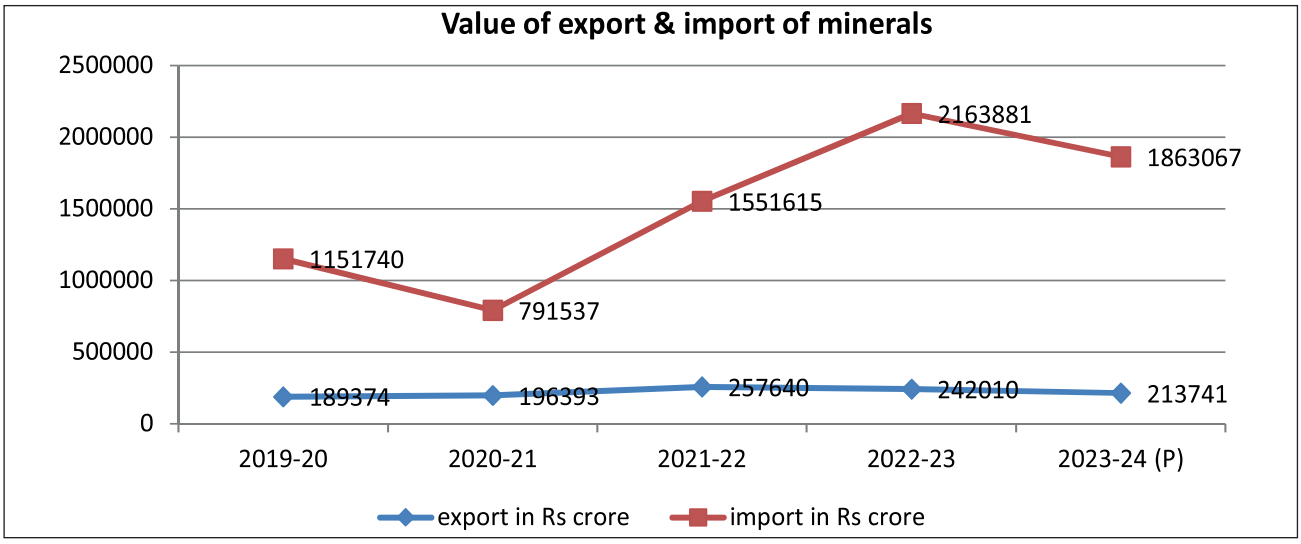

Figure 2.2: Trends in Value of Mineral Exports & Imports

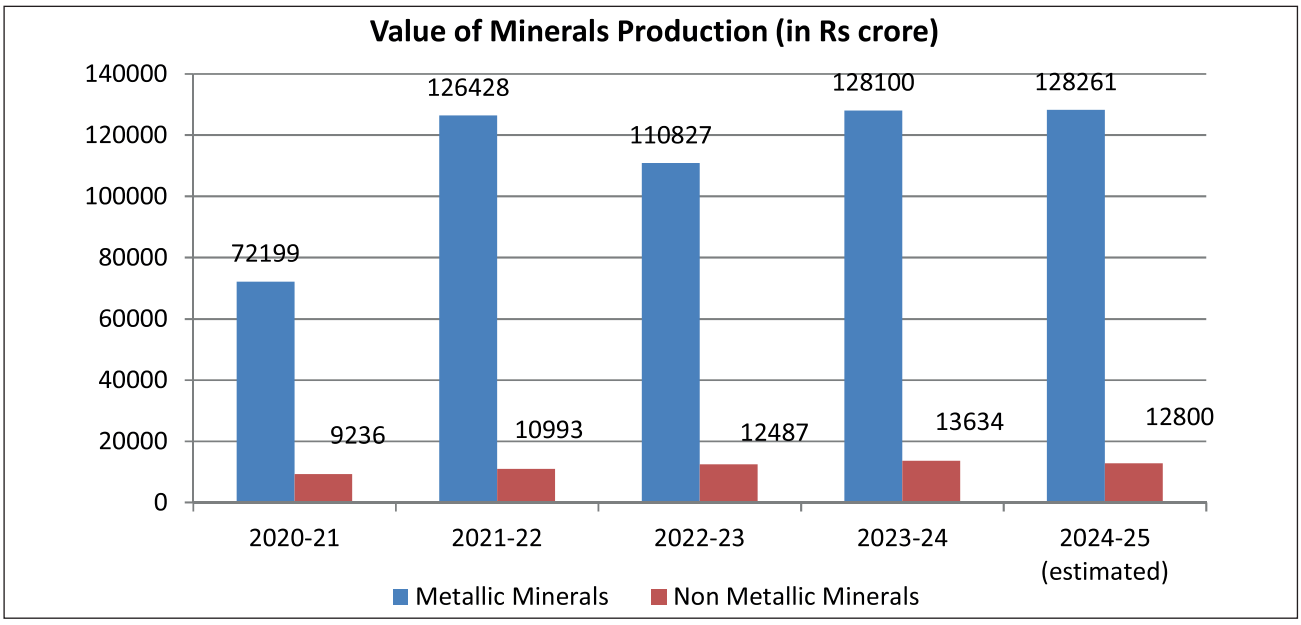

Figure 2.3: Value of Minerals Production (by groups) (excluding atomic, fuel minerals and minor minerals) (2024-25 figures are estimated)

Price Trend

2.5 Presently the base year for Wholesale Price Index covering minerals is 2011-12. The WPI for minerals (base 2011-12 = 100) stood at 228.5 in November 2024 and the corresponding index was 215.8 for November, 2023.

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 220.1 in November, 2024 as compared to 205.8 in November, 2023 and that of other minerals was 258.1 in November, 2024 as compared to 250.6 in November, 2023. Source of this particular information is www.eaindustry.nic.in.

Mining

2.7 Indian mining industry is characterized by many small operational mines. The number of mines which reported MCDR Returns of

mineral production (excluding atomic, fuel and minor minerals) in India was 1426 (estimation) in 2023-24 as against 1457 (Provisional) in the previous year.

2.8 Out of 1426 reporting mines, 322 were in Madhya Pradesh followed by Gujarat (162), Karnataka (130), Odisha (122), Andhra Pradesh (120), Chhattisgarh (112),Rajasthan (104), Tamil Nadu (96), Maharashtra (95) and Jharkhand (41) etc.

2.9 The numbers of mines reported in MCDR Returns 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 Mines Reported MCDR Returns

Sector	2023-24	2024-25 (P)
All Minerals*	2046	1973
Metallic Minerals	799	772
Non-Metallic Minerals	1247	1201

**Excluding atomic minerals, fuel mineral and minor minerals. (P): Provisional*

Table 2.2
Area Wise Status of Lease (Frequency In Hect.) (Other than Atomic, Hydro Carbons Energy and Minor Minerals)

As on 31/03/2023(P) (All India)

Frequency (Hectare)	No. of Leases	Lease area (Hectare)
0 to 2	368	477.95
>2 to 5	809	3135.74
> 5 to 10	353	2594.36
> 10 to 20	319	4661.15
<20 to 50	388	12680.12
<50 to 100	231	16707.48
<100 to 200	182	26016.43
>200 to 500	197	64146.87
Above 500	160	151936.44
Total	**3007**	**282356.54**

Sources: Information received from respective State Government Departments and Regional Offices of IBM for minerals (excluding atomic minerals, hydrocarbon energy minerals and minor minerals).

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 2023-24 @ (By Principal Minerals)

Mineral	Cat. A	Cat. B	Total
Chromite	4	-	4
Copper	4	-	4
Gold	4	-	4
Lead & Zinc Ore	8	-	8
Manganese	14	5	19
Rock salt	-	1	1
Vermiculite	1	3	4

@ excluding fuel, atomic & minor minerals; Data is based on the List of Mines as on 01.04 .24 provided by the CCoM Office

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

2.11 For the year 2024-25, the estimated mineral production (excluding Atomic, Fuel and Minor Minerals) would be from 20 States of which the bulk of value of mineral production of about 97.70% was confined to 8 States only. The order was Odisha with a share of 43.49% followed by Rajasthan (16.26%), Chhattisgarh (13.69%), Karnataka (12.42%), Maharashtra (4.76%), Jharkhand (3.26%), Madhya Pradesh (2.78%) and Andhra

Pradesh (1.04%) in the total value of mineral production (excluding Atomic, Fuel and Minor Minerals). Remaining states contributed 2.30%. The estimated contribution of States/ UTs in the value of mineral production for 2024-25 is pictorially shown in **Figure 2.4**.

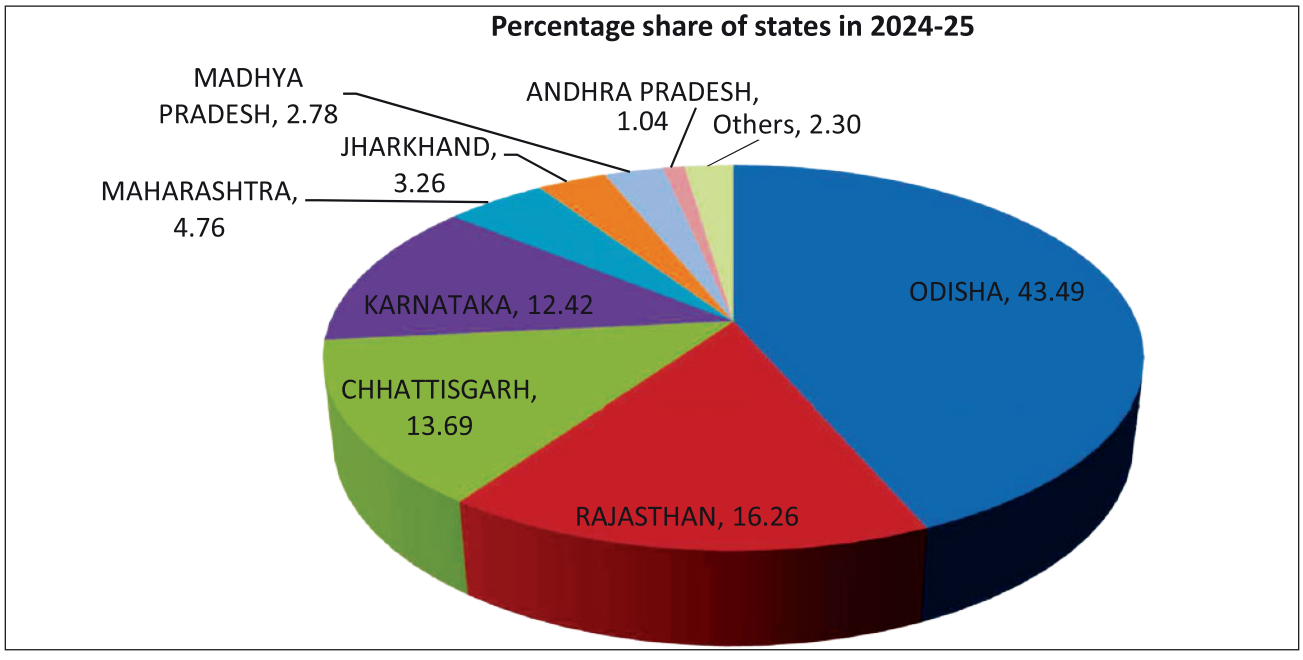

Figure 2.4: Share of States in Value of Estimated Mineral Production 2024-25 (Excluding Atomic, Fuel Minerals, minor minerals)

Source: Statutory returns submitted to IBM

2.12 The principal mineral producing States, which have indicated an increase in the value of mineral production during 2023-24 with respect to 2022-23, are Maharashtra (64.49%), Uttarakhand (49.8%), Bihar (26.12%), Karnataka (20.12%), Odisha (17.23%), Madhya Pradesh (16.3%), Meghalaya (15.21%), Andhra Pradesh (13.56%), Jharkhand (12.78%), Tamil Nadu (11.86%), Himachal Pradesh (9.59%), Chhattisgarh (8.55%), Assam (7.6%), Jammu And Kashmir (5.14%), Rajasthan (4.88%), Gujarat (4.33%) and Uttar Pradesh (1.7%). However, some of the principal mineral producing States revealed decrease in value of mineral production and those include Telangana (-1.8%) and Kerala (-3.88%).

2.13 All India Reserves and Resources of various minerals as on 01.04.2020, as per parameters of UNFC System are given in **Annexure 2.4**.

2.14 During the year 2023-24, the Private Sector contributed for 61.4% or Rs. 87028 crores (including metallic and non-metallic) in the total value. The minerals which were wholly mined/ recovered by the private sector in 2023-24 were Lead concentrate, Limeshell, Siliceous earth, Sillimanite, Wollastonite, Zinc concentrate, Marl and Moulding sand. In 2023-24, the Private Sector accounted for sizeable 93.2% of Limestone, 52.3% of Chromite, 54.5% of Iron Ore, and 46.7% of Bauxite.

During the year 2023-24, the Public Sector contributed for 38.6% or Rs. 54706 crore (including metallic and non-metallic) in the total value. The minerals which were wholly mined / recovered by the public sector in 2023-24 were Copper ore and concentrate and Diamond. In 2023-24, the Public Sector accounted for sizeable 74.3% of Fluorite (graded), 91.2% of Tin concentrate, 99.2% of Phosphorite and 98.2% of Gold Ore.

2.15 As per World Mineral Production, 2018-22, British Geological Survey, India's ranking in 2022 in world production in term of quantity was 2nd in steel (crude/liquid) and lead (refined); followed by 3rd in zinc (slab) and chromite ores & concentrate; 4th in iron ore and graphite; 5th in aluminium (primary); 6th in manganese ore and bauxite; 10th in copper (refined); and 16th in apatite & rock phosphate and magnesite.

Table 2.4
Contribution and Rank of India in World Production of Principal Minerals & Metals, 2022

Sector	Unit	Production quantity		Contribution (Percentage)	India's rank in World order$
		World	India*		
Metallic Minerals					
Bauxite	'000 tonnes	401500	23844	5.94	6th
Chromite	'000 tonnes	37900	3557	9.39	3rd
Iron ore	'000 tonnes	2516000	258364	10.27	4th
Manganese ore	'000 tonnes	54200	2826	5.21	6th
Industrial Minerals**					
Magnesite	'000 tonnes	32200	108	0.34	16th
Apatite & Rock phosphate	'000 tonnes	222000	1978	0.89	16th
Metals					
Aluminium (primary)	'000 tonnes	67200	4066#	6.05	5th
Copper (refined)	'000 tonnes	258001/	554#	2.15	10th
Steel (crude/liquid)	million tonnes	1873	125	6.67	2nd
Lead (refined)	'000 tonnes	125002/	211#	1.69	2nd
Zinc (slab)	'000 tonnes	13400	821#	6.13	3rd

Source: World Mineral Production, 2018-2022, British Geological Survey for world production and MCDR returns & individual plants for production with respect to India.

**: Figures relates to financial year 2022-23 (P)*

***: Minerals declared as minor minerals vide Government of India Notification S.O. 423(E) dated 10th February, 2015, are not included due to non-availability of production with respect to India.*

$: India's rank based on India's production as per MCDR return and world production mentioned in World Mineral Production 2018-22, British Geological Survey.

#: As per World Mineral Production, 2018-22, the production of Aluminium (primary), Copper (refined), lead (refined) and Zinc (Slab) during 2022 are 2322 thousand tonnes, 542 thousand tonnes, 966 thousand tonnes and 684 thousand tonnes, respectively.

1/ Figures relate to both primary and secondary refined copper, whether electrolytic or fire refined. Metal recovered from secondary materials by remelting alone is excluded.

2/ Figures related to both primary & secondary refined lead and include the lead content of antimonial lead.

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, cement, etc. India is self-sufficient or near to self-sufficient in bauxite, chromite, iron ore, kyanite, limestone, sillimanite, etc. In spite of significant production, some ores/minerals are also imported to meet the demand either for blending with locally available mineral raw materials and/or to meet special requirement for manufacturing special qualities of mineral based products. India is deficient in magnesite, manganese ore, rock phosphate, etc. which were imported to meet the domestic demand. 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. The Degree of Self-sufficiency in respect of various principal minerals and metals in 2023-24 is furnished in **Table 2.5**.

Table 2.5
Degree of Self-sufficiency in Principal Minerals & Metals, 2023-24 (P)

Sl. No.	Commodity	Apparent Consumption ('000 tonnes)	Supply/Domestic supply ('000 tonnes)	Order of self-sufficiency (%)
Minerals*				
1	Bauxite	28258.20	23929.48	85
2	Chromite	3318.25	3147.95	95
3	Iron ore	235923.45	277339.45	100
4	Kyanite	2.38	0.89	37
5	Limestone	483192.20	451045.20a	93
6	Magnesite	607.68	132.00	22
7	Manganese ore	9034.37	3441.76	38
8	Rock phosphate	10368.20	1557.78	15
Metals				
10	Aluminum	4134.47	4158.844	100
11	Copper (Cathode)	1430.97	509.429	36
12	Lead (primary)	371.61	215.983	58
13	Zinc	847.30	817.058	96

Source: MCDR Returns for production and DGCI&S, Kolkata for export & import.

Apparent demand = production+ import-export

**: Minerals declared as minor mineral vide Government of India Notification S.O. 423(E) dated 10th February, 2015, are not included due to non-availability of production for the year 2023-24.*

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

b/ Based on production of copper cathode and imports & exports of copper & alloys. c/ Based on production of lead (primary), and imports & exports of lead & alloys.

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

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

Production Trends

Metallic Minerals

2.17 The estimated value of metallic minerals in 2024-25 at Rs. 128261 crore increased by about 0.13% over the previous year. Among the principal metallic minerals, iron ore contributed Rs 97777 crore or 76.2%, Zinc concentrate Rs. 9239 crore or 7.2%, Silver Rs. 5942 crore or 4.6%, Chromite Rs. 4759 crore or 3.7%, Manganese Ore Rs. 2814 or 2.2%, Lead Conc Rs. 2761 crore or 2.2% and Bauxite Rs. 2729 crore or 2.1%.

2.18 The estimated production of bauxite at 24.22 million tonnes in 2024-25 increased by 1.25% compared to the previous year. Companies, namely Utkal Alumina, NALCO, Odisha Mining Corporation, HINDALCO dominated the mining activities of bauxite of the country in 2024-25. Odisha (74%), Gujarat (9%) and Jharkhand (8%) are the major bauxite producing states in the country.

2.19 The estimated production of Chromite at 3.04 million tonnes in 2024-25 decreased by 3.54% as compared to the previous year. Odisha Mining Corporation (OMC), Tata Steel Mining Ltd., and Indian Metals and Ferro Alloys are the major producers of Chromite. Odisha reported the entire production of chromite (100%) in the country.

2.20 The estimated production of copper concentrate at 106.83 thousand tonnes in 2024-25 decreased by about 14.69% as compared to the previous year. Hindustan Copper Limited is the top producing company. Madhya Pradesh (69%) and Rajasthan (31%) are the major producers of Copper concentrate in the country.

2.21 The estimated production of primary gold at 1431 kg in 2024-25 registered decrease of about 9.77% as compared to the previous year. Hatti gold mines company ltd is the top producing company. Karnataka was the leading producer of gold accounting 98% of the total production. The remaining production was reported from Jharkhand.

2.22 The estimated production of iron ore at about 277.83 million tonnes in 2024-25 registered an increase of 0.18% over the previous year. Major producer of Iron Ore in the year 2024-25 are NMDC Limited, Odisha Mining Corporation, SAIL, Tata Steel Limited and JSW. Odisha (55%), Karnataka (16%) and Chhattisgarh (15%) are the major Iron Ore Producing states.

2.23 For the year 2024-25, the estimated production of lead concentrates at 384.59 thousand tonnes increased by 1.00% and that of zinc concentrate at 1639.26 thousand tonnes showed a decrease of -4.14% over the previous year. Rajasthan accounted for the entire production of lead concentrate and zinc concentrate during the year 2024-25. Hindustan Zinc Limited is the top producing company.

2.24 The estimated production of manganese ore at 3.51 million tonnes in 2024-25 increased by about 1.96% compared to that in the previous year. MOIL continued to be the largest producer of manganese ore, followed by Tata Steel and Sandur Manganese & Iron Ores Ltd. Maharashtra (31%), Madhya Pradesh (28%), and Odisha (17%) are top producing states.

Non-Metallic Minerals

2.25 The estimated value of production of non-metallic minerals at Rs 12800 crore during 2024-25 decreased by 6.11% as compared to the previous year. Limestone retained its leading position by contributing 89.2% (Rs 11422 crore) of the total estimated value of non-metallic minerals in the year 2024-25, following that, the other non-metallic mineral is Phosphorite Rs 1191 crore or 9.3%.

2.26 The production of limestone was at 431.53 million tonnes in the year 2024-25 decreased by 4.33%, as compared to that in the previous year. Limestone is widely produced in India. Major producers of Limestone are Ultratech cement Limited, Shree Cement Limited, Ambuja Cement Limited and ACC Limited. Rajasthan (23%), Madhya Pradesh (14%), Andhra Pradesh (13%), Chhattisgarh (11%) and Karnataka (9%) are top producing states.

2.27 The production of magnesite at 112.12 thousand tonnes during 2024-25 decreased by 15.06% as compared to that in the previous year. Major producing companies are Tamil Nadu Magnesite ltd and Almora Magnesite ltd. Tamil Nadu (61%) and Uttarakhand (34%) are the top producers of Magnesite in the country.

2.28 The production of phosphorite at 1649.14 thousand tonnes in 2024-25 has increased by 5.86% as compared to that in the previous year. Major producing companies are Rajasthan State Mines and Minerals Ltd and MP State Mining Corporation Ltd. Rajasthan contributed 85% and the rest was accrued from Madhya Pradesh.

Critical Minerals

2.29 Critical minerals are those minerals which are essential for economic development and national security; the lack of availability of these minerals or even concentration of existence, extraction or processing of these minerals in few geographical locations may lead to supply chain vulnerability and disruption. As part of the Atmanirbhar Bharat initiative, the Government of India has undertaken several initiatives over the past two years to address challenges in the critical minerals sector.

2.30 Mines and Minerals (Development and Regulation) Act, 1957, has been amended in 2023 to increase exploration and mining of critical minerals. The Ministry of Mines has successfully auctioned 24 blocks for 24 critical and strategic minerals as specified in Part D of the Schedule-I. Geological Survey of India (GSI) has undertaken 195 projects for critical minerals in 2024-25.

2.31 On 23rd July 2024, Hon'ble Finance Minister Smt. Nirmala Sitharaman announced the setting up of Critical Mineral Mission in the Union Budget for 2024-25. The Mission aims to secure a long-term sustainable supply of critical minerals and strengthen India's critical mineral value chains encompassing all stages from mineral exploration and mining to beneficiation, processing, and recovery from end-of-life products.

Table 2.6
Critical Minerals – Production and Import (FY 2023-24)

S. No.	Critical Mineral	HS Code	Description	Annual domestic production (ton)	Import Quantity 2023-24 (ton)	Import Value 2023-24 (Rs. cr)
1	Beryllium	284190	Other salts of oxometallic or peroxometallic acids	-	2,542.8	127.8
		81121200	Beryllium unwrought, powders	-	0.00	0.01
		81121300	Beryllium, waste & scrap	-	0.00	0.00
			Beryllium	-	2,542.8	127.9

S. No.	Critical Mineral	HS Code	Description	Annual domestic production (ton)	Import Quantity 2023-24 (ton)	Import Value 2023-24 (Rs. cr)
2	Cadmium	28259020	Cadmium oxide	-	5,047.5	51.7
		81126910	Cadmium, unwrought; Powders	-	9,896.4	330.8
		81126100	Cadmium, waste & scrap	-	0.00	0.00
			Cadmium	0	14,943.9	382.5
3	Cobalt	2605	Cobalt ores and concentrates	-	1.1	0.1
		28220010	Cobalt oxides	-	333.2	58.2
		28220020	Cobalt Hydro-Oxides	-	215.1	31.6
		28220030	Commercial cobalt oxides	-	27.4	5.9
		81052020	Cobalt, unwrought	-	316.9	89.5
		81053000	Cobalt, waste & scrap	-	0.00	0.00
			Cobalt	0	893.7	185.3
4	Gallium	811292	Other: Unwrought; waste and scrap; powders	0	0.01	0.01
5	Graphite	2504	Natural Graphite	1,68,341	54,784.1	320.3
		3801	Artificial Graphite	-	1,01,885.7	1,279.7
			Graphite	1,68,341 (natural)	1,56,669.8	1,600.0
6	Indium	811292	Other: Unwrought; waste and scrap; powders	-	0.01	0.01
7	Lithium	25309099	Spodumene/ Lithium concentrate	-	16,27,073	412.1
		28252000	Lithium oxide and hydroxide	-	1,147.5	248.0
		28369100	Lithium carbonates	-	1,146.1	203.7
			Lithium	-	16,29,366.6	863.8
8	Molybdenum	2613	Molybdenum ores and concentrates	-	13,481.8	3,431.2
		282570	Molybdenum oxides and hydroxides	-	7,948.2	176.6
		810294	Unwrought molybdenum, including bars and rods obtained simply by sintering	-	288.9	162.8
		810297	Molybdenum, waste & scrap	-	0.7	0.2
			Molybdenum	0	21,719.6	3,770.9
9	Niobium	261590	Niobium ores and concentrates	-	325.3	7.7
		811292	Other: Unwrought; waste and scrap; powders	-	0.01	0.01
			Niobium	0	325.3	7.7

S. No.	Critical Mineral	HS Code	Description	Annual domestic production (ton)	Import Quantity 2023-24 (ton)	Import Value 2023-24 (Rs. cr)
10	Nickel	2604	Nickel Ores and concentrates	-	0.0	0.0
		282540	Nickel oxides and hydroxides	-	91,580.1	351.1
		282735	Chlorides of Nickel	-	258.3	14.1
		283324	Sulphates of Nickel	-	1516.7	65.6
		7502	Unwrought nickel	-	33,732.5	5,759.8
		7503	Nickel waste & scrap	-	4,345.9	366.7
			Nickel	0	1,31,433.5	6,557.3
11	Platinum Group Elements (PGE)	7110	Platinum, unwrought or in semi-manufactured form, or in powder form	-	10.4	2,433.0
			PGE	0	10.4	2,433.0
12	Phosphorous	25101010	Unground: Natural calcium phosphate	-	49,72,415.3	6,656.9
		25102010	Ground: Natural calcium phosphates	-	38,29,661.4	5,991.7
			Phosphorous	15,57,783	88,02,077	12,648.6
13-14	Potash, Glauconite	281520	Potassium hydroxide	-	29,183.8	254.0
		283421	Nitrates of potassium	-	1,473.0	14.0
			Potash	0	30,656.8	268.0
15	REE	28053000	Alkali or alkaline earth metals: Rare-earth metals, scandium and yttrium, whether or not intermixed or inter alloyed	6,500	1,184.8	43.7
		2846	Compounds, inorganic or organic, of rare earth metals	-	1,085.6	113.2
			REE	65001	2,270.3	156.9
16	Rhenium	284190	Other salts of oxometallic or peroxometallic acids	-	2,542.8	127.8
		81124110	Unwrought Rhenium	-	0.00	0.00
		81124120	Rhenium, waste & scrap	-	0.00	0.00
			Rhenium	-	2,542.8	127.8
17	Selenium	280490	Selenium	0	506.9	88.8
18	Tantalum	26159020	Niobium or tantalum ores and concentrates	-	0.00	0.00
		810320	Unwrought tantalum, including bars and rods obtained simply by sintering; powders	-	0.41	0.68
		810330	Tantalum, waste & scrap	-	0.00	0.00
			Tantalum	-	0.4	0.7

[1]*From Monazite sands in Kerala and Odisha*

S. No.	Critical Mineral	HS Code	Description	Annual domestic production (ton)	Import Quantity 2023-24 (ton)	Import Value 2023-24 (Rs. cr)
19	Tellurium	28045020	Tellurium	0	6.6	4.5
20	Tin	2609	Tin ores and Concentrates	22,335	0.0	0.0
		8001	Unwrought Tin	4.9	11,967.1	2,664.4
		8002	Tin, waste & scrap	-	0.00	0.00
			Tin	-	11,967.1	2,664.4
21	Titanium	2614	Titanium Ores and Concentrates	2,23,0002	89,921.1	640.9
		2823	Titanium Oxides		17,787.9	486.2
		81082000	Unwrought titanium; powders	3003	910.06	78.16
		81083000	Titanium, waste & scrap	-	6,805.24	207.80
			Titanium	-	1,15,424.3	1,413.1
22	Tungsten	2611	Tungsten Ores and Concentrates	-	74.1	2.6
		81019400	Unwrought tungsten, including bars and rods obtained simply by sintering	-	208.37	77.87
		81019700	Tungsten, waste & scrap	-	11.46	2.25
			Tungsten	0	293.9	82.7
23	Vanadium	26159010	Vanadium ores and concentrates	-	325.3	7.7
		282530	Vanadium oxides and hydroxides	-	3,101.8	153.9
		811292	Other: Unwrought; waste and scrap; powders	-	0.01	0.01
			Vanadium	0	3,427.1	161.6
24	Zirconium	26151000	Zirconium ores and concentrates	-	82,257.0	1,393.7
		81092100	Unwrought zirconium; powders, Containing less than 1 part hafnium to 500 parts zirconium by weight	-	2.64	2.59
		81092900	Zirconium, waste & scrap	-	0.47	0.34
			Zirconium	15,600	82,260.1	1,396.6

Source: Indian Bureau of Mines; Department of Commerce; US Geological Survey

[2]*Refers to production of ilmenite and rutile*
[3]*Refers to titanium metal sponge production*

3

Legislative Framework, Mineral Policy and Implementation

Legislative Framework, Mineral Policy and Implementation

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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 National Mineral Policy 2008 ("NMP 2008"). The impetus to review NMP 2008 came about by 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 for giving 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 focuses on Make in India initiative and gender sensitivity in terms of the vision. In so far as the regulation in minerals is concerned, the main focus of the policy is on ease of doing business by adopting e-Governance, IT enabled systems, awareness and information campaigns. Regarding the role of States 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 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 have setup the Task Forces, specially constituted to control illegal mining and review the action taken by member department for checking the illegal mining activities.

(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, Nagaland, 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 the 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 MMDR Act, 1957 was amended through the MMDR Amendment Act, 2015. Through MMDR Amendment Act, 2015, Central Government has inserted the following provisions under the MMDR Act with the objective to curb illegal mining in the Country:

(i) Penalty for illegal mining has been made more stringent by amendment of the MMDR Act in 2015. Penalties for contravention of Section 4(1) and 4(1A) of the Act have been increased from Rs. 25 thousand per hectares to

Rs. 5 Lakh per hectare and the term of imprisonment has been increased from 2 years to 5 years. [Section 21(1) & Section 21(2)]

(ii) Section 30B of the MMDR Act, 1957 provides for constitution of Special courts by State Governments for speedy trial of Illegal mining/Transportation/Storage cases and 30C of the Act provides that such Special Courts shall be deemed to be a Court of Session.

3.11 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.

3.12 IBM has entered into a Memorandum of Understanding (MoU) with National Remote Sensing Centre (NRSC), for a pilot project "Sudoor Drushti" to demonstrate the feasibility of using High-Resolution Satellite imagery and Digital Elevation Model (DEM) in monitoring mining activities/changes over a period of time over selected group of mines.

3.13 The Ministry of Mines has begun use of Geo-spatial technologies such as GIS and Satellite imagery to monitor and prevent illegal mining activities. The Ministry of Mines has launched the Mining Surveillance System (MSS) in October 2016. It aims at developing a system for detection of incidence of illegal mining by use of space technology and surveillance of area up to 500m outside the lease boundary to check incidences of illegal mining. The MSS has been developed through Indian Bureau of Mines (IBM) in collaboration with Ministry of Electronics and Information Technology (MeitY) and Bhaskaracharya Institute for Space Applications and Geo-informatics (BISAG) Gandhinagar.

Since, the inception of MSS in 2016-17, the project was implemented in major mineral rich states which includes State Government of Andhra Pradesh, Assam, Bihar, Chhattisgarh, Goa, Gujarat, Haryana, Himachal Pradesh, Jharkhand, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Odisha, Rajasthan, TamilNadu, Telangana and Uttar Pradesh; in total 5 phases. The MSS analyzes land pattern changes within a 500-meter radius of mining leases. If discrepancies are detected, alerts are generated and sent to the respective State Government for ground verification. A mobile app has also been developed and launched to facilitate reporting of cases of illegal mining.

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

Table 3.1
Details Registers as on December, 2023

Mining Leases*	8121
End users	5604
Traders	10625
Stockists	3066
Exporters	1707

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

3.15 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

3.16 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.

3.17 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 proposed to create a data bank of images of land use of the mining areas of the country and effectively plan for their systematic & scientific mine closure.

Mining Surveillance System

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

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

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

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

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

The training of all the States for its adoption of the MSS for minor minerals has also been done. Total 179 MSS have been developed by the Ministry of Mines & Indian Bureau of Mines (IBM) with assistance from Bhaskaracharya Institute for space applications and Geo-informatics (BISAG), Gandhinagar and Ministry of Electronics and Information Technology (MeitY).

Details of triggers generated, verified and cases of unauthorised mining detected are given below:

	Generated	Verified	Unauthorized Mining Confirmed
Phase-I (Major) (2016-17)	296	287	47
Phase-II (Major) (2018-19)	52	45	5
Phase-II (Minor) (2018-19)	130	104	9
Phase-III (Major) (2021-22)	177	98	12
Phase-IV (Major) (2022-23)	138	40	7
Phase-IV (Major) (2023-24)	157	-	-

Mineral Concession System

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

3.20 The Offshore Areas Mineral (Development and Regulation) Act, 2002 and the Mines and Minerals (Development and Regulation) Act, 1957

a) Ministry of Mines is responsible for the 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. The Ministry is also responsible for the 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. The Ministry is allocated all metals and minerals not specifically allotted to any other Ministry/ Department, such as, aluminium, zinc, copper, gold, diamonds, lead, nickel, etc. and planning, development and control of, and assistance to, all industries related thereto.

b) The Ministry administers the Mines and Minerals (Development and Regulation) Act, 1957 ('MMDR Act, 1957') and the Offshore Areas Mineral (Development and Regulation) Act, 2002 ('OAMDR Act, 2002'). In performing its functions, the Ministry is assisted by Geological Survey of India and Indian Bureau of Mines.

3.21 Amendment to the OAMDR Act, 2002 :-

a) Article 297 of the Constitution of India vests all minerals in the offshore area in the Union. The Parliament enacted the OAMDR Act, 2002 to provide for development and regulation of mineral resources in the offshore areas which include the territorial waters, continental shelf, exclusive economic zone and other maritime zones of India. The provisions of the Act and the OAMDR Rules, 2006 came into force with effect from 15th day of January, 2010.

b) The OAMDR Act provides for regulations of Mines and development of the mineral in the Country.

c) The OAMDR Act, 2002 has been amended through the Offshore Areas Mineral (Development and Regulation) Amendment Act, 2023, w.e.f. 17.08.2023. The OAMDR Act, 2002 is available on web link: https://www.indiacode.nic.in/bitstream/123456789/2040/3/A2003-17.pdf.

3.22 Amendments to the MMDR Act, 1957:-

The MMDR Act, 1957 provides for regulation of mines and development of minerals in the

country. The MMDR Act, 1957 is available on web link– https://www.indiacode.nic.in/bitstream/123456789/1421/3/A1957-67.pdf. The details of various amendments to the 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 Goa, Daman and Diu Mining Concession (Abolition and Declaration as Mining Leases) Act, 1987 (16 of 1987) (w.e.f. 01.10.1963).

vi. The Mines and Minerals (Regulation and Development) Amendment Act, 1994 (25 of 1994) (w.e.f. 25.01.1994).

vii. The Mines and Minerals (Regulation and Development) Amendment Act, 1999 (38 of 1999) (w.e.f. 18.12.1999).

viii. The Mines and Minerals (Development and Regulation) Amendment Act, 2010 (34 of 2010).

ix. The Mines and Minerals (Development and Regulation) Amendment Act, 2015 (10 of 2015) (w.e.f. 12.01.2015).

x. The Mines and Minerals (Development and Regulation) Amendment Act, 2016 (25 of 2016) (w.e.f. 06.05.2016).

xi. The Mineral Laws (Amendment) Act, 2020 (2 of 2020) (w.e.f. 10.01.2020).

xii. The Mines and Minerals (Development and Regulation) Amendment Act, 2021 (16 of 2021) (w.e.f. 28.03.2021).

xiii. The Mines and Minerals (Development and Regulation) Amendment Act, 2023 (16 of 2023) (w.e.f. 17.08.2023).

3.23 Other amendments

a) MMDR Act, 1957

The Second Schedule to the MMDR Act, 1957 has been amended to rationalise the royalty rate of 12 critical and strategic minerals, viz., Beryllium, Cadmium, Cobalt, Gallium, Indium, Rhenium, Selenium, Tantalum, Tellurium, Titanium, Tungsten, and Vanadium vide Notification No. G.S.R. 152 (E) dated 01.03.2024.

Specification and rationalization of royalty rates of critical minerals has facilitated the auction of mineral blocks of critical minerals.

b) OAMDR Act, 2002

The First Schedule of the OAMDR Act, 2002 has been amended to rationalize the royalty rate of offshore Minerals, viz., Construction sand, Dolomite, Limestone and Lime mud, Polymetallic Nodules and crusts, overburden or waste. vide Notification S.O. 4760(E), dated 29.10.2024.

Specification and rationalization of royalty rates of offshore minerals would facilitate the auction of mineral blocks in the offshore area under the OAMDR Act.

3.24 Subordinate Legislation

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

i. The Minerals (Other than Atomic and Hydro Carbons Energy Mineral) Concession Rules, 2016 has been amended through the Minerals (Other than Atomic and Hydro Carbons Energy

Minerals) Concession Amendment Rules, 2024 notified vide G.S.R. 50(E) dated 21.01.2024 to implement the provision of exploration licence, to clarify provisions regarding disposal of minerals below threshold value and for rationalization of penalty for small miners having lease area up to 25 hectares and approved production up to 2.0 lakh tonnes. The Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Amendment Rules, 2024 are available at Ministry of Mines' website on web link -https://mines.gov.in/admin/storage/app/uploads/65fd6174b1a681711104372.pdf

ii. The Mineral Conservation and Development Rules, 2017 have been amended through the Mineral Conservation and Development (Amendment) Rules, 2024 notified vide G.S.R. 51(E) dated 21.01.2024 for implementing provision of exploration licence, for rationalization of penalty for small miners having lease area up to 25 hectares and approved production up to 2.0 lakh tonnes and to relax the requirement of submission of mining plan for its review and for submission of self-assessment report for star rating, for the mines where mining or mining operations have been discontinued and such discontinuance has been duly reported. The Mineral Conservation and Development (Amendment) Rules, 2024 are available at Ministry of Mines' website on web link -https://mines.gov.in/admin/storage/app/uploads/65ae5390911361705923472.pdf

iii. The Mineral (Auction) Rules, 2015 has been amended through the Mineral (Auction) Amendment Rules, 2024 notified vide G.S.R. 49(E) dated 21.01.2024 to implement the provision of exploration licence which was introduced through the MMDR Amendment Act, 2023. The Mineral (Auction) Amendment Rules, 2024 are available at Ministry of Mines' website on web link -https://mines.gov.in/admin/storage/app/uploads/65ae5352376011705923410.pdf

iv. The Minerals (Evidence of Mineral Contents) Rules, 2015 has been amended through the Minerals (Evidence of Mineral Contents) Amendment Rules, 2024 notified vide G.S.R. 52(E) dated 21.01.2024 to implement the provisions of the MMDR Amendment Act, 2023. The Minerals (Evidence of Mineral Contents) Amendment Rules, 2024 are available at Ministry of Mines' website on web link -https://mines.gov.in/admin/storage/app/uploads/65ae53c19cab41705923521.pdf

v. The Atomic Minerals Concession Rules, 2016 has been amended through the Atomic Minerals Concession (Amendment) Rules, 2024 which have been notified vide G.S.R. 106(E) dated 14.02.2024 to implement the provisions of the MMDR Amendment Act, 2023. The Atomic Minerals Concession (Amendment) Rules, 2024 are available at Ministry of Mines website on web link: https://mines.gov.in/admin/storage/app/uploads/65e6e33f561941709630271.pdf

vi. The Minerals (Other than Atomic and Hydro Carbons Energy Mineral) Concession Rules, 2016 has been amended through the Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession (Second Amendment) Rules, 2024 which have been notified vide G.S.R 118(E) dated 20.02.2024. Through the said rules, methodology for calculation of

Average Sale Price of several critical minerals was specified. The Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession (Second Amendment) Rules, 2024 are available at Ministry of Mines website on web link: https://mines.gov.in/admin/storage/app/uploads/663482301e1eb1714717232.pdf

3.25 The following rules have been framed and notified in pursuance of the OAMDR Act:

i. The Offshore Areas (Existence of Mineral Resources) Rules, 2024 have been notified vide G.S.R. 315(E) dated 06.06.2024. Through the said rule, criteria for auction to grant production lease (PL) and composite licence (CL) was specified. Rules also provide exploration norms for Construction Grade Silica Sand, Non-Construction Grade Calcareous Sand, Calcareous mud or Lime-mud, Phosphatic Sediment, Deep Sea Minerals, REE Minerals, Hydrothermal Minerals/ Iron Manganese Crusts & Nodule of mineral deposits. The Offshore Areas (Existence of Mineral Resources) Rules, 2024 are available at Ministry of Mines website on web link: https://mines.gov.in/admin/download/666ab5ceae0021718269390.pdf

ii. The Offshore Areas Mineral Trust Rules, 2024 have been notified vide G.S.R. 490(E) dated 09.08.2024. Through the said rule, it provides for research and studies with respect to offshore areas and mitigation measures for any adverse impact, providing relief upon the occurrence of any disaster, activities for the interest and benefit of persons affected by operations, funding institutions for undertaking studies for mineral development, sustainable production operations, adoption of advanced scientific & technological practices and mineral extraction metallurgy, funding procurement of sophisticated scientific equipment by government organizations and using the Trust Fund for other purposes. The said rules also provide contribution to Offshore Areas Mineral Trust (OAMT) Funds at 10% of royalty. The Offshore Areas Mineral Trust Rules, 2024 are available at Ministry of Mines website on web link: https://mines.gov.in/admin/download/66c7132bf1e341724322603.pdf

iii. The Offshore Areas Mineral (Auction) Rules, 2024 have been notified vide G.S.R. 502(E) dated 14.08.2024. Through the said rule, it provides for 2-round Ascending Forward Online Electronic Auction, minimum percentage of the value of mineral dispatched ("reserve price") have been specified in the tender document, bidder shall quote a percentage of value of mineral dispatched equal to or above the reserve price. The Periodic Payments of Auction Premium – as per final bid in auction, Royalty / fixed rent, Contribution to Offshore Areas Mineral Trust – 10% of royalty and Contribution towards the International Seabed Authority (applicable only beyond 200 NM). This rule also provide one time payments for Bid security, Upfront Payment, Performance Security for Production Lease (PL) and Composite Licence (CL). The Offshore Areas Mineral (Auction) Rules, 2024 are available at Ministry of Mines website on web link: https://mines.gov.in/admin/download/66c2cca830a291724042408.pdf

iv. The Offshore Areas Operating Right Rules, 2024 have been notified vide G.S.R. 646(E) dated 16.10.2024. Through the said rule, it regulates the grant of operating rights, viz. Production lease, Composite licence and stipulate

key terms and conditions of operating rights to be complied by operating right holder. Rules also provide conditions for lapse, surrender, termination and transfer of operating rights. Rules also have separate chapter for mineral valuation, including, methodology for payment of royalty, auction premium. The Offshore Areas Operating Right Rules, 2024 are available at Ministry of Mines website on web link: https://mines.gov.in/admin/download/67124e3f456b41729252927.pdf

v. The Offshore Areas Mineral Conservation and Development Rules, 2024 have been notified vide G.S.R. 791(E) dated 31.12.2024. Through the said rule, reconnaissance, exploration or production has been under permit, licence or lease. Rule for safety of persons and property, prevention and control of pollution and protection of marine environment have been introduced. Through this rule Central Government is empowered to make rules pertaining to conservation & systematic development of minerals in offshore areas under the operating rights, inter-alia, exploration plan and production plan, safety measures, control of pollution, protection of marine environment. The Offshore Areas Mineral Conservation and Development Rules, 2024 are available at Ministry of Mines website on web link: https://mines.gov.in/admin/download/677630ad806681735798957.pdf

3.26 Others Reforms:

i. In exercise of the powers conferred under the proviso of clause (b) of sub-section (1) of Section 6 of the Mines and Mineral (Development and Regulation) Act, 1957, the area limit for prospecting licence and mining lease in respect of each of the 24 critical and strategic minerals listed in Part-D of the First Schedule to the MMDR Act, 1957 has been increased to 100 Sq. Km and 50 Sq. km. respectively, for each of the States vide order dated 22.02.2024.

ii. 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. In pursuance of these amendments, the Ministry has accepted the scheme of accreditation of private exploration agencies developed by the QCI-NABET and issued guidelines on 12.08.2021 for notification of accredited private exploration agencies. So far 28 Private Exploration Agencies have been notified for the said purpose.

iii. Ministry of Mines vide Order dated 21.10.2024, issued directions under Section 20A of the MMDR Act, The Central Government, in the national interest, for the scientific and sustainable development and exploitation of mineral resources, directed that the Central Government shall henceforth notify the mineral blocks and conduct their auction for grant of exploration license under sub-section (4) and (6) section 10BA of the Act, vide No. M. VI 1/3/2023- Mines VI order dated 21.10.2024.

3.27 Auction of Offshore Mineral Blocks

The OAMDR Act, 2002 has been amended through the Offshore Areas Mineral (Development and Regulation) Amendment Act, 2023 introducing auction as the method of allocation of the offshore mineral blocks.

In exercise of the power of auction conferred by Section 12 of the Offshore Areas Mineral (Development and Regulation) Act, 2002

to the Administering Authority to grant composite license in accordance with the Offshore Areas Mineral (Auction) Rules, 2024 as amended from time to time notified thereunder, the Government of India through the Administering Authority, Ministry of Mines has issued Notice Inviting Tender on 28.11.2024 for the 13 offshore Mineral Blocks for grant of Composite Licence.

The details of the 13 Offshore Mineral Blocks are as under:

Sl. No.	Mineral Block Name	Mineral Name	Offshore Region	Coast/Sea	PL/CL	Reserve Price
1.	Kollam CS Block-1	Construction Sand	Off Kerala	West Coast, Arabian Sea	CL	01.00%
2.	Kollam CS Block-2	Construction Sand	Off Kerala	West Coast, Arabian Sea	CL	01.00%
3.	Kollam CS Block-3	Construction Sand	Off Kerala	West Coast, Arabian Sea	CL	01.00%
4.	Porbandar LM Block-1	Limemud	Off Gujarat	West Coast, Arabian Sea	CL	01.00%
5.	Porbandar LM Block-2	Limemud	Off Gujarat	West Coast, Arabian Sea	CL	01.00%
6.	Porbandar LM Block-3	Limemud	Off Gujarat	West Coast, Arabian Sea	CL	01.00%
7.	West Sewell Ridge PMNC Block-1	Polymetallic nodules and crusts	Off Great Nicobar Island	Andaman Sea	CL	01.00%
8.	West Sewell Ridge PMNC Block-2	Polymetallic nodules and crusts	Off Great Nicobar Island	Andaman Sea	CL	01.00%
9.	West Sewell Ridge PMNC Block-3	Polymetallic nodules and crusts	Off Great Nicobar Island	Andaman Sea	CL	01.00%
10.	West Sewell Ridge PMNC Block-4	Polymetallic nodules and crusts	Off Great Nicobar Island	Andaman Sea	CL	01.00%
11.	West Sewell Ridge PMNC Block-5	Polymetallic nodules and crusts	Off Great Nicobar Island	Andaman Sea	CL	01.00%
12.	West Sewell Ridge PMNC Block-6	Polymetallic nodules and crusts	Off Great Nicobar Island	Andaman Sea	CL	01.00%
13.	West Sewell Ridge PMNC Block-7	Polymetallic nodules and crusts	Off Great Nicobar Island	Andaman Sea	CL	01.00%

3.28 Auction of Mineral Blocks:

i. The MMDR Amendment Act, 2015 instituted the system of e- auction for the grant of mineral concession for major minerals with a view to bring in greater transparency and removal of discretion in the allotment.

ii. Subsequent to the 2015 amendment, the MMDR Act was further amended in the year 2020 with the objective of maintaining sustainable mineral production in the country and in the year 2021 with the objective of inter-alia increasing employment and investment in the mining sector, boosting mineral production, time-bound operationalization of mines, increasing the pace of exploration, and auction of mineral resources. Further, the subordinate rules to implement the above reforms have been notified within the stipulated time.

iii. The MMDR Act, 1957 has been further amended through the MMDR Amendment Act, 2023 in FY 2023-24 empowering the Central Government to exclusively auction mining leases and composite licences for 24 critical minerals and introducing the auction of Exploration Licence (EL) for deep-seated and critical minerals.

iv. These amendments in the MMDR Act and subsequently in Mineral Auction Rules have resulted in a significant increase in the auction of mineral blocks. So far, 442 blocks have been auctioned across the 14 major minerals states. It is worth noting that the number of blocks auctioned per year has increased a lot since the reforms of 2021. From 2015-2021, in 6 years, 108 mineral blocks (Mining Lease-99, Composite Licence-9) were auctioned whereas since 01.04.2021, 334 blocks (Mining Lease - 190, CL-144) have been auctioned from FY 2021-22 to FY 2024-25 till date. The summary of Yearwise/ Statewise auctions is as under:

List of Successful auction since 2015, as on 31.12.2024

Year	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	Total
State											
Andhra Pradesh	-	1	2	2	-	-	4	11	3	2	25
Bihar										1	1
Chhattisgarh	3	-	2	-	-	2	2	20	6		35
Gujarat	-	-	3	-	-	4	3	2	6	7	25
Jharkhand	2	1	1	3	-	-	-	-	3		10
Karnataka	-	7	-	7	4	1	8	11	6	1	45
Madhya Pradesh	-	1	-	5	2	5	4	29	22	14	82
Maharashtra	-	-	2	1	10	-	9	6	10	2	40
Odisha	1	2	2	-	25*	1	9*	10			48
Rajasthan	-	3	2	1	2	-	7	8	31	33	87
Tamilnadu	-	-	-	-	-	-	-				0
Telangana	-	-	-	-	-	-	-			2	2
Uttar Pradesh	-	-	-	-	-	-	-	4	3		7

Year	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	Total
Goa	-	-	-	-	-	-	-	4	5	2	11
Central Government	-	-	-	-	-	-	-	-	-	24	24
Total	**6**	**15**	**14**	**19**	**43***	**13**	**46***	**105**	**95**	**88**	**442**

**Note:- 2 Iron Ore Blocks auctioned in 2019-20 in Odisha were forfeited. The same have been re-auctioned in September, 2021. Therefore, in total 444 mineral blocks were auctioned but in actual, the net figure is 442.*

v. Largest number of mineral blocks auctioned is of Limestone (152) followed by Iron Ore (113), Manganese Ore (40), and Bauxite (39). The mineral-wise summary is as under:

Mineral-wise Auction Summary as on 31.12.2024

Year Mineral	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	Total
Limestone	4	5	10	5	4	9	18	20	35	42	152
Iron Ore	1	7	2	9	17	1	13*	32	24	8	113
Iron Ore & Manganese	0	0	0	0	6	0	1*	2	1		9
Gold	1	1	1	1	0	2	2	5	4	4	21
Manganese	0	1	0	1	3	0	3	19	11	2	40
Diamond	0	1	0	0	1	0	-				2
Bauxite	0	0	1	0	5	1	5	14	8	5	39
Graphite	0	0	0	3	2	0	1	5	1	9	21
Vanadium & Graphite	0	0	0	0	0	0	0	0	0	3	3
Chromite	0	0	0	0	3	0	-				3
Copper	0	0	0	0	2	0	-		2		4
Kyanite	0	0	0	0	0	0	1				1
Rock Phosphate	0	0	0	0	0	0	1	3			4
Copper & Gold	0	0	0	0	0	0	1				1
Phosphorite	0	0	0	0	0	0	0	3	2	2	7
Ni, Cr and associated PGE	0	0	0	0	0	0	0	2		2	4
Ni, Cr and Co	0	0	0	0	0	0	0	0	0	1	1
Glauconite (Potash)	0	0	0	0	0	0	0	0	2	3	5
Basemetal	0	0	0	0	0	0	0	0	5		5
Silicious Earth	0	0	0	0	0	0	0	0	0	2	2
Semi Precious Stone	0	0	0	0	0	0	0	0	0	1	1
Lithium & REE	0	0	0	0	0	0	0	0	0	1	1
Co,Mn &Iron										1	1
Tungsten	0	0	0	0	0	0	0	0	0	2	2
Total	**6**	**15**	**14**	**19**	**43**	**13**	**46***	**105**	**95**	**88**	**442**

**Note:- 2 Iron Ore Block auctioned in FY2019-20 in Odisha was forfeited. The same were reauctioned in September, 2021. Therefore, in total 444 mineral blocks were auctioned but in actual, the net figure is 442.*

vi. In the FY2024-25 till date, a total of 163 Notice Inviting Tenders were issued by the various State Governments and Central Government. It is important to note that States of Bihar and Telangana issued Notice Inviting Tenders and conducted successful auction of mineral blocks for the first time since the introduction of auction regime in 2015. Further, during the FY2024-25 till date, 88 mineral blocks (ML-51, CL-37) have been successfully auctioned across 13 major mineral states.

3.29 Critical Minerals

Critical minerals are essential for our country's economic development and national security. The lack of availability of these minerals or the concentration of their extraction or processing in a few countries poses a challenge of supply chain vulnerabilities. The future global economy will be underpinned by technologies that depend on minerals such as lithium, graphite, cobalt, titanium and rare earth elements (REE). India has committed to achieve 50% of cumulative electric power installed capacity from non-fossil sources by 2030. Such ambitious plan for energy transition is set to drive the demand for electric cars, wind and solar energy projects and battery storage systems thereby increasing the demand for these critical minerals. Critical and Strategic Minerals are in high demand and the demand is usually met by imports. Critical minerals cater to the needs of sectors like renewable energy, defense, agriculture, pharmaceutical, high-tech electronics, telecommunications, transport, creation of Gigafactories etc.

3.30 Steps taken by Ministry of Mines for Critical and Strategic Minerals

i. India has proactively undertaken a series of initiatives aimed at strengthening the supply chain of critical minerals. The MMDR Act, 1957 amended through the MMDR Amendment Act, 2023 dated 17th August 2023 further inserted section 11D in the Act which empowered the Central Government to exclusively auction mining leases and composite licences in respect of 'critical and strategic mineral' specified in Part D of the First Schedule of the Act.

ii. The revenue generated from these auctions shall accrue to State Governments. Subsequently, royalty rates of critical minerals have been rationalized to encourage more participation in auctions. The Government had specified royalty rates for Platinum Group of Metals (PGM) at 4%, Molybdenum at 7.5%, Glauconite and Potash at 2.5% in March, 2022. Further, the Central Government has specified royalty rates for Lithium at 3%, Niobium at 3% and Rare Earth Elements at 1%.

iii. Subsequently, Central Government has issued Notice Inviting Tender (NIT) "Invitation of Bids for Grant of Mineral Concession of Critical and Strategic Minerals" for 1st, 2nd, 3rd and 4th tranches on 29 November 2023, 29 February 2024, 14 March 2024 and 24 June 2024 respectively. So far, Notice Inviting Tenders for auction of 48 critical mineral blocks have been issued by the Central Government, spread across the states of Andhra Pradesh, Arunachal Pradesh, Bihar, Chhattisgarh, Gujarat, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Tamil Nadu, Uttar Pradesh, and UT: Jammu and Kashmir.

iv. A total of 24 critical mineral blocks consisting of 4 mining leases and 20 composite licences are successfully auctioned having minerals viz., Lithium, REE, Graphite,

Vanadium, Nickel, Chromium, Cobalt, Manganese, Glauconite, Platinum Group of Elements (PGE), Tungsten, and Phosphorite. These blocks are spread across the States of Andhra Pradesh, Arunachal Pradesh, Bihar, Chhattisgarh, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Tamil Nadu, and Uttar Pradesh. States of Arunachal Pradesh, Bihar and Tamil Nadu has marked their presence on the auction map of India with their maiden auctions of critical and strategic mineral blocks.

3.31 Auction of Exploration Licence Blocks

i. Taking significant strides towards unlocking the potential of critical and deep-seated minerals, the MMDR Act, 1957 amended through the MMDR Amendment Act, 2023 dated 17th August 2023 further inserted Section 10BA incorporating provisions for grant of Exploration Licence ("EL") for minerals specified in Seventh Schedule through auction. Further, the process for grant of Exploration Licence has been notified in chapter III A of the Mineral (Auction) Amendment Rules, 2024, with respect to the minerals specified in Seventh Schedule of the MMDR Act.

ii. Accordingly, 20 blocks of critical minerals specified in the Seventh Schedule of the Act have been handed over to 14 states to initiate the auction process for EL. Subsequently, NITs for auction for grant of Exploration Licence for 12 blocks were issued by 6 States namely Andhra Pradesh (1), Chhattisgarh (3), Karnataka (1), Madhya Pradesh (2), Maharashtra (2), and Rajasthan (3).

iii. NITs for these EL blocks were annulled due to receipt of insufficient bids. Further, Ministry of Mines in the national interest, for the scientific and sustainable development and exploration of mineral resources issued Order dated 21.10.2024 under section 20A of the Act. The order notified that for the purpose of Sub-sections (4) and (6) of Section 10BA of the Act, Central Government will conduct the auction process for grant of Exploration Licence. Additionally, provision of Section 10BA of the Act and the Rules made thereunder

Auction of EL, as applicable to a State Government, shall mutatis mutandis be also applicable to the Central Government for notifying the blocks for auction or conduct auction of EL.

iv. The Exploration Licence holders will play a pivotal role in exploring the blocks and identifying areas suitable for mining lease auctions, potentially bolstering revenue for State Governments. This concerted effort by the Government underscores the commitment to harnessing the potential of critical minerals, fostering economic growth, and advancing the exploration landscape in India.

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

i. DMF is meant to address the long-standing demand of the local people in mining-affected 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% of royalty by miners of auctioned 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. 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/admin/storage/app/uploads/6638a345632971714_987845.pdf

ii. On 15/01/2024, the Government of India has issued the revised PMKKKY guidelines and increased the percentage of utilisation in high priority sectors from at least 60% to at least 70%. New sectors of Housing, Agriculture and Animal Husbandry, along with general guidelines regarding convergence of schemes, project management unit, endowment fund and affected areas in more than one district are introduced. Further, new guidelines have also incorporated amendments and addition in the section 'Transparency & Accountability' for the development of online portal by the Central Government for facilitating the administration of DMF, State Level Monitoring Committee, grievance redressal and compliance mechanism. The details are available at the web link:

https://mines.gov.in/admin/storage/ckeditor/Revised_Guidelines_PMKKKY_1712904597.pdf

iii. A total of Rs 90,730.07 Crores has been collected under DMFT till 31.03.2024.

iv. Till March 2024, 3,29,775 projects under different sectors have been sanctioned for various programmes/ development schemes under DMF/PMKKKY. For the said projects, Rs. 82,030.33 Crores has been allocated and the amount of Rs. 49,844.92 Crores has been spent till 31.03.2024.

State wise Daily Report on utilization of the funds available under District Mineral Fund (DMF) for supplementing and augmenting facilities of medical testing, screening as part of Economic Response to COVID 19 announced under Pradhan Mantri Garib Kalyan Package is as under:

Daily expenditure report for Covid - 19 - DMF funds

Till Mar 2024

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	139.79
2	Assam	77.5	-	0.65
3	Bihar	84.5	-	0
4	Chhattisgarh*	1190.04	1707.59	106.41
5	Goa	187.89	-	30.53
6	Gujarat	153.52	83.68	26.23
7	Haryana	20.24	-	0
8	Himachal Pradesh	135.66	-	0.43
9	Jharkhand	2056.85	-	22.85
10	Karnataka	1281.64	1211.64	205.04
11	Kerala	2	-	0
12	Madhya Pradesh	1297.65	1185.56	9.24
13	Maharashtra	687.99	-	59.5

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)
14	Odisha**	3274.18	6418.9	482.72
15	Punjab	26.16	-	0.65
16	Rajasthan	2020.08	2625.28	60.03
7	Tamilnadu	98.93	99.6	17.92
18	Telangana$	1001.2	-	334.08
19	Uttar Pradesh	383.22	423.22	11.29
20	Uttarakhand	74.39	110.62	10.16
21	West Bengal	17.7	-	0.46
	Total	**14694.46**	**14144.77**	**1517.98**

Note: Total balance available in DMF as on 28 March 2020 is 14694.47 cr. and 30% of this comes as approx. 4408 cr.

$As per D.O.No.7/2/2020-MIV, dated 28.03.2020 Rs 334.08 crore from 19 districts has been transferred to Chief Minister's relief fund.

**Chhattisgarh reported correction in COVID19 reporting in Jan 23 for districts Bijapur (5.14 cr. reduced to 2.53 cr.) and Korea (7.66 cr. reduced to 2.63 cr.)*

**Odisha reported reduction of 2.08 Cr. from August 23 COVID19 reporting in September 23*

3.33 Revision Applications

3.33.1 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.

3.33.2 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.

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

3.33.4 The website is accessible by public and the copy of Final Order & Hearing dates can be obtained from the Website.

3.33.5 During 1st January, 2024 to 31st December, 2024, total 129 Revision Applications were disposed of by Revisionary Authorities in the Ministry of Mines.

4

Revenue from Mineral Resources

Revenue from Mineral Resources

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- Revision of rates of royalty and dead rent in respect of major minerals (non-coal minerals)..... Page - 49
- Existing royalty rates for ores and minerals ..... Page - 50

Royalty - Legal Provisions

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

Similarly, under the provisions of Section 16(2) of the Offshore Areas Mineral (Development and Regulation) Act, 2002 (17 of 2003), the Central Government may, by notification in the Official Gazette, amend the First Schedule so as to enhance or reduce the rate at which royalty shall be payable in respect of any mineral 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 mineral more than once during any period of three years.

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

4.2 In exercise of the powers conferred under Section 9(3) of the MMDR Act, 1957, the Central Government has amended the Second Schedule to the said Act and notified the same vide notification No. G.S.R. 630(E) dated 01.09.2014. Further, in exercise of the powers 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 01.09.2014. Recently, the Central Government/Ministry of Mines has also amended the Second and the Third Schedule to the MMDR Act, 1957 vide Notification No. G.S.R. 621(E) dated 02.09.2019 and G.S.R. 622(E) dated 02.09.2019, respectively. After that 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 05.09.2019, respectively.

The following amendments in the Second Schedule to the MMDR Act, 1957 have also been notified-

(i) Vide notification No. G.S.R. 204(E) dated 15.03.2022 the Central Government made amendments in the Second Schedule to the MMDR Act, 1957 for specifying the rate of royalty in respect of Glauconite, Potash, Emerald, Platinum Group of Metals (PGM), Andalusite, Sillimanite, Kyanite and Molybdenum.

(ii) Vide notification No. G.S.R. 736(E) dated 12.10.2023 the Central Government made amendments in the Second Schedule to the MMDR Act, 1957 for specifying the rate of royalty in respect of Lithium; Niobium (i) Primary (produced from ores other than Columbite-tantalite) (ii) By-product (produced from ores other than Columbite-tantalite); Rare Earth Elements (produced from ores other than Monazite occurring in beach sand minerals).

(iii) Vide notification No. G.S.R. 152(E) dated 01.03.2024 the Central Government made the amendments in the Second Schedule of the MMDR Act, 1957 for specifying the rate of royalty in respect of Beryllium; Cadmium: (i) Primary (ii) By-product; Cobalt: (i) Primary (ii) By-product; Gallium: (i) Primary (ii) By-product; Indium; Rhenium; Selenium: (i) Primary (ii) By-product; Tantalum (produced from

ores other than Columbite-tantalite): (i) Primary (ii) By-product; Tellurium; Titanium (produced from ores other than Brown Ilmenite (Leucoxene), Ilmenite and Rutile occurring in Beach Sand Minerals found in teri or beach sands): (i) Primary (ii) By-product; Tungsten; Vanadium: (i) Primary (ii) By-product; and Zircon.

Further, in exercise of the powers conferred under Section 16(2) of the Offshore Areas Mineral (Development and Regulation) Act, 2002 (17 of 2003), the Central Government has amended the First Schedule to the OAMDR Act 2022 vide notification No. S.O. 4760(E) dated 29.10.2024 for specifying the rate of royalty in respect of Construction Sand; Dolomite; Limestone and Lime mud; Polymetallic Nodules and Crusts; and Overburden or waste.

4.3 Existing royalty rates (updated as on 12.10.2023) for ores & minerals, as per Second Schedule to the MMDR Act, 1957, is available at-

https://ibm.gov.in/writereaddata/files/17192309526679 61e85a0a8Rates_of_Royalty_of_major_minerals.pdf

Further, the rates of royalty, as amended by vide notification No. G.S.R. 152(E) dated 01.03.2024, is given at-

https://mines.gov.in/admin/download/65e955082e7bb1709790472.pdf

Royalty accrual for minerals (other than atomic, coal, lignite & sand for stowing and minor mineral) by the various State Governments for the year 2021-22 to 2023-24(P) is given below:

Table–4.1
State wise Royalty accrual on major minerals (other than Minor, Atomic, Coal, Lignite, Sand for Stowing) during last 03 years.

(Rs. in Lakhs)

State	2021-22(R)	2022-23(P)	2023-24(P)
Andhra Pradesh	41401.751	43279.634	49267.051
Assam	1476.45	1393.25	2018.78
Bihar	710.39	NA	NA
Chhattisgarh	883872.12	NA	NA
Goa	9755.24	95.5	NA
Gujarat	25165.114	NA	NA
Haryana	Nil	Nil	Nil
Himachal Pradesh	1167	983	NA
Jammu & Kashmir	NA	NA	NA
Jharkhand	279140.34	NA	NA
Karnataka	409280	337486	NA
Kerala	1055	1725	NA
Madhya Pradesh	58112	56393	NA
Maharashtra	30453.66	55869.1	82632.37
Meghalaya	12433.485	NA	NA
Odisha	1795922	1082312	NA
Rajasthan	382179.24	383133.36	363449.32
Tamil Nadu	17936.39	NA	NA
Telangana	22674.058	21076.916	21133.899
Uttar Pradesh	2452.322	NA	NA
Uttarakhand	41.15	NA	NA
West Bangal	Nil	Nil	Nil

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

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- Memorandums of Understanding (MoUs) signed during the period ..... Page - 53
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Objectives:

5.1 Ministry of Mines has been working to strengthen India's position in mining sector including critical minerals. In the interest of developing bilateral cooperation with countries having rich mineral resources, the Ministry has entered into bilateral agreements with the Governments of a number of countries such as Australia, Argentina, Zambia, Peru, Zimbabwe, Bolivia, Morocco, Mali, Colombia, Chile, Mozambique, Malawi, Cote D'Ivoire and International organizations such as International Energy Agency (IEA).

5.2 Ministry of Mines is also engaging on various multilateral and bilateral platforms such as Minerals Security Partnership (MSP), the Indo- Pacific Economic Framework (IPEF), and initiative on Critical and Emerging Technologies (iCET) for strengthening the critical minerals value chain.

Memorandum of Understanding (MoU) Signed during the Period

5.3 An MoU between Ministry of Mines and Govt. of Republic of Cote d'Ivoire for collaboration in the field of Geology and Mineral Resources has been signed on the side-lines of Mining Indaba-2024 on 5th February, 2024 in South Africa.

5.4 A Memorandum of Understanding (MoU) was signed between the Ministry of Mines and Shakti Sustainable Energy Foundation for providing knowledge support in the field of Critical Minerals in New Delhi on 30th April, 2024 on the side-lines of high level conference on 'The Critical Minerals Summit: Enhancing Beneficiation and Processing Capabilities' organised by Ministry of Mines and in collaboration with the Shakti Sustainable Energy Foundation (SSEF), the Council on Energy, Environment and Water (CEEW), and the International Institute for Sustainable Development (IISD).

5.5 The Ministry of Mines has signed a Memorandum of Understanding (MoU) with the International Energy Agency (IEA) on cooperation in the area of Critical Minerals on 13th November, 2024. This collaboration marks a significant step towards securing India's critical mineral resources while aligning with global best practices in the critical mineral sector.

Joint Working Group (JWG) and Sub-Group Meetings

5.6 An Indian delegation led by Shri Vivek Kumar Bajpai, Joint Secretary, Ministry of Mines participated in the 2nd Joint Working Group (JWG) for cooperation in the field of Geology and Mineral Resources between India and Zambia held during 10th to 11th June, 2024 in Lusaka, Zambia.

5.7 The 9th meeting of the India-Russia Sub-Group on Mining of the Working Group on Modernization and Industrial Cooperation under the Intergovernmental Russian-Indian Commission on Trade, Economic, Scientific, Technical and Cultural Cooperation (IRIGC-TEC) was held on 11th September, 2024 through hybrid mode at Shastri Bhawan, New Delhi. The Indian delegation was headed by Shri Vivek Kumar Bajpai, Joint Secretary, Ministry of Mines, Government of India, the Co-chair of Indian side. The Russian delegation was headed by Mr. Ivan Markov, Director of the Department of Metallurgy and Materials of the Ministry of Industry and Trade of the Russian Federation, the Co-chair of the Russian side.

5.8 The 4th India -Australia Joint Working Group meeting on Critical Minerals was held on 29th October, 2024 in Sydney, Australia under the Co-chairmanship of Shri V. L. Kantha Rao, Secretary, Ministry of Mines.

Bilateral Meetings

5.9 A Meeting on "Opportunities for Indian Mining Companies in Australia" was organized by Ministry of Mines, Government of India on 8th January, 2024 at the India Habitat Centre, New Delhi. H.E. Shri Gopal Bagley, HCI Designate to Australia Chaired the Meeting. In the meeting total 17 stakeholders were present. A number of industry representatives like Hindalco, Aditya Birla group, Vedanta, Tata Steel, Adani, JSW Steel Ltd., Shree Cement ltd., JSPL, Kaveri Naptol, Lohum, RIL and many government companies like SAIL, CIL attended the meeting.

5.10 7th India-US forum was held from 27th to 29th January at the Imperial Hotel in New Delhi. This event was attended by Shri. V.L. Kantha Rao, Secretary, Ministry of Mines on 28.01.2024. During the event Shri V.L. Kantha Rao, Secretary, Ministry of Mines, stated that both countries would take up joint projects on Geoscientific Data Processing, R & D in the processing of Critical Minerals, opportunities for Junior Mining Companies and the recycling of Critical Minerals.

5.11 A meeting chaired by Dr. Veena Kumari Dermal, Joint Secretary, Ministry of Mines was held on 05.01.2024 with key representatives of industries like Ola, Hindalco, Jindal, GMDC, IESA etc. to discuss the opportunities for Indian companies for mining of Graphite in Sri Lanka.

5.12 A meeting between Shri. V.L. Kantha Rao, Secretary, Ministry of Mines and Shri Manish Gupta, High Commissioner-designate to the Republic of Ghana was held on 15.01.2024.

5.13 A meeting between Shri. V.L. Kantha Rao, Secretary, Ministry of Mines and a US delegation headed by Mr. Geoffrey Pyatt, Assistant Secretary for Energy Resources, USA was held on 29.01.2024. Objective of the meeting was to have deliberation on exploring opportunities for collaboration in the realms of clean energy and critical minerals, with a focus on leveraging the iCET, MSP, and IPEF platforms for enhanced cooperation.

5.14 A Bilateral meeting between Shri V. L. Kantha Rao, Secretary, Ministry of Mines and Mr. Tim Gould, Chief Energy Economist, International Energy Agency held on 8th February, 2024 in the Ministry of Mines to discuss various dimensions of the sustainable and responsible supply chain of critical minerals for clean energy transition.

5.15 A meeting between Dr Veena Kumari Dermal, Joint Secretary, Ministry of Mines with Mr. Sanjiva De Silva, Counsellor, Australian High Commission held on 14.02.2024 in Ministry of Mines, for update on the KABIL CMO partnership post the first meeting of KABIL CMO steering committee.

5.16 A meeting between Shri V. L. Kantha Rao, Secretary, Ministry of Mines and the delegation of United Kingdom led by Ms. Christina Scott, Acting High Commissioner, UK held on 20.02.2024 in Ministry of Mines to discuss about India-UK Tech and Security initiatives as well as cooperation in the areas of Critical Minerals exploration, beneficiation and circularity.

5.17 A Bilateral meeting between Shri Pralhad Joshi, Hon'ble Minister of Mines with Canadian delegation led by Mr. Scott Moe, Hon'ble Premier of Saskatchewan, Canada held on 21.02.2024 in Ministry of Mines to explore opportunities for collaborative efforts in joint research and development programs in the realm of critical minerals value chain and the clean energy sector.

5.18 An Inter-Ministerial Committee (IMC) to discuss the participation in the International

Mining events abroad during the year 2024-25 held on 28th February, 2024 under the chairmanship of Secretary (Mines) through Hybrid mode.

5.19 A bilateral meeting between Shri V.L. Kantha Rao, Secretary (Mines) with Dr. Sethuraman Panchanathan, Director, NSF, USA held on 22.03.2024 through VC to discuss about taking Collaborative Projects on Critical Minerals under the initiative on Critical and Emerging Technology (iCET) platform.

5.20 Shri V.L. Kantha Rao, Secretary, Ministry of Mines virtually attended inaugural event of the MSP Forum held in Leuven, Belgium on 05th April 2024 with senior officers in the Ministry of Mines

5.21 A meeting between Shri V. L. Kantha Rao, Secretary, Ministry of Mines and Senior Officers of Ministry of Mines, Coal and Steel with Shri Gopal Baglay, High Commissioner-Designate to Australia was held on 05.04.2024 in Ministry of Mines to interact for enhancement of cooperation between India and Australia in the mining sector.

5.22 A Bilateral meeting between Shri V.L Kantha Rao, Secretary, Ministry of Mines with a delegation from Democratic Republic of Congo (DRC) led by the H.E. Mr. Wabenga Kalebo Theo, Permanent Secretary, Ministry of Foreign Affairs, DRC was held on 09.04.2024 in Ministry of Mines, Shastri Bhawan. Both sides discussed areas of cooperation in critical mineral sector, processing of precious and semi-precious stones as well as capacity building and skill development.

5.23 A high-level meeting focused on "exploring investment opportunities in the African mining sector, with a particular emphasis on potential collaborations with companies from the Middle East" under the chairmanship of Secretary, Ministry of Mines was held on 10.04.2024 through Hybrid mode in Ministry of Mines, Khanij Kaksh to facilitate discussions with key stakeholders from Indian industries.

5.24 An Interactive consultation session with CPSEs and private companies engaged in Mineral/Mining Sector, Critical Mineral Sector and Battery Manufacturers under the chairmanship of Dr. Veena Kumari Dermal, Joint Secretary, Ministry of Mines held through Hybrid mode on 24.04.2024 in Ministry of Mines for seeking valuable insights and feedback on Indo-Pacific Economic Framework and Mineral Security Partnership Projects.

5.25 The second meeting of the Inter-Ministerial Group with regard to Critical Minerals "for formulating overall coordinated approach for formation of a holistic strategy for critical minerals and action plan to support the same" under the chairmanship of Sh. V. L. Kantha Rao, Secretary, Ministry of Mines held on 25.04.2024 in Ministry of Mines, Shastri Bhawan, New Delhi.

5.26 In continuation to the first industry interaction organized by Ministry of Mines on 05.01.2024, a VC meeting was convened on Vein Graphite in Sri Lanka on 20.05.2024. The meeting was hosted by High Commission of India, Colombo.

5.27 A meeting between Shri V. L. Kantha Rao, Secretary, Ministry of Mines with Mr. Geoffrey Pyatt, US Department of State Assistant was held on 23.05.2024 virtually in Ministry of Mines to discuss joint projects related to critical minerals which can be announced during the upcoming iCET annual review meeting.

5.28 A meeting was held on 20.05.2024 between Ministry of Mines and Asian Development Bank (ADB) to discuss Critical Minerals and supply chains, under the

chairmanship of Shri. V. L. Kantha Rao, Secretary (Mines) in Shastri Bhawan, New Delhi regarding collaborations on Technical Assistance programme, Critical Mineral Fund and Green Mining Initiatives.

5.29 Secretary, Ministry of Mines had a productive meeting with Mr. Sethuraman Panchanathan, Director, NSF, USA in New Delhi on 17.6.2024. Both sides discussed the areas for potential partnerships in Critical Minerals sector and the innovative use of AI in analysing geological data sets under the iCET platform.

5.30 A meeting held between Shri Vivek Kumar Bajpai, Joint Secretary, Ministry of Mines and Mr. Dylan Jones, DOE, Embassy of USA in India on 2nd July 2024 at Shastri Bhawan, New Delhi, to discuss the lab-to-lab cooperation pertaining to the R & D projects identified under iCET (India Initiative on Critical and Emerging Technology) framework.

5.31 A virtual meeting held on 03.07.2024 between Shri Vivek Kumar Bajpai, Joint Secretary, M/o Mines and Indian Mission in Mongolia along with senior representatives of Indian copper producing companies viz. Hindustan Copper Ltd. (HCL), Vedanta (Sterlite Copper Ltd.), Hindalco (Birla Copper Ltd.), and Adani (Kutch Copper Ltd.), to discuss the possibilities of accessing copper reserves in Mongolia.

5.32 High Commissioner designate to the United Republic o f Tanzania, Mr. Bishwadip Dey met with Shri Vivek Kumar Bajpai, Joint Secretary, M/o Mines to discuss about the mineral sector in Tanzania and its prospective.

5.33 A preparatory inter-Ministerial meeting for the 9th meeting of Sub-group on Mining under the India-Russia Working Group of Modernization and Industrial Cooperation under IRIGC-TEC under the Chairmanship of Shri Vivek Kumar Bajpai, Joint Secretary, Ministry of Mines was held on 4th July, 2024 in the Ministry of Mines on hybrid mode to discuss/finalize the Draft protocol of Indian side.

5.34 Shri Sanjuy Sudhir, Indian Ambassador, UAE met Secretary (Mines) on 24th July, 2024 in M/o Mines and discuss about possibilities UAE's investment in India in mining sector.

5.35 HE Philip Green, Australian High Commissioner to India met Secretary (Mines) on 29 July, 2024 in Shastri Bhavan, M/o Mines to discuss about partnership on Critical Minerals and broader mining interests.

5.36 Sh. V.L. Kantha Rao, Secretary, Mines had a productive meeting with Ms. Lindy Cameron, British High Commissioner to India on 30th July, 2024 in the M/o Mines, Shastri Bhavan. Meaningful exchanges occurred on the UK-India Technology Security Initiative (TSI), with a view to fostering collaboration in the critical mineral sector.

5.37 Secretary (Mines) had a meeting with Mr. Subhash Prasad Gupta, Ambassador Designate to Suriname and concurrently accredited to Barbados, St. Lucia and St. Vincent & Grenadines on August 2, 2024 at Shastri Bhawan, New Delhi.

5.38 Shri V.L. Kantha Rao, Secretary, Ministry of Mines held a meeting with the delegation of Burikina Faso on August 22, 2024 in Shastri Bhawan, New Delhi where representatives from Burkina Faso discussed about collaboration in field of artisanal mine modernization, mining technology, and cutting/polishing of building stone.

5.39 For seeking the potential investors for Hindustan Zinc Limited (HZL), an Indian delegation led by Shri Vivek Kumar Bajpai, Joint Secretary, Ministry of Mines visited Hong Kong and Singapore to attend the Non-Deal

International Road Shows for Hindustan Zinc Ltd. (HZL) from August 26, 2024 to August 28, 2024.

5.40 Shri V. L Kantha Rao, Secretary, M/o Mines met HE Mr Philip Green, Australian High Commissioner to India on 23rd September, 2024 at Shastri Bhawan, New Delhi for discussions on the Australia- India critical minerals partnership and to foster deeper collaboration between the two nations.

5.41 Shri V. L Kantha Rao, Secretary, M/o Mines had a virtual meeting with Indian Mission in Australia on 27th September, 2024 to discuss about the International Minerals and Resources Conference (IMARC) 2024 to be held in Sydney, Australia in October, 2024.

5.42 Shri Vivek Kumar Bajpai, Joint Secretary, Ministry of Mines held an online meeting with the delegation of Uzbekistan led by Mr Kadirkhodjaev Azam Alisherovich, Deputy Minister, Ministry of Mining Industry and Geology, Uzbekistan on 07.10.2024. Ms Smita Pant, Ambassador of India to Uzbekistan also attended the meeting.

5.43 An online meeting was held between Shri Vivek Kumar Bajpai, Joint Secretary, M/o Mines and Shri Prashant Kumar Das, Ambassador of India to the Republic of Equatorial Guinea on 29.10.2024 to discuss opportunities available in Equitorial Guinea in the field of Geology, Exploration and Mineral Resources.

5.44 A meeting was held on 26th November, 2024 in Shastri Bhavan, New Delhi between Shri Vivek Kumar Bajpai, Joint Secretary, Ministry of Mines and Ms. Donna Looney, Head of Division (International Trade & National Security Division), Australian Government to discuss the updates on the Australia India Critical Minerals Investment Partnership and explore similarities/complementarities between Australian and Indian Government priorities within the resources/Critical Minerals portfolio.

5.45 A video conference meeting between Shir Vivek Kumar Bajpai, Joint Secretary, Ministry of Mines and Mr. Yohei Kawasaki, Deputy Director, Mineral Resources Division, Manufacturing Industries Bureau along with his colleague, Japan was held on 02.12.2024 to discuss on proposing MoU in the field of geology, mineral resources and energy.

Conferences/Workshops

5.46 A Critical Raw Materials for Low Carbon Technologies workshop was organized from 30.01.2024 to 31.01.2024 by CEEW, CSEP, ICRIER, IISD, and Shakti Sustainable Energy Foundation. The workshop was attended by Shri V.L. Kantha Rao, Secretary and Dr. Veena Kumari Dermal, Joint Secretary, Ministry of Mines on dated 30.01.2024 and 31.01.2024 respectively.

5.47 In the workshop Secretary, Ministry of Mines highlighted key actions taken by the Government to strengthen India's position in securing Critical Raw Materials for a sustainable energy transition and to meet India's Net Zero targets. Joint Secretary Ministry of Mines, emphasized the Ministry's efforts in enhancing India's critical mineral sector through Policy Reforms and Global Partnerships. She also engaged with think tanks, addressing queries ranging from Exploration to the Recycling of Critical Minerals.

5.48 Ministry of Mines, Government of India, in collaboration with the Shakti Sustainable Energy Foundation (SSEF), the Council on Energy, Environment and Water (CEEW), and the International Institute for Sustainable Development (IISD), has organised a high- level conference, 'The Critical Minerals Summit: Enhancing Beneficiation and Processing

Capabilities', on April 29th and 30th, 2024, at the India Habitat Centre in New Delhi. The summit, designed to foster collaboration and innovation in critical minerals beneficiation and processing, was inaugurated under the patronage of the Ministry of Mines, with Shri V L Kantha Rao, Secretary, Ministry of Mines, presiding over the opening ceremony.

5.49 Dr. Veena Kumari Dermal, Joint Secretary of the Ministry of Mines, delivered the closing remarks, encapsulating the summit's key takeaways and emphasized both domestic and international efforts to secure the critical mineral supply chain, enhance skill development in India, and focus on critical minerals recycling.

Foreign Visits:

5.50 An Indian delegation led by Ms. Farida M. Naik, Joint Secretary, Ministry of Mines participated in the 'Future Minerals Forum 2024' held at Riyadh, Saudi Arabia from 9th – 11th January, 2024. During the event, Indian delegation shared crucial insights into India's exploration and mining sector. Deliberation were held on the significance of advancing the critical mineral value chain, a focal point in the global economy and other domains like sustainability and green technology.

5.51 An India Delegation led by Shri Sanjay Lohiya, Additional Secretary, Ministry of Mines participated in Mining Indaba-2024 event held at Cape Town, South Africa from 5th to 8th February, 2024. An Indian Pavilion was also set up to showcase capability and opportunity in Indian mining and mineral sector.

5.52 An Indian delegation led by Shri V.L. Kantha Rao, Secretary (Mines) participated in Prospector Developers Association of Canada (PDAC)-2024 event held at Toronto, Canada from 3rd to 6th March, 2024. An Indian Pavilion was set up to showcase capability and opportunity in Indian mining and mineral sector. An India Day Session was also held on 4th March, 2024 at PDAC2024.

5.53 An Indian delegation led by Shri V. L. Kantha Rao, Secretary (Mines) participated in 105th International Organizing Committee Meeting of the World Mining Congress, CRU World Copper Conference and associated Copper mines visit in Santiago, Chile during 14th to 18th April, 2024.

5.54 An Indian delegation led by Shri Vivek Kumar Sharma, Director, Ministry of Mines visited the Democratic Republic of Congo to participate in the DRC Mining Week Expo & Conference, held from 12th to 14th June, 2024, in Lubumbashi, Congo.

5.55 India delegation led by Shri V. L. Kantha Rao, Secretary, Ministry of Mines to participate in BRICS Round Table on "Prospects for Cooperation in BRICS in the Sphere of Exploration and Management of Mineral Resources", Site visit to Nickel production facilities in Murmansk and Other Bilateral Meetings held in Moscow, Russia during July 15 to 18, 2024.

5.56 Shri V.L. Kantha Rao, Secretary(Mines), visited Kola Mining and Metallurgical Company production facilities, a subsidiary of MMC Norilsk Nickel, in the Murmansk region of Russia on 15.7.2024. The visit included a tour of matte separation, nickel concentrate roasting, electrolysis department, separation of electrolytic nickel, etc.

5.57 Shri V.L. Kantha Rao, Secretary (Mines) met with Mr. Maxim Ryabushkin, Acting Director General, Kola MMC, and his team in the Murmansk region of Russia, on 15.7.2024. Both delegations expressed interest in collaboration on Ni exploration and ore processing.

5.58 An Indian delegation led by Shri Sanjay Lohia, Additional Secretary, M/o Mines attended the MSP Principal and MSP Forum meetings in New York, USA on 26th September, 2024.

5.59 Smt. Farida M Naik led an Indian delegation to Mongolia for participation in Mining Week 2024 and 'International Quarrying and Mining Exhibition & Convention' (Mine Pro 2024) from 02.10.2024 to 03.10.2024.

5.60 Shri V.L Kantha Rao, Secretary, M/o Mines led an Indian delegation to Australia for participation in IMARC 2024 and other bilateral engagements in Australia from 28.10.2024 to 01.11.2024.

5.61 Shri Sukhdeep Singh, Joint Director, Ministry of Mines participated in 20th Annual General Meeting of Inter-Governmental Forum (IGF) on Mining, Minerals, Metals and Sustainable Development held during 18-21 November, 2024 in Geneva, Switzerland.

5.62 Shri Dinesh Mahur, Joint Secretary, Ministry of Mines led a 33 members' Indian delegation to participate in "The Mining Show 2024" held at Dubai, UAE from 26th to 27th November 2024.

Khanij Bidesh India Limited (KABIL)

5.63 On 15.01.2024, Khanij Bidesh India Limited (KABIL) signed an Exploration and Development Agreement with CAMYEN, a state- owned enterprise of Catamarca province of Argentina, for Exploration & mining for 5 Lithium Blocks in Argentina. The signing ceremony was virtually attended by Shri Pralhad Joshi, Hon'ble Minister of Parliamentary Affairs, Coal and Mines and Shri. V. L. Kantha Rao, Secretary, Ministry of Mines, Government of India. From Argentinean side H.E Shri. Raul Jalil, Governor of Catamarca Province, Argentina and other senior officials of CAMYEN attended the ceremony. This strategic move not only strengthens the bilateral ties between India and Argentina but also contributes to the sustainable development of the mining sector.

5.64 Shri V. L. Kantha Rao, Secretary (Mines) chaired a review meeting with CEO, KABIL on implementation status of KABIL- CAMYEN Agreement through VC on 29.03.2024 in Ministry of Mines, Shastri Bhawan.

5.65 Shri V L Kantha Rao, Secretary, Ministry of Mines, Government of India, inaugurated the Registered Office of Khanij Bidesh India Limited (KABIL) at PTI Building, Sansad Marg, Delhi, on 11 May, 2024. In his address, he emphasized KABIL for playing a crucial role in driving India's growth and self-sufficiency in the realm of critical & strategic minerals aligning with the objectives of "Make in India" and "Viksit Bharat", along with India achieving the Net Zero Emission Goal.

5.66 A meeting between Shri Vivek Kumar Bajpai, Joint Secretary, Ministry of Mines with Mr. Sanjiva de Silva, Counsellor, Australian High Commission held on 14.05.2024 in Ministry of Mines, Shastri Bhawan for discussion on KABIL CMO.

5.67 A meeting was held on 01.07.2024 under the chairmanship of Hon'ble Minister of Mines in the Ministry of Mines on virtual mode to discuss about the progress made by Khanij Bidesh India Ltd (KABIL) so far and for further course of action.

6

Attached / Subordinate Offices

Attached / Subordinate Offices

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Geological Survey of India (GSI)

6.1 The Geological Survey of India (GSI), established in 1851, began its voyage with the mission to explore and evaluate the country's coal and mineral resources through regional exploration. Over the years, GSI has expanded its scope to encompass a wide range of geoscientific activities, significantly contributing to the field of geosciences and, consequently, to India's economic development. The primary functions of GSI include the creation and updating of national geoscientific information and the assessment of mineral resources. GSI undertakes ground, airborne, and marine surveys, mineral exploration, multidisciplinary geoscientific studies, geotechnical and geo-environmental research, natural hazard assessments, glaciology, seismotectonic studies, and fundamental research.

Organization of GSI Mission

6.2 The Geological Survey of India (GSI) designs and implements its geoscientific programs through five key Missions: Baseline Geoscience Data Generation (Mission-I), Natural Resources Assessment (Mission-II), Geo-informatics (Mission-III), Fundamental, Multi-disciplinary Geoscience and Special Studies (Mission-IV), and Training and Capacity Building (Mission-V). These programs are executed across six regions. To facilitate effective planning, coordination, and evaluation, GSI operates three Support Systems: the Scientific & Technical Support System (STSS), the Administrative Support System (Ad.SS), and the Policy Support System (PSS).

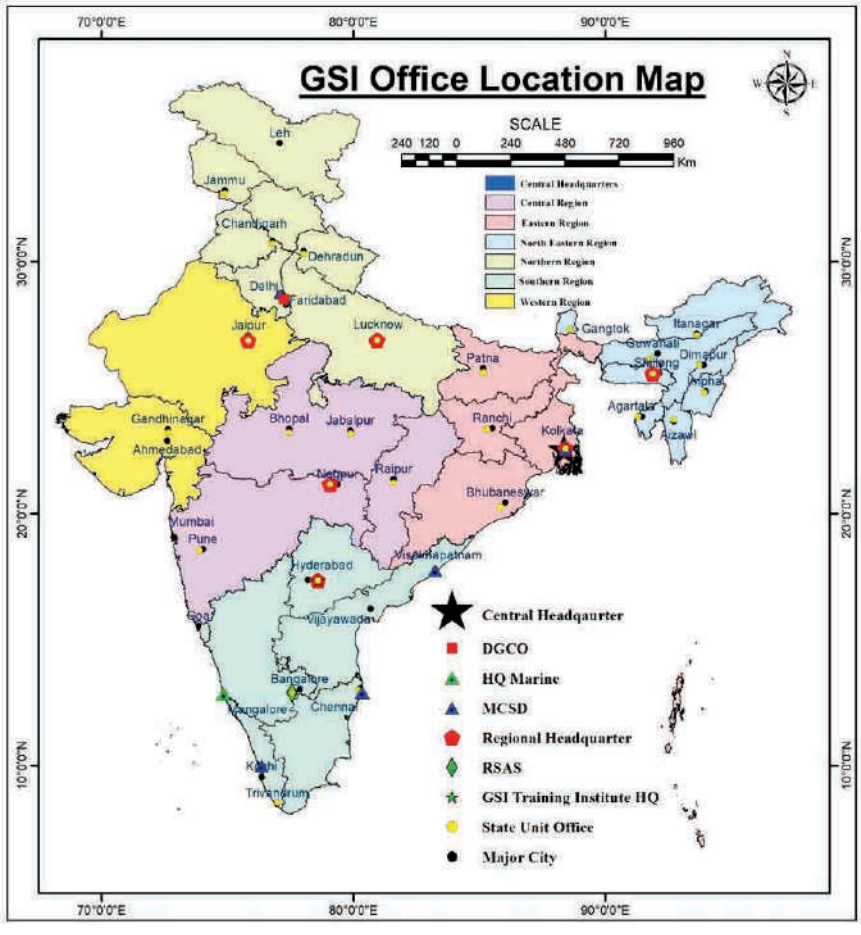


Photo 6.1 Organization of GSI Mission

MISSION-I: Baseline Geoscience Data Generation

The activity under this mission involves Ground Surveys (Geological, Geophysical and Geochemical surveys), Marine & Coastal Surveys (Marine Survey within Territorial Water, Exclusive Economic and beyond, Zone, Coastal survey), Remote Sensing and Aerial Surveys (Aero-geophysical Survey; Photo Geology & Remote Sensing-Multispectral and Hyperspectral studies). GSI is the only organization in India which is actively engaged in three layers of ground mapping (geology, geochemical & geophysics) of the Indian landmass. The integration of all geo-scientific data (Geological, Aero-geophysical, Geophysical, Geochemical and Remote sensing) in GIS platform is also being done for prognostication of potential mineralized belt, to resolve geological problems as well as to do public good geoscience and all data are uploaded in GSI's "BHUKOSH" portal (https://bhukosh.gsi.gov.in/Bhukosh/Public) and in "NGDR" portal (https://geodataindia.gov.in/login) for use of all other stakeholders.

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 already covered bringing the total coverage to 99.27%. The SGM data along with all other geoscientific data of GSI are available on Bhukosh.

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

6.4 Specialized Thematic Mapping

Specialised Thematic Mapping (STM) is the theme-oriented mapping programme which is done on 1: 2,5000 scale to resolve the complex geological problems. It involves collection of multidisciplinary data, and is backed by advanced laboratory studies. Such thematic mapping will refine and update the existing geological knowledge base in greater detail in the light of available new scientific concepts and advancements in knowledge in different branches of Earth Science. STM plays a pivotal role in natural resource prognostication through generation of spin off reconnaissance mineral investigation programmes (mostly G4 stage). Till December, 2024, an area of about 0.438 million sq. km. (including 0.028 million sq. km. area mapped in 2024) has been mapped. Another 0.008 million sq.km area is expected to be covered till March 2025.

6.5 National Geochemical Mapping

The National Geochemical Mapping (NGCM), in implementation since Field Season 2001-2002, aims to create a seamless baseline geochemical base map of 64 elements on 1:50,000 scale for the entire country. However, 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. The NGCM data along with other geoscientific data helps in generation of reconnaissance mineral investigation

programmes (mostly G4 stage). It also finds application in environmental, agricultural, human health and other social concerns. The elemental analyses of NGCM samples are being done in the laboratories of GSI and sometimes outsourced from other government organizations like National Geophysical Research Institute **(NGRI)**, Mineral Exploration and Consultancy Limited **(MECL)**, Jawaharlal Nehru Aluminium Research Development and Design Centre **(JNARDDC)** and National Metallurgical Laboratory **(NML)** on need basis.

The procedure follows international standards, which are considered benchmarks for deciding anomalous value of different elements for preparation of geochemical anomaly maps. For detailed reports visit website of GSI at www.gsi.gov.in. GSI has completed the geochemical mapping under NGCM programme in the targeted areas of country excluding Indo-Gangetic-Brahmaputra Alluvium, parts of Thar Desert, Core Deccan Trap areas and some inaccessible parts in March 2024 with a total coverage of 2.139 million sq. km. Further, during FS 2024-25 few projects on NGCM are taken up in the Indo-Gangetic-Brahmaputra alluvium to complete some Degree sheets for data compilation.

The Deccan Trap areas falls under hard rock terrains of the country and cannot be completely ruled out from mineralization of PGE, Cu, Ni, Cr etc. Therefore, during FS 2024-25, GSI devised the new methodologies to cover the core areas of Deccan Volcanic Province (DVP) by geochemical mapping under the programme '**Geochemical Assessment of Core Deccan Trap (GCA-CDT)**' with collection of additional information to understand the chemical variability in a profile section. Till December 2024, an area of 0.054 million sq. km has been covered by geochemical mapping under GCA-CDT. Another 0.066 million sq. km area is expected to be covered by March 2025.

6.6 National Geophysical Mapping

GSI is systematically carrying out the geophysical mapping or acquiring ground gravity and magnetic data on 1: 50,000 scale under the National Geophysical Mapping Program (NGPM). It aims at generating a baseline ground gravity-magnetic data and prepare geophysical anomaly map of the country. The analysis and interpretation of the NGPM data will facilitate in deriving the crustal architecture and delineating the mineral prospective zones. The results of the NGPM survey are integrated with other available geological and geochemical data sets and further mineral exploration programmes are being launched in the favourable areas delineated by integration study. During the period from January to December 2024, an area of 0.168 million sq. km was covered by GSI utilizing in-house resources and 0.064 million sq. km by outsourcing utilizing NMET fund, thereby completing a total area of 1.571 million sq.km by NGPM.

6.7 Aero-geophysical Survey

Airborne geophysical surveys are being carried out under "National Aero-Geophysical Mapping Program" (NAGMP) and Heliborne Magnetic and Time Domain Electromagnetic (TDEM) utilizing NMET fund and Twin Otter Aircraft Survey System (TOASS) by GSI with the fixed-wing consisting of Magnetic and Gamma Ray Spectrometric Sensors. The survey using TOASS over Gaya-Dumka area in parts of Bihar, Jharkhand, and West Bengal has been completed in FS 2023-24 and final report circulated in September, 2024. The details of NAGMP and TDEM are given below.

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

The "National Aero-Geophysical Mapping Program" **(NAGMP)** was initiated in April, 2017, to acquire uniform aero-geophysical data over OGP areas of the country. 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. The project is being funded by National Mineral Exploration Trust (**NMET).** The Project Implementing Agencies [PIAs] are being selected through global tendering/GeM. The total target for Phase-I (Blocks-1 to 12) and Phase-II (Blocks-13 to 21) of NAGMP survey is 11.6 lakh sq.km

Since initiation in 2017, the NAGMP survey over Block-1 to 4, 6, 8 and 11 has been completed in the states of Rajasthan, Gujarat, Madhya Pradesh, Uttar Pradesh, Chhattisgarh, Andhra Pradesh, Telangana, Tamil Nadu and Karnataka, Maharashtra and a total of 332 potential zones/block have been identified for further follow-up survey.

The data acquisition over Block-5, 14 and 15 covering/in parts of the states of Chhattisgarh, Gujarat, Jharkhand, Madhya Pradesh, Rajasthan and Uttar Pradesh is under progress.

In Total, 4.73 Lakhs Sq.km area has been covered under NAGMP program till December 2024.

6.9 Heliborne Magnetic and Time Domain Electromagnetic (TDEM) survey

Advanced Heliborne Time Domain Electromagnetic (TDEM) and magnetic survey funded by the NMET of the Ministry of Mines has been initiated. Surveys over 10 potential target zones identified from the interpretation of NAGMP Block-1 and available legacy data covering a total of 3,354 Sq. Km area with 24,595 Line Km in the states of Rajasthan, Odisha, Andhra Pradesh, Telangana and Karnataka with a traverse line spacing of 150 m and 1500 m control line spacing with an altitude of 40 m above ground level. The first block MPZ-Block-1 was completed by covering a total of 195 Sq. Km in Rajasthan. The Surveys over MPZ-H1-1 block in Odisha is under progress and till December 2024 an area of 410 Sq. Km covered. The results from this survey will provide critical insights into the geological structures and mineral potential zones that are not visible on the surface.

6.10 Hyperspectral/Multispectral Remote Sensing technique in exploration

Since 2022, GSI devised a new methodology to cover in surface mineral mapping using ASTER multispectral data on 1:50,000 scale over the OGP areas of the country. In the FS Year 2024-25, mapping has been extended to cover an area of 3,12,782 sq. km, including OGP regions in Karnataka, Goa, Telangana, Andhra Pradesh, Maharashtra, Madhya Pradesh, Chhattisgarh, Rajasthan, Gujarat, Odisha, Meghalaya, Assam, Sikkim, Himachal Pradesh, Haryana, Punjab, Uttarakhand, and the Union Territories of Jammu & Kashmir and Ladakh. Additionally, an area of 1,38,150 sq. km, covering non-OGP regions of Rajasthan and Gujarat, has been taken up. This data will contribute to the baseline database generation. Furthermore, hydrocarbon exploration using multispectral data has been initiated over 1,600 sq. km in parts of Tripura. A mine subsidence study using SAR Interferometry has also been taken over the Jharia coalfields, Jharkhand during this period.

GSI has taken up two projects in collaboration with ISRO-Space Application Center, Ahmedabad. Under projects focused on Rare Earth Element Prospect Modelling using Hyperspectral remote sensing and Aero-geophysical datasets in Rajasthan and Gujarat, 50, 000 sq. km area has been covered out of the target of 1,50000 sq. km. while project on Development of mineral prospect models for gold exploration leveraging Machine Learning, Hyperspectral Remote sensing and Aero-geophysical datasets in Hutti-Muski schist belt, an area of 400 sq. km has been covered out of the target of 750 sq. km. The remaining target is likely to be achieved by March 2025.

6.11 Geoscience Data Integration (GID)

Two projects are under execution in FS 2024-25 wherein the large data sets acquired by GSI under NAGMP/Aerial Survey and the legacy data of GSI acquired over the time is being integrated for finding the new locales of mineralization in parts of Mewat, Faridabad and Palwal districts of Haryana; Alwar and Bharatpur districts of Rajasthan and Mathura district of Uttar Pradesh.

The aero-geophysical data sets have been collated, synthesized and integrated with geological, geochemical, ground geophysical and other legacy data. The priority study area was segmented and field studies are initiated. The sample analysis field studies and prospective map will be prepared for identifying potential areas for exploration in the future course.

6.12 Marine and Coastal Surveys

GSI in coordination with other government organizations like CSIR-National Institute of Oceanography (**CSIR-NIO**) and National Centre for Polar and Ocean Research (**NCPOR**) carries out mineral exploration within and beyond the Exclusive Economic Zone (**EEZ**) of the country. GSI acquires baseline data on bathymetry [sea bottom topography], sea surface sediment distribution, sub-seabed characters, gravity, magnetic, etc. within the EEZ of India. Marine and Coastal Survey Division (MCSD) of the Geological Survey of India has carried out 814 cruises so far within the Exclusive Economic Zone (EEZ) of India since 1983 using deep-sea vessels RV Samudra Manthan (1983-2013) and R V Samudra Ratnakar (Since 2014) and coastal vessels RV Samudra Shaudhikama and RV Samudra Kaustubh (since 1984) to generate baseline marine-geoscientific data and to collect seabed samples for delineation of economic mineral deposits within the EEZ of India. An area of 20,42,057 sq. km out of the total EEZ area of 21,59,620 sq.km (on 1:5,00,000 scale) accounting for 94.55% in EEZ has already been covered by systematic seabed mapping.

The compilation and synthesis of this enormous volume of marine geoscientific data resulted in the identification of 5,89,160 sq. km as Offshore Prospective Area (OPA) for marine minerals within EEZ of India. GSI also carries out preliminary and detailed mineral investigation programmes. These mineral investigation programmes paved the way for demarcation of prospective areas of offshore minerals in the Indian EEZ namely heavy minerals (47,823 sq.km), sand (37,570 sq.km), limemud (1,32,300 sq.km), phosphorite (1,04,367 sq.km), polymetallic nodules (1,37,100 sq.km), metalliferous mud (20,000 sq.km) and hydrothermal deposits (1,10,000 sq.km). An area of 3,09,512 sq.km has been covered by preliminary mineral investigation programmes out of the targeted potential area of 5,89,160 sq.km within the EEZ of India (52.5% coverage in preliminary exploration target area).

GSI has also launched seabed mapping in the selected areas within the international waters for generation of baseline data with search for possible mineral occurrences in Ninety East Ridge near Equator, Indian Ocean and in the Laxmi Basin, Arabian Sea and covered a total area of 86877 sq.km. including the 20,000 sq. km achieved during FS 2024-25.

During the period from January to December 2024, GSI has carried out systematic seabed mapping over an area of 700 sq.km out of the targeted area of 2800 sq.km. Further, preliminary marine mineral investigation has been carried out over an area of 15,143 sq.km out of the targeted area of 16,038 sq.km and close grid mineral investigation has been carried out over an area of 160 sq.km out of the targeted area of 817 sq.km within the EEZ. The preliminary mineral investigation programme for limemud in the offshore of Gujarat delineated zones of limemud and lime sand in the investigation area **(Fig.6.2)**. Taking the offshore survey and exploration data to the next level, GSI has prepared Geological Memorandum of offshore mineral blocks of limemud (3 blocks), heavy mineral (16 blocks), construction sand (9 blocks) and polymetallic crust and nodules (7 blocks) and submitted to the Ministry of Mines for auction. Offshore surveys for filling the data and knowledge gap and to identify the potential mineral zones and further delineation of auctionable mineral blocks will be continued.

A Preliminary Exploration (G3) for marine phosphorite, off Chennai, and Multi-channel seismic surveys for the delineation of limemud/ lime sand in the Western Continental Margin of India, off Gujarat and Maharashtra, will be taken up during January and March 2025.

Two detailed investigation programmes (PME and CGME) for heavy minerals in the offshore of Andhra Pradesh and three multi thematic mapping programmes in the contiguous zone off Karnataka is also scheduled during January to March 2025.

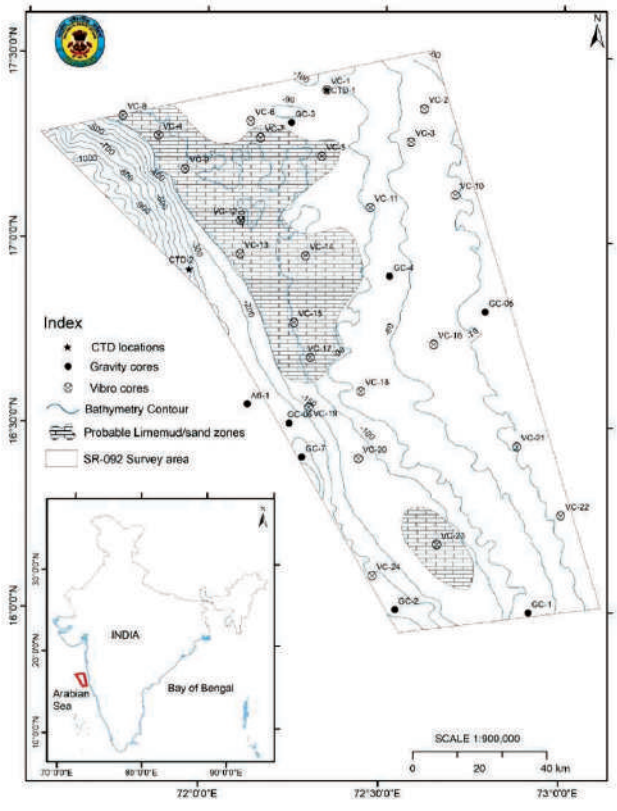


Photo 6.2 Distribution map of probable limemud/lime sand zones off Gujarat (Cruise SR-092)

Mission-II: Natural Resources Assessment

6.13 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 FS 2024-25, a total of 438 mineral exploration programs were taken up by GSI, which include 15 projects on 'offshore mineral investigation', 354 projects on Mineral Exploration [26 on Ferrous Minerals, 44 on Precious Metals and Minerals, 247 on Non-Ferrous and Strategic Minerals (including fertilizer minerals), 37 on industrial Minerals] and 24 projects on Natural energy resources [17 coal, 3 lignite, 1 shale gas, 1 Natural Hydrogen and 2 geothermal], 15 Regional Mineral Targeting (RMT) projects, 16 CMAP projects, and 14 R&D projects.

6.14 Handing over of G2/G3 Reports and Geological Memorandum (GMs)

In the month of January 2024, the GSI proffered a total of 50 G2/G3 stage resource-bearing mineral investigation reports for auction. Amongst these, 21 reports pertaining to critical minerals were handed over to the Ministry of Mines, Government of India, for auction. The critical mineral blocks encompassed 04 reports on graphite, 03 on potash, 02 each on glauconite, potash, and rare earth elements, and 01 each on cobalt, molybdenum, and nickel. The remaining 29 reports were entrusted to the respective state governments for auctioning. These reports included 07 on manganese and copper, 05 on limestone, 04 on gold, 03 on iron, and 01 each on dunite, magnetite, and zinc.

Simultaneously GSI handed over a total of 37 numbers G4 stage Geological Reports/ Geological Memorandums for auction as Composite Licenses. A total of 05 reports for critical minerals has been handed over to the Ministry of Mines. These reports included 03 reports for graphite and 01 each for nickel and phosphorite. The remaining 32 reports were handed over to the respective State Governments for auction. These reports comprised of 10 reports for bauxite, 07 for copper, 04 each for limestone and iron, 03 for gold, 02 for manganese, and 01 each for emerald, and zinc.

6.15 Natural Energy Resources [Coal and Lignite]

In 2024-25 (from January 2024 to December 2024), GSI has augmented total coal resources of 3631.95 million tonnes (2299.65 MT G3, 1332.3 MT G4) in Pench (Madhya Pradesh), Birbhum (West Bengal), Hura (Bihar) Ib River and Talcher (Orissa) coalfields. Lignite resource of 781.13 million tonne has been augmented from Ramanathapuram East block from Ramnad Sub-basin, Tamil Nadu.

6.16 Geothermal Studies

During FS 2024-25, a total of two (02) geothermal projects, one (01) from Maharashtra and one (01) from Jammu & Kashmir Region have been taken up to identify geothermal sprout and to define the geothermal resource and the work is in progress.

Mission-III: Geoinformatics

Geoinformatics focuses on the efficient management and utilization of geoscientific data to deliver accurate, up-to-date, and comprehensive products and services. It plays a vital role in supporting users, missions, and stakeholders by building, maintaining and

effectively managing the IT infrastructure, archiving datasets, making IT policy decisions, and planning for the organization's overall IT enablement.

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

The Online Core Business Integrated System (OCBIS) Portal is a web-based platform which connects all users and integrates both the core and e-Governance business processes of Geological Survey of India. The OCBIS portal consists of 29 modules and 4 e-Gov applications to enable all GSI geoscientists and administrators to collect, process, analyse, store and disseminate data and information in an efficient and organized manner. The Enterprise Portal operates the Field Season programmes along with its related processes like field data collection to Laboratory analysis and its progress online, manages the Geoscientific Repository "Bhukosh", displays Mission Details, Recent circulars, Virtual Museum, Laboratory facilities and all new activities of GSI to the Public. Till date 1465 publications (including the GSI own Journal), 32 coffee table books, 3185 published maps and 34675 progress reports have been disseminated to Public. The OCBIS portal can be viewed from the link: https://www.gsi.gov.in/webcenter/portal **(Photo 6.3)**.

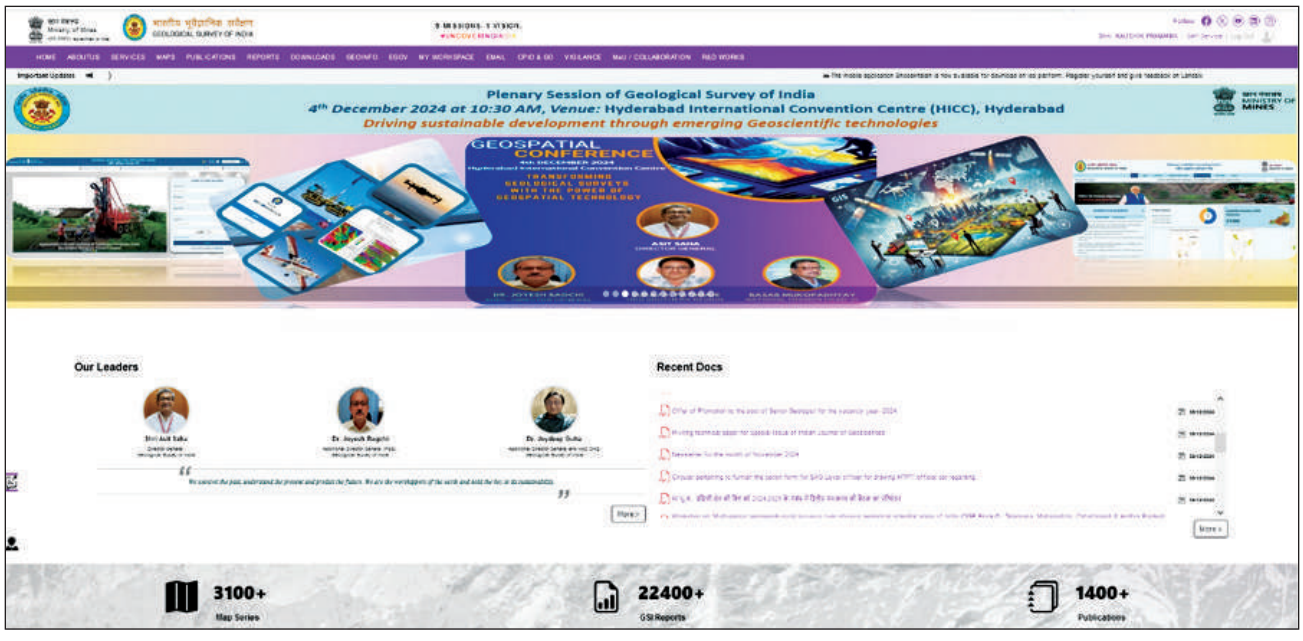


Photo 6.3: The new Homepage of OCBIS Portal

The Bhukosh of GSI is a geoscientific data repository provides OGC Compliant Map Services with latest Geodata base (.gdb) and Map Exchange Document (.mxd) covering 20 themes like Geology, Geophysics, Geomorphology, Geo-chemistry, Mineral, Geochronology, Geothermal, Tectonic, Seismotectonic, Landslide Inventory, NLSM, Meteorites, Glacial retreat etc. which facilitate the users to visualise, query data, create maps, print with dynamic legend and download. A total of 158 geospatial layers with 1,31,93,352 features are available. Till date 2,11,302 geospatial map data and geophysical data sets have been downloaded among which 1,75,685 are by registered users. Borehole Information is an application developed in FSPMIS module with an aim to digitize the borehole data related information from legacy reports as well as ongoing Field Season Programme (FSP) exploration reports which ultimately display the data as a map service in Bhukosh. The new

Bhukosh Portal can be accessed from the URL: https://bhukosh.gsi.gov.in/Bhukosh **(Photo 6.4)**. The data uploaded as map services in Bhukosh acts as a feeder database for National Geoscience Data Repository (NGDR). GSI has already initiated compilation of Legacy Borehole Data Repository (LBDR) to further enhance the country's geoscientific data resources. Till date, data of 9,184 boreholes have been fed into Borehole Information. The network infrastructure and related services have continuously been upgraded as per industry standard and based on organisational requirements. At present the infrastructure and application which were deployed in Physical Data Centre (DC) at Kolkata and Disaster Recovery (DR) at Hyderabad has now been migrated to Oracle Cloud Infrastructure (OCI) using Infrastructure-As-A-Service (IAAS) with DC at Mumbai and DR at Hyderabad.

Photo 6.4: The new Bhukosh Portal

The meetings/trainings conducted over video conference have increased exponentially over couple of years. IT infrastructure facility at GSI allows officials to update the field data in GSI server right from data collection site through its own custom build field device. As a technological advancement, and ease of doing business GSI has already conceptualized WLAN & SDWAN technology which will be implemented very shortly across all GSI offices. Recently GSI has planned to migrate and re-platform its OCBIS modules, applications and master data to the Oracle Cloud Infrastructure (OCI) approved by the MeitY.

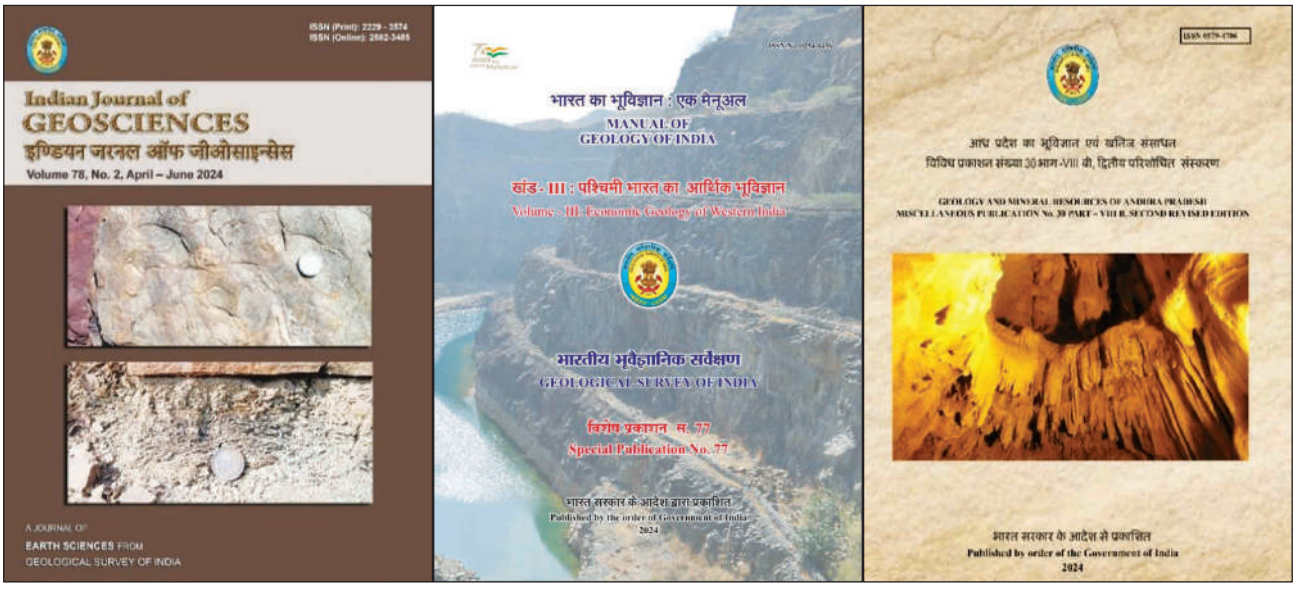
In line of new age emerging exploration techniques, GSI is strongly moving ahead with Mineral Prospectivity Mapping (MPM) using geostatistical methods, leveraging Geological, Geochemical (NGCM) and Geophysical (NGPM) datasets. These initiatives are further enhanced through Artificial Intelligence (AI) and Machine Learning (ML) models aimed at optimizing efforts of mineral exploration programs across the country. As per the National Geospatial Policy (NGP), 2022, GSI is declared as Nodal Agency for National Fundamental Geospatial Data Themes on Geology. Since this data theme encompasses with Soil and Forest as well as the characteristics of the surficial feature, NSDI & DST (LITD-22: Geospatial Information Sectional Committee) has recommended that the document should be focused on the Data Content Standard for Surface Geology. The draft document on Surface Geology was shared to NSDI for onward submission to Bureau of Indian Standards (BIS). Later on,

BIS has circulated the Preliminary draft (Document No. LITD 22-25215) of the Data Content Standard for Geospatial Information on Geology to all the stakeholders for comments. The work is under progress.

6.18 Mission-III B: Publication and Central Library

Publication: GSI brought out its first publication as 'Memoir' in 1856. Published since 1861, as Monographs or Memoirs, these publications record the results of comprehensive palaeontological research and since then these publications are brought out in series. Over the years, GSI expanded the activities in different field of geosciences and generated huge data. To disseminate this huge data and share the knowledge, GSI publications are now brought out under following categories namely: (i) Memoirs (detailed report on survey & investigations); (ii) Records (activities of regions and CHQ); (iii) Palaeontologia Indica (palaeontological studies); (iv) Special Publications (proceedings symposia and seminars organized by GSI/ papers dedicated to a particular field of study in Earth Science or on special projects); (v) Miscellaneous Publications (consolidated document on geology and mineral resources of states); (vi) Bulletins- A, B & C (compilation of work on: A- Economic Geology; B- Engineering Geology & Ground Water and C- Basic data generated by laboratories/specialized divisions); (vii) Catalogues (relevant aspects of scientific information, collected and collated in the department); (viii) Manuals (analytical methodology and procedures carried out in laboratories of GSI) and (ix) Indian Journal of Geosciences.

Total 18 numbers of different types of scientific publications like (i) Special Publications on Manual of Geology of India. Volume-III: Economic Geology of Western India), (ii) Miscellaneous publications on the Geology and Mineral resources of Sikkim, Andhra Pradesh & Bihar, (iii) Bulletin Series A on "Manganese, Phosphorite, Graphite and associated mineralisation of Jhabua Belt, Jhabua and Alirajpur districts of Madhya Pradesh, (iv) Indian Journal of Geosciences (IJG), (v) Records of GSI (Extended Abstracts of Progress Reports of Field Season Programme of different regions) etc. have been released during January 2024 to December 2024 (**Photo 6.5**). 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.



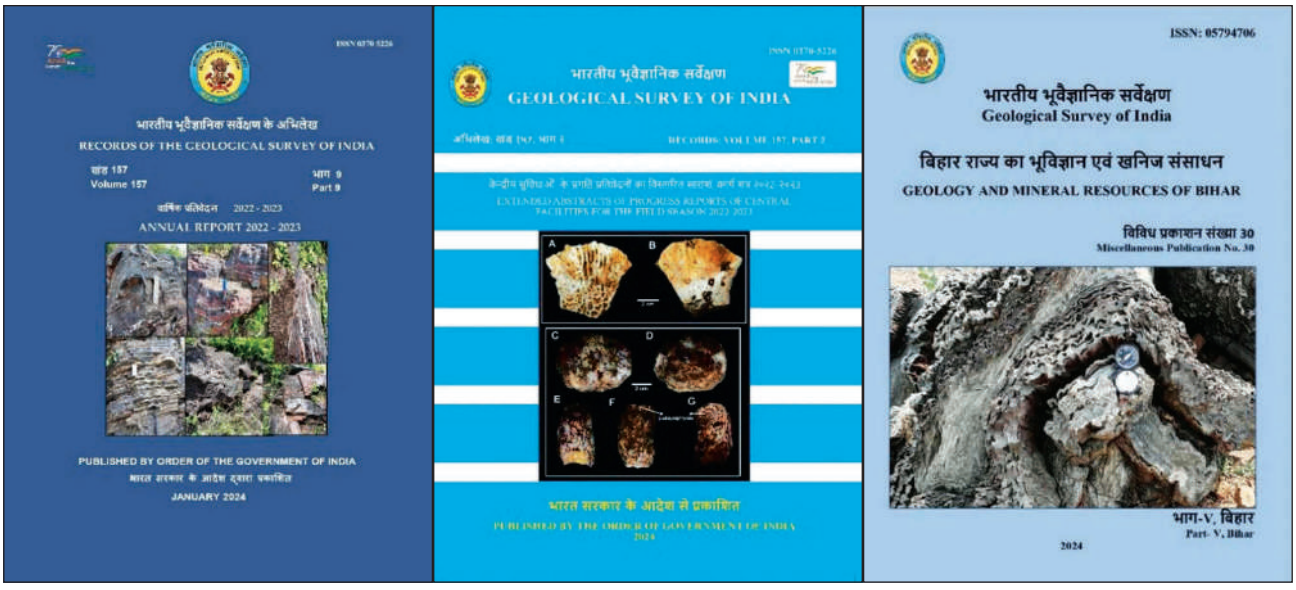


Photo 6.5: Glimpses of GSI Publications available in OCBIS Portal [viz. Special publications, Miscellaneous publications, Records, and Indian Journal of Geosciences]

6.19 Mission-III C: Map, Geoinformatics & Data Integration

This mission is mandated to prepare scrutiny and disseminate both analog and digital geological maps/databases for the entire country. This mission also includes compilation of maps like Geological Quadrangle Maps (GQM), District Resource Maps (DRM), Geological and Mineral maps of States, Mineral belt maps (MBM), Coalfield maps, Territorial water (TW) Maps, etc.

The following maps published in OCBIS:

(i) State Geological and Mineral map of Assam (1:1M).

(ii) Metallogenic Map of India.

(iii) 131 District Resource Maps (10 DRMs of Madhya Pradesh, 5 DRMs of West Bengal, 15 DRMs of Bihar, 5 DRMs of Jharkhand, 15 DRMs of Odisha, 15 DRMs of Assam, 6 DRMs of Arunachal Pradesh, 6 DRMs of Meghalaya, 5 DRMs of Manipur, 10 DRMs of Uttar Pradesh, 3 DRMs of Uttarakhand, 4 DRMs of Himachal Pradesh, 2 DRMs of Haryana, 4 DRMs of Punjab, 6 DRMs of UT: Jammu & Kashmir, 7 DRMs of Karnataka, 2 DRMs of Goa, 11 DRMs Gujarat)

Mission IIIC is presently attending to the following projects:

1. Geological and Mineral Map of Central Region (1:2M), Chhattisgarh (1:1M), Karnataka (1:0.5M), Odisha (1:0.5M), Madhya Pradesh (1:1M), Nagaland (1:1M), Arunachal Pradesh (1:1M).

2. Miscellaneous Publication Map of Jharkhand (1:2M), Manipur, Mizoram, Nagaland and Tripura (1:1M) and Special Publication Map of Cuddapah Basin (1:1 M).

3. Compilation of 150 nos. of DRMs (5 DRMs of Chhattisgarh, 10 DRMs of Madhya Pradesh, 3 DRMs of West Bengal, 18 DRMs of Bihar, 10 DRMs of Jharkhand, 17 DRMs of Odisha, 6 DRMs of Meghalaya, 14 DRMs of Assam, 8 DRMs of Tripura, 8 DRMs of Arunachal Pradesh, 10 DRMs of Uttar Pradesh, 10 DRMs of Haryana, 5 DRMs of Jammu & Kashmir, 10 DRMs of Tamil Nadu, 5 DRMs of Andhra Pradesh, 11 DRMs Gujarat) are under progress.

4. Compilation and preparation of a Mineral Belt Map of graphite deposits in the Golighat-Bhopali sector of the Betul belt in Madhya Pradesh, and phosphorite deposits in the Amlamal-Khatamba North-Piploda sector of the Jhabua mineral belt, Madhya Pradesh, and 9 MBMs from WR.
5. Creation of 3 GQMs (63C, 63G, and 63K Degree Sheet) from the Northern Region.
6. A total 18 nos. of Territorial water (TW) & Contiguous Zone (CZ) Maps (Scale 1:50,000 scale) have been scrutinized, approved and published and 23 nos. of TW & CZ maps have been scrutinised and sent to respective division for modification/finalisation.
7. 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). A total of 246 nos. of Topo Sheet (T.S) of NGCM Stream Sediment Sample (SSS), 203 nos. of T.S for Soil-C, 193 nos. of Soil-R, 126 nos. of T.S Gravity and 126 nos. of T.S Magnetic (scale: 1:50,000) data has been uploaded on Bhukosh OCBIS Geoportal for public access during January-December, 2024.
8. Creation of a commodity-wise GIS database for critical and strategic minerals, including REE, tin, tungsten, lithium, molybdenite, ferrous metals (Fe and Mn), graphite in Chhattisgarh, and gold & strategic minerals in Kerala.
9. Creation of a geodatabase on a 1:25K scale using STM data from ER, NER, NR, SR & WR.
10. Resolution of 1:50K lithological mismatches in SR through field checks.
11. Creation of a 1:2M geological map of the Western Region (Rajasthan, Gujarat, Daman, and Diu) in spatial platform.

National Geoscience Data Repository (NGDR)

NGDR is a flagship initiative conceptualised by Ministry of Mines as a part of National Mineral Exploration Policy (NMEP), 2016 for hosting all exploration related geoscientific data for dissemination to stakeholders so as to expedite, enhance and facilitate the exploration coverage of the country. GSI is the nodal agency for the implementation of NGDR project.

The NGDR portal had been inaugurated in the month of December, 2023 by Shri Pralhad Joshi, Hon'ble Union Minister of Parliamentary Affairs, Coal and Mines of India, at New Delhi for public and stakeholders. Milestone-3 (Development of Mobile App of NGDR and integration of Milestone-1 & 2 with the map) and Milestone-4 (3D visualization of borehole) and Milestone-5 (Go-Live, System stabilization, Hand holding) of NGDR project have been completed during the tenure. Currently, 27 map services and 50 data layers have been incorporated with NGDR portal. Additional functionalities like proximity calculation, query builder, map printing and downloading in PDF format and on the fly contour generation from geochemical and ground geophysical data have been implemented within NGDR portal. NDMAC (NGDR Data Management and Analysis Centre) lab has been inaugurated by Director General, GSI on 13.11.2024.

Currently, a total 12569 nos. of reports, including 7763 exploration reports and 4806 baseline reports have been handed over in phased manner to BISAG-N for digitization & geodatabase creation. Till date 10654 reports have been scrutinized by GSI and sent to BISAG-N for uploading. Total 9174 reports uploaded to NGDR portal through Mineral Exploration Reporting Template (MERT), while the remaining reports are at various stages of scrutiny.

Mission-IV activities: Fundamental & Multidisciplinary Geosciences and Special studies

The GSI, through its Mission-IV activities, continues to lead India's efforts in addressing geo-hazards, environmental challenges, and multidisciplinary geoscience research. Mission-IV is a cornerstone of GSI's commitment to mitigating natural hazards, understanding climate change impacts, and delivering geoscientific solutions to pressing environmental and societal concerns. By focusing on engineering geological studies, landslide hazard management, slope stability analysis, polar research, geogenic contamination studies, and fundamental geoscience research, GSI significantly contributes to public safety, disaster risk reduction, and sustainable development.

Mission-IV is structured into three specialized sub-missions, each addressing distinct geoscientific domain:

- **Mission-IVA:** Geotechnical and Geohazards Management
- **Mission-IVB:** Climate Change & Ecosystems, Polar Studies, and Environmental Geology
- **Mission-IVC:** Fundamental Geosciences Research and Development

Equipped with cutting-edge infrastructure, GSI's Mission-IV leverages its three National Centres of Excellence in Geoscientific Research (NCEGR) located in Kolkata, Bengaluru, and Delhi NCR (Faridabad), along with six regional laboratories across India. These facilities, coupled with highly skilled manpower and multidisciplinary expertise, enable GSI to tackle emerging challenges such as the increasing frequency of natural disasters, environmental degradation, and the far-reaching impacts of climate change.

In Field Season (FS) 2024–25, Mission-IV activities encompassed 169 projects nationwide, categorized into 88 projects under Mission-IVA, 32 under Mission-IVB, and 49 under Mission-IVC. These projects have made significant contributions to advancing knowledge and solutions in critical areas such as landslide dynamics, glacier recession monitoring, groundwater contamination assessment, and fundamental geoscience research.

6.20 Geotechnical & Geohazards Management (M-IVA)

India's susceptibility to geohazards such as landslides, earthquakes, and ground instability presents significant risks to life, infrastructure, and economic activities, particularly in the Himalayan and Western Ghats regions. GSI as the nodal agency for landslide hazard studies, has made remarkable advancements in disaster risk reduction through scientific investigations, innovative methodologies, and collaborations. During Field Season 2024-25, GSI's efforts focused on multi-scale susceptibility mapping, site-specific investigations, landslide forecasting, and the development of mitigation strategies to protect vulnerable communities and infrastructure.

GSI prioritized investigations at meso-scale (1:10,000) and site-specific scales (1:1000/2000), taking up 31 meso-scale projects and five site-specific investigations during FS 2024-25. Notable studies include two critical site-specific investigations in Shimla, Himachal Pradesh, initiated after the devastating 2023 monsoon-induced landslides. These studies address slope stability concerns and recommend effective mitigation measures. Similar detailed investigations are underway in Haflong, Assam, and Ambithang, Sikkim, focusing on enhancing resilience and minimizing landslide risks in these vulnerable regions.

In a landmark achievement, the **National Landslide Forecasting Centre (NLFC)** at Kolkata was inaugurated on July 19, 2024, by **Shri G. Kishan Reddy, Hon'ble Union Minister of Coal and Mines.** As India's first operational landslide forecasting system, NLFC has commenced issuing **operational landslide forecast bulletins** for Darjeeling and Kalimpong districts in West Bengal, and Nilgiris district in Tamil Nadu. To enhance accessibility and public awareness, the **Bhusanket web portal and Bhooskhalan mobile app were also launched**, offering real-time updates, critical data, and resources for disaster response and planning.

Photo 6.6 Shri G. Kishan Reddy, Hon'ble Union Minister, Coal and Mines Inaugurating the National Landslide Forecasting Centre in presence of senior officials.

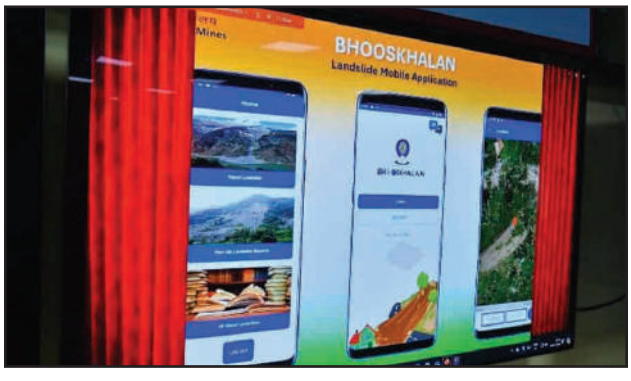


Photo 6.7 Shri G. Kishan Reddy, Hon'ble Union Minister, Coal and Mines launching the Bhooskhalan mobile app and Bhusanket web portal.

To enhance its Landslide Early Warning System (LEWS), GSI has taken four projects in FS 2024-25, covering 16 landslide-prone districts across 11 states, including Assam, Meghalaya, Mizoram, Nagaland, Kerala, Karnataka, Tamil Nadu, Sikkim, West Bengal, Uttarakhand, and Himachal Pradesh. Daily experimental bulletins were issued to district authorities/ SDMA during the southwest and northeast monsoons for ground validation and refinement of forecasting models. Experimental forecasting for districts in Uttarakhand and Himachal Pradesh concluded on October 31, 2024, while bulletins for West Bengal, Sikkim, Tamil Nadu, and Kerala are ongoing. Additionally, the national landslide geodatabase has been integrated with the National Database for Emergency Management (NDEM), supporting disaster management plans across states and union territories.

Two pilot projects were initiated to assess debris run-out analysis and debris flow modelling in two distinct terrains—one in the Western Ghats (Maharashtra) and the other in the Himalayas (Himachal Pradesh). These projects aim to evaluate risks to habitations in landslide-prone areas.

Geodynamic Studies Division (GSD) and Seismo-Geodetic Data Receiving and Processing Centre (SGDRPC) in Kolkata continued their critical work in seismotectonic studies. GSD operates a pan-India network of 34 Permanent GNSS stations to acquire high-precision data for monitoring long-term crustal deformation and geodynamic activity. Research projects include DEM-based morphotectonic studies, traverse mapping, and campaign-mode GPS surveys in the Darjeeling-Sikkim Himalayas to analyze tectonic controls, crustal deformation, and fault dynamics.

SGDRPC focuses on real-time seismo-geodetic data acquisition, processing, and analysis from 10 broadband seismic observatories. During FS 2024-25, the division conducted site response and electrical resistivity surveys in Himachal Pradesh (Kinnaur and Lahaul & Spiti districts) as part of earthquake-induced landslide susceptibility mapping. An MEQ survey in

the Darjeeling-Sikkim Himalayas is planned to record micro-earthquakes in the region. SGDRPC is also preparing a Compendium on Micro-Earthquake studies undertaken by GSI across India, which will serve as a valuable resource for understanding seismic activity.

Geotechnical and engineering geology studies remain a core strength of GSI. During FS 2024-25, GSI undertook 28 geotechnical projects to provide geological support for critical infrastructure initiatives. These include water resource development projects and transport infrastructure, such as roads and railways. Five projects focused on reviewing geological and geotechnical chapters of pre-DPRs and DPRs for Pumped Storage Projects (PSPs) under the Ministry of Power.

Key investigations were conducted for hydropower projects, including the **Renukaji Dam Project** in Himachal Pradesh and the **Lakhwar Multipurpose Project** in Uttarakhand, to support pre-construction and construction phases. To expand its role in national infrastructure development, GSI signed MoUs with organizations like **NHAI and MoRTH**, to provide geological and geotechnical support for road construction and maintenance projects.

6.21 Climate Change & Eco systems, Polar Studies, Environmental Geology, and Medical Geology (M-IVB)

Sub-Mission M-IVB focuses on addressing the diverse impacts of climate change through glaciology, GLOF studies, polar research, and environmental geology. During FS 2024-25, these efforts have provided critical insights into climate dynamics, disaster preparedness, and environmental sustainability.

Glaciology projects have centered on glacier recession patterns and long-term mass balance studies, key indicators of climate change impacts. GSI continued monitoring the benchmark Hamtah Glacier in Himachal Pradesh, an initiative ongoing since 2000. Six glaciology projects were undertaken in FS 2024-25, including studies on pro-glacial lakes like Vasudhara Tal (Uttarakhand), Suru Basin (Ladakh), and Mabang Lake (Uttarakhand) for Glacial Lake Outburst Flood (GLOF) susceptibility. Glacier recession studies in the Jhelum Basin (Jammu & Kashmir), Zanskar Basin (Ladakh), Baspa Basin (Himachal Pradesh), and Vishnuganga Basin (Uttarakhand) have advanced disaster preparedness and understanding of glacial dynamics.

Photo 6.8: Mapping of Mabang Proglacial Lake using Total Station Instrument, Lassar Yankti Valley, Pithoragarh District, Uttarakhand

Photo 6.9: Glaciological studies of Polar ice sheet at Larsemann Hills, East Antarctica.

In polar research, GSI's NCEGR, Faridabad, is leading studies in East Antarctica to assess climate change impacts and uncover geological history. Projects in the Larsemann Hills explore ice sheet dynamics, while studies in the Nivlisen Drainage Basin analyze hydrological

changes. Research in the Lomonosov Mountains investigates the continuation of the East African Orogeny, contributing to the understanding of ancient tectonic processes.

Under environmental geology, GSI undertook 20 projects addressing groundwater contamination, riverbank stability, urban flooding, and carbon sequestration. Fourteen projects, some in collaboration with CGWB, focused on arsenic, fluoride, and heavy metal contamination in states like Andhra Pradesh, Bihar, Assam, and Chhattisgarh. Coastal morphodynamic studies along Odisha's coastline are predicting land-use changes over 50 years. Additionally, an innovative project with IIT Bombay is exploring CO2 sequestration potential in the Sahyadri Group of the Deccan Volcanic Province, underscoring GSI's commitment to sustainability and India's net-zero goals.

6.22 Fundamental Geosciences & Research (M-IVC)

Fundamental research remains the backbone of GSI's activities under Sub-Mission M-IVC. During FS 2024-25, GSI has undertaken diverse research initiatives across Petrology, Palaeontology, Geochronology, Isotope Geology, and niche fields such as Meteorite and Planetary Sciences, Gemmology, and Quaternary Geology.

Petrological research focuses on unraveling mineralization processes in various geological terrains, with **22 R&D projects targeting critical minerals** like Rare Earth Elements (REE), Lithium, Cobalt, and Vanadium, along with Copper, Gold, and Platinum Group Elements (PGE). Notable studies include REE mineralization in the Samalpatti and Hogenakal carbonatites (Tamil Nadu), Lithium occurrences in the Bastar Craton, and porphyry Cu-Au-Mo potential in the Ladakh Batholith. Research on pegmatites, laterites, and schist belts has identified potential zones for Nickel, Cobalt, and Chromium in the Western Dharwar Craton, furthering India's goal of mineral self-reliance.

The Geochronology and Isotope Geology Division has made significant strides, including isotopic studies of the Trans-Himalayan Ladakh Granitoid Complex and IOCG deposits in the Khetri Basin. Geochronological investigations of Quaternary sediments in the Damodar Basin and Cauvery-Vellar Delta provide insights into sedimentary evolution and paleoclimate. Meanwhile, Palaeontology projects have explored faunal assemblages from the Fatehgarh Formation (Rajasthan), Cretaceous fauna in Peninsular India, and marine pollution using foraminiferal studies along Odisha and Tamil Nadu coasts.

A significant achievement was the inauguration of a state-of-the-art meteorite gallery at CHQ, Kolkata by Shri Asit Saha, DG, GSI, showcasing 643 meteorites, advancing planetary research. Additionally, the Gemmology Laboratory at NCEGR, Kolkata, tested over 2600 gemstones, generating revenue and enhancing public access to gem identification services. Out of 169 Mission-IV projects, over 110 directly benefit society, while 22 support mineral exploration, underscoring GSI's commitment to geoscience innovation and societal advancement.

Mission V: Training and Capacity Building

6.23 Human Resource Development

Geological Survey of India Training Institute (GSITI) is presently conducting training programmes across India at GSITI headquarter, six Regional Training Divisions (RTD) and four Field training Centres (FTC). The GSITI, Hyderabad Centre is designated as the Headquarters which is hosting specialized division for laboratory and classroom trainings

and Regional Training Division (RTD), Southern Region. The other five RTDs are located at Nagpur, Kolkata, Jaipur, Lucknow, Shillong and four FTCs at Chitradurga (Karnataka), Raipur (Chhattisgarh), Kuju (Jharkhand) and Zawar (Rajasthan) which are conducting field intensive modules, laboratory modules and administrative courses.

A total of 236 no. of training courses were conducted from January 2024 to December 2024 and 15122 no. of trainees participated. Apart from domain and administrative courses, exploration for critical minerals and training courses on emerging technology viz. Drone Technology, Artificial Intelligence and Machine Learning were also conducted. Custom made Workshops/Seminars were conducted on the use of the National Geoscience Data Repository (NGDR) portal for stakeholders, Exploration agencies, State DGMs in co-ordination with Ministry of Mines. During the period, 3 International courses were conducted for 61 International Participants from 34 ITEC countries, under the Indian Technical and Economic Cooperation (ITEC) Programme sponsored by MEA, Government of India. Several need-based training programmes were conducted for the training requirement of GSI and other organizations on various themes. In continuation of the Commemoration of 75 years of India's Independence (Azadi ka Amrit Mahotsav), GSITI organized 68 field-based, laboratory based, e- Lecture/Training sessions from HQ-Divisions, Regional Training Divisions and Field Training Centres. GSITI could reach 4537 participants across India under the Azadi ka Amrit Mahotsav Programme.

Photo 6.10: Participants attending training programmes in GSITI Training Centres

PSS: Policy Support System

6.24 Central Geological Programming Board (CGPB)

The Central Geological Programming Board (CGPB), chaired by the Secretary (Mines), is the principal national body in charge of coordinating geological mapping, mineral prospecting, and exploration activities throughout the country. Each state has its own State Geological Programming Board (SGPB) that oversees geoscientific activities inside the state, in collaboration with the CGPB and the Geological Survey of India.

GSI functions as the Nodal Department (Member Secretary), with participation from State Geology and Mining Departments, Central Government Agencies, PSUs, Other Ministries, and Industry Representatives.

The CGPB meeting is organized annually under the chairmanship of the Secretary, Ministry of Mines, Govt. of India, to discuss geological programs as well as related issues and concerns of state governments, central institutes, and other stakeholders involved in mineral exploration and other geoscience fields. The annual Field Season Program (FSP) of GSI is also placed before the august gathering to avoid duplicity in work.

To keep up with significant reforms in the mining sector and amendments to the Mines and Minerals (Development and Regulation) Act, 1957, from 2015 to 2023, the Central Government established various entities at the central and district levels, such as NMET and DMF. NMET focuses on facilitating mineral exploration, while DMF addresses the socio-economic development and welfare of mining-affected areas and communities. In line with the emphasis on self-reliance, the central government has accredited several private exploration agencies to conduct prospecting operations and mineral explorations across the country. The CGPB and its twelve committees have been reconstituted through a series of resolutions, with the latest being resolution F. No. M.I-4/1/2021-Mines-I dated 18.08.2023. This reconstitution includes representatives from 12 Ministries/Departments of the Government of India, the Advisor (Minerals) from NITI Aayog, 30 Heads of Central Organizations, 6 Industry Representatives, Secretaries (Mining and Geology) of State Governments, Directors of Geology & Mining of States, GSI, and any other special invitees approved by the Chairman.

Outcome of 63rd CGPB alongwith focus/main agenda of 63rd CGPB Meeting

The 63rd meeting of the Central Geological Programming Board (CGPB) was held on 22nd January 2024 at Kushabhau Thakre International Convention Centre, Bhopal, Madhya Pradesh under the chairmanship of Shri V.L. Kantha Rao, IAS, Secretary, Ministry of Mines. Shri Sanjay Lohiya, IAS, Additional Secretary, Ministry of Mines; Shri Janardan Prasad, Director General, GSI and Shri Asit Saha, DDG, PSS-P&M, GSI has also shared the dais on the occasion. The meeting attracted the presence of senior functionaries of different Central Ministries/Organisations, State Directorates of Mining & Geology, PSUs, representatives from private mining industry, mining associations and other stakeholders.

For the year 2024-25, GSI has placed about 1055 scientific programs for the year 2024-25, which includes 392 Mineral Development projects (G2; G3; G4 and Offshore Explorations) that has the potential to generate auctionable mineral blocks in near future and 133 are the Mineral Discovery Projects (RMT; Research Project; C-MAP; GT; MPA; Multispectral/ Hyperspectral projects) having potential for

generating areas for further exploration in G4 stage. Within the exploration activity, the major thrust has been given on the exploration of strategic & critical and fertilizer minerals. A total of 188 projects on strategic and critical minerals including 18 programs on fertilizer minerals have been proposed for FS 2024-25.

Besides, approval of the FSP items of GSI, the Report on Geological & Geotechnical investigation of Joshimath Township, Chamoli District was also unveiled by Shri V.L. Kantha Rao, Secretary, Ministry of Mines for handing it over to Uttarakhand Govt. The Mineral Map of the newly carved out UT of Ladakh was also released on this occasion along with other significant publications of GSI.

During his address, Shri V. L. Kantha Rao, Secretary, Ministry of Mines highlighted the importance of scientific rigor in mining sector. He urged GSI and other exploration agencies to increase the pace of exploration and emphasized on exploration of Critical Minerals. He also urged the State Governments to be more aggressive in implementation of exploration projects through NMET funding. He requested stakeholders to make use of geoscience data available in NGDR portal for smooth exploration process.

A two-hour session was also held for the recently launched National Geoscience Data Repository (NGDR) Portal, to brief stakeholders about this cloud-based portal, that will host all pre-competitive baseline geological and mineral exploration data, making it available to all participants in the mineral and mining sectors.

In the presence of other senior officials, Shri V.L. Kantha Rao, inaugurated an Exhibition on the theme, **"Mining and Beyond"**, in which GSI, PSUs, DMFs, major mining companies, private exploration agencies, startups, Madhya Pradesh Government showcased their achievements. PSUs like Manganese Ore India Ltd. (MOIL), Hindustan Copper Limited (HCL), National Aluminum Company Ltd. (NALCO), Mineral Exploration Consultancy Ltd. (MECL) etc. showcased their best practices and technical advancements in this exhibition.

The outcome of 63rd CGPB meeting are summarized as under:

- Engaging applications of emerging technologies viz. Drone technology, AI/ML to enhance the mineral exploration activities in the country.
- To formulate a mineral-wise SOP for critical minerals.
- Private Industries and State DGMs/DMGs to engage CSIR labs in the study of critical minerals.
- Sharing of data by all exploration agencies on NGDR.
- All State DGMs/DMGs to provide handholding to the private agencies in preparation and submission of proposals.
- Notified Private Exploration Agencies (NPEAs) to come up with good projects on beneficiation and processing of critical minerals.
- All exploration agencies to take initiatives in offshore mining sector.

Salient points of 20th CGPB Committee meetings

The 20th CGPB Committee Meetings (I to XII) were conducted in the months of September-October and December 2024. The salient points of 20th CGPB Committee meetings are as follows:

- IBM to determine the threshold of critical and strategic minerals.

- Signing of MoA between GSI and Digital India Corporation (DIC), Ministry of Electronics and Information Technology (MeiTY) to establish Data Processing, Interpretation and Integration Centre (DPIIC) at GSI, Bengaluru
- Mineral Resource Map of Tripura to be provided to the State DIC by GSI, SU: Tripura & Mizoram.
- Organizing brainstorming session on the techniques of extraction of trace elements and REE from coal, lignite and associated minerals.
- To finalise Indian Standard Procedure (ISP) for sulphur rich coal resource calculation.
- To conduct a comprehensive integration study of the latest airborne geophysical data with all existing datasets, led by a specialized team of geophysicists and geologists from GSI's RSAS to identify potential areas for further exploration.
- Memorandum of Understanding (MoU) was signed between GSI and Assam State Disaster Management Authority (ASDMA) for Institutional Cooperation Programme on implementation of Experimental Regional Landslide Early Warning System.
- Indian Institute of Remote Sensing (IIRS) has sought collaboration with GSI in the field of GLOF studies, palaeochannel studies, landslide studies and active fault mapping.
- The research scope is being formulated between Meteorite and Planetary Science Division, NCEGR Kolkata and ISRO which would look into the study of Irregular Mare Patches (IMP), their mineralogy and exploration prospect and study of High Ti-basalt to understand its origin and studying its analogue to understand the exploration potential.
- Emphasis laid on enhanced data sharing through NGDR portal with unified APIs data in the NGDR portal.
- Adoption of AI/ML and modern geospatial techniques such as drone and magneto-telluric surveys have been emphasized to undertake by the stakeholders for incorporating similar data in NGDR for future use.
- Capacity building through workshops and programs to advance IT in geosciences.

In preparation to 64th CGPB Meeting

All States/UT have conducted the State Geological Programming Board (SGPB) meeting for the year 2024-25. New agenda items have been proposed by 08 State DGMs and 11 Agencies/Institutes for discussion during 64th CGPB Meeting-Chhattisgarh, Odisha, Jharkhand, Arunachal Pradesh, Ladakh, Karnataka, Assam, West Bengal, WIHG, MECL, NMDC, CGWB, CMPDI, NRSC/ISRO, Tata Steel, TAMIN, Hindmetal, SCCL and NDMA.

The 64th meeting of the Central Geological Programming Board (CGPB), for the year 2024-25, is scheduled to held on 19th January at State Convention Centre, Lokseva Bhawan, Bhubaneshwar, Odisha under the chairmanship of Shri V.L. Kantha Rao, Secretary, Ministry of Mines.

Photo 6.11: Addressed by Secretary Mines during the inauguration of the 63rd CGPB meeting

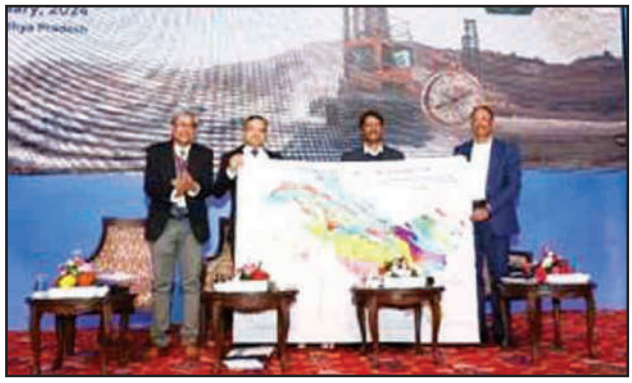


Photo 6.12: Release of the Mineral Map of the newly carved out UT of Ladakh by the dignitaries in 63rd CGPB meeting

Photo 6.13: Inauguration of exhibition on theme of "Mining and Beyond" at Minto Hall, Bhopal.

Photo 6.14: View of various stakeholders participating in the 63rd CGPB meeting

6.25 Quality Management (QM) Cell of GSI

The GSI meticulously establishes and upholds standardized procedures as a quintessential measure of quality control for its myriad technical undertakings. This standardization is meticulously ensured through the formulation of distinct Standard Operating Procedures (SOPs) for all technical activities conducted by GSI. Subsequently, it is scrupulously ensured that each project and item of GSI is executed in strict adherence to these SOPs. The NABL accreditation of GSI's Chemical Laboratories is undertaken to guarantee the quality of the diverse analyses performed by the various laboratories of GSI. This accreditation also ensures that the analytical studies conducted by GSI, for incorporation into technical reports, are of international standards, thereby ensuring the satisfaction of stakeholders and end-users. As an additional measure of quality control, randomly selected Technical Reports and Field Season Proposals undergo external peer review.

As part of the quality control checks for the various standard items being executed by the GSI during the Fiscal Year 2023-24, a total of 171 randomly selected proposals were subjected to External Peer Review. The FSP proposals submitted by the respective Regions/ Missions/Wings/Divisions for the items to be executed during FS 2025-26 has also been taken up for External Peer Review. A total 219 numbers of proposals from different Regions/ Missions/Wings/Divisions are being taken up external peer review. The shortlisted proposals are meticulously reviewed by a distinguished panel of External Experts, comprising retired

personnel from GSI, eminent professors from universities, and serving professionals from other esteemed organizations.

External peer review of 10% reports of F. S. 2020-21 submitted during F. S. 2021-22 & F. S. 2022-23 has been carried out. Out of the different standard item reports submitted by the six Regions, Central facilities, Remote Sensing & Aerial Survey and Marine & Coastal Survey Division; 67 reports were randomly selected domain-wise for external peer review. The external peer review process for the reports of F. S. 2021-22 submitted during F. S. 2022-23 & F. S. 2023-24 has also been initiated and the procedure for the external peer review of the randomly selected reports by external experts is under progress.

In the year 2023-24, the Standard Operating Procedure (SOP) for "Spectral Geological Mapping in OGP areas using ASTER data on a 1:50000 scale" underwent rigorous scrutiny at all levels. This SOP was also subjected to an External Peer Review by two domain experts and subsequently received approval from the Competent Authority. Additionally, during the same period, the SOP for "Exploration of REE and other trace elements in Gondwana sediments" was meticulously drafted and is currently under review at various levels. This SOP is being crafted with the highest precision to ensure that the quality of work meets international standards. The comprehensive review process is designed to uphold the highest standards of excellence, ensuring that the methodologies and practices employed are on par with global benchmarks.

6.26 International Cooperation

The Geological Survey of India (GSI) engaged in international activities by interacting with various scientific organizations and foreign agencies through collaborative programs and participation in seminars, workshops, and meetings for knowledge sharing and technology upgradation.

6.27 Bilateral Collaborative Activities

A. Bilateral Meetings

I. **India-USA:** A meeting (in hybrid mode) was conducted on 05/01/2024 for the possible areas of collaboration between Indian organizations with US organizations for furtherance of research focused on beneficiation of critical minerals from diverse host rocks with the reference to the recent India-US inter-sessional review of Initiative on Critical and Emerging Technologies (iCET). Another virtual meeting was conducted on 10/04/2024 and discussed on different themes (a total of five themes) under the India-US New and Emerging Renewable Energy Technology Action Platform (RETAP), which has been established to take bilateral collaboration further through a result-oriented, time-bound, technology-focused effort to advance new and emerging technologies. In this line, Geothermal Energy is an important thrust area which has been considered under this bilateral agreement.

II. **India - Finland (Geological Survey of Finland - GTK):** A virtual meeting between the Geological Survey of India and GTK Finland under the MoU was conducted on 12/01/2024 to discuss capacity building on artificial intelligence and prospectivity modelling for mineral investigation. The meeting aimed to assist GSI in creating effective exploration strategies using their extensive database. Attendees included representatives from both organizations. The scope of the work was further discussed with GTK Finland during 37th International Geological Congress, Busan, South

Korea. GTK Finland is ready to offer training on AI for Mineral Exploration and collaboration for critical mineral studies.

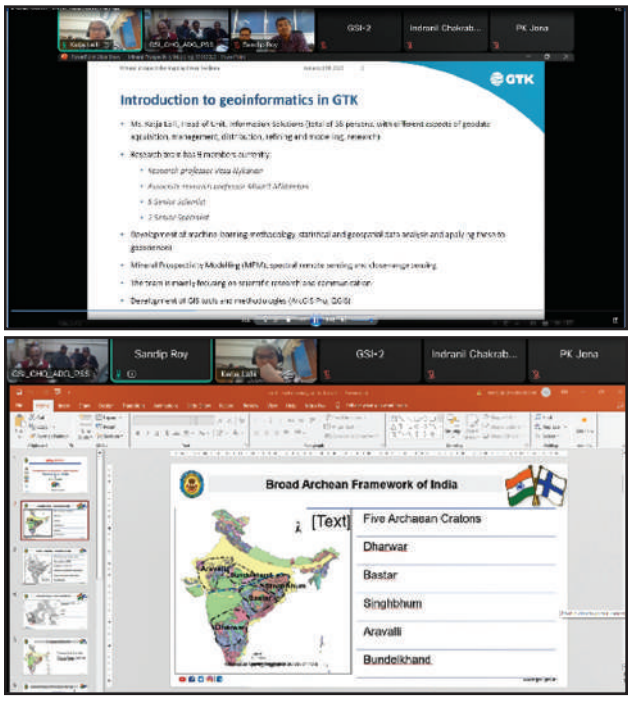


Photo 6.15: Glimpse of the meeting between GSI and GTK Finland

III. India-Australia (Geoscience Australia-GA): A virtual interactive meeting conducted on 23/02/2024 between the Geochronology Secondment team of GSI and a representative from Geoscience Australia, under the 3rd Term of Reference (TOR). The meeting aimed to discuss nine geochronology samples sent for laboratory study (from Northern-Transect and Southern-Transect of Project Uncover) to Geoscience Australia, and to plan out the visit of the GSI team to Geoscience Australia. Four GSI geoscientists will visit Geoscience Australia laboratory to acquire, process and interpret the U-Pb SHRIMP data of the consigned samples from mid-April to mid-May, 2025. Since the 3rd TOR under the umbrella of MoU was expiring on 30th June, 2024, both the parties i.e. Geoscience Australia and Geological Survey of India discussed for extension of the TOR up to 31 August 2025 i.e. until the end of the current MoU.

The extension of the 3rd Term of Reference between Geoscience Australia and Geological Survey of India signed on the 30th day of October, 2024. Further, to ensure the timings and arrangements for the visit of the GSI team to GA laboratory discussion was held between GSI and GA team over ePlatform on 22/11/2024. Hence, it was mutually decided that the Secondment will start from 14th April, 2025 for five weeks and will be concluded on 16th May, 2025.

Subsequently, virtual technical discussion between GSI and GA was held on 13/12/2024 for another secondment under the 3rd ToR i.e. "Mineral System and Mineral Potential". The Secondment could start from mid-May 2025 for three weeks was considered.

Photo 6.16: Glimpse of signing of Extension of 3rd Term of Reference between Geoscience Australia and Geological Survey of India

IV. GSI-CSIRO (Commonwealth Scientific and Industrial Research Organization), Australia

GSI team headed by DG GSI met Dr. Erick Ramanaidou, Chief Research Scientist, Iron Ore and Critical Minerals, CSIRO, Australia on 16/04/2024 for discussion on collaborative project proposal on Nickel-Cobalt mineralization in Banasandra, Chitradurga and on products generation using ASTER datasets.

Draft Collaboration project agreement between Geological Survey of India (GSI), Ministry of Mines, the Government of the Republic of India and Commonwealth scientific and Industrial Research Organization (CISRO) of the Government of Australia on cooperation in the field of Geology under the research project entitled "Geochemical and Mineralogical Characterization of Nickel-Cobalt Mineralization in Regolith and altered serpentinites in Banasandra, Chitradurga Schist Belt, Southern India" has been placed.

Photo 6.17: Glimpse of meeting between GSI and CISRO, Australia

V. India-Brazil (Geological Survey of Brazil - SGB)

The virtual meeting between GSI and SGB-Brazil was held on 29/05/2024 under the MoU between Geological Survey of India (GSI) and Geological Survey of Brazil - SGB, Brazil on cooperation in the field of Geology and Mineral Resources.

GSI prepared project proposal for REE mineral system studies in Siwana Ring Complex, Rajasthan, India and shared with SGB, Brazil side for their view/ concurrence. But later it was decided to prepare alternative collaboration project and the same is under progress.

The scope of the work was further discussed during interaction with Brazil Geological Survey during 37th IGC, Busan, South Korea and they have shown keen interest to collaborate (with new management in place) for additional areas of geoscientific studies.

VI. GSI-FIU (Florida International University):

GSI signed a MoU with Florida International University (FIU), USA, on October 6, 2021, for two research projects:

i. "Study of Post-collisional magmatism in the India-Asia collision zone (Ladakh Granitoids, Indus Ophiolite Belt)"

ii. "Integrative Geological and Geochronological Studies of the Mishmi Tectonic Belt, North-eastern India (Arunachal Pradesh)"

Two joint fieldworks were conducted, and a tectonic evolution model will be developed through laboratory analysis/various studies of rock samples (petrographical, geochemical, petrochemical and isotopic work).

The MoU signed for an initial period of three years. Hence, a meeting on 22/11/2024 took place between GSI and FIU officials to review progress and agreed to extend the MoU for three more years to finish important work related to Himalayan Geology.

VII. India-UK (British Geological Survey-BGS):

A MoU between the Geological Survey of India (GSI) and the British Geological Survey (BGS) was signed on 01/08/2017 for technical cooperation in Earth Sciences, Mineral Prospecting, and Disaster Management. The MoU was extended for another four years from 01/08/2021. An implementing arrangement (IA) on Landslide Multi-Hazard Risk Assessment, Preparedness and Early Warning in South Asia: Integrating Meteorology, Landscape and Society – LANDSLIP was successfully completed. A draft Implementing Arrangement on 'Landslide trigger thresholds for tropical residual soils' has been prepared for another four years has been placed.

BGS expressed interest in working with GSI on critical mineral studies and Geopark establishment during a bilateral meeting at 37th IGC, Busan, South Korea.

VIII. India-Zambia:

2nd JWG meeting between India and Zambia was held during the visit between 10/06/2024 to 11/06/2024 of Indian delegation to Lusaka, Zambia led by Joint Secretary, Ministry of Mines. GSI discussed training programmes available with GSI and asked Zambia to share their requirements for customized training programme.

Photo 6.18: Dr. Joyesh Bagchi, ADG, GSI delivering the presentation on GSI's capacities and capabilities in Za

IX. India-Bhutan:

GSI participated in the 8th meeting of the reconstituted Joint Technical Team for flood management between the Royal Govt. of Bhutan (RGoB) and Govt. of India (GoI) between 18/11/2024 to 20/11/2024 at Chalsa, Jalpaiguri, West Bengal.

GSI attended various meetings between MoM and other countries from time to time. In most cases in which the meetings were conducted, a mutual agreement exists between India and other countries.

B. Other international activities

International Affairs division continued its endeavour towards 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 various issues like updated status of MoU, BRICS (Kazan declaration), BRICS (Roundtable on Mineral Exploration, Moscow), India-UK TSI, cooperation in the field of Geology and Mineral Resources between India and foreign countries like Bhutan, US, UAE, Bolivia, Cameroon, Mongolia, Russia, Zimbabwe, Saudi Arabia, Somaliland, Zambia, Mozambique, South Korea, Japan, South Africa, Malawi, Cote d'Ivoire, Equatorial Guinea, Papua New Guinea etc.

C. Geotechnical Consultancy Services

Geological Survey of India (GSI) has been rendering geotechnical consultancy services for various hydroelectric projects of Bhutan.

i. Two officers visited Punatsangchhu-I Hydro Electric Project (PHEP-1), Bhutan between 02nd April, 2024 to 05th April, 2024 to physically inspect the drill core logs at Punatsangchhu I Hydroelectric Project site Bhutan for GSI inputs and for validation.

D. International Visits/Workshops/ Seminars/ Symposiums/Exhibitions

i. Dr. Sudip Bhattacharyya, Dy Director General and Shri Abhishek Das, Sr. Geologist participated in the Future Mineral Forum 2024 during 9th to 11th January, 2024 in Riyadh, Saudi Arabia as part of the Indian delegation. GSI showcased India's NGDR portal and advocated for AI/ML integration and spotlighted GSI's Training Institute, a hub for international training and capacity enhancement.

ii. Shri. Pankaj Kumar, Dy Director General and Shareef Mohamed Neduvenchery, Director participated in in Mining Indaba-2024 during 5th to 8th February, 2024 in Cape Town, South Africa as part of the Indian delegation. Bilateral meetings of Indian delegation with Zambia were held and a MoU was signed between the Republic of India and the Republic of Cote d'Ivoire.

iii. Shri. R. L. Sarkar, Dy Director General and Pradeep Kumar Jena, Director participated in PDAC- 2024 during 3rd to 6th of March, 2024 in Toronto, Canada.

iv. Shri. Trigun Trivikram Paradkar, Sr. Geologist accompanied the Indian delegation to Mauritania to work out the various modalities of supply of Rock Phosphate to India during 20th to 22nd March, 2024.

v. Dr. Sandip Kumar Roy, Dy Director General participated in the Minerals Security Partnership (MSP) working level meeting on Minerals Recycling/ seminar on Energy Security and Critical Minerals during 21st to 22nd March, 2024 in Tokyo, Japan.

vi. Shri. Rambabu Pinninti, Shri. Nagasundaram Mohan, Shri. Manoj Rajappan Vijaylekshmi, Senior Geologists participated in scientific surveys and observations in Central Indian Ridge and South Western Indian Ridge region to delineate locations of Seafloor Massive Sulphide deposits in Indian license area in SW Indian Ocean using Autonomous Underwater Vehicle (Cruise RSV-AS) Leg-II, III & IV.

vii. Shri. Saju Varghese, Superintending Geologist attended expert scoping workshop in Porto, Portugal during 03rd to 04th April, 2024.

viii. Dr. Praveer Pankaj, Director participated in the 4th session of India-Ghana JTC during 2nd to 3rd May, 2024 in Accra, Ghana.

ix. Shri. Archisman Dutta, Senior Chemist attended Geothermal Training in Iceland on a GRO GTP Fellowship under the auspices of UNESCO for six months from 26th May 2024 to 16th November 2024.

x. Dr. Pradip Kumar Mukherjee, Director accompanied the Indian delegation led by Director, MoM to participate in 'DRC Mining Week Expo & Conference during 12th to 14th June, 2024 at Lubumbashi, Congo.

xi. Dr. Snigdha Ghatak, Dy Director General, Shri. Suhel Ahmed, Director attended the International Intensive Course on UNESCO Global Geopark 2024 in Lesvos Island, Greece scheduled between 27th May, 2024 to 03rd June 2024. They interacted with the UNESCO and GGN Executive Board members.

xii. Dr. Joyesh Bagchi, Additional Director General, Shri. Amit Srivastava, Director accompanied the Indian delegation to participate in 2nd Joint Working Group (JWG) meeting during 10th to 11th June, 2024 in Lusaka, Zambia. They showcased GSI's capacities and capabilities in international platform.

xiii. Dr. Pramod Kumar Singh, Dy Director General attended BRICS Round Table on "Prospects for Cooperation in BRICS in the Sphere of Exploration and Management of Mineral Resources" in Moscow, Russia during 15th to 18th July 2024.

xiv. Shri. Susobhan Neogi, Shri. Debojit Talukdar, Senior Geologists and Shri. Manish Banerjee, Senior Chemist attended Geological application training by CAMECA in Stockholm, during 12th to 16th August 2024.

xv. Shri. Asit Saha, Director General, Dr. Joyesh Bagchi, Additional Deputy General, Dr. Snigdha Ghatak, Deputy Director General, Shri. Pankaj Kumar, Deputy Director General, Shri. Muduru Lachhna Dora, Director, Dr. Ranjit Gangadhar Khangar, Director, Shri. Jaya Prakash Mohakul, Director, Shri. Pankaj Pralhadrao Vaidya, Director, Shri. Prabhakar Lakra, Director, Shri. Satya Prakash, Director, Dr. Rajkumar R. Meshram, Director, Dr. Arindam Dutta, Director, Smt. Ritu Pragya Chourasia, Superintending Geologist, Smt. Trina Vishal Vyas, Superintending Geologist, Smt. Sainaba N.K, Senior Geologist, Dr. Mukesh Kumar Mishra, Senior Geologist, Dr. Sayani Khan, Senior Geologist, Smt. Arpita Karmakar, Senior Geologist, Smt. Alka Kumari Mishra, Senior Geologist and Dr. Bhagirathi Behera, Senior Chemist from Geological Survey of India attended 37th International Geological Congress (IGC) at Busan, South Korea scheduled between 25th to 31st August 2024. During the event, the three key functionaries conducted business meetings and also involved in chalking out future course of geoscientific investigations which includes baseline geoscientific survey, mineral exploration, data analysis, multidisciplinary geoscience, Geoheritage, international collaboration etc. Seventeen geoscientists presented a high-quality papers in various themes like Sedimentary Geology, Quaternary Geology, Earth History and Stratigraphy, Planetary Science, Volcanology, Petrology, Structural Geology, Resource Geology and Economic Geology, Coastal, Marine and Lacustrine Geosciences, Groundwater and Hydrogeology, GIS and Remote Sensing and Geoethics and societal Relevance of Geoscience. Geoscientists also attended the workshops and the sessions. GSI established GeoExpo stall under "Geotourism & Geopark theme" and showcased the GSI's recent activities with special reference to Geoheritage, Geotourism and potential Geoparks in India. Various flyers, information material in flash drive was distributed from the pavilion to the visitors. Hence, the Congress gave the unique opportunity to the geoscientists to showcase its work at the global platform of Olympics of geoscience and to chalk out a future roadmap for geoscience development in the country by interacting with global geoscientific peers.

xvi. Dr. Praveer Pankaj, Director attended First meeting of the Open-Ended Working Group of UNESO Global Geopark (OEWG) in Paris on 16th September 2024.

xvii. Shri. Pradeep Kumar Jena, Director participated in Indian delegation to International Copper Study Group (ICSG) and International Lead & Zinc Study Group meeting (ILZSG) in Lisbon, Portugal, during 24th to 27th September 2024.

xviii. Shri. Mohammad Sadiq, Superintending Geologist accompanied in Indian delegation led by Additional Secretary, Ministry of Mines to Mineral security

partnership meeting in New York on 26th September 2024.

xix. Shri. P. Rajesh Durai, Director attended the Mining week 2024 and International Quarrying and Mining Exhibition & Convention-Mine-pro 2024 in Mongolia as a part of Indian delegation during 02nd to 03rd October 2024.

xx. Smt. Madhumita Banerjee, senior Geologist participated in regional cooperation and Integration conference on "Enhancing critical mineral for the clean energy transition" in Hanoi, Vietnam scheduled between 15th to 17th October 2024.

xxi. Shri. H. Rajaram, Director attended the International Mining and Resources Conference-2024 at Sydney and Perth, Australia as a part of Indian delegation scheduled between 28th October to 01st November 2024. Extension of Third ToR under MoU between GSI and Geoscience Australia was signed during the event.

xxii. Shri. Akshay Kumar Mishra, Director participated in the 2024 International Consortium on Landslide-Kyoto landslide Commitment (ICL-KLC) and signed Kyoto Commitment on Landslide 2020 on behalf of Government of India during 04th to 07th November 2024.

xxiii. Shri. Mohammad Naushad, Superintending Geologist accompanied in Indian delegation led by Joint Secretary, Ministry of Mines to the 'Mining Show – 2024' in Dubai, UAE during 26th to 27th November 2024.

xxiv. Shri. M. N. Praveen, Dy. Director General accompanied in Indian delegation to Explore the potential cooperation in the REE and critical mineral in Mayanmar during 08th to 12th December 2024.

6.28 Collaborative Projects with Other Organizations

During the year 2024, GSI has taken up twenty-one (21) collaborative projects with different organisations and institutes like Savitribai Phule Pune University; CWC, Aizwal; SAC, ISRO; NHAI; NIRM; Survey of India; IMMT; Narmada Valley Development Authority (NVDA); ONGC Energy Centre (OEC); Water Resource Dept. (WRD), MP; CWC, Sikkim; Mizoram University; SJVNL(HP); Oil India Ltd. (OIL); NGRI; CGWB; NTPC; Digital India Corporation (DIC); Presidency University and Assam SDMA etc.

STSS: Scientific & Technical Support System

6.29 ISO certification of Chemical Laboratories & Central Headquarters

The Central Chemical Laboratories (XRF and ICPMS laboratories) at GSI, CHQ and the Regional Chemical Laboratories at NR, SR, WR, CR, ER & 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 which is a continuous process. 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.The newly established Coal

Testing Laboratory of Chemical Division, SR was also granted accreditation in accordance with ISO/IEC 17025:2017 in the discipline of Chemical testing by the National Accreditation Board for Testing and Calibration Laboratories (NABL) in the year 2024. It is the first chemical laboratory of GSI accredited by NABL for the testing of coal for proximate analysis. The water testing laboratory of NR Chemical Division was also granted NABL accreditation in accordance with ISO/IEC 17025:2017 in the year 2024. It is the first chemical laboratory of GSI accredited by NABL for the testing of water.

Photo 6.19: NABL accreditation of Water testing Laboratory of GSI, NR, Lucknow and the inauguration of the new ICP-MS laboratory by the DG, GSI

Photo 6.20: ICP-MS LABORATORY OF CCL, KOLKATA

Photo 6.21: XRF LABORATORY OF CCL, KOLKATA

6.30 Modernization program in GSI

The state-of-the-art instrumental facilities of GSI mainly operate under the aegis of National Centre of Excellence in Geoscience Research (NCEGR) with main centre in Kolkata and satellite centres at Bangalore and Faridabad. Existing laboratories are operating successfully.

STSS is continuously procuring the instrument based on the requirements of the GSI. Constant efforts are being made to augment the existing infrastructure and laboratory facilities under different streams. Further efforts are being made to modernize the existing facilities and provide state of art instrumentations and equipments for conducting research in Geosciences as per world standards.

High end machineries and equipment are being procured in a phased manner to improve the capabilities of GSI in generating vital geoscience data.

The important machineries procured recently and functional in different chemical laboratories are Hot plates, UV Spectro photo meter, Fire Assay Furnace, Fume Hoods with Scrubbers. Similarly Differential Global Positioning System (DGPS), Total Precision Magnetometer, Gravimeter, Ultra-Wideband MT System have been procured for geological and geophysical research activities. Field vehicles, Consultancy for Geo Heritage Sites and Setting up of National Geological Data Repository (NGDR) IT Infrastructure, NGDR are also procured for high end research in line with extent policies of Government of India. All these high-end machineries produce quality data and cater the need of GSI as well as other geoscience institutes of country as per their requirement. Besides these, the newly setup National Landslides Forecasting Center (NLFC) facility with state of art infrastructure facility was established at Central Headquarters, Kolkata which was inaugurated by Hon'ble Minister of Mines.

Keeping in pace with the thrust in the mineral exploration activities and search for critical minerals GSI is procuring hydrostatic deep drilling rigs as well as other laboratory instruments in phased manner during FY-2024-25. Some of them are listed below-

S. No	Major instruments procured / planned to be procured	No of units	Concerned laboratories/ Divisions
1.	ICPMS	1	Chemical laboratories
2.	AAS (Flame & GTA)	1	
3.	Fume Hoods with Scrubbers	1	
4.	Ultrapure Water Purification System	1	
5.	Hydrostatic rigs – 150m, 300m,600m	16	Engineering Divisions
6.	Field vehicles	48	
7.	HCV Truck	12	
8.	Coastal Research Vessel	02	Marine and Coastal Survey Division

S. No	Major instruments procured / planned to be procured	No of units	Concerned laboratories/ Divisions
9.	Laptops	800	Information Technology Division
10.	X-ray diffractometer	1	Mineral Physics Division
11.	Seismographs	11	Geophysical Division
12.	IRMS	1	Geological Laboratories
13.	Instrument for MPD	1	
14.	Stereo zoom Microscope	1	
15.	High end research grade microscope	1	
16.	Solid State Laser Unit	1	
17.	Petrological Microscope	1	

Apart from these process for procurement of EPMAs and Digi loggers have also been initiated.

6.31 Internal Resource Generation

In the year 2024, total Rs. 1,50,37,400 (Rupees one crore fifty lakh thirty-seven thousand four hundred) only has been generated as Internal Resource and Rs. 20,64,149 (Rupees twenty- lakh sixty-four thousand one hundred forty-nine) only collected as Service Tax and Cess by way of undertaking various commercial activities such as sponsored commercial geotechnical works; multidisciplinary & fundamental research; sale of maps, unpublished reports; providing analyses of samples (petrological/ chemical/ mineral physics/ geotechnical Labs.), EPMA studies and gem testing etc.

6.32 Activity – wise budget expenditure of GSI

Activity-wise budget expenditure of GSI against the approved budget grant during FY 2023- 24 and the activity wise total BE grant and expenditure of FY 2024-25 is given in **Annexure 6.1.**

Human Resources

6.33 Out of the total sanctioned strength of GSI i.e., 8676 as on 31.12.2024, 6198 posts are occupied. The group wise and category wise details of personnel as on 31.12.2024 are given in the **Table 6.1**.

Table 6.1: Statement showing category wise details of sanction and filled up strength in GSI as on 31.12.2024

Class	Sanctioned Strength	Men in position	SC	ST	OBC	No. of Women	PH	Total (SC, ST, OBC, Women, PH)
Group-A	3439	3124	471	238	907	873	37	2526
Group-B (Gaz.)	912	513	103	57	127	78	8	373
Group-B (NG) (Min.)	841	632	84	63	86	131	9	373
Group-B (NG) (Tech.)	705	314	50	30	55	23	8	166
Group-C (Min.)	605	364	52	24	89	56	9	230
Group-C (Tech.)	1152	546	84	55	165	22	10	336
MTS (Erstwhile Gr-D)	1022	705	146	100	155	125	27	553
TOTAL	**8676**	**6198**	**990**	**567**	**1584**	**1308**	**108**	**4557**

6.34 Public Relation and Media Management

The Public Relations and Media Management (PRM) Cell of the Geological Survey of India (GSI) plays a pivotal role in bridging the organization with the public, stakeholders, and the scientific community. Through strategic use of traditional and digital platforms, the PRM Cell has effectively showcased GSI's contributions to geoscience and national development. By promoting initiatives like mineral exploration, landslide forecasting, environmental sustainability, and cutting-edge geotechnical advancements, the PRM Cell has significantly bolstered GSI's visibility and engagement across diverse audiences.

In 2024, GSI intensified its outreach efforts with a blend of press interactions, digital campaigns, and strategic collaborations. PRM Cells across GSI actively engaged with media outlets in English, Hindi, and regional languages, ensuring a steady stream of updates and achievements to national, regional, and local platforms. As a result, GSI experienced a notable rise in visibility, capturing the attention of both the general public and specialized audiences.

On social media, GSI achieved substantial growth, **gaining approximately 10,812 new followers** across platforms. Total impressions across Facebook, Twitter, Instagram, YouTube, and LinkedIn reached an **impressive 27,63,470, with 2,49,645 engagements** (including comments, shares, and video views) and a post reach of 7,43,533. This digital success reflects GSI's ability to resonate with a tech-savvy and younger demographic increasingly interested in geoscience.

Traditional media coverage was equally impactful, **with 305 media impressions**, including over 270 newspaper coverage, **23 electronic news features, 07 television broadcasts, and 05 Akashvani radio** programs. This broad-spectrum coverage underscored GSI's relevance across diverse geoscientific and public domains.

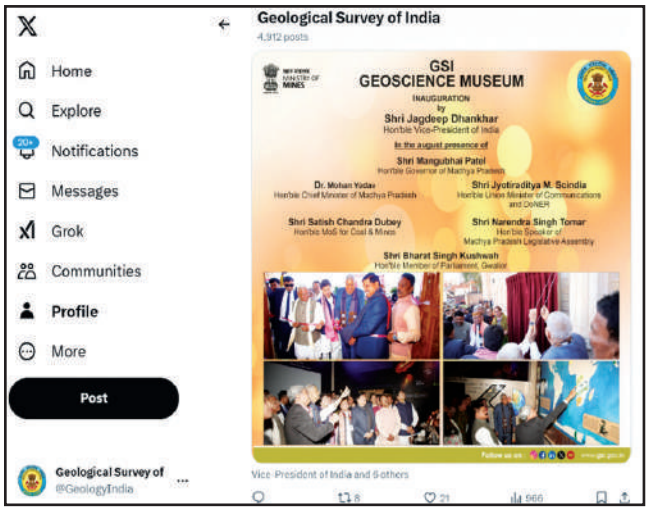
Key milestones and events were extensively publicized during the year. The **63rd Central Geological Programming Board (CGPB) Meeting** set priorities for upcoming field seasons, while workshops on **offshore exploration** highlighted the blue economy's potential. The **Mineral Exploration Hackathon** spotlighted innovation in mineral discovery. Events like the **inauguration of the National Landslide Forecasting Centre (NLFC) in Kolkata**, the **commissioning of a rooftop solar power plant at GSITI**, Hyderabad, by the **Hon'ble Union Minister of Coal & Mines, Shri G. Kishan Reddy**, and the launch of the **GSI Geoscience Museum in Gwalior by the Hon'ble Vice President of India, Shri Jagdeep Dhankhar**, received significant media coverage, amplifying GSI's national presence.

On social media platforms, innovative methods were employed to showcase GSI's work in areas such as Glacial Lake Outburst Flood **(GLOF) risk assessments, landslide hazard mitigation**, geological studies along India's border areas, the **Critical Mineral Mission, and carbon sequestration initiatives**. Campaigns like **Swachhata Hi Seva 2024**, **Special Campaign 4.0, and the Fit India Run,** along with the inauguration of the National Meteorite Repository and NGDR Data Management Centre, were featured prominently. GSI's international engagements, including participation in the 37th International Geological Congress, the Future Minerals Forum 2024, and collaborations with UNESCO on Geoparks and Geoheritage sites, showcased its expanding global footprint.

Short-form videos/reels emerged as an effective tool for outreach, with content showcasing **heliborne surveys, DSRS-MT**

surveys, magnetotelluric (MT) surveys, and fieldwork initiatives attracting significant attention. Interactive posts like **quizzes, riddles, and the "Any Guess?"** series simplified complex geoscience topics for public understanding, fostering widespread interest. Internally, the PRM Cell focused on employee engagement through WhatsApp groups and initiatives like iGOT Karmayogi, featuring congratulatory posts celebrating employee milestones and fostering a sense of recognition and community within GSI.

Looking ahead, GSI envisions further amplifying its outreach through emerging technologies, creative content strategies, and enhanced engagement with diverse audiences. By bridging the gap between science and society, the PRM Cell continues to position GSI as a leader in geoscience communication, contributing to the organization's mission of advancing geoscience for the betterment of the nation and the world.




Geological Survey of India
Published by Geologist Gsi · 22 January at 11:00 ·
63rd Central Geological Programming Board Meeting inaugurated with traditional Lamp Lighting by Shri V.L. Kantha Rao, Secretary, Ministry of Mines, and Chairman CGPB, along with Shri Janardan Prasad, DG, GSI, and Shri Sanjay Lohiya, Addl. Secretary, Ministry of Mines in Bhopal.
Pralhad Joshi Raosaheb Patil Danve Ministry of Mines, Government of India


Geological Survey of India
Published by Geologist Gsi · 15 February at 10:42 ·
Commencing a journey of collaboration and knowledge exchange! Shri V. L. Kantha Rao, IAS, Secretary, Ministry of Mines inaugurated the Offshore Exploration workshop by traditional Lamp Lighting along with Shri Janardan Prasad, DG, GSI and other dignitaries.
#MiningReforms
Pralhad Joshi Raosaheb Patil Danve Ministry of Mines, Government of India


Creating Awareness for a Clean India
• Swachhata Pledge
• Cleanliness drives
• Ek Ped Maa ke Naam
• Public awareness
• Wall painting
• Waste to Art
• Selfie points
• Nukkad Natak
• Competition
• Swachhata marathon
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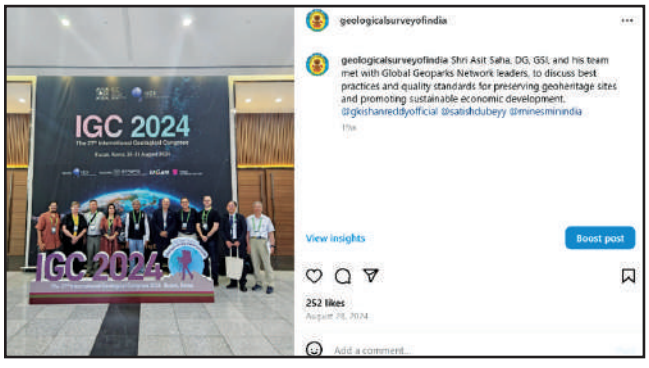
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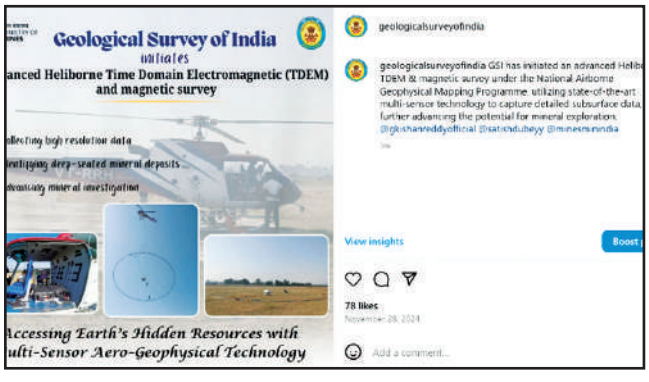
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Photo 6.22: Some of the Snippets from the Social media handles of GSI

UNCOVER (India) Projects

6.35 A pilot scale project [Northern Transect] has been taken up by the GSI under Project "Uncover (India)" to probe for deep-seated/ concealed mineral deposits. The highlights of the projects during FS 2024-25 is given below.

NORTHERN TRANSECT

6.36 Deep Seismic Reflection Survey (DSRS) And Magnetotelluric (MT) Survey along Churu, Rajasthan to Tikamgarh, M.P Northern Transect, Project Uncover (Phase-III)

Under phase III, the acquisition, processing, and Interpretation (API) of Deep Seismic

Reflection Survey (DSRS) & Magnetotelluric (MT) Survey work along northern transact is outsourced to the CSIR-NGRI through an MOU, signed between GSI and CSIR-NGRI on 1st January 2024. The timeline for completion of DSRS MT survey is 36 months i.e. January 2024 to December 2026.

The Northern Transect is covering parts of Marwar Craton - North Delhi Fold Belt (NDFB) – Bundelkhand Craton from Churu, Rajasthan in the northwest to Tikamgarh, MP in south east. The northern transact profile line for DSRS and MT survey is 600 km long and passes through 14 districts - 8 in Rajasthan, one in UP & 5 in MP. The study includes (1) The **MT survey**, to be carried out along the 600 long main transact profile line with 611 MT stations comprising the combination of Long Period MT (LPMT) for very deep, Broad Band MT (BBMT) for intermediate depth and Audio MT (AMT/SPMT) for shallow depth. A total of 57 LPMT (15-20 days recording), 93 MPMT (48 hrs. recording) and 461 Short Period MT (4-5 hrs) recording at an interval of 10 km, 05 km and 01 km respectively will be carried out. The recording period may vary to acquire high signal to noise ratio. Period of recording time will depend on strength of the signal. (2) **The 2D DSRS survey** is to be carried out over 700 L km i.e. 600 L km along main transact profile line from NW of Churu in Rajasthan to SE of Tikamgarh in MP and 100 Line km mostly parallel to the main transact across known Khetri Copper deposit. In soil covered area of 215 L km (115 L km main transact + 100 L km in second parallel transacts across known Khetri copper prospect), the data will be acquired by Vibroseis and in the remaining 485 L km along main transact in hard rock terrain through explosives.

The MT survey team from NGRI has carried out necessary preparation to conduct the MT survey along the northern transact profile line such as obtaining necessary permission from local authorities (District collectors, Superintendent of police, District Forest officers etc.), procurement of new MT spares and accessories, appointment of students and research scholars etc. After obtaining necessary permission, acquisition of data for the MT survey along Northern Transect profile line was initiated from the western end near Churu in Rajasthan in the third week of April 2024 and data were acquired till the last week of June, 2024. During this period, data acquisition was carried out at 93 MT stations, including 70 AMT stations (1 km interval), 15 MPMT stations (5 km interval), and 8 LPMT stations (10 km interval) covering a length of about 70 L km (Out of 600 L km). The data acquisition was paused due to summer and rainy season and processing of the acquired data, modelling and interpretation work was carried out at NGRI Hyderabad. This acquired data covers only a small patch of the 600 km long transact, thus, the proper modelling and interpretation will be carried out after acquiring sufficient data along the transact profile line. Two officers from GSI WR also participate in MT data processing at NGRI Hyderabad for a week. The second phase of data acquisition for MT survey by NGRI team has again started from the mid November 2024 from Neem Ka Thana, Rajasthan and data acquisition is in progress. By the end of December 2024, MT survey data acquisition has been completed at 163 stations including 122 AMT (1 km interval), 28 MPMT stations (5 km interval), and 13 LPMT stations (10 km interval) covering a length of about 122 L km (Out of 600 L km). The MT data acquisition will continue further. The quality of data acquired in the initial 70 L km is of good quality due to less anthropological noise. However, the presence of high-tension electric lines and other anthropological noises, posing some challenges in data acquisition for MT survey in Neem Ka Thana sector.

The DSRS survey team from CSIR-NGRI has also initiated pre field preparation and obtained supporting letters and permissions for carrying out DSRS survey along the northern transact from various agencies, including District Collectors, Superintendent of Police, Land Revenue offices, Chief Conservators of Forest, and local Taluka authorities of different districts in Rajasthan, Uttar Pradesh, and Madhya Pradesh. The calibration process for ground electronics, including land sensors, cables, wireless systems etc. has been completed. The DSRS team initiated Low Velocity Layer (LVL) survey of weathering layer from the north-western part (Churu, Rajasthan) in August 2024 and data recording for the 600 km long transect profile line was completed by the first week of October 2024. A total 116 LVL points have been covered along the 600 km long Northern Transact. The processing of the LVL data set is going on in CSIR-NGRI, Hyderabad. This initiative of LVL survey is part of a larger Deep Seismic Reflection Survey (DSRS) project. Mapping the weathering layer accurately is crucial for subsurface DSRS investigations, as it affects seismic wave propagation. The findings will provide essential insights for determining shot hole depths, important for future seismic studies. The NGRI has informed that the tendering for services such as Topographical Surveys, Shot hole drilling, Seismic Job services for Laborers and Supply of Explosives is in process. The DSRS Survey and data acquisition along the northern transact is expected to start in January 2025.

6.37 Inauguration of GSI Geoscience Museum, Gwalior

The GSI Geoscience Museum in Gwalior was inaugurated on 15th December, 2024 by Hon'ble Vice President Shri Jagdeep Dhankhar in the august presence of several distinguished dignitaries, including Shri Mangubhai Patel, Hon'ble Governor of Madhya Pradesh, Dr. Mohan Yadav, Hon'ble Chief Minister of Madhya Pradesh, Shri Jyotiraditya M. Scindia, Union Minister of Communications and Development of North Eastern Region, Shri Satish Chandra Dubey, Minister of State for Coal and Mines, Shri Narendra Singh Tomar, Speaker of the Madhya Pradesh Legislative Assembly, Shri Bharat Singh Kushwah, Member of Parliament, Gwalior.

Located in the historic Victoria Market Building, Gwalior, the museum features two main galleries to serve as a hub for geoscience education and public engagement, promoting scientific temperament and knowledge-sharing among the public:

1. **Dynamic Earth –** This gallery showcases Earth's marvels across seven sections, highlighting phenomena such as volcanoes, meteorites, and magnetic fields. It includes rare geological specimens like Antarctic rocks, rare gemstones, volcanic rocks from Japan, Himalayan fossils, Deccan Trap zeolites, dimensional stones, and dinosaur eggs.

2. **Life through ages –** This gallery chronicles the epic story of life, tracing its origins to the rise of Homo sapiens. Through seven meticulously designed sections, visitors explore ancient ecosystems, the process of evolution, and mass extinction events.

Developed in coordination with the Gwalior Municipal Corporation and the National Council of Science Museums (NCSM), it reflects GSI's commitment to advancing geoscience literacy and sparking curiosity about the Earth and its resources.

During the inauguration, Hon'ble Vice President Shri Jagdeep Dhankhar commended the efforts of the Geological Survey of India in exploring and understanding the country's geological wealth, supporting sustainable resource management, and contributing to national development.

Photo 6.23: Glimpses of inauguration of GSI Geoscience Museum, Gwalior

Hackathon on "Innovative Mineral Hunt Techniques"

6.38 The Geological Survey of India organized a Hackathon on "Innovative Mineral Hunt Techniques" for mineral prognostication using state-of-art techniques practiced globally including interpretation and modelling of geophysical data, integration of multiple geo-data sets, application of emerging technologies like AI/ML etc. The aim was to use baseline and available exploration data to identify new target areas for mineral exploration, particularly deep seated /concealed ore bodies involving the geoscientific community of India and abroad. The program was launched by Shri G. Kishan Reddy, Hon'ble Minister of Coal and Mines, Govt. of India and Shri Vijay Kumar Sinha, Deputy Chief Minister of Bihar, at Hyderabad, on 20th July 2024. It was marked by the presence of dignitaries from Ministry of Mines, State Government Officials, representatives from Government Organizations and industry. One hundred and

eight (108) participants registered for this event and finally, fifteen (15) solutions were received/ submitted through the website for further evaluation. The results of the hackathon were announced during 64th Central Geological Programming Board Meeting held on 19th January 2025 at Bhubaneswar, Odisha. The Hackathon winners—namely, the first prize-winning team AMD, the second prize-winning team GSI, and the third prize-winning team IIT-ISM, Dhanbad were awarded cash prizes. During the event, 1st, 2nd and 3rd prize winners also presented their solutions in front of the stakeholders.

Data Processing, Interpretation and Integration Centre (DPIIC)

6.39 The Geological Survey of India (GSI) is in the process of developing a state-of-art Data Processing, Interpretation, and Integration Centre (DPIIC), at GSI, RSAS, Bengaluru for mineral targeting with application of modern data science technologies including Artificial Intelligence/Machine Learning/Deep Learning (AI/ML/DL). The main objective of DPIIC will be Mineral Targeting in Brownfield and Greenfield areas by application of integration geoscience, mineral systems, AI/ ML/ DL applications; analyze, interpret and integrate the available aero-geophysical data with other geoscience data for building appropriate 2D & 3D models for finding new areas of exploration for internal and external stakeholders. The Digital India Corporation (DIC), a section 8 not-for-profit GoI company under MeitY has been engaged as Project Management Unit (PMU) for implementation of Phase-1 of DPIIC within a period of 24 months. During this period, DIC will prepare EoI, DPR, RFP and assist GSI in evaluation of EoI, RFP, selection of the Implementation Agency (IA) and act as the PMU during implementation of DPIIC by the selected IA. An MoA was signed between GSI and DIC on 27.09.2024. The DIC has submitted the Expression of Interest (EOI) for the purpose of identifying agencies that are willing to participate in the main tendering process with willingness to act as the IA for establishing, maintaining and operating DPIIC. The EOI was floated on CPP portal on 23.01.2025. After getting EoI responses, DPR and RFP will be prepared with the detailed Specifications, Scope of work, Terms & Conditions, estimated cost etc.

Indian Bureau of Mines (IBM)

6.40 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.

6.41 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.

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

6.43 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".

6.44 Mission

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

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

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

6.45 Objectives

To work as National Technical Regulator operating at national-level designing systems, processes and guidelines for regulation of the mining sector;

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;

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.

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.

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

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.

6.46 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 Indian Bureau of Mines, Nagpur (ibm.gov.in).

6.47 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

6.48 IBM has its headquarters at Nagpur, 4 Zonal Offices at Bengaluru, Nagpur, Udaipur and Kolkata, and 14 Regional Offices at Ajmer, Bengaluru, Bhubaneswar, Chennai, Gandhinagar, Goa, Dehradun, Guwahati, Hyderabad, Jabalpur, Nagpur, Ranchi Raipur and Vijayawada. During the year 2017, IBM opened two new skill development centers for sustainable mining practices at Udaipur and Kolkata.

6.49 IBM has modern mineral processing laboratory and pilot plant at Nagpur and well-equipped Regional Mineral Processing Laboratories and pilot plants at Ajmer, Bengaluru.

6.50 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 subgrade 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)

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

- Minerals Development & Regulation Division (MDRD);
- Mineral Processing Division (MPD);
- Technical Consultancy, Mining Research and Publication Division;
- Mineral Economics Division;
- Mining and Mineral Statistics Division; and
- Planning and Coordination Division.

Performance relating to various regulatory and development functions of IBM during the year 2024-25 is given hereinafter. The same is also enclosed at **Annexure 6.2**.

6.52 Inspection of Mines

During the year 2024 (January to December), 1422 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, 857 violations were pointed out to 531 mines during 2024. 1019 (pointed out to 508 mines) violations in 2023. Total 356 violations were rectified during the year. So far, for the reporting period, 6 cases (including cases launched in previous years also) were decided in favour of IBM in the year 2024. Mining operations were suspended under Rule 11(2) of MCDR 2017 in 40 mines for not carrying out mining operations in accordance with the approved mining plan/ review of mining plan

and recommended 22 cases revocked. A list of principal violations observed during inspection of mines for the year 2023 and 2024 are given at **Table 6.2.**

Table 6.2
Principal Violations of MCDR, 2017 detected by IBM during 2024.

(January to December, 2024)

Rule No	No. of Violations Pointed out 2023	No. of Violations Pointed out 2024, (Jan. to Dec. 2024)	Rule description
11(1)	366	313	Rule11 (1) - Mining operations in accordance with mining plans
11(3)	01	00	Rule 11 (3) - Submission of Review of Mining Plan / Scheme of mining
20	00	00	Rule 20 - Notice of opening of mine
23	00	00	Rule 23 - Submission of progressive mine closure plan
26 (2)	42	16	Rule 26 (2) - Responsibility of the holder of mining lease to submit yearly report
27(2)	20	14	Rule 27(2) - Submission of Financial assurance
28(1)	4	5	Rule 28 (1) - Notice of temporary discontinuance of mining operations
31(4)	35	38	Rule 31(4) - Maintenance of plans and sections
33	46	28	Rule 33 - Copies of plans and sections to
35, 36, 37, 38, 39, 40, 41, 42, 43, 44	115	26	**Protection of environment:** Rule 35, 36, 37, 38, 39, 40, 41, 42, 43, 44 - Sustainable mining, removal and utilization of top soil, Storage of overburden, waste rock Precaution against ground vibrations, Control of surface subsidence, Precaution against air pollution, Discharge of toxic liquid, Precaution against noise, Permissible limits and standards, Restoration of flora respectively.
45(5)(b)	44	44	Rule 45 (5) (b) - Submission of Monthly Return
45(5)(c)	9	13	Rule 45 (5)(c) - Submission of Annual Return
55(1)(c)(i)	6	38	Rule 55(1)(c)(i) - Employment of Whole time Mining Engineer/Geologist
55(1)(c)(ii)	3	04	Rule 55(1)(c)(ii) - Employment of Part time Mining Engineer/Geologist
Others	328	318	
Total	**1019**	**857**	

Table 6.3
Inspection of Mines carried out by IBM during 2024 (January to December, 2024)

Andhra Pradesh	138
Assam	2
Bihar	0
Chhattisgarh	102
Goa	5
Gujrat	213
Haryana	0
Himachal Pradesh	38
J & K	10
Jharkhand	48
Karnataka	127
Kerala	0
Madhya Pradesh	278
Maharashtra	88
Manipur	0
Meghalaya	22
Orissa	131
Punjab	0
Rajasthan	148
Sikkim	0
Tamil Nadu	128
Telangana	52
Uttaranchal	1
Uttar Pradesh	2
West Bengal	0
Total	**1533**

Mining Plan, Review of Mining and Mine Closure Plan

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

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 system for preparation & submission of Mining Plan /Review of Mining Plan / Modified Mining Plan has been launched under MTS. With the launch of Mining Plan Approval system (MPAS), the entire process of approval of mining plan has become online in digital form. The lessee can submit his mining plan, on the click of the mouse and the process has become simpler and less time consuming. Refer to **Annexure 6.3**.

6.54 Till the year, 2024 (January to December), Financial Bank Guarantees for a value of Rs. 39,22,79,90,047/- i.e, 39227.990045 Million Rupees (As per revised per hectare rate of Rule 27(1) of MCDR, 2017) have been collected.

6.55 During the year 2024 (January to December, 2024), 59 mining plans were approved and 3 not approved, 509 review of Mining Plan were approved and 81 not approved and 7 final mine closure plans approved and 0 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 2024.

(January to December 2024)

Sr No	State	Mining Plans		Review of Mining Plans		FMCP	
		Approved	Not approved	Approved	Not approved	Approved	Not approved
1	Andhra Pradesh	0	0	66	7	2	0
2	Assam	0	0	1	0	0	0
3	Chhattisgarh	5	0	28	7	0	0
4	Goa	5	0	0	0	0	0
5	Gujarat	8	0	49	4	0	0
6	Himachal Pradesh	0	0	9	3	0	0
7	Jammu & Kashmir	0	0	1	1	0	0
8	Jharkhand	0	0	14	0	0	0
9	Karnataka	4	0	38	7	1	0
10	Madhya Pradesh	9	1	114	30	2	0
11	Maharashtra	2	0	29	2	0	0
12	Meghalaya	5	1	6	2	0	0
13	Odisha	3	1	55	5	2	0
14	Rajasthan	17	0	33	0	0	0
15	Tamil Nadu	0	0	50	11	0	0
16	Telangana	0	0	15	2	0	0
17	Uttarpradesh	1	0	1	0	0	0
	Total	**59**	**3**	**509**	**81**	**7**	**0**

6.56 Monitoring of mining activities using Digital Aerial (Drone and Satellite) Images:

Mineral Conservation and Development Rules, 2017 were amended in the year 2021 requiring submission of digital aerial images (Drone/Satellite) of the lease hold areas by the mineral concession holders/preferred bidders to Indian Bureau of Mines (IBM). Every lessee is required to submit the digital aerial images to IBM on or before 1st day of July every year. Further, all mine plans are also required to be submitted along with the digital aerial images. Vide Gazette Notification No. S.O. 719(E) dated 14.02.2023, the mineral concession holders have also been directed to submit a copy of the Digital Aerial Images under Rule 34A of MCDR 2017 to the State Government. IBM has developed a Drone Data Management System (DDMS) application for online submission of these images. The mineral concession holders are required to submit the images in this portal. The images can then be accessed by the various offices of IBM and also the State Governments for monitoring the mining activities.

During the year 2024-25 as on 31.12.2024, 1368 digital images have been received on DDMS portal. These digital images are being validated and analysed using GIS by the regional offices for the purpose of MCDR inspections.

For capacity building of IBM officials to process the drone and satellite image data on GIS platform, necessary hands on training on "Basics of GIS & Processing of Drone Survey Data" has been commenced from March 2022. Internal SOP for processing and utilization of Digital Aerial images of mining lease area has been specified for the officers of IBM. A road map has been carved out to train all the technical officials of the Minerals Development and Regulation Division through a series of in-house training program to develop expertise in analysing the aerial images and to make appropriate use of these images in inspection of mines and approval of mining plans. During the year 2024-25, upto December 2024 four training programs were conducted over 20 days to train 33 IBM officers and 16 State government officers in processing and analysis of Digital images using GIS software. Cumulatively, till December 2024, seventeen training programs over 132 days involving 173 nos. of technical officers of State Governments and Central Governments (IBM) have been provided for effective use of digital images by the officers. One Workshop cum Training program on "Utilization of Drone Survey and Satellite data for monitoring of Mining Areas" was also organized for officers of State DGMs on 21.06.2024 to create awareness about the utility of drone images for monitoring of Mining activities. The training and workshops have been conducted by GIS & Remote Sensing Centre, GM&MM Cell, IBM, Nagpur.

6.57 Generation of Land use classification map of mining leases on GIS platform:

The geospatial database of land-use of individual leases is also generated from the drone images. This database can be used to generate customized maps & reports viz. state-wise,district-wise, mineral-wise, feature-wise, etc. for land-use classification by query analysis on GIS platform. During the year 2024-25, the existing database of land use classification map of mining leases is being updated based on drone data received and land use classification map of 85 mining leases has been generated till December 2024.

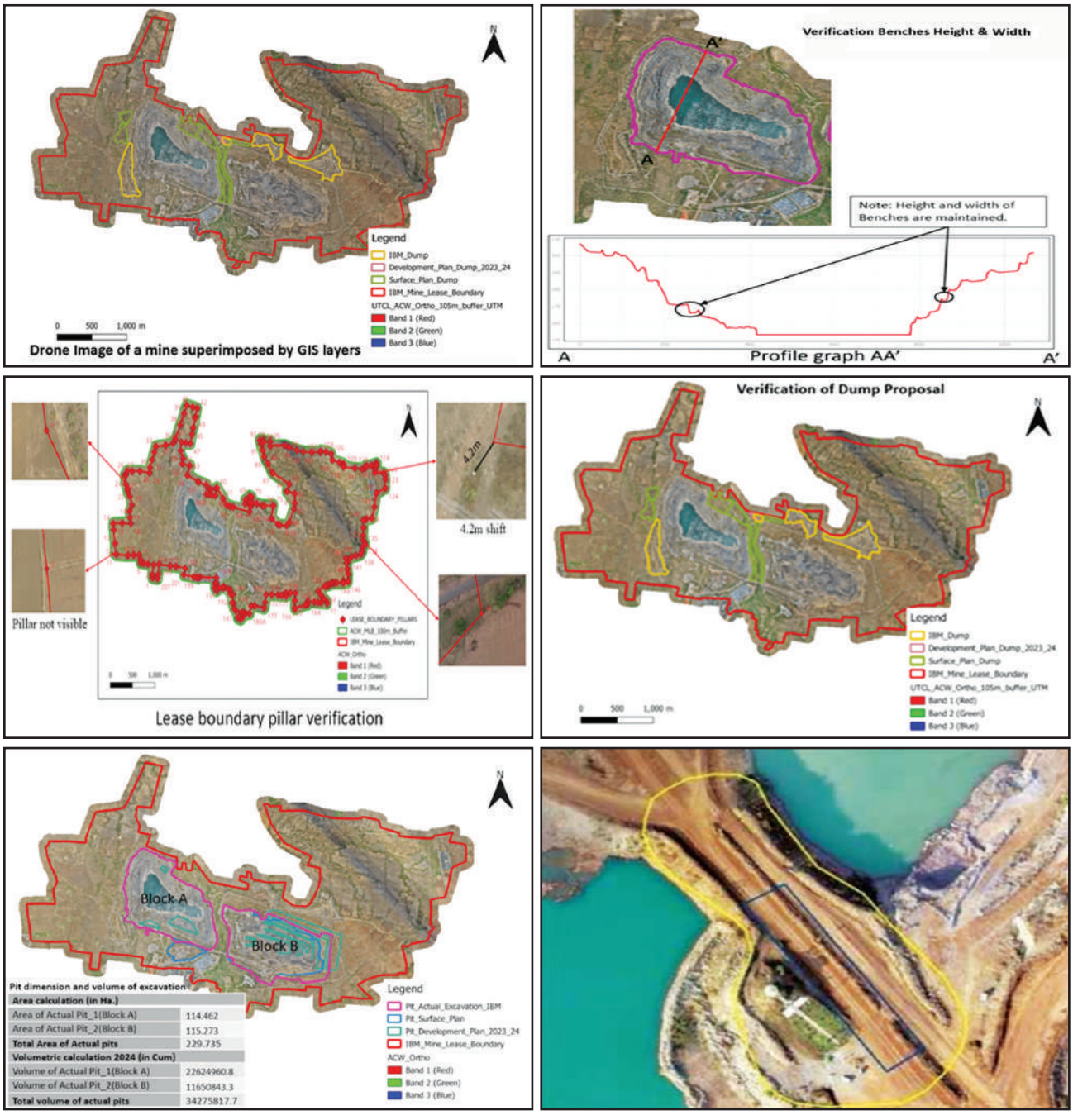

Photo 6.24: Mine Pit Analysis Mine Reclamation& Rehabilitation Analysis

Mineral Beneficiation

6.58 Mineral Beneficiation: Mineral beneficiation studies including mineralogical studies and chemical analysis are carried out for conservation and development of mineral resources. During the year 2024 (January 2024 to December 2024), 44.75 Ore Dressing Investigations, 26,763 Radicals in Chemical Analysis, 2778 Mineralogical Examinations study were completed.

Beneficiation studies of Mineral deposits set for auction.

6.59 Beneficiation study is essential to assess the auction potential of mineral blocks. IBM conducts beneficiation studies on exploration samples to assess the amenability of the ore for upgradation. To meet the growing demand of Indian industry and to fulfill the objective of "Atma Nirbhar Bharat" and "Vikshit Bharat", enhancement of mineral production and

utilization of low grade ores and processing & extraction of critical minerals are need of the hour. Hence, mineral beneficiation study has paramount and crucial role for the development of mineral deposits in India.

6.60 IBM has been carrying out laboratory scale beneficiation studies on exploration samples of different exploration agencies. IBM has conducted beneficiation studies on a large number of exploration samples comprising different ores and minerals received from various parts of the country. Till date beneficiation studies on total 190 mineral blocks have been completed and reports were submitted by IBM to the respective organizations for auctioning. Out of these, several mineral blocks comprising of Gold ore, Graphite ore, Copper-Lead-Zinc ores, Iron ore, Bauxite ore, Rock Phosphate etc have already been auctioned successfully and remaining blocks are under process of auction.

Since the year 2016, IBM has been carrying out bench scale beneficiation studies on all G2 Level of exploration samples of GSI, MECL and state DGM's. Till date studies on 162 nos. G2/G1 Level samples of GSI, 17 nos. G2/G1 level sample of MECL and 11 Nos. G2/G1 level sample of State DGM's have been completed. Besides, studies on 7 blocks of GSI are in progress.

National Mineral Inventory (NMI) as on 01.04.2020

6.61 Quinquennial updation of NMI as on 01.04.2020 - The updated informations on National Mineral Inventory (NMI) as on 01.04.2020 are compiled in two publications titled "National Mineral Inventory as on 01.04.2020 – At a glance" and "National Mineral Inventory as on 01.04.2020 – An overview" and uploaded on IBM website. These publications disseminates UNFC grade wise reserves/resources of All India, State wise & mineral wise, summary of all India reserves/ resources, mineral wise (chapter) of all 46 major minerals-grade wise, state wise and category (freehold and leasehold) wise change of reserves/resources with respect to earlier inventory and district wise reserves/resources.

6.62 The NMI database has transferred from older system (Oracle) to new MTS system (module). The work involves Processing, Mapping, Checking and Validation of existing freehold and leasehold deposits of NMI as on 01.04.2020 (in oracle database) with respect to new MTS module for fulfillment of data gap. The work of updation as per new system (MTS module) is in progress.

Statistical Publications

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

6.64 Published ASP for Minerals and of Metals up to November 2024. The statistical publications released during the year 2024-25 include Monthly Statistics of Mineral Production (MSMP) up to advance release up to November 2024.

Consultancy Service

6.65 IBM provides technical consultancy services on prescribed charges for geological appraisals, survey of the areas, preparation of feasibility study reports, environment impact assessment and environment management plan, selection of suitable mining equipment, evaluation of feasibility report prepared by

other consultants, financial institutions, etc. During the year 2024-25, "Automation In Indian Mining Industries", publication draft is prepared.

6.66 In 2024-25, IBM Technical Consultancy and Mining Research Division also associated in formulation of offshore areas rules. The following four rules have been notified so far.

(i) Offshore Areas (Existence of Mineral Resources) Rules on 06.06.2024.

(ii) Offshore Areas Mineral Trust Rules, 2024 on 09.08.2024.

(iii) Offshore Areas Mineral (Auction) Rules, 2024 on 14.08.2024.

(iv) Offshore Areas Operating Right Rules, 2024 on 16-10-2024.

Further, the following three rules were under preparation.

(i) Offshore Areas Mineral Conservation and Development Rules, 2024 (final stage)

(ii) Offshore Areas (Prevention of Illegal Mining, Transportation and Storage) Rules, 2024 (Draft)

(iii) Offshore Areas Operating Right Rules for Atomic Minerals, 2024.

Technical Publications

6.67 IMYB is a flagship publication of IBM which is brought 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 & 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.

In IMYB, 2022 (data 2021-22), total 59 general/metals & alloys/mineral reviews were prepared, technically edited, finalized and sent to Publication section for print-release after consolidation of all chapters with the statistical data. Three separate volumes of IMYB 2022 were uploaded on IBM Website.

6.68 Preparation of IMYB, 2023 (data 2022-23), was taken up for three separate volumes, viz. Volume-I for General Reviews, Volume-II for Metals & Alloys and Volume-III for Mineral Reviews. Total 55 reviews of IMYB 2023 in respect of General review, Metals & alloys review and Mineral reviews were prepared and technically edited. Finalization of these reviews in the new format using Adobe InDesign for printing is under progress.

6.69 Two half yearly Bulletins on mineral information and one yearly Bulletin of Mining Leases, Composite Licences, Exploration Licence and Auction- 2023, as per the below list, is released and uploaded at IBM's website (URL: https://ibm.gov.in/IBMPortal/pages/Bulletins)

- Bulletin of Mineral Information - October, 2023 to March, 2024
- Bulletin of Mineral Information - April, 2023 to September, 2023
- Bulletin of Mining Leases, Composite Licences, Exploration Licence and Auction- 2023

Training

6.70 IBM is discharging its roles and responsibilities through a mandated charter of functions. In the wake of recent policy initiatives and statutory amendments, IBM needs to enhance its skills in various advanced technologies for mine regulation and development.

Method envisaged for carrying out Training

6.71 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. Nominations are sought in advance. After approval of the Competent Authority, training programmes are organized through classroom lectures/presentation by the faculties drawn from IBM as well as Industry.

Presently the trainings are being conducted offline. In the last couple of years, IBM personnel had attended training programmes in outside organizations /institutes like GSITI, Kolkata National Remote Sensing Centre, Hyderabad. Further training programme, wherever necessary, will be conducted in association with these organizations / institutions. Further, through bilateral cooperation with other countries, capacity building programme will be taken up.

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

6.72 Implementation of provisions of MMDR Amendment Act, 2015 and subordinate legislation framed there under; preparation of Mining Plan/Mining Scheme, including Mine Closure Plan, Mine Reclamation and Rehabilitation; Sustainable Development Framework and Star Rating System for Mines; Mining Surveillance System; Mineral Resources as per United Nations Framework Classification (UNFC); Technological improvements and innovative advances in the areas of mineral processing and beneficiation.

6.73 IBM imparts training to technical and non-technical officials of IBM and also to persons from the mineral industry and other agencies in India and abroad. During the year 2024-2025, 18 training programmes have been conducted, in which a total of 297 IBM personnel, 451 Industry officials and 198 from the State Government officials have participated. 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.

6.74 IBM had initiated its efforts to upload its training modules on iGOT platform, YouTube Channel and IBM website. As per the Ministry's letter No. A-33/2//2021-ESTT. Dated 05.07.2022 regarding uploading of training courses on iGOT portal, three topics/modules are identified for IBM for lecture videos i.e. (a) Mining Reforms, (b) Process of Mining Lease to LoI & (c) Mining Plan Approval System. Therefore, IBM has initiated the process for preparing the lecture videos through Training Centre & expertise available in IBM, and prepared training videos related to the topics. So far, 02 lecture videos have been uploaded on YouTube, 06 courses on i-GoT portal and 10 lecture videos on IBM website. Further preparation is underway to upload more such videos in various platforms.

Status of Capacity Building Plan of IBM

As per Ministry of Mines Letter No. A-33/2/2021-ESTT. (Part-1) dated 21.09.2023 regarding "Capacity Building Plan for Employees under the administrative control of M/o Mines", IBM entrusted M/s Ernst &Young LLP to prepare the Annual Capacity Building Plan (ACBP) of IBM.

In pursuance of RFQ No. IBM/TC/2023, the said agency submitted its draft Deliverables on stipulated time and ACBP of IBM came into effect from 01.05.2024. The ACBP consists of both training & non-training interventions. Based on competency requirements identified

for each cadre training interventions have been recommended across domain, behavioural & functional areas. The Training Centre collects, compile and monitor the ACBP progress on monthly as well as quarterly basis.

Measures for Abatement of Pollution and Environmental Protection

6.75 The IBM undertakes inspections/ studies for the enforcement of provisions of MCDR, 2017 which include provision on protection of mine environment to ensure that due care is being taken by the mine operators. During inspection it ensures that mine operators are taking due care for preservation and utilization of topsoil, 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, Review of mining plan 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

6.76 IBM generates revenue through consultancy, training, statutory processing and sale of publications &data etc. Revenue generated during 2024 (January to December 2024) is Rs. 2945.5787 Lakh from processing of mining plans/Review of Mining plans and compounding fees & fines.

Mineral Processing Division, IBM generates revenue during the course of its functional activities by conducting beneficiation studies for the industry. Rs. 2,07,58,124/- (Rupees Two Crore Seven Lakh Fifty Eight Thousand One Hundred Twenty Four Only) revenue was generated for sponsored work from Mineral Industries. In addition to the above, Rs. 41,73,123/- (Rupees Forty One lakh Seventy Three Thousand One Hundred Twenty Three) was generated during the year 2024 towards notional charges for work carried out for GSI and State DGMs on exploration samples, departmental promotional samples etc.

Computerization

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

6.78 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.

6.79 The domain https://ibmregistration.gov.in is functional for grant of IBM Registration number and https://ibmreturns.gov.in is 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.

6.80 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.

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

Table 6.5
Month-wise Returns Submitted online

(up to December, 2024)

S. No.	Month	Monthly returns received
1	Jan-24	1986
2	Feb-24	1979
3	Mar-24	1974
4	Apr-24	1963
5	May-24	1879
6	Jun-24	1839
7	Jul-24	1831
8	Aug-24	1823
9	Sep-24	1827
10	Oct-24	1820
11	Nov-24	1810
12	Dec-24	1791

6.82 Mineral Wise Summary of Mining Lease (excluding Atomic, Hydro Carbon Energy and Minor Minerals) as on 31.03.2023(P) (All India) is given in **Annexure 6.3**.

Mining Tenement System (MTS)

6.83 Mining Tenement system (MTS) is a flagship project of Indian Bureau of Mines and it's a unique application, first of its kind in the world. With MTS, IBM envisions digitizing its internal processes of the core modules which in turn can induct a workflow-based system to increase the efficiency and transparency in its charter of functions. As part of this project, IBM also envisions conducting enhancements, wherever applicable. The following modules were launched -

Registration Module– Launched on 01/05/2022

Returns Module – Launched on 01/05/2022

Mining Plan Approval System Module - Launched on 12/07/2022

Drone Data Management System Module - Launched on 01/06/2023

Mine Imagery Data Processing & Analysis System Module - Launched on 20/08/2023

Average Sale Price Module - Launched on 23/01/2024

ML Directory/ WMI/ NMI Module – Launched on 28/03/2024

Star Rating System Module- Launched on 01/04/2024

Final Mine Closure Plan Module – Launched on 10/06/2024

Exploration licence/ Composite licence/ Prospecting licence Module- Launched on 07/08/2024

6.84 Through MTS, digitization of the tasks has been implemented in IBM and the manual processes in place were thoroughly examined, and their requirements were standardized. These standardized procedures were then digitized through a System Requirement Specification, incorporating a process flow to handle data consumption, analysis, and exchange, ultimately producing the required information and reports.

Consequently, in compliance with the stipulations of rule 45 of MCDR 2017, the registration and returns management systems were upgraded. Both portals were made

accessible to the public on May 1, 2022. Likewise, in accordance with the requirements outlined in rule 16/17 of Mineral Concession Rules (MCR), 2016, the mining plan approval system was developed, marking a pioneering initiative. This portal was made available to the public on July 12, 2022.

As per the directives set forth in rule 34A of MCDR 2017, stakeholders are mandated to submit drone/satellite-based imagery to IBM. Accordingly, the drone data management system was devised to process and manage this data online. The portal was launched on June 1, 2023.

Additionally, in accordance with the provisions outlined in MCDR 2017, MCR 2016, and Mineral Auction Rules, 2015, IBM is required to publish the average sale price of minerals on a monthly basis. To streamline this process, the system was automated, and a dedicated module (Average Sale Price system) was implemented.

As per the requirement of rule 35 of MCDR 2017, the star rating templates for large & small mines are now accepted in the star rating portal which was developed & dedicated to the stakeholders on 31.3.24. For the financial year 2023-24, more than 1200 mines have submitted their self-assessed templates online.

As per rule 24 of MCDR 2017, the stake holders are also required to submit their Final Mine Closure Plan for proper scientific closure of their mines. The application for capturing the same was developed & deployed online on 10.6.24.

Also, EL/PL/CL module has also been launched to capture exploration details under the licences granted.

Sustainable Development framework (SDF)

6.85 **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.

6.86 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.

6.87 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.

6.88 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)**.

Table 6.6

Performance Year	No. of 5 Star Rated mines selected for award	Felicitation 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
2020-21	40	12th July 2022, new Delhi
2021-22	76	1st March 2023, Nagpur
2022-23	68	9th August 2024, New Delhi

6.89 During the year 2024-25 (till 31st December 2024), 1249 online self-assessment reports for the performance of year 2023-24 have been filed by the lessees. Out of these 536 self-assessment reports have been validated.

Mining Surveillance System

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

- Ministry of Mines & Indian Bureau of Mines (IBM) have developed the MSS, with assistance from Bhaskaracharya Institute for space applications and Geo-informatics (BISAG), Gandhinagar and Ministry of Electronics and Information Technology (MeitY).
- The system works on the basic premise that most minerals occur in the continuity and their occurrence is not limited to the lease area but is likely to extend in the vicinity. The MSS checks a region of 500 meters around the existing mining lease boundary to search for any unusual activity which is likely to be illegal mining. Any discrepancy is found is flagged-off as a trigger.
- The MSS is a transparent & bias-free system, having a quicker response time and capability of effective follow-up. The deterrence effect of 'Eyes watching from the Sky' would be extremely fruitful in curbing instances of illegal mining.
- A user friendly mobile app for MSS has been created and launched on 24th January, 2017 at Gandhinagar for enabling public participation in assisting the governments endeavor to curb illegal mining, which was being used by the inspecting officials to submit compliance reports of their inspections.
- The training of all the States for its adoption of the MSS for minor minerals has also been done. Total 179 Ministry of Mines & Indian Bureau of Mines (IBM) have developed the MSS, with assistance from Bhaskaracharya Institute for space applications and Geo-informatics (BISAG), Gandhinagar and Ministry of Electronics and Information Technology (MeitY).

- Details of triggers generated, verified and cases of unauthorised mining detected are given below:

	Generated	Verified	Unauthorized Mining Confirmed
Phase-I (Major) (2016-17)	296	287	47
Phase-II (Major) (2018-19)	52	45	5
Phase-II (Minor) (2018-19)	130	104	9
Phase-III (Major) (2021-22)	177	98	12
Phase-IV (Major) (2022-23)	138	40	7
Phase-IV (Major) (2023-24)	157	-	-

The total sanctioned personnel strength of IBM is 1477. The present filled-in strength is 710 as on 1st January 2025. The cadre-wise employment position in IBM as on 1st January 2025 is given in **Table 6.7**.

Table 6.7
Employment of Personnel in IBM as on 1st January 2025

Sl No	Group	Sanctioned	Filled	Vacant	SC	ST	OBC	EWS	Women	PH
1.	GROUP 'A'	459	197	262	25	08	45	03	11	00
2.	GROUP 'B'	251	115	136	15	06	25	03	15	04
3.	GROUP 'B' (Non-Gaz)	251	114	137	11	06	26	05	18	07
4.	GROUP'C'	516	284	232	51	18	92	06	35	09
	TOTAL	**1477**	**710**	**767**	**102**	**38**	**188**	**17**	**79**	**20**

7

Central Public Sector Undertakings

Central Public Sector Undertakings

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- Hindustan Copper Limited (HCL)..... Page - 136
- Mineral Exploration & Consultancy Limited (MECL) ..... Page - 151
- Bharat Gold Mines Limited (BGML) ..... Page - 162

National Aluminium Company Limited (NALCO)

Introduction

7.1 National Aluminium Company Limited (NALCO), a 'Navratna' company under the Schedule 'A' category, was founded on January 7, 1981, with its registered office in Bhubaneswar. It is one of the country's largest complexes integrating bauxite, alumina, aluminium production, and power generation. Currently, the Indian government owns 51.28% of NALCO's 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 850 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 37 years.

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 profitability, NALCO is example of India's industrial might.

7.3 The company is a significant contributor to India's foreign exchange earnings. It has also been acknowledged as the world's most cost-efficient producer of bauxite and alumina for the past five years.

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. It boasts of multiple ISO certifications, including ISO 9001, ISO 14001, ISO 45001, ISO 50001, and SA 8000. The Data Centre at NALCO's Corporate Office and the Disaster Recovery Site at the Alumina Refinery have been awarded the ISO 27001:2013 Certification for Information Security Management System, accredited by International Accreditation Services, USA.

NALCO Corporate Office, Bhubaneswar

7.5 The Company has forayed into renewable energy sector by commissioning 198 MW wind power plant in four different places i.e. one WPP in Andhra Pradesh, two WPPs in Rajasthan and one in Maharashtra to reduce carbon foot print. The Company has also utilised the available roof top space in Corporate Office, Township and NRTC (NALCO Research & Technology Centre) at Bhubaneswar and M&R Complex, Damanjodi for setting up of 850 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. The Company is operating two mining leases i.e. Panchpatmali North & Central blocks and Panchpatmali

South block.

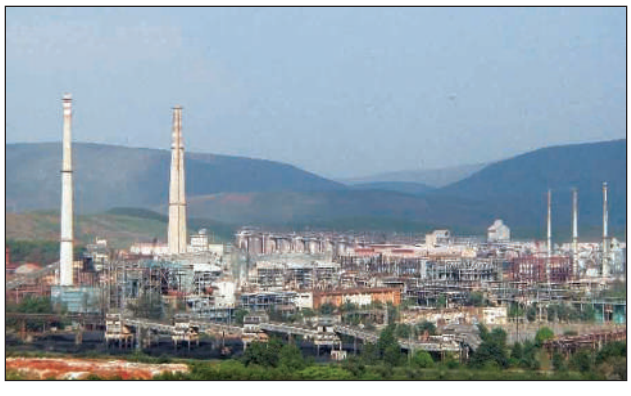
The mined-out bauxite is transported from the Mine to Refinery by a 14.6-km. long single-flight, multi-curve, variable-speed cable belt conveyor of 1800 TPH capacity.

Panchpatmali mine

Alumina Refinery

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

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



Alumina Refinery

Aluminium Smelter

7.9 The Aluminium Smelter is located at Angul, Odisha and approx. 5 km away from the captive thermal power plant. Aluminium produced 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. The Aluminium produced is also exported through Vizag port and Kolkata Port.

Aluminium Smelter

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 the casting units, where the Aluminium can be cast into ingots, sow ingots, tee ingots, billets, wire rods, cast strips, alloy ingots and rolled products.

Captive Power Plant

7.11 The Aluminium Smelter and coal-based pit head captive power plant at Angul are strategically located. The Power Plant is located approximately 5 km away from Aluminium Smelter. The location of captive thermal power plant at Angul is also strategic to the availability and supply of coal.

NALCO sources its major coal requirement for captive thermal power plant from the

Talcher coalfields of Mahanadi Coalfield Ltd. (a subsidiary of Coal India Ltd.), located approximately 15 km from Angul. The 18.5 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. Recently, the Company has started coal production from its Utkal – D coal mines and using the coal in its captive power plant.

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 a small amount of power to the Alumina Refinery through wheeling.

Captive Power Plant

Wind Power Plants

7.13 The 1st wind power plant of capacity 50.4 MW in Gandikota, Andhra Pradesh was commissioned in FY 2012-13 and the 2nd wind power plant of capacity 47.6 MW at Ludarva site, in Jaisalmer, Rajasthan was commissioned in FY 2013-14. The 3rd & the 4th wind power plants of capacity 50 MW at Devikot site, Jaisalmer, Rajasthan and the 50.4 MW Wind Power Plant at Sangli, Maharashtra were commissioned in FY 2016-17.

Wind Power Plant, Jaisalmer

Rooftop Solar System

7.14 NALCO utilised the available roof top space in Corporate Office, Township and NRTC at Bhubaneswar for setting up of 630 kilowatt peak (KWp) solar power plant. Also, 220 KWp Roof-top Solar PV Plant had been installed at Mines & Alumina Refinery, Damanjodi. The total installed Roof-top Solar PV Plant capacity now stands at 850 KWp.

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.

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

(in lakh tonne)

Product	Unit	2020-21 Actual	2021-22 Actual	2022-23 Actual	2023-24 Actual	2024-25 (Target)	2024-25 Actual upto Q3	2024-25 (Expected)
Bauxite	Lakh tonne	73.65	75.11	74.57	75.27	75.25	53.59	75.25
Alumina Hydrate	Lakh tonne	20.86	21.22	21.23	21.24	21.00	14.91	21.00
Aluminium Metal	Lakh tonne	4.19	4.60	4.60	4.63	4.70	3.42	4.60

Table 7.2
Financial Performance of NALCO

(in Rs. crore)

Sl. No.	Particulars	2020-21 Actual	2021-22 Actual	2022-23 Actual	2023-24 Actual	2024-25 achievement upto Q2	2024-25 Expected
1.	Income*	9,102	14,478	14,490	13,400	6,990	Sensitive data. Shall be Furnished after declaration of Q4 result.
2.	Operating Cost**	7,173	9,664	11,806	9,849	4,374	
3.	Interest & Transaction Loss	7	23	13	17	8	
4.	Depreciation & Amortization	606	837	716	750	354	
5.	Profit before Income tax and Dividend	1,316	3,955	1,955	2,784	2,254	

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

Table 7.3
Sales Performance of NALCO

(in lakh tonne)

Sales	Unit	2020-21 Actual	2021-22 Actual	2022-23 Actual	2023-24 Actual	2024-25 (Target)	2024-25 Actual upto Q3	2024-25 (Expected)
Total Alumina/ Hydrate Sale	Lakh Tonne	12.28	12.33	12.47	11.68	11.04	7.59	11.25
Aluminium Export	Lakh Tonne	1.92	1.33	0.25	0.51	0.25	0.06	0.06
Domestic Aluminium Sale	Lakh Tonne	2.31	3.24	4.39	4.19	4.45	3.29	4.54
Total Aluminium Sale	Lakh Tonne	4.23	4.57	4.64	4.70	4.70	3.35	4.60

Ongoing Projects

7.17 The major activities during FY 2024-25 pertaining to various projects of NALCO are as under:

a) 5th Stream Refinery:

- Project conceived to be executed through 21 LSTK packages, 16 Work contracts & 119 Supply Items.
- All 21 LSTK packages ordered.
- All Works contracts have been ordered.
- Orders placed for 114 out of 119 supply items. Balance small value items are being placed, as project is progressed.
- Project Execution under progress. As of Dec,'2024- Physical Progress: 70% & Financial Progress: 60%
- The work progress of various packages/works is being monitored closely at various levels to expedite the execution.

b) Development of Pottangi Bauxite Mines:

- Mining Plan, Forest clearance, Environment clearance, Consent to Establish & Consent to Operate obtained.
- Grant Order of Mining Lease issued by GoO.
- Execution of Mining Lease deed completed.
- Forest Clearance of Overland Conveyor Corridor (OLCC) & Water Intake Facility (WIF) obtained.
- Land Acquisition of Govt. Land & Pvt. Land of Over Land Conveyer Corridor & Water Intake Facility (OLCC & WIF) is under progress through IDCO.
- DPR for Pottangi Bauxite Mines & mode of operation has been approved by the Board of Directors on 13.11.2024.

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

- Order placed for all the packages (04 LSTK & 05 Works): Rs. 436 Crore
- Site execution activities are in progress.
- Overall project progress as on end of Dec'2024 is 87 %.
- The work progress of various packages is being monitored closely at various levels to expedite the execution.

d) Utkal D & E Coal Mines:

- Utkal D Coal Mine opened in Nov'2022.
- Coal Production & Dispatch of 2 Million Tones (full capacity) accomplished from Utkal-D for FY 2023-24 & FY 2024-25.
- Amalgamated mining lease for Utkal D & E Coal Mines executed on 24.12.2024. Utkal-E will be combined with Utkal-D. Balance clearances for combined mining is under process.
- The combined Coal block is scheduled for operation in the current financial year 2024-25 with a combined peak rated production of 4 million tons.

e) Angul Aluminium Park in JV with IDCO:

NALCO in JV with Odisha Industrial Infrastructure Development Corporation (IDCO) is setting up Angul Aluminium Park for promotion of downstream industries to manufacture Conductors, Extrusions, Castings, Foils & other aluminium products. NALCO will facilitate by supplying molten metal/ primary metal to the units to be set up in the park.

The land acquisition for the project is completed. Constructions of boundary wall and approach road have been completed. Modalities for metal transfer from NALCO to AAPPL have been prepared. The Standard Operating Procedure (SOP) for supply of molten metal to the Units in the Park has been finalized. Administrative building, Aluminium development centre & internal roads of the Aluminium Park have been completed. Seven project proponents have been already allotted Land in the Aluminium Park and their work are in progress.

f) Acquisition of Strategic minerals in overseas (KABIL):

JV Company among NALCO, HCL and MECL named Khanij Bidesh India Limited (KABIL) formed in Aug'2019 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. At present, KABIL is focusing on identifying and sourcing these critical battery minerals like Lithium and Cobalt. KABIL is exploring options for various mineral deposits in Argentina and Australia.

Argentina: KABIL signed an agreement with CAMYEN in Jan'2024 for exploration and development of five lithium blocks at Catamarca, Argentina. Catamarca mining authority has issued resolution in April'2024 stating KABIL as mining operator for 3 blocks initially and subsequently for the other 2 blocks in Sept'2024. Environment permit approval have been obtained for all 5 blocks for conducting non-invasive prospective activities from Mining Authority. M/s Kgori Punku Consultora SRL has been appointed by KABIL in Sep,2024 as geology contractor for non-invasive exploration activities for five blocks at Catamarca. Non-invasive exploration activities commenced in Oct, 2024 with Geological mapping, Geochemical sampling, survey, etc.

Australia: MoU with detailed collaborative framework was signed in March, 2022 between KABIL, India and Critical Mineral Office (CMO), Department of Industry, Science and Resources (DISER), Govt. of Australia for carrying out joint due diligence and further joint investment in Lithium and Cobalt mineral assets of Australia. CMO has appointed M/s. E&Y as new consultant in May, 2024 for continuing the due diligence activities of Lithium and Cobalt mineral assets in Australia. Detailed due diligence studies for the shortlisted projects has been initiated and under progress. KABIL is also in discussion with two accelerated investment opportunity in Lithium assets in Australia.

g) Brownfield Expansion of Smelter (Capacity: 0.5 million TPA):

Investment approval for implementation of Smelter expansion project has been obtained. Detailed Project Report (DPR)

for the project was prepared. Acquisition of land, including private and Govt. land, through Government of Odisha is in progress. M/s EIL has been engaged for obtaining Environmental Clearance (EC) and Consent to Establish (CTE). Discussion for finalization of suitable Smelter technology is under process.

h) Sourcing of Power for Smelter expansion:

Smelter expansion project of 0.5 Million TPA capacity requires about 800 MW power. NALCO has signed a MoU with NTPC to explore sourcing of uninterrupted thermal power, including round-the-clock (RTC) renewable power. NALCO and NTPC are pursuing setting up of new thermal Captive Power Project of 2X660 MW at NALCO's existing CPP at Angul, Odisha in Joint Venture mode, for which a preliminary report has been prepared. Preparation of DPR is being pursued.

Information Technology (IT)

7.18 Role of IT in NALCO's Business Functions: Information Technology (IT) serves as a foundational pillar of NALCO's business strategy, catalysing operational excellence, fostering transparency, and driving innovation to enhance the organization's competitive edge.

7.19 Digital enablement: Since 2010, NALCO has undertaken a digital transformation journey, spearheaded by the implementation of Enterprise Resource Planning (ERP). This comprehensive system integrates all core business functions, including sales & distribution, finance & controlling, materials management, human resources and production planning. The ERP system ensures uniformity in processes, enhances information availability, and fosters transparency, empowering informed decision-making. Additionally, NALCO has made significant strides in digitalizing its operational workflows. The implementation of Plant Maintenance solution has optimized asset utilization.

NALCO is embarking on the journey to migrate the on-premise SAP ERP to SAP S4HANA making it capable to process and present Industry 4.0 related data which is expected to start flowing as the use cases across plants increases.

Under ease of doing business NALCO has launched Despatch Automation System at Smelter plant at Angul.

On the administrative front, the adoption of an electronic file handling system (e-Office) across all plants and offices has streamlined document management processes, paving the way towards a paperless office environment. The e-Office Knowledge Management System elevates organizational efficiency by enabling seamless access to digitized documents, while ensuring the secure and controlled dissemination of critical information.

7.20 Employee self-service

NALCO is committed to enriching the employee experience by leveraging digitally-enabled self-service applications that empower employees to seamlessly manage diverse aspects of their work-life, including payroll, attendance, income tax, appraisals, leave, loans, perquisites, tours, medical reimbursements, and probation confirmations. Furthermore, the implementation of a state-of-the-art Computerized Hospital Management System at its company-operated hospitals in Angul and Damanjodi ensures the provision of efficient and timely medical care, reinforcing a culture of health and well-being within the organization.

7.21 Digital enablement for stakeholder

Acknowledging the critical role of stakeholder engagement, NALCO has developed a suite of online platforms and mobile applications designed to address their diverse needs with precision and efficiency. These include:

- **Customer Mobile App "NAGINAA":** Provides customers with information and networking opportunities.
- **Vendor Mobile App "NAMASYA":** Facilitates communication and collaboration with vendors, particularly micro and small enterprises.
- **Citizen Mobile App "NISARG":** Raises awareness about NALCO's Corporate Social Responsibility (CSR) initiatives among citizens.
- **Retired Employees Mobile App "Hamesha NALCOnian":** Offers access to relevant resources and updates for the retired employees.
- **"Suraksha" Mobile App:** Streamlines onsite safety inspection reporting at plants, ensuring a secure work environment.
- **"NurtureNest" Mobile App:** Systemic Development of Quality-Based Safe Motherhood with Newborn Care.

7.22 Cloud based services

NALCO leverages cloud-based services for efficient procurement and invoice management. E-procurement of goods is seamlessly conducted through platforms such as Government e-Marketplace (GeM), Central Public Procurement Portal (CPPP), and Supplier Relationship Management (SAP SRM). The integration with the Invoice Registration Portal (IRP) strengthens financial transparency and ensures seamless compliance with regulatory standards in transaction processing.

7.23 Governance & Monitoring

The organization has deployed a range of advanced web-based applications to elevate governance and monitoring capabilities. These tools facilitate real-time tracking of capital expenditure, fund utilization, compliance management, employee probation, departmental promotions and the resolution of vigilance complaints. By fostering data-driven insights, these initiatives empower timely decision-making, optimize resource allocation, and ensure adherence to statutory regulations.

7.24 Analytics

NALCO leverages advanced data analytics and visualization tools to streamline and enhance processes across production, sales and distribution, and human resource management. By transforming data into actionable insights, the organization drives strategic decision-making and achieves unparalleled operational efficiency.

7.25 IT Infrastructure

To ensure uninterrupted service delivery, NALCO has invested in robust IT infrastructure, including:

- Primary Data Center located at Corporate Office, Bhubaneswar, equipped with server virtualization technologies, and hosts all Centralized Applications including ERP and e-Office. Disaster Recovery Data Center is located in a separate seismic zone.
- For increased network availability across locations a state-of-the-art SDWAN technology for an intelligent provisioning of application policies that align to business intent.

- Dual MPLS circuits connecting plants and offices to the Corporate Data Center, ensuring uninterrupted access to applications and services.
- Gigabit Ethernet LAN with Firewall at each plant location and Corporate Office, ensuring network security and integrity.
- Multichannel video conferencing solution facilitating effective communication across all business units.

7.26 Cyber Security

NALCO places paramount importance on data security and regulatory compliance, exemplified by its ISO 27001:2013 certification for its Data Centre and Disaster Recovery site. The organization employs advanced IT security measures, including network gateway defences and endpoint protection solutions, to safeguard against cyber threats. Regular audits and strict adherence to government-mandated cybersecurity protocols further reinforce the integrity, confidentiality, and resilience of its digital infrastructure.

7.27 Adoption of emerging technologies

Blockchain Integration Project: In line with its commitment to innovation, NALCO is currently spearheading a Blockchain Integration Project. This initiative, by leveraging blockchain's immutable ledger technology, aims to integrate blockchain technology with the organization's recruitment app, ensuring tamper-proof records, enhancing transparency, security, and efficiency in the hiring process.

Action Taken on Pollution Control and Environment

7.28 As a responsible corporate entity, NALCO has prioritized environmental management and pollution control, ensuring a cleaner, greener, and safer environment at all its production units and surrounding areas. All production units are certified to International Standards on Environmental Management Systems (ISO14001) as well as Occupational Health and Safety Management Systems (ISO 45001) affirming commitment to comply proactively with continual improvement. To ensure cleaner and greener surroundings at all its operating units, NALCO has adopted the 5S principle and initiated extensive plantation efforts in and around its plants. Additionally, all production units are operating with valid consents, licenses, and authorizations in compliance with various statutes.

7.29 Global climate change and warming have led to increasingly stringent environmental regulations. NALCO, certified to international standards, proactively addresses these challenges by periodically updating its policies and strategies. The revision of our Sustainable Development policy is a key step in this direction. Each year, NALCO publishes a sustainable development report aligned with the international Global Reporting Initiatives (GRI) Standards.

7.30 In our endeavour to maintain a clean and green environment, NALCO has invested in upgrading our pollution control infrastructure and initiated extensive plantation and afforestation drives 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.

7.31 The unit Specific major improvements taken up in the field of environment management at different units of NALCO

during the year 2024-25 are as follows:

a) Bauxite Mines:

- 1,20,389 trees were planted in and around Mines against the target of 1,10,000 trees. Also around 5500 fruit bearing seedlings were distributed to local villagers to improve awareness about plantation among the villagers.
- Appx 14.3 Ha of mined out area were rehabilitated with plantation.
- 7000 square meter of grass-turfing was carried out inside the Mines as per the target.
- One Miyawaki garden have been established in South block mined out area in an extent of 0.25 Ha with indigenous plant species of 25 varieties including fruit bearing, medicinal, flowering and of timber value towards improvement of biodiversity with creation of dense forest within short span of time.
- A biodiversity conservation policy was developed for Mines to for protection of biodiversity by adopting best biodiversity management practices.

b) Refinery Plant

- 15,084 trees were planted in and around Alumina refinery.
- 2nd Red Mud Pond construction work is completed.
- E-Waste have been channelized to authorized collection centre/ Recyler as per E-Waste Management & Handling Rule.
- Hazardous wastes (discarded asbestos and Used oils) are channelized through the authorized agency.
- Plastic wastes (Used filter clothes) are disposed through authorized co-processing cement plant.
- Empty Chemical containers/ Barrels are being disposed through authorized recycler.

c) Smelter Plant:

- As a part of compliance to the order of Hon'ble Supreme Court of India, Third Party Audit on HW management in Smelter Plant for FY 2023-24 has been carried out and report submitted to OSPCB on 19.07.2024.
- As a part of Hazardous waste management,

  (i) 779 MT of Carbon Area hazardous wastes were disposed to Common Hazardous Waste Treatment, Storage & Disposal Facility (CHWTSDF), Sukinda, Jajpur.

  (ii) 1230 MT of carbon portion of spent pot lining (SPL) was disposed to Authorized Actual user.

  (iii) 4402 MT of dross was sold to Authorised Actual User and an amount of Rs.76 lakh Revenue earned.

  (iv) 60 MT used/ spent oil was sold to Authorised Actual User and an amount of Rs.29 lakh Revenue earned.
- An amount of Rs. 8 lakh, in Revenue, was generated by selling of 635 MT Induction furnace slag (Solid waste) to outside agency.
- As a part of resource conservation and waste water recycling, 304695

M^3 of treated waste water is recycled inside Smelter Plant premises.

- As a part of compliance to the order of Hon'ble Supreme Court of India, ESA II & Contaminated Site Remediation Study had been completed by M/s NEERI, Nagpur and final report received in May 2023.
- As a part of remedial action, total 20,000 MT of Spent Pot Lining (SPL) have been excavated departmentally from Site-1.
- Installation of online flow measuring device with digital display and data recorder at Drain-2 completed which is working satisfactorily. Installation of the same at Drain-1 & 3 is under way.
- EPR registration in CPCB Portal for use of plastic materials for both Importer and Brand owner has been done for the first time by Smelter SH&E department for all Units of NALCO. EPR Credit and Filing of annual report under PWM Rule 2016 has been done in September 2024 by Corporate SH&E.
- Re-calibration and data validation of PM-CEMS for Star Rating Programme has been carried out for ten major stacks (FTP-1 to 8 attached to Potline & FTC-1 to 2 attached to Bake Oven) and reports submitted to OSPCB on 11.11.2024.
- Efficiency study of De-dusting Units of Carbon Area conducted by M/s NIT-Rourkela. Implementation of recommendation for further improvement of de-dusting Units is under way.
- As a part of compliance to special conditions of CTO, Work Order has been placed on M/s IIT, Bhubaneswar on dated 10.10.2024 for Carrying out Performance evaluation of all Air Pollution Control Devices, Water Pollution Control Devices, Online Monitoring Systems and HD IP Surveillance Cameras in Smelter Plant. Performance evaluation study completed.
- One Online Fluoride Monitoring System and HD IP Camera have been installed at the Outlet of Holding pool-1 with its connectivity to RT-DAS server of OSPCB in August 2024.
- To develop green belt, 2150 saplings were planted inside Smelter Plant and 9400 saplings were distributed to outside periphery villages during April 2024 to November 2024.

d) Captive Power Plant:

- Stack emission is maintained within the specified norm as prescribed by SPCB. To further improve stack emission, revamping of Electrostatic Precipitators has been carried out.
- CPP NALCO has planted 5000 saplings in the 2024-25. The plantation done since its inception is covering around 34.75 % of total area.
- Adopted eco-friendly manner of ash disposal to allotted mine void of South Bharatpur after commissioning of most coveted Lean slurry project (LSP). In the year till November 2024, the total ash utilization in mines void filling is 11.43 lakh MT.

- Implemented incentive scheme of Rs 150/MT to Brick manufacturer to enhance ash utilization. In the year 2024-25 (Upto November 2024) around 4.37 lakh MT of dry ash has been supplied to Brick manufacturer.
- In the year 2024-25 till November 2024, around 0.19 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.
- 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 2024-25, till December 2024, 1,63,35,681 cubic meter water has been recycled and reused after treatment in CPP from sources like mine void overflow water, rain water harvesting, Industrial Drain water, Ash Pond.

Energy Conservation

7.32 NALCO is having Energy Management System in its energy intensive Production Units i.e. Refinery, Smelter & CPP and certified to International Standard on Energy Management System (ISO 50001). Unit wise energy conservation measures taken up during FY 2024-25 are as follows:

a) Bauxite Mines

- Replacement of 14 old inefficient air conditioners with energy efficient air conditioners was executed in 2024-25 till December'24.
- Reduction of HSD oil consumption has been achieved by addition of fuel additives in HEMM, modification in methodology of operations, optimum selection of HEMM for bauxite generation and modification in methodology of loading of excavated ore in Central Block Sector-2 area. Approx. 372.42 KL of HSD oil has been saved till November 2024.

b) Alumina Refinery

- Boiler-3 Air Preheater advanced profile heating elements replacement in September-24 resulted annual saving in coal by 5673 MT or energy by 20774.526 Mkcal.
- Dosing of coal additives in Boiler-1,2,3,4,5 furnace from April to November-24 resulted boiler efficiencies improvement upto 1.5% & reduces clinker formation.
- Reduction of Specific oil consumption (HFO) in Calciners by 2.62 % from existing Specific oil consumption by application of Thermol, Dewatering Aid, Hydrate Bypass Rotary Valve.
- Provision of VFD in the motor of Mud Pump P-003 in digestion area saved electrical energy by 81600 kwhr annually.
- Replacement of 3 old and multiple rewound motors by energy efficient IE2/IE3 class LT motors for electrical energy saving by 1-2% of motor rating as per IS:12615: 2011 in Refinery Plant.

- Reduction of steam loss by replacement of 60 faulty steam traps and bypass valves which resulted saving of 600MT of steam annually in Refinery Plant.
- Reduction of energy consumption in SL Feed pump P-196, 197 through pump speed reduction, thus 60 Kw power saving resulted.
- Auto stopping of Stream 1 Turbid Pump-131 based on level in Kelly Filter area resulted saving of Electrical energy to the tune of 10 MWH per annum.

c) Smelter

- Graphitization of cathode to reduce specific DC energy consumption in pot line, saving @ 55kwh/MT of hot metal, is going on. 23 Nos of Pot started till November FY 24-25. Out of the total operating pots, 917 numbers are Graphitized pots at present.
- 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 GG2 section of pot lines were under trial operation. After trial, it was found that there is an energy saving of 150 KWH/MT of hot metal compared with reference pots. Nalco has planned to go for trial of AP2XN technology in additional 45 number of pots. For this project, 45 sets of Graphitized bottom block and simultaneously 45 sets of side slabs are being procured.
- 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 is expected to be completed shortly.
- Energy Saving device in breaker assembly has been incorporated in 47 pots with an objective to reduce consumption of compressed air. The compressed air saving achieved are 62% (approx.) as per the extensive tests conducted.
- Replacement of 05 electrically heated desiccant air dryer by refrigerated air dryers at both old and new compressor house. The desiccant dryers were old and inefficient with external heaters consuming substantial electrical energy. Energy efficient Refrigerated air dryers consume less energy with better dew point performance.
- 55 numbers of IE4 motors (ranging from 15 KW to 55 KW) are procured this year for better energy efficiency. 64 5-star rated Window Air conditioners (58, 1.5T / 6, 2T) and 5 (4, 1.5T and 1, 2T) of 5 star rated split air conditioners are being procured during this year.
- Proposals are in advance stage for implementation of about 2389 KWp rooftop solar systems at various buildings of Smelter and S&P Township. In-Principle approval for Rooftop Solar Project in RESCO model of financing is already initiated for various locations of NALCO. M/s NVVN (NTPC Vidyut Vyapar Nigam Limited) shall be the project management consultant for the project.

d) **Captive Power Plant:**

- 80 old LT motors were replaced with new energy efficient IE3 motors thereby saving of 53138 kWh Electrical Energy per annum.
- VFD was commissioned and tested in APH-A & B drive motor of Unit-5 which reduced the power consumption from 10KW to 1.0KW per motor.
- 250 old conventional 70Watt ceiling fans are being replaced with energy efficient 35Watt BLDC fans.
- Computational Fluid Dynamics (CFD) analysis of flue gas ducts (Economizer outlet to ESP inlet) of Unit-1, 2, 3, 5 & 6 are being carried out. The requisite modification will be carried out during next overhauling of Units. After implementation of analysis result it will reduce the flow imbalance and duct leakages which will help in reduction of auxiliary power consumption.
- Inefficient HPH-5 of Unit-1 & 2 will be replaced with newly purchased HP Heaters. Material already received. Installation will be done in coming overhauling of the Units.

Procurement

7.33 NALCO has achieved 20.36% of procurement from MSME for the FY 2024-25 till December'2024.

7.34 Total procurement by the Company from MSEs for the FY 2024-25 including SC/ST owned & women owned MSEs is Rs.622.33 crore till December'2024 (against Rs. 1059.84 crore in FY 2023-24) out of which procurement from SC/ST owned MSEs is Rs.13.26 crore till December'2024 (against Rs. 7.235 crore in FY 2023-24) & Women owned MSEs is Rs. 37.86 crore till December'2024 (against Rs. 108.05 crore in FY 2023-24).

7.35 Total procurement by the Company through GeM portal is Rs. 3056.46 crore in FY 2024-25 till December'2024 (against Rs. 3458.8 crore in FY 2023-24).

7.36 Total 373 reverse auction were done in FY 2024-25 till November'2024(December data awaiting) (against 651 in FY 2023-24) and notional cost reduction due to reverse auction is Rs. 93.04 crore (against Rs28.78 crore in FY 2023-24).

Industrial Relations

7.37 Industrial Relations: During the fiscal year 2024-25, the Company sustained a constructive and harmonious industrial relations environment, with zero man-days loss due to labour disputes. Rigorous compliance with applicable labour regulations, strict adherence to governmental directives and a collaborative approach to Decision-making were integral to the effective management of employee benefits and welfare. The Company's unwavering commitment to discipline, underpinned by a zero-tolerance policy, remained a cornerstone of its industrial relations framework.

MoU rating of NALCO during the last five financial years

Year	Composite Score	Grade
2018-19	96.04	Excellent
2019-20	44.70	Fair
2020-21	90.75	Excellent
2021-22	95.03	Excellent
2022-23	65.00	Good
2023-24	79.00	Very Good

Aluminium Industry in India

7.38 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 approximately 4.14 million tonnes. The total production of Primary Aluminium metal was 4.19 million tons in FY 2023-24. The total domestic sales of primary metal by the major primary producers, i.e., NALCO, Hindalco and Vedanta for the FY 2024-25 (up to Dec'24) has increased by 12.45% YOY. It is expected that by 2033, India's Aluminium demand may increase to 9 million tons. India's per capita Aluminium consumption is only 3.1 kg compared to the world average of 11 kg and China's at 31.7 kg.

7.39 A study conducted by CRU has revealed that global aluminium demand will increase significantly by 2030 and that the aluminium sector will need to produce an additional 33.3 Million tons to meet demand growth in all industrial sectors – from 86.2 Million tons in 2020 to 119.5 Million tons in 2030. The study details demand across key industrial sectors and regions in a post-Covid economy. Transportation, construction, packaging and the electrical sectors are the four key sectors that are likely to drive demand, accounting for about 75% of the total requirement. Two-thirds of this growth is expected to come from China, which will require 12.3 Million tons, the rest of Asia adding a further 8.6 Million tons, North America 5.1 Million tons and Europe 4.8 Million tons. Together, these four regions alone will account for more than 90 per cent of the additional aluminium required globally.

According to the report, decarbonization policies plus a shift from fossil fuels in the transport sector will see an increase in EV production to 31.7 Million tons in 2030 (compared to 19.9 Million tons in 2020). Renewable energy demands will also see a rise in demand for aluminium for solar panels, as well as replacing existing copper cabling for power distribution. In total, the electric sector will require an additional 5.2 Million tons by 2030. The construction sector will require an additional 4.6 Million tons by the end of the decade. Urbanization will account for 44% of growth, coming from Asia (excluding China). Aluminium packaging will rise from 7.2 Million tons in 2020 to 10.5 Million tons in 2030, driven by an increase in the popularity of canned drinks across North America, Europe and China. A surge in demand for environmentally friendly packaging combined with new products is also behind the increase.

7.40 Aluminium is an important input to a number of technologies critical to the energy transition. Direct emissions from the global aluminium sector have been steadily rising. Therefore, countries transit to clean technologies, in response to the urgent need for climate action and sustainable lifestyles, the shift to a 'Net Zero' economy is expected to be metal-intensive and aluminium has been identified as one of the critical metals that will aid this transition, catering to the emerging demand for clean energy solutions, green technologies and sustainable systems. Aluminium is a light-weight material, which is ideal for use in EVs, 'Green Buildings' and power cabling. Based on the International Energy Agency's projections for a sub-two degrees global warming scenario, consistent with the Paris Agreement (Beyond 2°C Scenario or B2DS), demand (including recycled aluminium and scrap) could increase from the present level by 80% to around 170Mt by 2050. It is estimated, in this context, that to cater to this huge spurt in demand, up to 28.5% increase in global primary aluminium production shall be required (from around 70 Mt in 2023 to 90Mt in 2050), while the rest may be met from secondary sources and scrap.

7.41 The Global Primary Aluminium production for the FY 2024-25 is projected to reach 72.631 million tons against world consumption of 72.776 million tons, resulting in a projected market deficit of 0.145 million tons. The Primary Aluminium average LME cash settlement prices upto Dec, 2024 have surged by 13.14% YoY. Some of the major factors likely attributed to this price increase are; the interest rate cut by US federal reserve, economic stimulus measures by China, ongoing geopolitical tensions, trade restrictions, including US tariffs on Canadian, Mexican and Chinese aluminium, which have disrupted global supply chains and increased uncertainty. The Alumina prices have soared nearly 100% in last eight months. Some of the major factors attributed to this price increase include production cuts, Bauxite shortage, and mining restrictions in China. The closure of 2.2 million tonnes of Alcoa Kwinana refinery in Australia, disruption of Rio Tinto's Yarwun alumina refinery and brief interruption of Century Aluminium's Jamaican operations have further tightened supply. While improved rainfall in China has alleviated power shortages and allowed the restart of some primary aluminium production (approximately 1.15 million tonnes), supply constraints remain a significant challenge. While these factors have temporarily boosted the price, the underlying fundamentals of the market remains weak, with record production and sluggish demand.

7.42 India is the world second-largest aluminium producer, contributes nearly 6 per cent to the global aluminium production. Indian Aluminium demand has maintained its upward trajectory in FY 2024-25 driven by robust end-use demand growth in key sectors including construction and automotive. According to latest report by Indian Bureau of Mines (IBM), the key sectors driving aluminium consumption in India are electrical (48%), construction (13%), automotive & Transport (15%), consumer durable (7%), machinery & equipment (7%), packaging (4%), other's (6%). As of November 2024, Indian aluminium demand has increased by 9.76% year-over-year. India has a projection to reduce carbon emissions by 1 billion tonnes by 2030 and also intends to reduce oil import dependency. Hence, Government of India envisages faster adoption and promotion of EVs as a means to achieve these objectives. The future of the EV market is bright, and aluminium will continue to play a significant role in driving innovation and sustainability in this exciting and dynamic industry. The International Aluminium Institute highlights the significant role of the renewable energy sector in boosting aluminium demand, from solar panel construction to power distribution. The Aluminium industry in India faces several daunting challenges including rising imports, and escalating production and logistical costs. The industry's sustainability is also affected by non-competitive energy costs and severe shortage of coal allotted to the Non-power sector. Corrective measures such as rationalization of duties, rectification of the inverted duty structure on critical inputs etc. is expected to improve cost competitiveness of the industry, as well as attract fresh new investment. Despite these challenges, India has sufficient domestic capacity to meet the country's aluminium demand of about 4.5 million MT. The well-resourced Indian primary aluminium industry is poised to further expand and contribute significantly to the nation's economic growth and development.

7.43 The total domestic production of Aluminium metal by Aluminium producers in the year 2020-21 to 2023-24 is given at **Table 7.4**

Table 7.4
Production of Aluminium in India

(Figs. in Tons)

Sl	Producer	2021-22	2022-23	2023-24	2024-25 (upto Dec'24)
1	NALCO	4,60,000	4,60,000	4,63,428	3,42,467
2	HINDALCO	13,03,517	13,49,862	13,70,742	10,15,519
3	VEDANTA GROUP	22,69,083	22,87,689	23,58,813	18,14,042
	Total	**40,32,600**	**40,97,551**	**41,92,983**	**31,72,028**

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

7.44 The sales figure of Aluminium (Domestic Sales of Aluminium & Export Sales of Aluminium in India are given at **Table 7.5** and **Table 7.6**

Table 7.5
Domestic Sales of Aluminium

(Figs. in Tons)

Sl	Producer	2021-22	2022-23	2023-24	2024-25 (upto Dec'24)
1	NALCO	3,23,809	4,38,876	4,18,946	3,28,406
2	HINDALCO	6,38,702	6,84,421	8,13,834	6,28,060
3	VEDANTA GROUP	6,05,510	7,75,198	9,78,706	8,47,566
	Total	**15,68,021**	**18,98,495**	**22,11,486**	**18,04,032**

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

Table 7.6
Export Sales of Aluminium

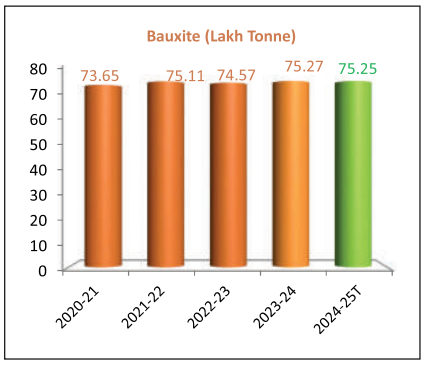
(*Figs. in Tons)*

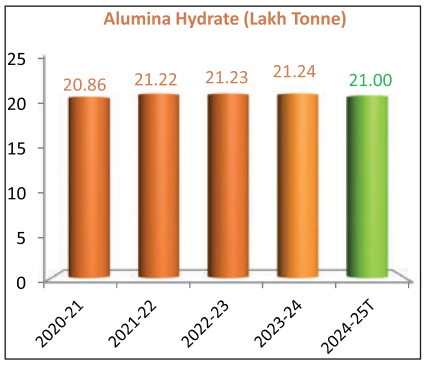
Sl	Producer	2021-22	2022-23	2023-24	2024-25 (upto Dec'24)
1	NALCO	1,33,085	25,214	51,163	6,114
2	HINDALCO	6,67,233	6,63,188	5,55,010	3,84,530
3	VEDANTA GROUP	16,64,724	15,10,452	13,79,979	9,54,886
	Total	**24,65,042**	**21,98,854**	**19,86,152**	**13,45,530**

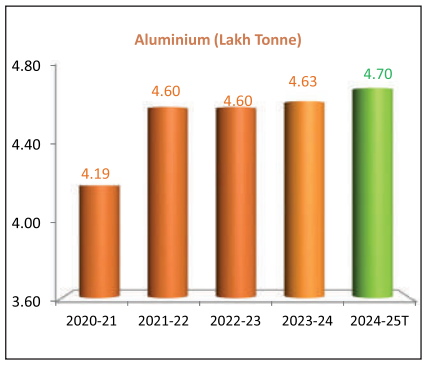
(Note: Export sales figures pertaining to other primary producers are based on available market data)

Trends of Production & Sales Parameters

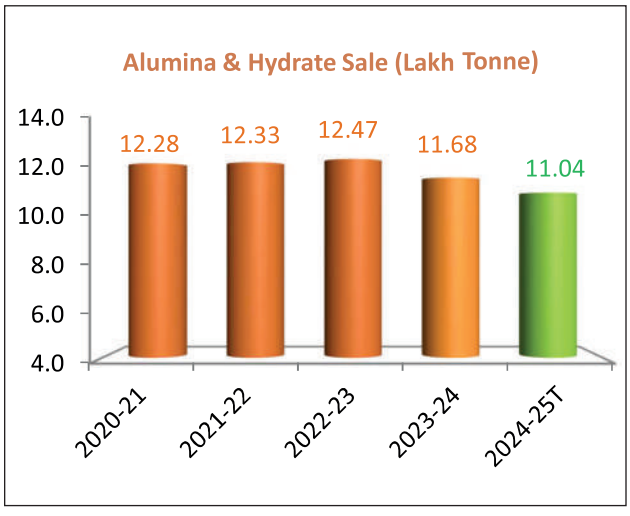
Production

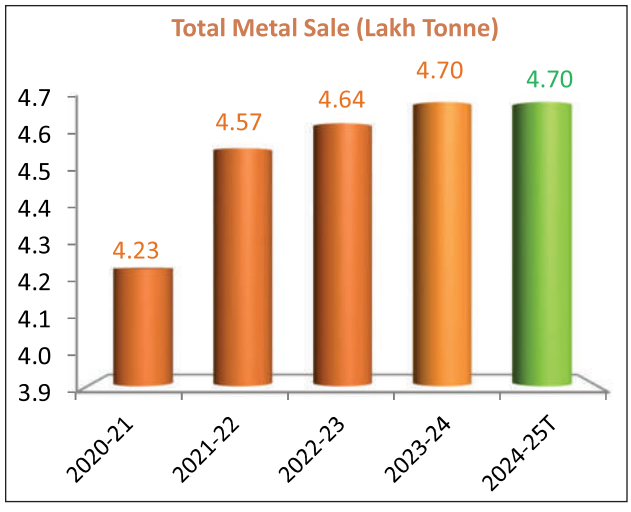






Sales





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. Major activities of HCL include mining, ore beneficiation and converting of refined copper metal into continuous cast rod (CCR) as downstream product. HCL have five units - one each in the states of Rajasthan, Jharkhand, Madhya Pradesh, Gujarat and Maharashtra. HCL is a listed company on BSE and NSE, with 66.14 % equity owned by the Government of India.

Highlights of Year (01.01.2024 to 31.12.2024)

- The Company has achieved copper ore production of 3.78 million tonne in FY 2023-24 which is highest in last four years and about 13% higher than FY 2022-23.
- The Metal in Concentrate (MIC) production for FY 2023-24 of the company reached 27,404 tonne which is the highest in last five years and about

11% higher than that of FY 2022-23.

- In FY 2023-24, Malanjkhand Copper Project (MCP) Unit has achieved ore production of 2.55 Million tonne which is 106% of the target of 2.40 Million tonne and 18% higher than FY 2022-23. Khetri Copper Complex (KCC) Unit has achieved ore production of 1.23 million tonne which is 103% of the target of 1.20 Million tonne and 11% higher than that of FY 2022-23.

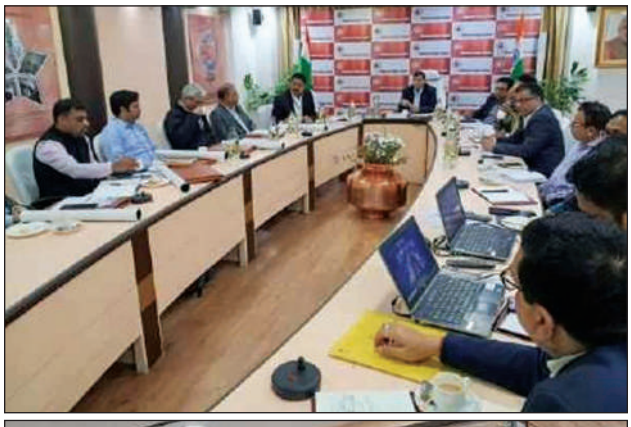
- Taloja Copper Project (TCP) Unit has achieved 27,833 tonnes of CCR production (for third party tolling) in FY 2023-24 which is higher by 21,275 tonnes as compared to 6,558 tonnes in FY 2022-23.
- HCL has achieved capital expenditure of Rs.519.98 Crore in FY 2023-24 against the target of Rs 350 Crore.
- The Board of Directors of HCL, in its meeting held on 24.05.2024 in Kolkata, had approved the financial results for FY 2023-24. The PBT achieved for FY 2023-24 was at Rs 410.43 crore and Revenue from Operations of Rs 1717 crore as against Rs 395.66 crore and Rs. 1677.33 crore in FY 2022-23 respectively. The EBITDA of the Company has risen to Rs 601.42 crore with a robust margin of 35%. The Board has recommended a dividend of 30.11% of PAT for FY 2023-2024. The payout on this account is estimated to be Rs 88.97 Crore to the shareholders of the company.
- The Profit Before Tax on standalone basis during the half year ending Sept 2024 has been Rs 289.46 crore as against Rs 144.96 crore in the corresponding period of the last year showing an increase of around 100%. The Profit Before Tax for the quarter ending Sept 2024 has been at Rs 135.33 crore as against Rs 82.75 crore in the corresponding period of the last year, an increase of around 64%. The Total Income of the company for half year ending September 2024 has been achieved at Rs 1050.49 crore which is higher by around 35% compared to corresponding period of the last year. The EBIDTA margin achieved has been a robust 38%.
- Shri Satish Chandra Dubey, Hon'ble Minister of State for Coal and Mines, inaugurated the restarting of Surda Mine on 05.10.2024 in presence of Shri Ramdas Soren, Minister of Water Resources Department, Minister of Higher Education and Minister of Technical Education, Government of Jharkhand, Shri Bidyut Varan Mahato, Hon'ble MP, Jamshedpur, and other senior officials and dignitaries.

- The then Hon'ble Minister of Mines, Coal & Parliamentary affairs and Chief Minister of Madhya Pradesh visited the HCL stall at 'Mining & Beyond' exhibition of the 2nd Mining Ministers Conference at Bhopal on 23.01.2024, where a miniature model of Ram Mandir, Ayodhya was displayed. HCL had supplied Copper Strips & Copper Wire Rods for joining the rocks in Ram Mandir construction.

HCL had provided 99.99% pure electro-refined Copper strips and Copper Wire Rods for interlocking of the stone slabs in Shri Ram Janmbhoomi Mandir construction in Ayodhya. Purest form of Copper assures longevity to the rock joints.

- 61st Annual Metalliferous Mines Safety Week (MMSW) competition 2023 was celebrated under the aegis of DGMS, Chaibasa Region, in Ranchi on 21.01.2024. The event was attended by Director (Mining)and ICC team wherein several awards were won by ICC team.

- HCL organized a Vendor's Meet on 08.01.2024 in Kolkata where Vendors joined the meeting physically as well as virtually.



- HCL has won the ASSOCHAM "Award for Excellence in Non-Coal Mining - Outstanding Contribution in the Non-Coal Mining Industry" in Kolkata on 27.09.2024. The award was received by CMD, HCL, and Director (Mining), HCL, along with other senior executives.

- HCL-MCP team received 5-star rating memento at Mines Environment and Mineral Conservation (MEMC) Week

celebrated under the aegis of IBM, Jabalpur region on 13.01.2024.

- Secretary (Mines) visited the MCP unit of HCL on 8th and 9th May, 2024 and reviewed the performance of the unit & visited the Underground Mine, Concentrator Plant, Tailing Dam and Paste Fill Plant.

- An open tender for sale of entire quantity of copper concentrate of the company has been finalized. M/s Kutch Copper Limited emerged as the H1 Bidder & M/s Hindalco became the H2 bidder. As per terms of the tender, LoI has been placed to H1 & H2 bidders in 70:30 ratio with the quoted price of H1 bidder for a period of one year. The H1 offer received against current tender is better than last year.

- KABIL, a JV Company between NALCO, HCL and MECL, signed an agreement with Camyen SE - a state-owned enterprise of Argentina on 15.01.2024. This is the first ever Lithium exploration and mining project by a JV of PSUs. Hon'ble Minister of Mines, Coal & Parliamentary Affairs, attended the signing event virtually.
- Hon'ble Union Minister of Coal & Mines and Hon'ble Minister of State for Coal & Mines and other senior dignitaries visited the HCL booth at the DMF Gallery displaying products made by Self-Help Groups constituted under HCL CSR schemes as livelihood enhancement programmes focusing on women empowerment.

- Shri G Kishan Reddy, Hon'ble Union Minister of Coal and Mines, visited KCC on 28.11.2024 to review the performance of the Unit and take stock of its future plans. He visited the Khetri & Kolihan mines and the concentrator plant. CMD, HCL, Director (Mining), and

other senior officials from the Ministry of Mines were also present. Hon'ble Minister also inaugurated the 800 KWp capacity ground based Solar Plant in Khetri Copper Complex and a Health Hall built under HCL's CSR initiative in Gothra, Khetrinagar. Hon'ble Minister interacted with the employees who were injured in the mine accident in Kolihan Mines on 14.05.2024. He further declared that HCL shall provide an ambulance to Public Health Centre (PHC) Gothra.

- Shri Ghanshyam Sharma, CMD, HCL, received the "CSR Excellence Award" on 16.12.2024 for consistent contribution to CSR in Eastern India for Nation Building in CSR Conclave 2024 organised by CIL at Taj Taal Kutir, Kolkata.

- In recognition of the exemplary performance of Hindustan Copper Limited during the National Learning Week, HCL was given a Certificate of Recognition by the Hon'ble Minister of State for Personnel, Public Grievances and Pensions of India, Dr Jitender Singh, during the valediction ceremony of the National Learning Week on 14.11.2024. The programme was attended by CMD, HCL, and GM(HR), HCL.

- A cheque of Rs 58.84 crore was presented to Shri G. Kishan Reddy, Hon'ble Minister of Mines, by CMD, HCL favouring the Hon'ble President of India, on account of Dividend to Govt. of India, for the FY 2023-24 in New Delhi on 22.10.2024. Shri Satish Chandra Dubey, Hon'ble Minister of State, Mines, Shri Vivek Bajpai, Joint Secretary, Ministry of Mines, and other dignitaries were also present during the occasion.

- Rozgar Mela was held on 12.02.2024, wherein 20 Offers of Appointment were issued by HCL. Shri Raosaheb Patil Danve, the then Hon'ble Minister of State, Ministry of Railways, Ministry of Coal and Ministry of Mines, Govt. of India, gave the offer of appointment at

Kolkata, to one of the selected candidates as Assistant Foreman (Mining), in MCP, HCL's Unit in Madhya Pradesh.

- Mining Indaba, 2024 was held between 5th - 8th February, 2024, at Cape Town, South Africa. HCL was the nodal organization showcasing Indian Mining Sector on behalf of MoM, GoI. India pavilion was inaugurated on 05.02.2024 by Mr Prabhat Kumar, High Commissioner of India to South Africa, and Mr Sanjay Lohiya, Addl. Secy., Ministry of Mines, GoI.

- HCL participated in the ICDC Copper Conference held at Mumbai on 22.02.2024.
- One Megawatt (MW) Solar Power Plant in MCP Unit, Madhya Pradesh, was inaugurated on 22.11.2024 by CMD, HCL.

- Malanjkhand Technical Association (MTA) National Seminar was held on 23.11.2024 in MCP themed on "Mining and Processing innovations and Technology Perspectives for the NextGen". CMD, HCL, Director (Mining) & Independent Lady Director, HCL graced the occasion.

- A 45-day-long training programme on Tailoring & Small Business was held for 20 local young women by MCP unit under its CSR scheme where Certificates & sewing machines were given to all. In another event, 56 sewing machines were distributed in KCC to women at Ramakrishna Mission, Khetri Nagar, as part of its CSR initiative. Such initiatives are expected to go a long way in women's empowerment.

- The 34th MEMC week closing ceremony was organized by IBM, Ajmer region, at JK Cement Works, Nembhada. Khetri mine of KCC won the 1st prize in Environmental Monitoring, 3rd prize in Overall Performance category in UG Mines, Publicity & Propaganda and Mineral Conservation. Kolihan mine of KCC won 2nd prize in Publicity & Propaganda and 3rd prize in Waste Dump Management on 17.03.2024.
- Massive Plantation drives were organized across all the units of HCL.

- MCP Mine won the following awards at the 1st MMSW 2023 at Parasia (MP).
  - 1st prize in Electrical Equipment & Installation & Vocational Training and First-aid
  - 2nd prize in Overall & Transport and Use of Explosive.
- MCP unit, under its CSR Programme, provided support for library development and promotion of sports in 44 schools of Birsa Block and handed over Books, Book Shelves and Sports kits to these schools.
- Director (Mining) of HCL had taken part at the International Conference on Nonferrous Metals & Material Science 2024 organized by The Indian Institute of Metals, Kolkata Chapter on 29.03.2024.
- HCL participated in the 105th International Organizing Committee Meeting of the World Mining Congress, Santiago, Chile, held between 14th – 17th April 2024. The meeting had representation from over 21 countries and 30+ global mining leaders.
- MCP unit has successfully achieved in installing and commissioning of Underground Leaky Feeder based communication system covering 16 km of mine. This wireless communication system will help in achieving Digitization, Automation and increased Safety in underground mining operations.

- HCL has been granted the license from Bureau of Indian Standards (BIS) to use ISI mark in the Continuous Cast Copper Rod produced at TCP Unit under IS:12444-2020 Standard for Copper Wire Rods for Electrical Applications with effect from 17.04.2024.

- HCL participated in the ICSG meeting held on 24th and 25th April, 2024, at the Study Groups' Headquarters in Lisbon with the Indian delegation led by AS (Mines).
- HCL participated in the Critical Mineral Summit: Enhancing Beneficiation and Processing Capabilities held between 29th-30th April 2024 in New Delhi.
- HCL has successfully installed and commissioned 4.5 MWp Ground Mounted Solar Plant at MCP unit on 04.07.2024 which will cater to 50% of the base load of MCP in day time and mitigate CO2 emission by 7250 Ton (approx.) per annum.

- Products of Self-help Groups (SHG) supported under the CSR Program of HCL were showcased for selling in Dilli Haat, New Delhi, as an initiative of the Ministry of Mines to provide an exposure to the SHGs and build public awareness about the contribution of the mining sector to welfare of the people.
- HCL's Contributory Pension Scheme 2023 was approved by the Ministry of Mines on 05.07.2024 with effect from 01.04.2023 which will benefit HCL employees and their family members as social security to the retired employees.
- Hindustan Copper Ltd was felicitated with Mines Safety Award (MSA) 2024 in Kolkata on 28.07.2024. The program was inaugurated by the then Director General Mines Safety, Shri Prabhat Kumar, along with CMD, HCL, Director (Mining), HCL and other senior officers. KCC unit won the 3rd prize in the category of Metal Belowground Medium.

- Malanjkhand Copper Project has recently installed a Paste fill plant with a capacity of 3 Million Tonne per Annum. It produces a non-segregating paste that can be efficiently pumped into underground void stopes through underground distribution system, thus effectively stabilizing the underground operation and protecting the surrounding environment. This process not only ensures the safety and stability of mining operations but also maximizes extraction of ore and resource utilization.

- HCL has successfully upgraded its ERP system with Oracle e-biz suite R12 which went live on 07.08.2024.
- The 57th Annual General Meeting of Hindustan Copper Ltd. was held on 26.09.2024, at the Registered office in Kolkata through VC
- A one-on-one discussion was held between Hon'ble Chief Minister of Madhya Pradesh (M.P.) on the sidelines of the Roadshow of Govt. of M.P. held in Kolkata on 20.09.2024. The investment plan of HCL at MCP was apprised.
- CMD, HCL, attended the critical mineral auction program of the Ministry of Mines held at New Delhi on 24.06.2024. The program was inaugurated by the Hon'ble Union Minister of Coal & Mines, Shri G. Kishan Reddy, and Hon'ble Minister of State for Coal & Mines, Shri Satish Chandra Dubey.
- Ms. Baby Mahato won Bronze Medal in Khelo Jharkhand State organised by School Games Federation of India (SGFI) held on 3rd-5th October, 2024 at Khelgaon, Ranchi. Ms. Baby Mahato is currently undergoing Archery Training at Kasturba Gandhi Balika Vidyalaya (KGBV) Ghatsila centre under CSR program of the Company.
- An MOU was signed by KCC unit in Rajasthan on 7.10.2024 with Khetri Municipality for sourcing 1.2 Million Litre per Day treated water from the Sewage Treatment Plant under construction at Khetri Town, for KCC Plant.
- M/s National Productivity Council (NPC), a Government of India organization, was engaged by HCL to develop a comprehensive plan for achieving the company's Net Zero Emission target by 2047, and the detailed report on HCL's Net Zero Plan has been submitted by NPC.
- In the 53rd Zonal Mine Rescue Competition 2024 held on the 28th and 29th October, 2024, at WCL Nagpur, MCP rescue team won 2nd prize in the Turnout Drill.

- Shri G Kishan Reddy, Hon'ble Union Minister of Coal and Mines, visited the HCL stall in the Ministry of Mines Pavilion at IITF 2024 and was warmly greeted by CMD, HCL.
- The Indian delegation, led by Shri V. L. Kantha Rao, Secretary, Ministry of Mines and Shri Gopal Baglay, India High Commissioner to Australia, jointly inaugurated the Indian Pavilion at IMARC, Australia, on 30.10.2024. Delegation from HCL participated in IMARC 2024.
- HCL observed its 57th Foundation Day on 09.11.2024. Employees completing maximum number of iGoT courses were awarded by CMD, HCL.
- The 31st Mines Environment & Mineral Conservation Week was celebrated at Kendadih Copper Mine of ICC unit under

the aegis of the Indian Bureau of Mines (IBM), Ranchi Region, on 21.10.2024.

- In the 38th Mines Safety Week 2024-25, Ajmer Region, First Aid Competition organized by Shree Cement, 2nd & 3rd position was achieved by Khetri Copper Mine team and Kolihan Copper Mine team respectively.
- An Underground Mine Safety Training session was conducted by Prof. R.M. Bhattacharjee from IIT-ISM, Dhanbad, at HCL's Corporate Office on 05.09.2024. CMD, HCL, Director (Mining) and other senior officers attended the session.
- HCL observed the Swachhata Hi Sewa (SHS) Campaign 2024 from 17.09.2024 to 02.10.2024 themed on "Swabhav Swachhata – Sanskaar Swachhata", thereby marking a decade of progress in cleanliness and sanitation. CMD, HCL, administered the Swachhata Pledge to all the employees of HCL. The company planned a series of activities across its various Units focusing on extensive cleanliness drives, thrust on fitness with Prabhat Pheris and Cyclathons, plantation drives ("Ek Ped Maa Ke Naam") to encourage the green mission, promotion of cultural activities, beautification of parks, wall paintings, waste to art activities, awareness against waste of food, health camps for sanitation workers, etc.

- MCP Mining team participated in the Trade Test of Metalliferous Mines Safety Week-2024 held at Tirodi mines on 20.11.2024 and won prizes in the categories of Mining Mate, LHD Operator/ LPDT, Cable Bolt operator, Pump Operator, Welder and Fitter.
- MCP unit participated in the "The Friend of Tigers" Meet organised by Madhya Pradesh Tiger Foundation Samiti of Forest Department, Govt. of MP, at Pench Tiger Reserve on 26.05.2024. MCP presented its contribution towards wildlife conservation under its CSR scheme.

- The Letter of Award (LOA) has been issued to M/s. South West Mining Limited, Barmer, Rajasthan on 25.11.2024 for appointment of Mine Developer cum Operator (MDO) for Rakha and Chapri Block within Rakha Mining lease with matching capacity of concentrator plant for an initial contract period of 20 years with a provision for further extension of 10 years on Revenue Sharing Model.
- HCL received the "CSR Excellence Award" for consistent contribution to CSR in Eastern India for Nation Building in CSR Conclave 2024 organized by CIL on 15.12.2024.
- Director (Mining), delivered a keynote address at the Indian Engineering

Congress organized by the Institution of Engineers (India) at Hotel Novotel, Kolkata, on 21.12.2024. During the event, The Institution of Engineers (India), Kolkata, felicitated Shri Singh for his outstanding contributions to the Indian Mining Industry.

- In the 53rd All India Mines Rescue Competition 2024 under the Metalliferous Mine category, rescue team of Khetri Copper Complex bagged the following awards on 21.12.2024:
  - ➢ Second Best in Overall Performance.
  - ➢ Second Best in Rescue & Recovery

  Additionally, the team has also been awarded the Best in Commendable Actual Rescue & Recovery work in mines during Kolihan Mines accident.

  These accolades underscore the team's dedication, skill, and commitment towards safety and excellence in mining operations.
- Appointment letters were issued to the newly recruited Mining Mates for MCP unit on 23.12.2024 at the 'Rozgar Mela' organized at Ajmer, Rajasthan. These appointment letters were distributed by the Minister of State for Agriculture and Farmer Development.
- HCL has entered into an MoU with the State Bank of India (SBI) on 30.12.2024 for implementation of Corporate Salary Package for all the permanent employees of HCL, having salary account in SBI, which includes special benefits like Personal Accident Insurance Cover of Rs. 1 crore, Air Accident Insurance Cover of Rs. 1 crore besides other benefits like Child Education Benefit and Girl Child Marriage Benefit admissible in case of any eventuality, add on covers like Health Insurance and concession on locker rents.

The capital structure of the Company as on 31st December, 2024 was as follows: -

a) Authorised Capital:

i) 180 crore Equity shares of ₹ 5/- each	-	₹900 crore
ii) 20 lakh Preference shares of ₹ 1000/- each	-	₹200 crore
Total:		**- ₹1100 crore**

b) Issued, Subscribed and Paid-Up Capital

i) 96,70,24,020 equity shares of ₹ 5/- each	₹ 483,51,20,000/-

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
Ore Milling Capacity of HCL

Location of Mines	Ore milling Capacity (million tonnes per annum)
Khetri Copper Complex (KCC), Rajasthan	1.8
Malanjkhand Copper Project (MCP), M.P.	2.5
Indian Copper Complex (ICC), Jharkhand	0.4
Total	**4.7**

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**

*****Production under temporary Suspension.*

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**

Physical performance: Physical performance details of HCL are as under:

Table 7.10
Physical Performance of HCL

Product	Actual for the previous two years		Target for FY 2024-25	Actual from Apr'24 to Dec'24	Actual for the period Jan'24-Mar'24
	FY 2022-23	FY 2023-24			
Ore Production ('000 Tonnes)	3346	3782	4240	2534	9987
*Metal in Concentrate (MIC) (Tonnes)	24760	27404	34500	18963	8162
Refined Copper (Cathode) (Tonnes)	7	-	-	-	-
**Wire rod (Tonnes) (Tolling)	6558	27833	30000	12698	6978

**As per the business plan of the Company, Copper concentrate of MCP, KCC and ICC origin are being sold directly in the market.*

***Production of wire rod (Tonnes) is based on tolling of 3rd Party cathodes.*

Financial performance: Financial performance details of HCL are as under:

Table 7.11
Financial Performance of HCL

(₹ in crore)

Sl No	Details	Actual for the previous two years		Target for FY 2024-25	For the Period Apr'24 to Sept'24 (Limited Review)	Actual for the period Jan'24-Mar'24)
		FY 2022-23	FY 2023-24			
1.	Turnover	1660.63	1686.51	(*)	1004.11	554.37
2.	Net Profit/(Loss) before Tax (PBT)	395.68	410.43	(*)	289.46	183.29
3.	Net Profit/(Loss) after tax (PAT)	295.31	295.41	(*)	215.09	124.31

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

SALES PERFORMANCE: Sales performance details of HCL are as under

Table 7.12
Sales Performance of HCL

Product	Actual for the previous two years		Target for FY 2024-25	Actual from Apr'24 to Dec 24'	Actual for the period Jan'24-Mar'24)
	FY 2022-23	FY 2023-24			
Total Copper Sales (MT)	24727	25630	34500	15971	7081

MINE EXPANSION SCHEMES

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

The Company has plans to increase its mining capacity from current level of around 4.0 million tons per annum to 12.2 million tons per annum in phase –I (under implementation) through expansion of existing mines, re-opening of closed mines and opening of new mines. During financial year 2024-25 (upto Dec'24), HCL has achieved an ore production of 2.53 million tonnes.

HCL carried out surface exploration drilling & underground definition drilling in FY 2024-25 to the tune of 28125 meters and 14920 meters for enhancing copper ore reserve and resources within its mining leases. New work for surface drilling at Kendadih Mines awarded in FY 2024-25 (upto Dec'24). Above exploration work was funded by HCL through its own resources.

7.47 R&D ACTIVITIES

- Scientific Study and numerical modelling at Malanjkhand underground Copper Mine by M/s CIMFR.
- Modelling and simulation studies for designing the ventilation system of MCP by M/s PMRC Pvt. Ltd.
- Slope Monitoring Study of Malanjkhand Mine for a period of three years (2023 to 2025) by M/s CIMFR, Dhanbad.
- Process audit and capacity augmentation of MCP Concentrator plant under R&D works has been awarded to M/s NML, Jamshedpur.
- The work of scientific study for optimizing rock fragmentation at Kolihan Copper Mine has been awarded to M/s IIT-ISM Dhanbad and the work has been completed and final report has been received.
- The initiative has been taken to overcome the problem of deterioration in metallurgical results and improvement in recovery front of KCC concentrator plant by an expert agency M/s. IBM, Nagpur.
- The work of subsidence study for Khetri and Kolihan Mine leases has been awarded to M/s IIT-ISM Dhanbad.
- R&D work for Development of an IoT (Internet of Things) Enabled Online Monitoring and Data Analysis System for Rock Mechanics Instrumentations at Kolihan Copper Mine has been awarded to M/s IIT-Kharagpur.
- Subsidence Monitoring Survey of Surda Mining Lease, Kendadih Mining Lease and Rakha Mining Lease of ICC unit for Three (03) years.

- Installation of Vibratory Disc Cup Mill Pulverizer at Mosabani of ICC unit for pulverization of Ore, tailing and concentrate samples.

7.48 ENERGY CONSERVATION

- Conventional motors in continuous running equipments in all plant areas were replaced by conventional motor and motor starters with the energy efficient VFD drive systems & energy efficient motors, to improve efficiency and reduction in energy consumption as well.
- Energy consumption is constantly monitored at the mines, plants and townships with a view to achieve overall reduction. In place of conventional lights, LED lights are installed in all five units to save energy and environment. Total Rs. 61.94 Lakhs have been saved in FY 2024-25 (upto Nov'24) by replacing conventional lights by these LED lights.
- Approximately 56.39 Lakh unit of solar electricity has been generated by the installed Solar Power Plants across various units at HCL resulting in a saving of Rs. 211.69 Lakhs during FY 2024-25 (upto Nov'24).
- HCL has saved electricity charges of Rs. 635.72 Lakhs approx. during FY 2024-25 (upto Nov'24) by taking various initiatives like reduction of contract demand, power factor improvement, TOD Rebate in Electricity Bill & introducing energy efficient equipment etc. across various units.
- "IE3 energy efficient motors" has been made the standard specification, for motor procurement, across all applications in the Unit.

7.49 HARVESTING RENEWABLE ENERGY

The project for design, supply and installation of solar power plant of various capacities under RESCO model of MNRE has been carried out across HCL with the help of M/s REIL. Out of total 8156.5 KWp solar plant installed in HCL, 7095.5 KWp carried out under RESCO model and remaining under CAPEX mode.

7.50 MoU Ratings achieved by HCL

Table 7.13

Year	Grade
2020-2021	Very Good
2021-2022	Good
2022-2023	Good
2023-24	Under Evalutaion

7.51 Reserves & Resources

India has very limited known reserves of copper ore exploitable for copper production. The total resources of copper ore in the country as on 1.4.2020 are estimated at 1660.87 million tonnes with about 12.20 million tonnes of copper metal. Of these 163.89 million tonnes (9.87%) fall under Reserve category containing 2.16 million tonnes of copper metal and the balance 1496.98 million tonnes (90.13%) are 'Remaining Resources' containing 10.03 million tonnes of copper metal.

Rajasthan is credited with 867.85 million tonnes ore (52.25%) containing 4.63 million tonnes of copper metal, Jharkhand 251.46 million tonnes ore (15.14%), containing 2.78 million tonnes of copper metal, Madhya Pradesh 386.66 million tonnes ore (23.28%), containing 3.66 million tonnes copper, and the rest 9.33% are accounted for by other states namely Andhra Pradesh, Gujarat, Hary-

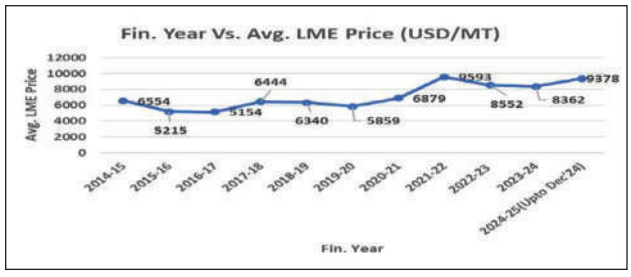
ana, Karnataka, Maharashtra, Meghalaya, Nagaland, Odisha, Sikkim, Tamil Nadu, Telangana, Uttarakhand and West Bengal (As per Indian Mineral year book 2022). India's share of world reserve is around 0.22% only. According to United States Geological Survey (USGS), copper reserves amount to 1000 million tonnes (Mt) of copper (The World Copper Factbook 2024). Globally, Chile has the largest reserves of copper followed by Peru, Australia, Congo, Russia, Mexico, USA, China, Poland are the other countries.

The undiscovered totals for porphyry and sediment-hosted deposits are 3,100 million metric tons and 400 million metric tons respectively, resulting in a global total of 3,500 million metric tons of copper. With identified copper resources estimated at 2,100 million metric tons, total copper resources (undiscovered + identified) are estimated at 5,600 million metric tons (Source: The World Copper Factbook 2024). HCL hold around two-fifths of the copper ore reserves and resources in India with an average grade 0.95%. As on 01.04.2024, HCL has reserves (proved & probable) of about 2.12 million tonnes in terms of copper metal and total reserves and resource of 7.18 million tonnes in terms of copper metal (i.e. 755.32 million tonnes of ore with average grade of 0.95% based on UNFC system).

7.52 PRICE OF COPPER

The price of copper is linked to London Metal Exchange (LME) price. The price of MIC is derived based on the LME price after adjustment of ruling TC/RC (Treatment & Refining Charge). The TC/RC is market driven dynamic parameter which depends on supply and demand of copper in the international market.

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



HCL is the only Company having captive mines in India, 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.

7.53 COPPER INDUSTRY IN INDIA

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.

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.

Currently, three major players dominate the Indian copper industry. Hindustan Copper Limited (HCL) in Public Sector (Annual Refining Capacity: 0.685 lakh tonnes), M/s Hindalco Industries Ltd. (Annual Refining Capacity: 5.00 lakh tonnes) and M/s Sesa Sterlite Ltd in private sector (Annual Refining Capacity: 2.16 lakh tonnes), having current total installed refined copper capacity in the country is 7.85 lakh tonnes. It is reported that M/s Adani Group is installing custom copper smelter refinery

complex named as Kutch Copper Limited of capacity 1 million tonnes in a phased manner.

Capacity & Production of cathode is given below.

Table 7.14

Commodity	Installed Capacity (Lakh tonnes)	Production during FY 2023-24 (Lakh tonnes)	Production during the period (Apr'24 to Oct'24)
a) HCL	0.685	-	-
b) Sesa Sterlite Ltd.	2.16	1.41	0.76
c) Hindalco Ind. Ltd.			
(Unit: Birla Copper)	5.00	3.68	2.24
Total >>>	**7.85**	**5.09**	**3.00**

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

7.54 REFINED COPPER CONSUMPTION

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, Atma nirbhar 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.

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.

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.

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.

As the global economy moves toward net zero carbon emissions through energy transition, the role of Copper remains pivotal as the most efficient conductive material, indispensable for capturing, storing and transporting the green energy. Hence significant rise in demand of copper has been predicted on account of thrust on low carbon economy.

7.55 Mineral Exploration & Consultancy Limited (MECL)

Introduction

Mineral Exploration and Consultancy Limited (Formerly Mineral Exploration Consultancy Limited) was established in 1972 as a Central Public Sector under the under the aegis of Ministry of Mines, Government of India. MECL plays a pivotal role in unlocking the potential of India's vast mineral resources. As a premier

exploration agency, MECL is tasked with the identification and evaluation of mineral deposits, conducting geological surveys and providing consultancy services that enable informed decision-making for sustainable resource management. With over five decades of expertise, MECL has been instrumental in advancing the country's exploration capabilities, thereby contributing to India's economic growth and industrial development.

MECL is at the forefront of mineral exploration, offering comprehensive services in regional and detailed exploration across a diverse range of mineral categories, including energy minerals, ferrous and non-ferrous metals, industrial and fertilizer minerals, precious and rare minerals, as well as critical minerals. We pride ourselves on our state-of-the-art, integrated facilities that support the entire exploration process, including:

- **Mineral Targeting**: Utilizing advanced remote sensing and GIS techniques, MECL excels in mineral targeting and land use/land cover studies, enabling the identification of high-potential areas for exploration.
- **Ground Exploration & Core Drilling**: MECL's robust ground exploration services, including diamond core drilling capabilities, extend to depths of up to 1500 meters, ensuring thorough and accurate exploration of mineral deposits.
- **Geological Software & 3D Ore Body Modeling**: Sophisticated geological software, combined with 3D ore body modeling, allows for precise visualization and analysis, enhancing the efficiency and accuracy of the exploration process.
- **Borehole Geophysics & Surface Geophysical Investigations**: With cutting-edge borehole geophysical logging equipment and advanced surface geophysical investigation tools, MECL provides invaluable insights into the subsurface, aiding in the identification of mineral-rich zones.
- **Advanced Chemical Laboratory for Mineral Analysis**: Our state-of-the-art chemical laboratory is equipped to analyze both energy and non-energy minerals, ensuring high-quality, reliable testing and supporting detailed exploration reports.
- **Digital Core Scanning Technology**: MECL's digital core scanner enables high-resolution, non-destructive core analysis, offering precise data to assess mineral composition and structure with unparalleled accuracy.

In addition to these exploration services, MECL operates a range of essential support facilities to enhance our operational efficiency:

- **Manufacturing of Drill Accessories**: Our dedicated workshops manufacture high-quality drill accessories, ensuring that all drilling operations are supported with precision-engineered tools tailored to meet the specific needs of exploration projects.
- **Drilling Machine Maintenance Center**: Our specialized maintenance center services and maintains a wide range of drilling machines, ensuring optimal performance and minimizing downtime for uninterrupted exploration operations.
- **Geophysical Instrument & Logger Maintenance Center**: MECL's maintenance center for geophysical instruments and loggers is staffed with expert technicians, ensuring all instruments are calibrated and maintained to the highest standards,

providing accurate and reliable data for every exploration mission.

As part of our ongoing commitment to innovation and excellence, MECL is expanding its capabilities by procuring advanced hydrostatic drilling machines, modern geophysical equipment and next-generation geochemical laboratory tools as well as softwares. This forward-thinking approach ensures that MECL remains your trusted partner for cutting-edge, reliable, and effective mineral exploration solutions.

MECL primarily serves the Ministry of Mines through the National Mineral Exploration Trust (NMET) for the exploration of minerals other than coal and lignite. As part of this responsibility, MECL prepares and submits detailed mineral exploration proposals in consultation with State Governments' Directorate of Mines and Geology (DMGs) or Directorate General of Mines (DGMs). These proposals are then presented to NMET, which provides funding under the provisions of the Mines and Minerals (Development and Regulation) Act, 1957 (MMDRA Act, 2015). Upon receiving an award for the exploration assignment, MECL undertakes extensive exploration activities. These reports are submitted to the State Governments, who use the findings for the auctioning and allocation of mineral blocks. Through this process, MECL plays a pivotal role in enhancing the exploration of non-coal and non-lignite mineral resources, supporting the government's efforts to foster sustainable mineral development.

With respect to the exploration of energy minerals, specifically Coal and Lignite, MECL plays a crucial role in both regional and detailed exploration activities. For coal, MECL collaborates with CMPDIL (Central Mine Planning and Design Institute Limited), the nodal agency under the Ministry of Coal. Through a long-standing Memorandum of Understanding (MoU), MECL conducts extensive exploration, including exploratory drilling and geological surveys, to prepare detailed Geological Reports for coal blocks. These reports are then submitted to CMPDIL, which utilizes them for the allocation of coal blocks to miners. For lignite exploration, MECL partners with Neyveli Lignite Corporation of India Ltd. (NLCIL), the nodal agency for lignite, to carry out regional and detailed exploration in the states of Tamil Nadu and Rajasthan, supporting the responsible development and sustainable management of lignite resources.

MECL also provides exploratory services to various major mining CPSEs as well as private exploration companies collaborating closely with them. This includes working alongside prominent companies such as NALCO, HCL, MOIL, SAIL, HGML and other CPSEs, as well as State Government PSUs. Through these partnerships, MECL supports the exploration and development of mineral resources within these leasehold areas.

MECL is providing vital services to the Geological Survey of India (GSI) for the creation of baseline data in mineral exploration. As part of this collaboration, MECL is conducting NGPM surveys, analyzing NGCM samples and carrying out exploratory drilling activities. The company is also working with mineral-rich State Governments to explore opportunities for developing mineral assets in collaboration with large mining companies. On the international front, MECL has initiated discussions with CSIRO Australia to assess the feasibility of adopting advanced technologies, such as machine learning, artificial intelligence and data mining, to enhance the efficiency and accuracy of mineral exploration. Further through its JV company KABIL, MECL has deputed its geophysicists to Catamarca, Argentina, for geophysical survey work for five lithium prospects.

The main strength of the company is its team of well-qualified and experienced Geologists,

Geophysicists, Analytical Chemists, Drilling & Mining Engineers and Surveyors supported by highly skilled, trained technical and scientific staff and state-of- art computer facilities. During FY 2023-24 MECL has inducted over 25 geologist, geophysicist, geochemist and IT engineers. The approved manpower of the Company vis-a-vis in position as on 01-01-2025 is given below:

Table 7.15

Category	Approved	Position as on 01-01-2025
Group A	390	251
Group B	64	40
Group C	1035	508
Total	**1489**	**799**
Functional Director & CVO	4	3+1*

**Additional Charge of D(F), MECL to D(F) HCL*

7.56 Physico-Financial Performance 2022-23 and 2023-24 & 2024-25

PHYSICO-FINANCIAL PERFORMANCE 2021-22, 2022-23, 2023-24 & 2024-25 (up to December, 24)

MECL has completed over 1663 projects / geological report and established 215.81 billion Tons of resources in various mineral deposit till March 2024. The Physical & Financial performance of MECL in last 3 years are given below:

Table 7.16
Physical Performance

Particulars	FY 2021-22	FY 2022-23	FY 2023-24	FY 2024-25 (up to Dec, 24) **
Geological Reports of NMET	11	12	32	24
Total Geological Reports	40	40	44	37
Borehole Geophysical Logging (lakh meters)	1.78	1.04	2.31	2.32
Geological Mapping (Sq. km.)	705	1,246	1610	648.68
Chemical Analysis (lakh samples)	0.96	0.93	1.07	0.75
Exploratory Drilling (lakh meters)				
Total meterage	2.62	2.35	3.49	3.11
Exploratory Drilling Mineral wise (lakh meters)				
Coal	1.74	1.59	2.72	2.54
Lignite	0.42	0.17	0.21	0.28
Other	0.46	0.60	0.56	0.29

Table 7.17
Financial Performance (Rs. In Crores)

Particulars	FY 2021-22	FY 2022-23	FY 2023-24	FY 2024-25 (up to Dec, 24)**
Total Revenue	237.62	230.03	343.08	270.49
Profit After Tax	20.21	13.94	80.41	42.10

***: Provisional*

Exploration Activity in Rajasthan

7.57 MECL Achievements during 2023-24

- **Exploration Activities and Performance**: Up to December 25, 2024, MECL has not only met but significantly exceeded its physical targets, achieving milestone of 3,00,000m on 24th December, 2024. MECL has reached 3,11,148 meters in exploratory drilling as on date. This achievement represents a remarkable 35.08% growth compared to the 2,30,352 meters completed during the same period in FY 2023-24 and reflects MECL's sustained efforts to enhance operational efficiency and deliver exceptional results despite challenges. The exploration covered a wide array of minerals, including energy minerals, ferrous and non-ferrous metals, industrial and fertilizer minerals, precious and rare minerals, as well as critical minerals reflecting MECL's extensive contribution to India's mineral inventory, especially for strategic and high-demand minerals. The target for FY 2024-25 is 4 lakh meters

- **Financial Performance and Revenue Growth**

  In the period from April to December 2024, MECL recorded a cumulative revenue of ₹250.36 crore, representing a 34.28% increase from ₹191.21 crore during the same period last year. The company also achieved a significant net profit of ₹42.10 crore, a 49.19 % increase from ₹28.41 crore in FY 2023-24. This growth is attributed to MECL's expanded market presence, increased project approvals, and effective resource management. Whereas the target for FY 2024-25 is 91 crore.

- **Geological Reports and National Mineral Inventory**

  MECL continues to play a key role in enhancing the National Mineral Inventory. As of December, 2024, the company has submitted 36 Geological Reports, including 23 for NMET, 5 contractual, and 8 for energy minerals. These contributions have added valuable resources to the national inventory.

- **Project Approvals and Ongoing Work**

  MECL has successfully secured 34 project approvals from NMET, totalling ₹104.59 crore. Further, 4 additional projects, worth ₹10.00 crore, are recommended by TCC. Currently exploration is in progress in 41 blocks which include 17 critical mineral blocks. Regional and detailed exploration activities covered 28 projects across 15 mineral commodities in 8 states, focusing on G-3 and G-4 level exploratory assignments.

Chemical Laboratory, MECL

- **Dividend**

  Demonstrating sound financial management, MECL has given a dividend of ₹24.15 crore for FY 2023-24,

contributing to the nation's exchequer and reinforcing MECL's profitability as a responsible public sector entity.

Shri Indra Dev Narayan, CMD, MECL, presents a cheque of ₹ 24.15 cr. to Shri G. Kishan Reddy, Hon'ble Union Minister of Coal & Mines, Govt. of India, for FY 2023-24, in the presence of Shri Sanjay Lohiya, Addl, Sec.MoM, Shri Pankaj Pandey, Director (Technical), MECL, & Shri Ghanshyam Sharma, Director (Finance), MECL.

➢ **Business Development and Commercial Partnerships**

The Business Development & Commercial Division has seen substantial growth, with available work valued at over ₹622 crore as of December 2024. MECL has established several high-profile collaborations, including partnerships wtih a diverse range of clients, including esteemed organizations such as GSI, HCL, NALCO, and NTPC among others. Additionally, MECL has undertaken NMET-funded projects, promotional coal exploration work on behalf of the Ministry of Coal (MoC) and exploration activities for NON-CIL coal blocks through collaborative efforts with CMPDIL. Continuous outreach efforts target prospective clients across government, PSU and private sectors, aiming to secure business for sustainable growth. Moreover, MECL has solidified partnerships through Memorandums of Understanding (MoUs) with key entities.

Key Memorandums of Understanding (MoUs)

- **Ongoing MoUs**:
  - **Central Mine Planning and Design Institute (CMPDIL)**: Valid for five years, up to 25.04.2026.
  - **Directorate of Mines & Geology, Govt. of Goa (DMG, Goa)**: Valid for five years, up to 18.07.2026.
  - **Directorate of Geology and Mining, Madhya Pradesh (DGM, MP) & Madhya Pradesh State Mining Corporation Limited (MPSMCL)**: Valid for five years, up to 23.11.2026.
  - **Directorate of Geology & Mining, Govt. of Assam (DGM, Assam)**: Valid for five years, up to 07.12.2026.
  - **RITES Ltd.**: Valid for five years, up to 24.03.2027.
- **New MoUs**:
  - **Extension of MoU with GSI**: Supplementing GSI in exploratory drilling for coal and lignite for one year.
  - **Memorandum of Agreements (MoAs) with GSI**: Ground Gravity and Magnetic Surveys, Data Processing & Interpretation, and Technical Report Submission (Eastern, Northern, and Southern Regions) signed on 06.09.2024.

➢ **Strategic Diversification and Consultancy Services**

MECL, as part of its diversification strategy, provides technical consultancy to Central and State Governments for feasibility studies and mineral block auctions. Supporting the Ministry of Mines for providing technical inputs for auctionable blocks. So far four tranches have been launched, including three this year, offering 49 blocks, of which 24 were successfully auctioned. MECL is now preparing for the 5th tranche while expanding services to include geochemical analysis for coal and power companies, CPSEs, and state governments. Further MECL has deputed its Geophysicists at Catamarca, Argentina for monitoring geophysical survey work for 5 lithium prospects for KABIL. Additionally, MECL is continuously conducting NGPM surveys in collaboration with the Geological Survey of India through a Memorandum of Understanding (MOU), aimed at generating essential baseline data for future exploration and resource development.

➢ **Capacity Augmentation:**

MECL has significantly strengthened its operational capacity with the addition of **four** state-of-the-art hydrostatic drill rigs, capable of drilling up to 1500 meters with N Series W/L drill rods, and extending to 1800 meters with B series W/L drill rods. Additionally, we have secured NMET funding to establish a National Facility aimed at boosting exploration capabilities by introducing advanced geological, geophysical, and geochemical analytical equipment.

➢ **Exhibitions and Global Engagements**

- **Critical Mineral Summit (29-30 April 2024)**: MECL participated in this event organized by the Ministry of Mines. MECL highlighted its exploration expertise in critical minerals through an engaging exhibition, showcasing its capabilities in leveraging innovation for mineral beneficiation and processing.
- **India International Trade Fair (IITF) 2024 (14-27 November 2024)**: At the Ministry of Mines Pavilion with the theme "Minerals to Milestones," MECL displayed state-of-the-art technologies like Ground Penetrating Radar (GPR) and Handheld XRF Analyzers. These exhibits underscored MECL's commitment to sustainable mineral resource development.
- **The Mining Show Dubai 2024 (26-27 November 2024)**: MECL successfully organized the India Pavilion on behalf of the Ministry of Mines. The pavilion was inaugurated by Shri Satish Kumar Sivan, Consulate General of India in Dubai, and Shri Dinesh Mahur, Joint Secretary, Ministry of Mines, GoI. The event showcased the expertise of Indian mining PSUs and promoted collaboration opportunities for introducing advanced technologies
- **International Mining and Resources Conference (IMARC)** IMARC-2024, Sydney Australia: **CMD, MECL** attended the IMARC, 2024 at Perth and Critical mineral Delegation at Sydney. The

event was to showcased India's exploration and mining capabilities and initiatives for critical mineral exploration in overseas location.

- **Capacity Building for Exploration**: MECL's team lead by Shri Pankaj Pandey, Director (Technical) visited Perth, Australia, to explore advanced geophysical and geological technologies for enhancing exploration capabilities.
- MECL actively engaged with the industry in 2024 through a series of workshops and events:
    - **Exploring the Mineral Wealth of Assam**: A workshop in Guwahati, focusing on mineral exploration reforms, ongoing activities, and the critical mineral auction process, organized with the Ministry of Mines and GSI.
    - **Workshop on Gujarat's Mineral Wealth:** Co-hosted with Commissioner of Geology and Mining (CGM), Government of Gujarat and NMET, Ministry of Mines, Govt of India a one-day workshop titled "Gujarat's Mineral Wealth: A Responsible Exploration and Development Paradigm.
    - **IITF-2024:** MECL participated in the India International Trade Fair, demonstrating advanced exploration technologies like Ground Penetrating Radar (GPR) and X-Ray Fluorescence (XRF).
    - Madhya Pradesh Mining Conclave on October 17-18, 2024; CMD MECL attended the event and presided over a technical session on "Mineral Beneficiation: Enhancing Mineral Values".

Workshop on Revisit the current Exploration Norm

Workshop on "Gujarat's Mineral Wealth: A Responsible Exploration and Development Paradig

India Pavilion, India's mining sector contributions at the Dubai Mining Show, November 2024

Shri Pankaj Pandey, Director Technical, MECL alongwith MECL officials visited Perth for Capacity Augmentation

7.58 Work Carried Out by MECL in North Eastern Region

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.

During the year 2024-25, MECL has submitted Geological report for reconnaissance survey for Copper & REE in Temi-Tarku-Damthong block, District: East Sikkim. MECL has also received approval for two G-4 level of exploration for Tungsten, REE and Associated minerals in Nellie Area, Morigaon and West Karbi Anglong , and Langmipi - Laching Thing Area, Karbi Anglong in Assam.

Further, MECL is also carrying out detailed exploration of Coal (Promotional Coal blocks on behalf of CMPDIL) in Bishnupur Block and Nimgaon Block in Tinsukia District of Assam. Exploratory drilling is in progress in these two blocks. 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 taken exploration for Coal in Khotarda block, Mikir hills district is under progress.

7.59 Action Taken on Abatement of Pollution and Environment:

MECL remains steadfast in its commitment to conserving natural resources and safeguarding the environment through sustainable exploration and operational practices. The company ensures that exploration activities are carried out with minimal environmental impact, conducting baseline environmental studies on geology, air quality, noise, and socio-economic factors. These studies are integrated into geological reports as required and shared with State Governments to support Environmental Impact Assessments (EIA) during exploration projects.

To reinforce its dedication to environmental stewardship, MECL has implemented a comprehensive Corporate Environment Policy. This policy emphasizes the adoption of eco-friendly technologies, regular maintenance of machinery to minimize emissions, strict adherence to environmental regulations, and resource conservation. It also promotes environmental awareness among employees. The details of this policy are accessible on MECL's official website: www.mecl.co.in.

MECL has also initiated several green initiatives to enhance sustainability within its premises. An herbal garden has been established to preserve indigenous plant species and promote biodiversity. This garden serves as a green space and contributes to environmental education and research efforts. Additionally, MECL has set up a composting facility to manage organic waste generated within its premises. By processing organic materials into nutrient-rich compost, the company reduces its environmental footprint and supports landscaping and agricultural activities.

Further aligning with the national "Swachhata Hi Seva" initiative, MECL organized cleanliness drives, awareness campaigns, and plantation programs across its field establishments and offices. Employees actively participated in these activities, including the planting of saplings to enhance green cover and promote biodiversity to encourage proactive approach to fostering a cleaner and greener environment, encouraging community involvement and employee engagement in ecological conservation.

7.60 Research & Development

MECL is advancing its exploration capabilities through continuous infrastructure development and the adoption of modern technologies. The acquisition of a state-of-the-art digital drill core scanner as well advance

geochemical and geophysical equipment's marks a significant step forward, enabling presice study for mineral targeting. Plans are underway to expand laboratory facilities by integrating advanced analytical instruments, which will support detailed mineralogical studies and assessments. These efforts lay the groundwork for the establishment of a comprehensive digital core library.

In its pursuit of operational excellence, MECL is exploring innovative drilling techniques and technologies. The company's ongoing efforts to upgrade drill fluid technology underscore its commitment to improving the safety and efficiency of borehole drilling operations. MECL's operational strength has been significantly enhanced with the addition of four advanced hydrostatic drill rigs, capable of drilling up to 1,500 meters with N series W/L drill rods and 1,800 meters with B series W/L drill rods, facilitating deeper and more efficient exploration.

Further, MECL has secured NMET funding to establish a National Facility for advanced exploration. This facility will be equipped with state-of-the-art geological, geophysical, and geochemical analytical tools, reinforcing MECL's ability to tackle complex and deep exploration challenges. These developments align with MECL's commitment to maintaining excellence in service delivery and meeting the growing demands of the mining and exploration sectors.

MECL is actively investing in initiatives that foster innovation, research and collaboration to enhance its exploration capabilities and operational efficiency. As part of this commitment, we have hosted two workshops at our Corporate office Workshop to Revisit the current Exploration Norm with GSI and the Ministry of Mines, bringing together various stakeholders to revisit and refine current exploration norms. Another notable initiative was the Workshop on Deep Seismic Reflection Survey: Opportunities & Challenges in Mineral Exploration Survey, which focused on leveraging advanced seismic survey techniques for mineral exploration and was attended by industry experts and key stakeholders.

In a significant step toward encouraging digital innovation, MECL organized Hackathon 2024, themed "Creating Digital Solutions for Mineral Exploration." with enthusiastic participation from students of several engineering colleges of Technology, Nagpur. The Hackathon aimed to foster research, support startups, and promote institutional collaboration. A key outcome of this initiative was the development of a conversational chatbot designed to address queries related to the NGDR Acts, Rules, and Regulations.

Hackathon 2024, themed "Creating Digital Solutions for Mineral Exploration.

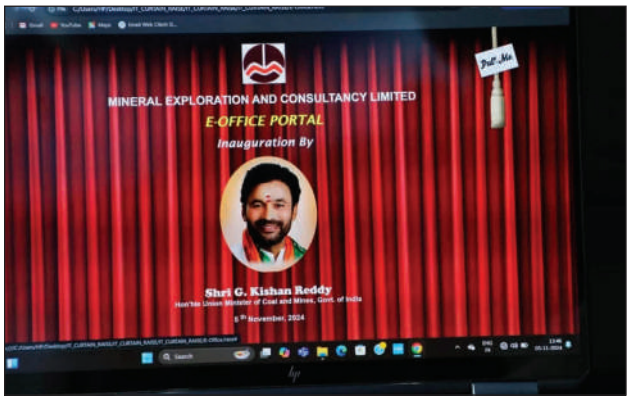
7.61 Information Technology (IT)

MECL being a service and consultancy sector organization has a well-equipped Information Technology Centre which plays a crucial role in managing the technological infrastructure and supporting the company's diverse operations, including geological data processing, ERP solutions, network management, and more. This year, the IT division has made significant strides in digital transformation, enabling MECL to improve operational efficiency, enhance service delivery.

MECL's IT department plays a crucial role in facilitating the efficient management of

vast technical data, particularly in handling geological reports for diverse exploration projects like promotional and contractual exploration, well as NMET funded projects. Central to effort is the successful integration of SAP solution, known as Khanij Sanjeevani, automates various business processes finance, marketing, exploration, project management, and human resources. This comprehensive system not only enhances operational efficiency but also ensures requirements. Embracing evolving workplace dynamics, the company has adopted virtual meeting solutions video conferencing, facilitating like seamless interactions with government agencies, project managers and internal teams.

MECL transitioned to a paperless environment with the successful launch of the E-OFFICE application. In line with the Digital India initiative, this system promotes transparency, efficiency, and eco-friendliness. Comprehensive training was provided to all employees, and the system was inaugurated by Honorable Union Minister of Coal and Mines, Shri G. Kishan Reddy.



In addition to maintaining and enhancing existing in-house software and web applications like "MECL Website", "MECL Connect", "CLIP","Vigilance Clearance System", "NDC", "DPR Monitoring", "Complaint Registration System for Civil works" etc. to streamline operations, geology and drilling related applications like "MinexP", "MyPlot", "GPL" etc. ensure optimal performance and functionality. The newly developed application portal for tracking BG and EMD submissions went live, improving transparency and efficiency for Finance and Procurement divisions. IT division played a key role in supporting the company's recruitment activities by ensuring the smooth operation and maintenance of the in-house developed recruitment portal. Ongoing digitization projects include the revamp of MECL website for GIGW 3.0 certification under STQC which is underway to comply with security, accessibility, and availability guidelines. CCTV surveillance systems were installed in critical MECL facilities, ensuring safety and security. The IT division also provided technical support for meetings, training sessions, and other events throughout the year. IT division successfully organized the "MECL Hackathon 2024," an event for developing solutions for "A conversational Chatbot capable of responding to text queries related to Acts, Rules and Regulations, NGDR, and Bhukosh Data". The initiatives underscore MECL's commitment leveraging technology for operational efficiency and process optimization

7.62 Central Manufacturing Unit

The central workshop and manufacturing unit, Regional Maintenance Centre and Instrumentation Center serve as a crucial hub for MECL's operations, providing essential engineering support to field activities. This facility specializes in the repair and overhaul of drilling rigs & equipment, Geophysical

instrument, analytical instruments and vehicles, ensuring their optimal functionality. Moreover, it plays a pivotal role in manufacturing of various spares and accessories required for both coring and non-coring drill machines.

Equipped with advanced CNC lathe machines, the workshop fabricates drill tubulars and other essential components. In the fiscal year 2024-25 (up to December, 24), the facility successfully manufactured a total of 29,887 items, including 1,211 Nos. TC bits, 1,746 Nos. Diamond bits, 13,346 Nos. drill rods & casings and 13,584 Nos. other drill accessories. This in-house manufacturing capability has significantly contributed to ensuring timely supply of essential items for drilling operations, thereby minimizing downtime for drill rig. This initiative aligns with the "Make in India" initiative, reflecting MECL's commitment to developing indigenous capabilities and contributing to the nation's self-reliance goals. Further, the MECL Regional Maintenance Centre has also provided repairing facility to M/s CMPDIL i.e. 01 No. drill rig at RMC, Ranchi and 01 No. Mud Pump at RMC Hingna.

MECL Workshop

7.63 Energy Conservation

MECL's is committed for energy conservation through various initiatives aimed at reducing energy consumption and promoting sustainability:

- MECL is actively transitioning from age-old drill rigs to state-of-the-art Hydrostatic drill rigs. These new rigs boast advanced technology, offering superior fuel efficiency and high-performance capacity. Additionally, MECL conducts regular maintenance activities aimed at enhancing fuel efficiency and minimizing carbon emissions.
- **Installation of Solar Power Plants:** MECL has embarked on a journey to replace conventional energy sources with non-conventional renewable sources. A total of 245 KW of solar power plants have been installed across various MECL premises.
- Further MECL is in process to incorporate 300 kWp solar power plant on CHQ building alongwith 85 kWp solar plant on rooftop of residential complex premises in Nagpur.
- Implementation of Smart Building Concepts in common areas and corridors of newly constructed facilities like the Geo-Chemical lab building. This includes automated lighting systems that switch off in the absence of manpower, thereby reducing overall energy consumption.
- Timer-based automatic on/off LED street lights have been installed in MECL premises, enhancing energy efficiency and reducing unnecessary power consumption.
- MECL operates an existing solar PV plant with a total capacity of 276.28 KW, comprising 245 KWp for on-grid and 31.28 KWp for off-grid systems installed in the CHQ building. Processes are underway for the installation of an additional solar plant on the available please.

Bharat Gold Mines Limited (BGML)

7.64 Secretary (Mines) visited Bharat Gold Mines Ltd (BGML), a closed PSU under the

Ministry of Mines, on 21.11.2023 and took a review meeting of BGML. Subsequent to that, following progress has been achieved.

i) Ministry of Mines has appointed a 'Transaction Advisor' to assist this Ministry for sale (by auction) of gold tailings of BGML. Accordingly, this Ministry after consultation with Govt. of Karnataka vide gazette notification dated 31.07.2024 (under Section 17 of the MMDR Act) has reserved the 1003.4 acres area in areas covering the tailing dumps of the expired mining lease of BGML to undertake mining operations for recovering gold and other precious metal from the tailing dumps. Further, Engineers India Limited (EIL) has been engaged for preparing a Techno-Economic Feasibility Report in respect of Tailing Dumps. Thereafter, a CPSE will be appointed as the project manager, which will then select a Mine Developer and Operator (MDO) for prospecting, mining and processing tailing dumps of BGML.

7.65 Operations of BGML were closed in 2001 and the Central Cabinet, in 2006, decided to dispose off the assets and liabilities of BGML through an open global tender, with First Right of Refusal in favour of the Co-operative society formed by the ex- employees of the Company. The matter went into litigation and Hon'ble Supreme Court in July 2013 permitted UoI to proceed with the global tender. However, as a lot of time lapsed, various changes in mining laws and other issues had taken place and therefore, the decision of Cabinet could not be implemented yet.

7.66 When the implementation of Cabinet decision for sale of assets of BGML through global tender became difficult in the changed scenario, the issue of deciding future course of action for BGML was discussed in the Ministry and it was decided to explore other options for BGML which were needed to be preceded by exploration of dumps and mining areas to assess the resources and Techno Economic Feasibility Study (TEFS) of the same. Ministry of Mines, accordingly, constituted a Monitoring Committee on 18.04.2019 to suggest a way forward for BGML consisting of CMD, MECL, MD, BGML and officers from Geological Survey of India, Indian Bureau of Mines and Ministry of Mines. The task of Monitoring Committee was to get legal review, asset valuation and hiring of Technical Consultant for preparing Techno-Economical Feasibility Report (TEFR).

7.67 Accordingly, Mineral Exploration Consultancy Limited (MECL) was assigned for exploration of dumps & two unmined blocks (i.e. Mectagart and Oriental) of BGML, MECL submitted its report in 2018. For identifying mineral resources in the other areas of BGML, exploration was also undertaken by MECL between September 2020 and February 2021 at Betraswamy and Doddabeta Blocks of BGML. MECL submitted its report in March, 2021. Simultaneously, Non Ferrous Materials Technology Development Centre (NFTDC) under the S & T schemes of M/o Mines had also conducted a study on Gold Ore Tailings of BGML. NFTDC submitted its TEFR in February 2021.

7.68 The TEFR for tailing dumps of BGML and the exploration reports of MECL were given to the 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 had submitted its report. Accordingly, Ministry of Mines is exploring future course and other viable option for BGML.

7.69 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 10307.70 acres. RTC and Mutation of remaining 1802 acres land is in progress.

7.70 All employees of the BGML at the time of closure were retrenched by giving Special Terminal Benefit Package (STBP). BGML also sold sital area of residential accommodation to 2812 retrenched ex- employees of BGML as one of the components of STBP benefits on concessional rate and not charged any amount for building/structure. However, title deeds could not be transferred to the beneficiaries because the properties were earlier not reflected in the name of BGML in land records of Government of Karnataka. Now the land has been mutated in the name of BGML and BGML is in the process of issuing Possession Certificates to around 2000 STBP beneficiaries in the first phase. An event for distribution of Possession Certificates to STBP beneficiaries was organized at BGML on 27.02.2024 around 2000 Possession Certificates were distributed and remaining will be distributed shortly.

7.71 Ministry of Mines has appointed a 'Transaction Advisor' to assist this Ministry for sale (by auction) of gold tailings of BGML. Accordingly, this Ministry after consultation with Govt. of Karnataka vide gazette notification dated 31.07.2024 (under Section 17 of the MMDR Act) has reserved the 1003.4 acres area in areas covering the tailing dumps of the expired mining lease of BGML to undertake mining operations for recovering gold and other precious metal from the tailing dumps. Further, Engineers India Limited (EIL) has been engaged for preparing a Techno-Economic Feasibility Report in respect of Tailing Dumps. Thereafter, a CPSE will be appointed as the project manager, which will then select a Mine Developer and Operator (MDO) for prospecting, mining and processing tailing dumps of BGML.

8

Science, Technology and Autonomous Bodies

Science, Technology and Autonomous Bodies

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- National Mineral Exploration Trust (NMET) ..... Page - 180

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 and revised in August 2023. With a view to promoting R&D in the mining sector, Ministry of Mines has launched a comprehensive Science & Technology Programme which includes (i) Research and Development (R&D) component, (ii) Information Education and Communication (IEC)component, (iii) Promotion of Research and Innovation in Startups and MSMEs in Mining, Mineral Processing, Metallurgy and Recycling Sector (S&T-PRISM) component.

Science & Technology Programme - Research and Development (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 2024-25, 42 project proposals, which are considered as relevant to the identified priorities, have been approved by SSAG for grant-in-aid by the Ministry under the R&D Component of S&T programme. The details are available at https://research.mines.gov.in.

Science & Technology Programme-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 2024-25, proposals for receiving funds under the IEC component are as follows:

i. Andhra University has been funded of ₹ 2 lakh as Grant-in-aid for organizing two-days National seminar on 27th and 28th September, 2024 under the IEC component of S&T Programme of Ministry of Mines.

ii. JNARDDC has been funded of ₹ 5 lakhs as Grant-in-aid for organizing organizing 5th International Structural Integrity Conference and Exhibition 22-24 October 2024, Nagpur.

iii. NML, Jamshedpur, Jharkhand has been funded of ₹ 2 lakhs for organizing a National Workshop on "Critical Minerals and Metals" at CSIR-NML on 10th December, 2024.

iv. Banaras Hindu University, Varanasi has been funded of ₹ 2 lakhs for organizing a National workshop on "Rare Earth Elements, Rare Metals and Strategic Minerals (REMS-2024)" from 30.11.2024 to 02.12.2024.

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

Science & Technology Programme-Promotion of Research and Innovation in Startups and MSMEs in Mining, Mineral Processing, Metallurgy and Recycling Sector (S&T-PRISM) component

8.7 Ministry of Mines has decided to promote Research and Innovation in Startups and MSMEs and has brought out guidelines for "Promotion of Research and Innovation in Startups and MSMEs in Mining, Mineral Processing, Metallurgy and Recycling Sector (S&T-PRISM)" in November, 2023. Proposals have been invited from eligible beneficiaries for funding so as to enable them to graduate to a level where they will be able to raise investments from angel/Venture Capitalist or they will reach a position to seek loans from commercial banks/financial institutions. The funding is positioned to act as a bridge between development and commercialization of innovative technologies/products/services in a relatively hassle free manner. The main idea of the S&T-PRISM is translation of research into technology (product/process/services) but not to carry out open ended fundamental research. Investigations must lead to innovation or new product/process ready for demonstration or pilot scale deployment (not only publication/ patent).

8.8 Jawaharlal Nehru Aluminium Research Development and Design Center, Nagpur, an autonomous body under the administrative control of Ministry of Mines is the Implementing Agency for S&T — PRISM.

8.9 Selected Startups and MSMEs will be provided mentorship or incubation support and technical advisory support during entire project development period and additionally for two years from the date of Technical Completion, by a Facilitation & Mentorship Team under the Implementing Agency. Scope of Mentoring Support will include Advisory, Networking, Tapping Resources, Piloting, Business Planning, Funding Raising. Further, piloting opportunity for supported Startups and MSMEs, shall be provided in the mining, mineral processing, metallurgy and recycling sector. Preference is given to Startups/ MSMEs of North East Region and women led enterprises.

8.10 Based on scrutiny which passes through different stages of evaluation including presentation of shortlisted projects before

the Technical Expert Committee (TEC) and final approval of APEX Committee chaired by Secretary (Mines), grants are given to the projects submitted by Startups and MSMEs. During the Financial Year 2024-25, 21 project proposals, which are considered as relevant to the identified priorities, have been approved by APEX Committee for grant-in-aid by the Ministry under the S&T-PRISM Component of S&T programme. The details are available at https://research.mines.gov.in.

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

8.11 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.

8.12 Grants for Creation of Capital Assets provided to the two autonomous institutions under Ministry of Mines during 2024-25 is given in **Table 8.1.**

Table 8.1
Grants for creation of Capital Assets

Institute Name	Amount (₹ in Crore)
JNARDDC	11.00
NIRM	3.50

Circular Economy and National Non-ferrous Metal Scrap Recycling Framework, 2020

8.13 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.

8.14 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.

8.15 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 and then channelizing the disaggregated scrap through a network of scrap pickers and collectors and eventually to the scrap recycler through appropriate policy interventions would earn rich dividends.

8.16 In this context, in FY 2020-21, Ministry of Mines has published National Non-ferrous Metal Scrap Recycling Framework, 2020 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/UploadFileNFMScrapRecyclingFramework3.pdf.

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

8.17 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.

8.18 JNARDDC is an ISO/IEC-17025:2017 & ISO-17034:2016 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.

8.19 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. Another objective is to promote and develop recycling industry and transition to a circular economy in Non-Ferrous Metal Sector.

8.20 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

8.21 Major activities

The Centre completed six projects and sixteen R&D projects are in progress for various government and non-government organization. The details are mentioned in **Annexure 8.1**. JNARDDC is setting in a recycling division in JNARDDC with DAIKI Aluminiu, Japan as the knowledge partner.

8.22 Designated Sector Expert

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

- **NITI Aayog -**
  - REE (Rare earth element) from red mud and coal fly ash
- **Bureau of Energy Efficiency (BEE), Ministry of Power –**
  - Sector expert for "National Mission for Enhanced Energy Efficiency"- PAT 2/3/4 cycle
  - Waste utilization of SPL & Dross
- **BIS, Bureau of Indian Standards for standards-**
  - Guidelines for Al-scrap
  - The standard for aluminium alloys

- **Referee Lab for Coal**
  - ➢ JNARDDC is nominated referee lab for coal sample analysis of third party sampling of coal
- **MoM (Ministry of Mines) –**
  - ➢ Carrying out functions earmarked for MRA as stipulated in the "National Non-Ferrous Metal Scrap Recycling Framework 2020.
  - ➢ Implementing agency for promoting startups and MSMEs
  - ➢ EPR for aluminium scrap
  - ➢ Vision document on recycling for non-ferrous sector

8.23 Implementation of S&T- PRISM Scheme for Startups & MSMEs

Shri G. Kishan Reddy, Hon'ble Union Minister of Coal and Mines, and Shri Satish Chandra Dubey Hon'ble Minister of State for Coal and Mines, handed over project sanction letters for ₹ 11.26 Crores to ten startups / MSMEs under the S&T PRISM 2.0 scheme on 24th June 2024. It's a major initiative of the Ministry of Mines to promote Startups, MSMEs and Individual Innovators for projects up to 2 years duration, which have direct bearing on mineral and metal sector, applied and sustainable aspect of mining, metallurgy and industrial applications. The grant will enable them to graduate to a level where they will be able to raise investments from angel/Venture Capitalist or they will reach a position to seek loans from commercial banks/financial institutions. The apex committee chaired by Shri V L Kantha Rao, Secretary (Mines) sanctioned funds to the following ten agencies :- (i) Sakshi Chem Sciences Pvt Ltd, Nagpur (ii) XYMA Analytics Pvt Ltd, Chennai (iii) Kimberlite Chemicals India Pvt Ltd, Bengaluru (iv) Greenewelty Pvt. Ltd, Bhubaneswar (v) OGPEX Geoscience (OPC) Pvt Ltd, Thane, Mumbai (vi) Innocule Materials and Additives Pvt Ltd, Bhubaneswar (vii) Corrosion Intelligence Pvt Ltd, New Delhi (viii) Lohum Materials Pvt Ltd, Delhi (ix) JAMP INDUSTRIES, Nagpur & (x) Relira Blastech, Itwari, Nagpur. The funding is positioned to act as a bridge between development and commercialization of innovative technologies/products/services in a relatively hassle free manner. JNARDDC played the pivotal role as the implementing agency by evaluating the proposals to the final award of the project with Director, JNARDDC as the chairman of the Technical Evaluation Committee. It underscores the Ministry's focus on innovation-driven growth through Startups and MSMEs.

Patent :

- Granted for "An improved heat treatment process for production of heat resistant Al-Zr alloy wire for overhead conductor" No. 533417 on 17.04.2024
- Filed for "Modified Route of Synthesis for High Pure a-alumina Using Virgin Aluminium Metal" (jointly with NALCO).

8.24 Seminars and Conferences

JNARDDC along with other academic and scientific institutes organized and participated in the following major seminars.

- 28th International Conference on Non-ferrous Metals (ICNFM-2024),12-13 July 2024, Bhubaneshwar; www.nonferrousmeet.net/

- 12th International Congress and Exhibition "Non Ferrous Metals and Minerals- 09-13 Sep 2024, Krasnoyarsk, Russia

JNARDDC team with Russian officials at Moscow

- 12th International Bauxite, Alumina & Aluminium Conference & Exhibition IBAAS-IIM 2024, 25-27 Sep 2024, BITS Pilani, Goa
- 5th International Structural Integrity Conference and Exhibition 22-24 October 2024, VNIT, Nagpur JNARDDC team also visited DAIKI Japan for signing the MOU for setting up the recycling unit at JNARDDC with DAIKI as the knowledge partner.

8.25 Technical Testing & Consultancy work

JNARDDC carried forward its reputation of being an outstanding analytical lab by analyzing around 15,000 third party referee sample analysis of coal samples provided by QCI, New Delhi and others. Besides coal the Centre carried out characterization of bauxite, Lime stone, graphite, Pulp, iron ore, Manganese ores, rare earth elements etc of M/s Lloyd Metals and Energy Ltd of Surjagarh Iron mine, Gadchiruli, OMC, MECL, MOIL etc of around 5500 samples. The institute also sold around 35 CRMs.

❖ Awards / Recognition

JNARDDC scientists out performed in various technical events and secured the following awards.

- *2nd position in Environment & sustainability session* for the presentation of the paper titled "Investigation of the Composition & Sintering Temperature of Industrial Waste Materials Synthesized Ceramic Membranes" at CHEMIX '24, VNIT Nagpur on 6-7 April, 2024. Prachi P Pradhan, Scientist
- *Best paper award* to on the topic "A Step Towards the Production of Alumina Trihydrate (ATH) Using Non-metallurgical Grade Bauxite Following Soda Sintering Process" for the Bauxite-Alumina session at 12th IBAAS held at BITS Pilani K K Birla Campus, Goa during 25th-27th September 2024. Prachi P Pradhan, Scientist
- Best Oral Presentation award in Non-Ferrous Metal Processing Session for the paper titled "Optimising electrical and mechanical properties of A356 alloys with high Fe and Cr, Mo & V additions" at 78th IIM-ATM 2024 Bengaluru. R Anil Kumar, Scientist

- Certificate of appreciation by BARC, Mumbai for excellent analytical competence of JNARDDC lab in ILCE of alumina.
- Appreciation award to JNARDDC at 8th NABL PTP/RMP Conclave for the Indigenization of Certified reference materials (CRMs) for Wrought aluminium alloys by JNARDDC during 29-30th August 2024 at Mysore

8.26 Swachhta Hi Seva Campaign 2024

The highlight of this year SHS campaign was the construction of Waste to Art Sculpture model made of 1.6 tons aluminium scrap which was installed in Ranilaxmibai Udyan Public Park, Wadi National Highway NH-6 with the theme "Recycle today for a better tomorrow". The model was inaugurated by Shri Nitin Gadkari, Hon'ble Union Minister (Road Transport & Highways) in the presence of Dr Agnihotri Director JNARDDC & Dr V Deshmukh CEO Nagar Parishad, Wadi; R Vishakha & R Srinivasan, Nodal Officers of JNARDDC. The Institute organized a Safai Mitra Suraksha Shivir cum TB camp in association with State Health Dept for all workers and safai karamcharis of JNARDDC and Nagpur Nagar Parishad in presence of WHO officials. Present during the camp were Dr Vidyanand Gaikwad, Dr Aparna Pawade, Dr Singh from District TB office, Govt of Maharashtra and Dr Sanket Nandekar WHO official of Vidarbha region. 115 volunteers participated during cleanliness drive and disposed off 1.5 tones dry waste and cleaned the CTU Smrutinagar Duttawadi Nagpur. Under "Ek Ped Maa Ke Naam" initiate a mass plantation drive was undertaken in presence of Dr Vijay Deshkumh, CEO, Nagar Parishad Wadi, wherein employees & citizens planted more than 50 plants at Smruti Nagar, Wadi, Nagpur. 'Swachhata Run' and public awareness campaign of RRR activities by organized by Feedback Foundation NGO Gurugram at JNARDDC campus. The Institute also felicitated all the local sanitation workers on Swachh Bharat Diwas to acknowledge their contribution to this zeal. It was selected for showcasing before PM by Ministry of Mines.

Waste to Art Sculpture model inaugurated by Shri Nitin Gadkari, Hon'ble Union Minister (Road Transport & Highways)

8.27 TB Elimination Campaign

JNARDDC rolled out its 100-days Tuberculosis (TB) Elimination Campaign in December 2024 to intensify progress towards ending the disease through improved case detection, reduction in diagnostic delays, and enhanced treatment outcomes. In the 1st phase JNARDDC carried out a TB screening camp in Sep 2024 in association with State Health Dept for all contractual workers the office and Nagpur Nagar Parishad in presence of WHO officials. This zeal will be extended further by several awareness campaigns in the 2nd phase upto March 2025.

8.28 Finances

The Centre has achieved an Internal revenue generation of ₹ 13.01 crores till now against target of ₹25 crore for 2024-25. A capital budget of ₹ 11.00 crore for creation of capital assets was released by Ministry of Mines in 2024-25 for the Centre

National Institute of Rock Mechanics

8.29 National Institute of Rock Mechanics (NIRM)

- Provides customized scientific solutions based on Rock Mechanics, Rock Engineering and allied sciences in the field of mining, hydel and critical infrastructure sectors.
- The scientific services of the institute pertain to mapping, imaging, testing, design, excavation and monitoring of rockmass of major underground structures to ensure their sustenance and durability.

NIRM Performance and Projections (January 2024 to March 2025)

8.30 The flow of work at NIRM is dependent on industry requirements and projects running at national and state level which is always variable. Financially, during this period NIRM has managed to reach 95% of previous year projects in number reaching upto 76% of cash flow compared to previous year. Still with such varying possibilities NIRM has achieved/expect the following revenues

- From 01 January 2024 till 30 December 2024 NIRM completed 51 projects worth 16.54 crores.
- 28 New projects were awarded worth 8.54 Crores during this period and likely to add 15 more projects worth up to 3.0 Crores till March 31, 2025.
- Thus, a total cash inflow of 11 Crore is expected to be achieved through projects during the financial year April 2024-March 2025.

8.31 NIRM is continuing its efforts for meeting industry requirements/challenges in rock engineering and rock mechanics related measurements and challenges with augmented scientific instrumentation and upgraded facilities with the support of Ministry of Mines, Govt. of India. Some part is sourced through internal resources generated.

NIRM has zero funding and aims to work for financial sustainability with its high-quality services under challenging variable industry conditions and trends. NIRM requires strong support in terms of capital upgradation, skilled young human resources, and overall financial support to the tune of at least ₹8 crores annually.

8.32 Ministry of Mines has been providing support and initiatives through industry involvement and research organisations for wider collaboration in mining, power, nuclear and infrastructure sectors. With this support NIRM looks forward to gear up its activities to reach better its performance by reaching out to various industries and global organisations.

8.33 Glimpses of work done and Achievements

List of major projects during April 2023-March 2024 include:

1. NDT of critical components and HEMM equipment testing at Zawar Mines, M/s. HZL, Rajasthan
2. NDT of winder vital parts, structural stability test, HEMM and its load bearing components of Kayad mine
3. Quality checking of raw granite blocks for new Anubhava Mantap project Basavakalyan
4. Quality checking of granite stones to be used for construction of Shri Ram temple at Ayodhya
5. Review of engineering geological/ geotechnical mapping and characterization of rock mass for the Bherughat and twin tunnels, portals areas of 4 laning of Tejajinagar to Balwara section of NH-347BG, Madhya Pradesh
6. Engineering geological investigation of the railway tunnels for the proposed electrification of Hassan (HAS)-Subrahmanya road (SBHR) in Mysore Division South western Railway
7. Construction stage Eng. Geological mapping of the foundation floor of on-site emergency support centre for Tarapur Atomic Power Station, Maharashtra
8. Engineering Geological investigation of balance stretch of tunnel alignment for realignment (ch 1800 to 3300 m) of Sengulam Augumentation Scheme (85 MU) Idukki dist, Kerala.
9. Review of Eng. Geological Investigation of 1.2 Km Twin tunnels of Six-lane Access controlled greenfield highway section of NH-150C at Kurnool Andhra Pradesh
10. Geophysical investigation to characterise the overburden rock mass and to locate the shallow aquifers along the hydro tunnel alignment of Sengulam Augmentation scheme, Idukki District, Kerala
11. Geophysical investigation to assess the cause of cracks in the SCADA control room building of HPCL Mangalore
12. Geophysical survey for assessment of contamination of ground around the bio-compost yard of Sri Chamundeshwari sugars ltd.
13. Guidance and support to Micro seismic monitoring at Rampura Agucha Mine, Hindustan Zinc Ltd.
14. Mine & Dump slope stability analysis for Lloyds metals & Energy ltd. Surjagarh, Gadchiroli, Maharastra
15. Assessment of Granite Building Stone quarry of Thomas OD at Resurvey Nos: 234/1, 234/2 & 234/5 in Muppiyanadu vilage, Vythri Taluk, Waynadu district Kerala. For an extent of 1.3307 Ha
16. To carry out in situ direct shear test at the power house area of Kirthal-II, HE Projects Jammu & Kashmir
17. Dilatometer test at Nalla Somanadri (Gattu) Lift Irrigation Scheme (NSLIS)
18. Consultancy services for Geotechnical studies for GMDC's Ambaji Multimetal and Kadipani Expansion Mines/Projects.
19. Slope stability studies for left bank slope / Abutment of concrete dam of Subansiri Lower Hydroelectirc project (200 MW) NHPC LTD.
20. Numerical Modelling studies for optimisation of Mining parameters at the open cast mines (Kadipani fluorspar and Kadipani Expansion project) of GMDC ltd Gujarat

21. Numerical Modelling studies for Optimisation of mining parameters at Ambaji underground mine of GMDC ltd. Gujarat.
22. Technical guidance for controlled blasting and monitoring of ground vibration for the excavation of hard rock Malabar hill sets, RIL MUMBAI (Phase -2)
23. Optimisation of blast design parameters and monitoring of blast vibration at Utkal D Coal Mines Chendipada, Angul dist, Odisha
24. Study on providing safe charges for blasting conducted to construct turbine building of unit 5 & 6 of Kaiga atomic power plant, Kaiga
25. Phase II Extension-3 Monitoring of ground vibration and air overpressure due to blasting carried out for construction of uit 5& 6 of Kaiga atomic power plant, Kaiga, Karnataka.
26. Extension of Tehnical Guidance Services for Excavation of various powerhouse complex components of Punatsangchhu-II (1020 MW) Hydroelectric project by controlled blasting, Punatsangchhu-II hydroelectric project authority (PHPA-II) Bhutan.
27. Seismotectonic Evaluation for the proposed Jaitapur Nuclear Power Plant within 50 km of radius, Jaitapur, Corporation of Maharashtra.
28. Seismotectonic Evaluation - feasibility study for the propose IREL, Chatrapur, Ganjam District, Odisha
29. Macro Landslide Hazard Zonation Mapping in the area surrounding the proposed chutka Madhya Pradesh Atomic Power Project at Village-Chutka, District-Mandla, Madhya Pradesh
30. QA support for the ongoing Geological/ Geotechnical investigations at mahi Banswara Rajasthan Atomic power project, Banswara Rajasthan.

NIRM-GSI MoU

8.34 NIRM and GSI have signed an MoU in March 2024 under the instruction of the Ministry of Mines for collaboration in Pumped Storage Projects (PSP). With modern equipment and a coherent team of skilled Scientists at NIRM and the expertise of GSI geologists and geophysicists and geotechnical engineers, the MoU will enable the organisations to provide customised solutions for a wide range of rock mechanics and rock engineering problems in the projects.

8.35 NIRM Scientific Publications

In addition to providing timely solutions to industries, NIRM has published 15 technical papers through national and international conferences, symposium, peer reviewed journals and other technical publications. Including technical reports, the publications are 51 for this period.

Glimpse of NIRM scientific outcome

In-situ stress and deformability at hydel project in J&K

8.36 The Kirthai-II Hydroelectric project (930 MW) is a runoff of the river with a 121 m high concrete gravity dam scheme to come up on the river Chenab in Padder Tehsil, Kishtwar district, Jammu & Kashmir. All the components of Kirthai II H. E. Project will be housed in the Pias Granites, which appear generally fresh, massive, and hard. The in-situ direct shear parameters of rock mass are one of the important engineering parameters required for the stability analysis and design of the rock structures was completed in an exploratory drift.

The railway tunnel site (left) and the hydroelectric project site (right)

Engineering Geological Investigations for Railway Tunnels

8.37 This is crucial for Engineering Geological Investigations for the Railway Tunnels for the Proposed Electrification of Hassan (HAS) – Subrahmanya Road (SBHR) in Mysuru Division, South Western Railway was carried out for rock mass classification and characterization of bracket areas ofunlined excavated portion of tunnels between Donigal and Subrahmanya Road of Hassan (HAS). Comprehensive report with identifications of geological defects in the excavated tunnel surface of bracket areas and recommendations for treatments based on rock mass characterization and site geological conditions was done.

Plate 1 : 1st Collapse from face-IV, ingress of debris flow on 7th January 2023

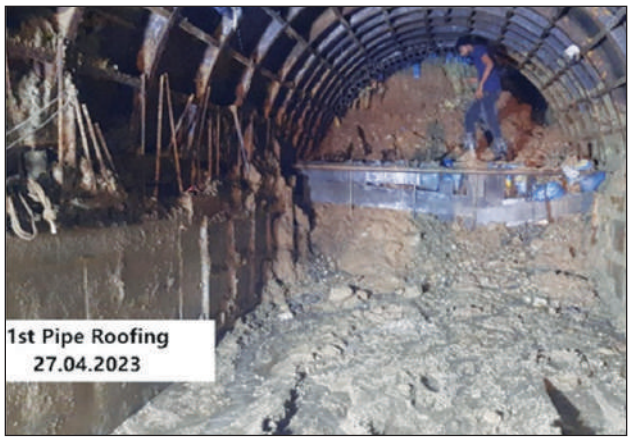
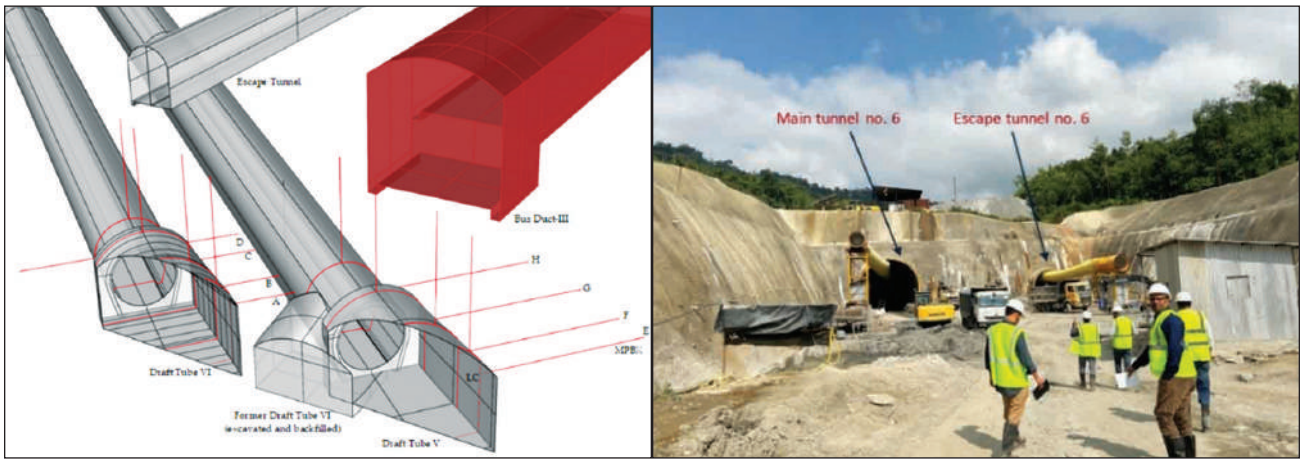


Plate 2 : 1st time pipe roofing was done on 27th April 2023

Numerical Modelling and Design for hydel projects

8.38 Analysis of geotechnical and geodetic instrumentation data for critical reaches / excavations like draft tube tunnels V and VI, tail race tunnel, downstream surge chamber and additional surge tunnels was carried out using numerical modelling tools. Notably, there are no physical deformation indications on the downstream wall surface at RD 70. Based on instrumentation monitoring post-excavation indicates stable conditions. Physical observations are recommended for the downstream wall from RD 75 to 195. The geodetic monitoring showed negligible deformations during the reporting period.



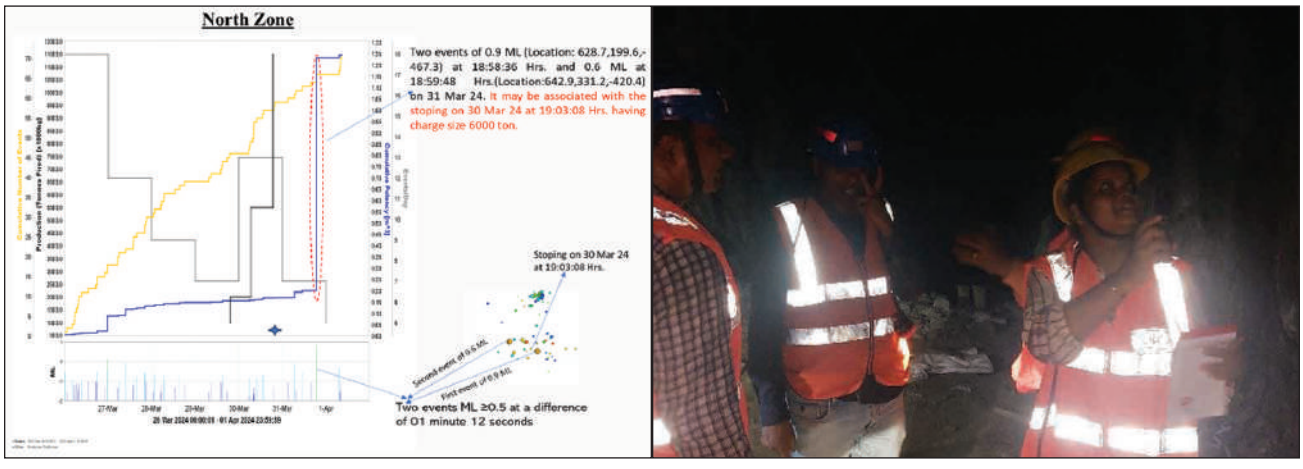
(left) Layout showing installation locations for DT V and DT VI,
(right) NIRM scientists at Tunnel No. 6 Dimapur-Kohima Railway Line

8.39 The total station survey recorded a maximum total displacement of 36 mm at RD 70 EL 593.2 D/S until the last month of reporting. The design of support for different rock classes and the methodology for underground excavation to expedite the progress.

8.40 A proper three-dimensional (3D) numerical modelling analysis was recommended for better assessing the stability of the tunnel excavation using 3D geological logs that encompass the entire circumference of the tunnel. Incorporating intermediate adits throughout the tunnel alignment can provide extra working faces for tunnel excavation and reduce the total time needed for the excavation.

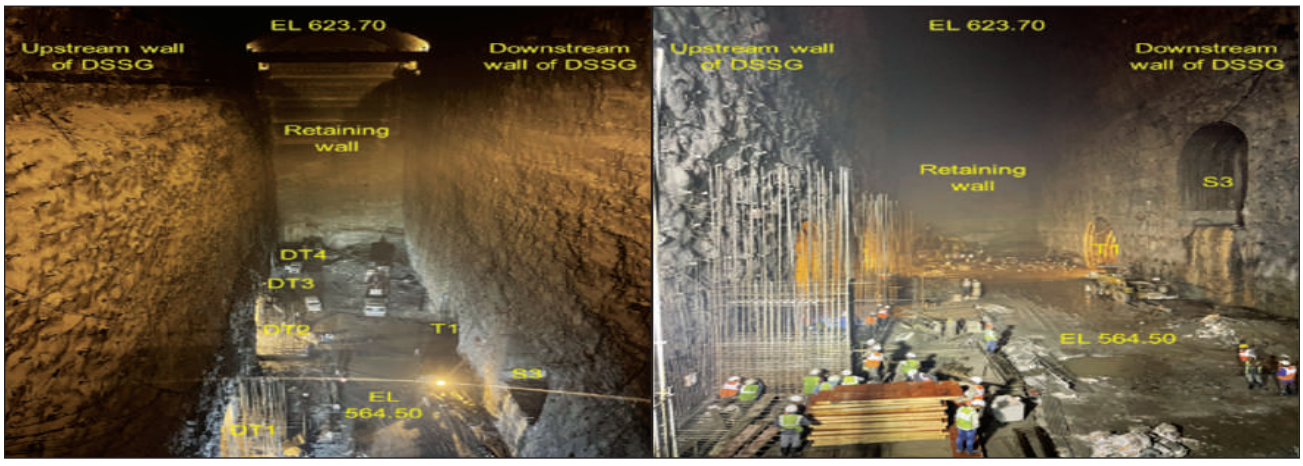
NIRM monitoring enable meet production targets in underground metal Mine

8.41 NIRM scientists provided support through guidance on seismic network installation, health of the monitoring system, and overall coverage of the underground mines for improving the monitoring efficacy. In addition, review of the quality of data being received, analysis of the seismic events, evaluation of seismic hazard was carried out with seismic event-based back analysis and for forecasting probable hazard and production.



Analysis of seismic events and mining shows the change of seismic source parameters with time during production cycle; NIRM scientists visit to HCL Malanjkhand mines for addressing stability issue with the proposed microseismic monitoring.

Excavation in challenging rock mass conditions



NIRM blasting in complex geological conditions was successfully at the PHPA-II- Bhutan, which was recently commissioned and is generating power.

8.42 NIRM provided advanced excavation strategy for two major underground structures at PHPA-II, Bhutan. Poor geological rockmass conditions encountered in the excavation stretches was successfully tackled by adopting site specific excavation techniques. Excavation of additional surge tunnels (AST-S2 and AST-S1) was successfully completed by adopting heading and benching method in water charged weak rockmass conditions without hampering the activities in the adjacent tunnels. Draft tube V and VI was successfully excavated and supported by adopting suitable controlled blasting techniques. NIRM has taken all the necessary precautionary measures in designing the blast to reduce the influence of blast induced ground vibrations on the surrounding rockmass and structures.

India International Trade Fair at New Delhi (IITF2024)

8.43 NIRM participated in the annual event at the Pragati Maidan New Delhi as part of the Ministry of Mines Pavilion at the IITF2024 to showcase its activities and capabilities in providing solutions to various mining and infrastructural sectors. The integrated pavilion had quizzes on various mining related topics, personal interactions with government authorities, video sessions, tutorials that kept the dignitaries, public and children engaged. The feedback received from the visitors showed keen interest in the spectrum of work done by NIRM and appreciation for its contribution in various industries under challenging conditions.

IITF 2024 NIRM STALL visited by the Honourable Union Minister of Coal and Mines Shri. G. Kishan Reddy after inauguration of the "Minerals to Milestones Pavilion" at the Pragati Maidan, New Delhi.

Shri Satish Chandra Dubey, the Honourable Minister of State for Mines graced the NIRM stall with his visit and interaction with NIRM scientists at IITF2024

NIRM services contribute to India's civil, mining and infrastructure sectors

8.44 NIRM contributions have been significant in terms of value addition to planning, design, excavation, and construction stages of minor and major projects. NIRM investigations and reports are appreciated and incorporated in various project decisions and regulations in mining, civil, hydel and critical infra sectors. Optimisation of method/techniques in mining, tunnelling and other large underground excavations have minimised hazards, improved productivity thereby reducing cost of projects thus indirectly contributing to project cost efficiency and national spending on such projects. During 01 January 2025 till 31 March 2025 new proposals are submitted to the industry for providing site specific solutions and it is projected that 15 more projects worth up to 6.5 Crores till March 31, 2025 will be taken up.

8.45 National Mineral Exploration Trust (NMET)

1. The National Mineral Exploration Trust (NMET) was established by the Central Government by notification dated 14th August, 2015 in pursuance of sub section (1) of Section 9C of The Mines and Minerals (Development & 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 to the State Government in terms of Second Schedule of the Act, simultaneously with payments of royalty.

2. NMET operates under a two-tier structure. The Governing Body (GB), under the chairmanship of Hon'ble Union Minister of Mines, holds the overall authority, conducts periodic reviews and sets the policy directions for the Trust, while the Executive Committee (EC) is responsible for managing, administering, and supervising the day-to-day activities of the Trust. Secretary, Ministry of Mines is chairman of the Executive Committee.

3. During the year 2024, the annual meeting of the Governing Body was convened on August 12, 2024 under the chairmanship of Hon'ble Union Minister of Mines. During the period Jan-Dec, 2024, the EC met six times; in these meetings, several important decisions were taken & 120 projects related to mineral exploration & other schemes were approved.

4. Since inception upto 31st December, 2024, the total NMET fund accrued is ₹6085.37 Cr. and total expenditure incurred is ₹1116.51 Cr. During the year 2024 (Jan-Dec), the total NMET fund accrued is ₹894.57 Cr. and expenditure of ₹318.25 Cr. has been incurred. The estimated expenditure for the period from January to March, 2025 is around ₹135 Cr.

5. The details of Projects sanctioned during the year are given below:

S. No.	Project Category	No. of Projects approved	Total approved cost (Rs. Cr.)
1.	Mineral Exploration	102	218.5
2.	Baseline Geoscience	04	196.93
3.	Financial assistance/ Procurement	14	194.11
	Total	**120**	**609.54**

6. Since the establishment of NMET, a total of 471 projects have been approved by EC for NMET funding, out of which 392 projects are of mineral exploration, 23 projects for baseline geosciences data generation, 45 Projects of financial assistance and 11 projects of S&T PRISM.

Out of 392 mineral exploration projects, 46 projects of 11 Notified Private Exploration Agencies (NPEAs) have been approved amounting to Rs. 72.39 Cr.

7. A total of 18 blocks explored with NMET funding have been successfully auctioned. During the year 2024, 05 blocks were successfully auctioned. The year wise break up of mineral blocks successfully auctioned is given below:

8. National Aero-Geophysical Mapping Program (NAGMP) with Magnetic-Gradiometry and Radiometric Surveys has been taken up by GSI through NMET Fund with the objective to (1) Acquire high resolution baseline aero-geophysical data, (2) Identify new target areas for mineral prognostication, (3) Understanding subsurface geological

Sl. NO.	Block	Mineral	State	Year of Auction
1	Nahardih-Maghaipur Block Tehsil- Tilda, District- Raipur	Limestone	Chhattisgarh	2021
2	Diggaon Block (G-3)	Limestone	Karnataka	2022
3	Ramsthan- Ghunchihai (G-2) Jamodi- Mahanna Part-A (G-2)	Limestone	Madhya Pradesh	2021
4	Purheibahal Block (G-2)	Iron	Odisha	2021
5	Chandiposhi Block (G-2)	Iron	Odisha	2021
6	Jumka- Pathiriposhi (G-2)	Iron	Odisha	2021
7	Gothra-Parasrampura East Block (G-3)	Limestone	Rajasthan	2022
8	Gothra-Parasrampura West Block (G-3)	Limestone	Rajasthan	2022
9	Mandri-Panchala Block, District- Nagpur, Maharashtra	Manganese	Maharashtra	2022
10	Sonrai Phosphorite Block II-IV	Phosphorite	Uttar Pradesh	2022
11	Lanjera- Futala	Manganaese	Maharashtra	2022
12	Jaisinghpura North Block	Iron	Karnataka	2023
13	Jaisinghpura South Block	Iron	Karnataka	2023
14	South of Damuda	Coal	Jharkhand	2024
15	Lamatola/North URTAN	Coal	Madhya Pradesh	2024
16	Preliminary exploration for Phosphorite in Pahadi Kalan-Gora Kalan Block, District Lalitpur	Phosphorite	Uttar Pradesh	2024
17	Babja Graphite and Manganese Block	Graphite and Manganese Ore	Central Government/ Odisha	2024
18	Biarpalli, Balangir district	Mn & Graphite block	Central Government/ Odisha	2024

and structural set up over the Obvious Geological Potential (OGP) areas and in its adjoining areas by engaging Project Implementing Agencies (PIA). The study area has been divided into 21 blocks in which blocks 1-12 belong to OGP areas & blocks 13-21 are adjacent to the OGP areas. So far, the survey has been completed in 6 blocks from which 302 mineralized potential blocks have been identified. This will serve as an important tool for enhancing exploration work in mineral sector and also make available the aerogeophysical data for various stake holders through the National Geoscience Data Repository to provide aid to exploration activities. The details of the survey carried out under NAGMP are given below:

Sl. No	Financial Year	Project Name	Approved Cost	Project Status
1	2017-2018	Multisensor Aerogeophysical Surveys Over Obvious Geological Potential and adjoining areas Block-1	26,52,44,532	Completed
2	2017-2018	Multisensor Aerogeophysical Surveys Over Obvious Geological Potential and adjoining areas Block-2	19,40,81,059	Completed
3	2017-2018	Multisensor Aerogeophysical Surveys Over Obvious Geological Potential and adjoining areas Block-3	23,98,29,029	Completed
4	2017-2018	Multisensor Aerogeophysical Surveys Over Obvious Geological Potential and adjoining areas Block-4	23,31,78,865	Completed
5	2023-2024	Multi-Sensor Aero-geophysical Survey Block-5	56,05,19,456	Ongoing
6	2020-2021	Multi-Sensor Aero-geophysical Surveys over Obvious Geological Potential areas of India, Blocks-6	40,36,01,633	Ongoing
7	2023-2024	Multi-Sensor Aero-geophysical Survey over Obvious Geological Potential OGP) Block 7	35,74,52,623	Ongoing
8	2020-2021	Multi-Sensor Aero-geophysical Surveys over Obvious Geological Potential areas of India, Blocks - 8	44,72,81,852	Completed
9	2023-2024	Multi-Sensor Aero-geophysical Survey Block-9	29,13,47,277	Ongoing
10	2023-2024	Multi-Sensor Aero-geophysical Survey Block-9	12,73,39,567	Ongoing
11	2023-2024	Multi-Sensor Aero-geophysical Survey Block-10	38,54,59,345	Ongoing

Sl. No	Financial Year	Project Name	Approved Cost	Project Status
12	2023-2024	Multi-Sensor Aero-geophysical Survey Block-10	-4,02,06,908	Ongoing
13	2018-2019	Multi-Sensor Aero-geophysical Survey Block-11	35,10,65,609	Completed
14	2023-2024	Multi-Sensor Aero-geophysical Survey Block-12	15,59,70,432	Ongoing
15	2023-2024	Multi-Sensor Aero-geophysical Survey Block-12	2,63,91,522	Ongoing
16	2024-2025	Multi-Sensor Aero-geophysical Survey Block 13	36,41,53,692	Ongoing
17	2021-2022	Multi-sensor aero-geophysical surveys over blocks 14 in adjoining Obvious Geological Potential (OGP) areas under National Airborne Geophysical Mapping Programme (NAGMP)	33,47,90,000	Ongoing
18	2021-2022	Multi-sensor aero-geophysical surveys over blocks 15 in adjoining Obvious Geological Potential (OGP) areas under National Airborne Geophysical Mapping Programme (NAGMP)	33,41,93,637	Ongoing
19	2024-2025	Multi-sensor aero-geophysical surveys over blocks16 17 19 20 in adjoining Obvious Geological Potential (OGP) areas under National Airborne Geophysical Mapping Programme (NAGMP)	95,03,81,566	Ongoing
20	2024-2025	Multi-Sensor Aero-geophysical Survey Block 18	30,54,21,665	Ongoing
21	2024-2025	Multi-Sensor Aero-geophysical Survey Block 21	34,94,13,701	Ongoing

9. A "Data Processing, Interpretation and Integration Centre (DPIIC)" at GSI, RSAS, Bangalore has been conceptualized by GSI with the vision statement "Excelling in geophysical data processing through the adoption of integrative geoscience approach for exploration decision-making" in order to store, analyze, interpret and integrate the data with other geoscientific data to build appropriate 2D & 3D models for finding new areas of mineral exploration. NMET has sanctioned amount of Rs. 4.07 Cr for implementation of the 1st phase of DPIIC during the year.

10. As part of the efforts towards capacity building of State governments to carry out mineral exploration, NMET provides financial assistance to the State DMGs/ DGMs, for procurement of machineries/ equipment, instruments and software for enhancing the exploration activities.

i. NMET has introduced a scheme on 23.03.2022 & 8.6.2022 to provide financial assistance to the State Governments/Central Government/ PSUs to augment their capacity in mineral exploration. During the year, NMET has approved 14 projects amounting to ₹ 194.11 Cr to GSI, Central PSU and State DGMs/DMGs aimed at strengthening technical infrastructure.

ii. An incentive of ₹ 16.60 Cr. was provided to 8 States (Karnataka, Madhya Pradesh, Gujarat, Andhra Pradesh, Maharashtra, Rajasthan, Uttar Pradesh and Chhattisgarh) for auction of mineral blocks during the year 2024.

11. NMET also provides opportunity to Start-ups and MSMEs under the S&T PRISM scheme of Ministry of Mines to support R&D projects. Till date, NMET has funded 11 Projects under the S&T Prism scheme of Ministry of Mines with approved cost of ₹12.46 Cr.

12. To encourage private participation in exploration, during the year, the Schemes for partial reimbursement of exploration expenses for holders of Exploration Licence and Composite Licence were introduced:

i) Partial Reimbursement of exploration expenses to Composite Licence Holders

In pursuance of provisions of NMEP, 2016 to encourage private participation in exploration, the scheme for Partial Reimbursement of Exploration Expenses for holders of Composite Licences was launched on 23rd March 2022. However, based on the feedback from stake holders, the scheme was modified on 24th October 2024 wherein NMET will partially reimburse exploration expenses incurred by Composite Licence Holders upto 50% of direct cost, with ceiling of ₹8 Cr.

ii) Partial Reimbursement for exploration expenses to Exploration Licence Holders

To encourage private participation in exploration and to facilitate, encourage and incentivize private sector participation in all spheres of exploration, with focus on critical and strategic minerals, Ministry of Mines, on 24th June 2024 launched the scheme where NMET will partially reimburse exploration expenses incurred by Exploration Licence Holders upto 50% of direct cost, with ceiling of ₹20 Cr.

13. Ministry of Mines revised the scheme for engagement of Notified Private Exploration Agencies (NPEAs) in mineral exploration on 27th June 2024. As per the modified scheme, project proposals for all major minerals other than minerals mentioned in Part B of the First Schedule of the MMDR Act, 1957 can be directly submitted and funded by NMET. This is in addition to the provision for direct submission of project proposals for exploration of critical and strategic minerals. In further modification of the scheme, on 22nd August 2024 NPEAs can submit Detailed Exploration Proposals directly to NMET, instead of application for in-principle approval. However, agencies that prefer to seek in-principle approval may still proceed with this option. A total of 46 projects have been approved to 11 Notified Private Exploration

Agencies (NPEAs) amounting to ₹ 72.39 Cr. Out of 46 projects, 31 projects are of critical minerals. During the year, 29 Projects amounting to ₹ 56.24 Cr. have been sanctioned to NPEAs, of which 19 projects amounting to ₹ 38.95 Cr are of critical minerals.

14. To encourage mineral exploration in districts affected by Left Wing Extremism (LWE), NMET enhanced the cost of field components of exploration work in Most affected LWE Districts to 1.25 times of the normal SoC rates on 8th July 2024. This includes total of 12 districts in the States of Chhattisgarh, Jharkhand, Madhya Pradesh, Maharashtra and Odisha.

Notified Private Exploration Agencies (NPEAs) in Mineral Sector

8.46 The second proviso to Section 4(1) of the Mines and Minerals (Development and Regulation) Act, 1957 was amended through MMDR Amendment Act 2021 w.e.f 28.03.2021. The said amended provision empowered the Central Government to notify entities, including private entities to undertake prospecting operations, subject to terms and conditions specified by the Central Government. The guidelines for notification of the private agencies came into force on 12.08.2021. Till 31.12.2024, a total of 28 private exploration agencies have been notified by the Central Government. The list of NPEAs is as follows:

1	M/s Synergy Geotech Private Limited
2	M/s APC Drilling & Construction Private Limited
3	M/s Vardan Environet LLP
4	M/s Envirogreen Consultants (India) Private Limited
5	M/s GMMCO Technology Services Limited
6	M/s Bhushilp Mines and Minerals Pvt Ltd
7	M/s Mining Tech Consultancy Services Limited
8	M/s Critical Mineral Trackers
9	M/s PRB Infraprojects Private Limited
10	M/s Ramgad Minerals and Mining Limited
11	M/s GEMS Project Pvt Ltd.
12	M/s Kundan Concentrates Private Limited
13	M/s Kartikay Exploration and Mining Services Pvt. Ltd
14	M/s Engeotech Consultant
15	Ms Novomine India Private Limited
16	Ms Infrastructure Logistics Private Limited
17	Ms Geo Marine Solutions Pvt. Ltd.
18	Ms Geo Exploration and Mining Solutions
19	Ms Ecomen Laboratories Pvt. Ltd.
20	Ms Maheshwari Mining Private Limited
21	Ms V. M. Salgaocar and Brother Private Limited
22	Ms Geovale Services Private Limited
23	Ms GeoExpOre Private Limited
24	Ms United Exploration India Private Limited
25	Ms Geotechnical Mining Solutions
26	Ms Gemcokati Exploration Private Limited
27	Ms. Indian Mine Planners and Consultants
28	Ms. Natural Resources Division-Tata Steel Limited

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.
- The company has spent Rs. 31.10 crore in the FY 2024-25 (Till December,2024) on various CSR projects against the mandated CSR obligation of Rs 57.93 crore.

9.2 Highlights on CSR activities for the financial year 2024-25 are furnished below

Health Care Initiatives

(a) **Door Step Health Service by Mobile Health Unit (MHU):** NALCO runs eight Mobile Health Units (MHUs) in and around 250 peripheral villages, providing medical treatment to over 100,000 patients annually.

(b) NALCO has provided financial support for health care infrastructure facilities i.e. (i) Financial Support to All India Institute of Medical Sciences (AIIMS), Bhubaneswar for procurement of Medical equipment. (ii) Financial Support to Shree Jagannath Temple Administration, Puri for procurement of Medical Devices and Diagnostic Analyzer Machines for Sevak Kalyan Dispensary of the Temple, Puri (iii) Financial Support to provide Additional Nutrition support to TB Patients in Visakhapatnam District under Pradhan Mantri TB Mukt Bharat Abhiyan.

(c) Preventive Health care measures and provision of nutritious and hygienic food at Puri during the Ratha Yatra.

9.3 Education Initiatives

(a) **Indradhanush:** For bringing the tribal students to the mainstream of education, NALCO has sponsored 1289 students from Maoist dominated periphery villages of Koraput district for formal education in 3 reputed residential schools in Odisha.

(b) **NALCO Ki Ladli:** In line with Beti Bachao, Beti Padhao' Mission of GoI, NALCO has provided financial assistance to Meritorious girl students of BPL families at Angul and Damanjodi sector. Till date 1096 girls have been supported to complete their high school education.

(c) NALCO is providing quality education to periphery students in vernacular medium schools at Angul and Damanjodi.

9.4 Iconic City Projects:

NALCO has taken the responsibility of Shri Jagannath Temple, Puri & its surrounding under PM's Iconic Shrine Development Programme to upgrade the infrastructure & maintain cleanliness. The Company has given special emphasis on Renovation and beautification of Gandhi Park as a tourist spot, temple illumination, beautification of Puri town with thematic painting based on Jagannatha culture.

Operation of Battery-Operated Vehicle for easy and free transportation services from Jagannath Ballav Math to Shree Jagannath Temple, Railway Station for differently-abled passengers, senior citizens & sick people, RO based water posts at different locations inside Puri Town.

9.5 Art & Culture

Contribution towards promotion of traditional arts, music and handicraft in District level & Block level events at Koraput and local cultural events. NALCO provided Financial Assistance towards organization of Tribal Festival (PARAB), Koraput and for organization of Panchpatmali Natya Mahotsav, Damanjodi.

9.6 Drinking Water

Financial Support towards Installation of 10,000 (LPH) capacity RO drinking water plant alongwith water supply system inside Shree Jagannath Temple, Puri.

Supply of drinking water through **tanker to peripheral villages of S&P Complex during Summer.**

9.7 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 the Company 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.

- Total 7708.5 training man-days provided to regular employees during the year 2024 – 2025 (Upto 31st December 2024).
- 198 executives were given virtual as well as external training on management development programme during 2024 – 2025 (Upto 31st December 2024) from reputed National organisations.
- In -house skill development programmes organized for 3040 Security personnel, contract labours and trainees across the company during 2024 – 2025 (Upto 31st December 2024).
- 936 apprentice trainees were engaged during FY 2024 – 2025 (Upto 31st December 2024), which is 19.72 % of total regular employees and 5.01% of total employees including contractual workers engaged by different contractors.
- 1357 students from different technical and management institutes across the country had undergone summer internship programme in various functional disciplines during 2024 – 2025 (Upto 31st December 2024).
- 23 students have been engaged under Prime Minister Internship Scheme (PMIS) during 2024 – 2025 (Upto 31st December 2024).

9.8 Hindustan Copper Limited (HCL)

HCL's CSR Policy revolves round 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.

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

(₹ in lakhs)

Financial Years	Required Spent (2% of average net profit (PBT) of last three FYs)#	Spent
2022-23	-	118.30
2023-24	321.59	266.92
2024-25	737.22	158.21 (Upto 30.11.2024)

9.9 The total CSR Budget allocation for FY 2024-25 is Rs. 793.99 lakhs inclusive

of carried forward [the unspent amount of Rs.56.77 lakhs of FY 2023-24]. The allocation has been done for important ongoing projects having direct impact on communities around company's operation.

Major projects planned are as under.

1. Drinking Water
2. Health Camps and Nutrition
3. Livelihoods
4. Plantation and Promotion of Sports
5. Conservation of Environment
6. Rural Development Projects

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

Mineral Exploration & Consultancy Limited (MECL)

9.10 Corporate Social Responsibility (CSR)

MECL has established a comprehensive Corporate Social Responsibility (CSR) Policy to address various social and environmental concerns. During the fiscal year 2024-25, MECL remains steadfast in implementing its CSR initiatives, aligned with its long-term policy to foster community welfare and sustainable development. The CSR efforts during the calendar year January to December 2024 aimed to improve health care, support vulnerable groups, and provide need-based assistance. CSR Expenditure Overview (2024)

The total CSR expenditure for the year was **₹182.68 Lakhs**.

Key CSR Initiatives for FY 2024-25

9,11 Provisional Allocation: ₹104.45 Lakhs focused on:

- Health care initiatives
- Support for women, orphans, and the elderly
- Contributions benefiting armed forces veterans and their dependents

9.12 Health Care Projects

- **Installation of Portable Water Purification Systems:** 21 units were installed across project sites in Chhattisgarh, Madhya Pradesh, and Rajasthan.
- **Distribution of Wheelchairs:** 110 manual wheelchairs were distributed to differently-abled individuals in project areas.
- **Procurement of Diagnostic Equipment:** A digital X-ray machine was procured for a project in Jharkhand to improve diagnostic capabilities.

9.13 Financial Assistance

- **Cycling Team Sponsorship:** Support was provided to promote sports and physical fitness.
- **Cervical Cancer Vaccination:** Financial aid for vaccination initiatives.
- **Eye Screening Camps:** Organized camps to enhance eye health awareness and care.

9.14 Infrastructure Development

- **Old Age Home Support:** Procured storage tanks for an old age home in Indore to facilitate food grain storage.

9.15 Need-Based Activities

- **Tuberculosis Awareness Campaigns:** Conducted campaigns in Nagpur, covering both rural and urban areas.

- **Ambulance Donation:** A fully equipped ambulance was donated to J.K. Hospital, Bhopal.
- **Medical College Support:** Provision of a 250 KVA diesel genset to ensure uninterrupted medical services at a medical college in Sultanpur, Uttar Pradesh.

MECL's CSR initiatives in 2024 reflect its commitment to creating a positive impact on society through targeted projects addressing health care, social welfare, and infrastructure needs. The organization remains dedicated to its mission of inclusive growth and community development.

9.16 Public Grievances redressel Mechanism

Public grievances at MECL are managed in accordance with guidelines provided by the Ministry of Mines. Oversight of these grievances falls under the purview of Director (Finance) who is designated as Director (Public Grievances). Stakeholders seeking information on public grievances related to MECL can access relevant details on the website http://pgportal.gov.in.

An overview of the current status of grievances handled by MECL:

SN	Details of Grievances	No. of Cases
01	Opening Balance of Grievance Cases as on 31-12-2023	01
02	New Cases received during the period from 01-01-2024 to 31-12-2024	16
03	Total No. of Cases	17
04	Cases disposed of during 01.01.2024 to 31-12-2024	17
05	PG Cases pending as on 31.03.2024	00

10

Progressive Use of Hindi

Progressive Use of Hindi

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Introduction

10.1 The Ministry of Mines undertakes several activities to ensure the compliance of the Official Language Policy of the Union in the Ministry and attached/subordinate offices and public sector undertakings. Also, proper compliance of Section 3(3) of the Official Languages Act, 1963 is ensured.

Hindi Advisory Committee

10.2 Hindi Advisory Committee is a high-level committee to monitor the implementation of official language policies. This committee has been constituted under the chairmanship of the Hon'ble Minister of Mines. Apart from the Hon'ble Members of Parliament, many linguists have also been included in the committee. This committee gives appropriate advice for the official language related policies of the government and its implementation in the Ministry and the offices under its administrative control.

Official Language Implementation Committee (OLIC)

10.3 Official Language Implementation Committee (OLIC) has been constituted in the Ministry under the chairmanship of the Joint Secretary (Admn.). The meeting of the Official Language Implementation Committee is held every quarter in which the quarterly progress reports of the sections of the Ministry and attached/subordinate offices are reviewed.

Official Language Inspection

10.4 As per the Annual Programme 2024-25 of Department of Official Language, Ministry of Home Affairs, Ministries/Departments, are required to conduct official language inspection of at least 25% of the offices located outside the headquarters. Three subordinate / attached offices i.e. NALCO Headquarters, Bhubaneswar on 20.05.2024, GSI, CHQ, Kolkata on 21.05.2024 and HCL, Corporate Office, Kolkata on 22.05.2024 of the Ministry of Mines were inspected.

Inspection by Parliamentary Committee on Official Language

10.5 The Parliamentary Committee on Official Language inspected the GSI, State Unit Gujarat, Gandhinagar on 12.01.2024, NALCO, Mumbai on 14.02.2024, HCL, Taloja, Mumbai on 14.02.2024, IBM, Goa on 16.02.2024, HCL, Delhi on 12.03.2024 , GSI, Hyderabad on 22.10.2024 and GSI, Faridabad on 21.11.2024. The Committee suggested some measures to improve the use of Hindi in other areas of official work. Necessary actions on the assurances given to the Committee have been taken or are being taken by the offices concerned.

Ministry's Website

10.6 The website of the Ministry serves as an important link to connect with the public. The content on the website is available in bilingual form. The content available on the website is updated from time to time by the sections concerned. The website of the Ministry is https://mines.gov.in and https://खान.मंत्रालय.सरकार.भारत.

Workshops

10.7 Hindi workshops are organized from time to time as per the requirement to encourage the officers/employees to do their official work in Hindi. Four Hindi workshops were organized in the Ministry for officers. The competitions of the Ministry were inaugurated by Hon'ble Minister of State for Mines on 18.09.2024. Rajbhasha Shield Scheme was also launched to promote the progressive use of Hindi in the Ministry. Under this, for the first time, a shield and certificates were given by Hon'ble Minister of State for Mines.

Celebration of Official Language Fortnight/Month

10.8 Official Language Fortnight was organized in the Ministry of Mines from 14th to 29th September, 2024. During this period, various competitions were organized to sensitize the officials about the various policies regarding official language. To reward the winning participants of various competitions organized during Hindi Fortnight, Hindi Fortnight Award Distribution Ceremony was also organized on 11th November, 2024.

The incentive scheme for doing official work originally in Hindi run by the Department of Official Language, Ministry of Home Affairs, was implemented in the Ministry of Mines from the year 2023-2024. Under this scheme, 6 employees were given cash awards.

Geological Survey of India (GSI)

10.9 Geological Survey of India (GSI) is an attached office of Ministry of Mines. Despite being a scientific and technical organization, GSI is also engaged in promoting the use of Hindi in its various offices. In compliance with the Official Language provisions in Indian Constitution, Official Language Act, 1963, Official Language Rules, 1976 and the instructions issued by the Department of Official Language, Ministry of Home Affairs, Government of India from time to time, Geological Survey of India is continuously implementing the Official Language Policies.

Official Language Inspection of Subordinate Offices

10.10 In order to assess the progress made in the use of Hindi in various offices of the Geological Survey of India, Official Language Inspection of 05 subordinate offices has been done by GSI, CHQ, Kolkata during this period. Besides, Official Language Inspection of the subordinate State Units and division/sections has been done by Regional Headquarters. Inspection of some more offices is proposed during 01 January 2025 to 31 March 2025.

Organisation of Hindi Workshop

10.11 Geological Survey of India is organising Hindi Workshop on regular basis as per the directives of Department of Official Language, Ministry of Home Affairs, Government of India. The details of the workshops held at Geological Survey of India, Central Headquarters during the said period are as follows:

- A workshop on the subject Forecasting of Landslide Disaster was organized on 13.02.2024.
- A workshop on the subject Monitoring of Coastal Processes and Beach Erosion: A Case Study at Odisha Coast, India was organised on 26.06.2024.
- A workshop on the subject National Integration and Hindi was organized on 20.09.2024.
- A workshop on the subject Role of GSI in Nation Building through Hydroelectric Projects was organized on 17.12.2024.

Next Hindi workshop is proposed to be organized in January- March 2025.

Organisation of Hindi Day/ Week/ Fortnight

10.12 Hindi Fortnight, 2024 was celebrated with great enthusiasm at Geological Survey of India, Central Headquarters, Kolkata. The grand inauguration of this year's Hindi Diwas was done in New Delhi during the fourth All India Official Language Conference under the chairmanship of Shri Amit Shah, Honorable Minister, Ministry of Home affairs

and Cooperation, in which officials of the offices of GSI participated and Hindi Day was inaugurated from the same platform. Accordingly, Hindi fortnight was organized at Geological Survey of India, CHQ, Kolkata from 17.09.2024 to 30.09.2024, during which various competitions were organized.

Hindi Translation

10.13 Under Section 3 (3) of Official Language Act 1963, the Gazette Notifications, 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. Accordingly, compliance of Rule 5 of OL Rules 1976 was also ensured. In addition to that, Abstracts of reports related to various survey programs of the Geological Survey of India were also translated into Hindi.

Review of Quarterly Progressive Report (QPR) of all the offices of GSI

10.14 The Quarterly Progress Reports of Hindi of all the subordinate Regional Offices were reviewed quarterly by Geological Survey of India, Central Headquarters and attention was drawn to the relevant points for taking appropriate action. Similar review was done by all the Regional Offices of the State Unit Offices under them.

Meeting of Official Language Implementation Committee

10.15 As per the directives of Department of Official Language, Ministry of Home Affairs, Government of India, the Official Language Implementation Committee has been constituted in all the offices of Geological Survey of India under the chairmanship of the administrative head of the office. During the said period, the meetings of the Official Language Implementation Committee of Central Headquarters were held on 13.02.2024, 17.05.2024, 09.08.2024 and 24.10.2024. Next meeting is proposed in Jan – Mar 2025.

All India Annual Official Language Review Meeting and All India Scientific and Technical Official Language Seminar

10.16 All India Annual Official Language Review Meeting and All India Scientific and Technical Official Language Seminar are proposed to be held in February, 2025 at the Central Headquarters level.

- Hindi Technical Seminar was organized by Central Regional, Nagpur in February 2024 in which 19 technical research papers were presented.
- Scientific and Technical Official Language Seminar cum Workshop was organized by State Unit: Rajasthan, Jaipur in June 2024 in which 17 technical research papers were presented.

Chairmanship of Town Official Language Implementation Committee

10.17 Geological Survey of India, Central Headquarters is nominated as Head of Town Official Language Implementation Committee, Office-3 and the Director General, GSI is ex-officio Chairman of this committee. At present, there are 58 members in this committee. The half-yearly meetings of the committee were held on 22.05.2024 and 11.11.2024 under the chairmanship of the Director General, GSI, in which half-yearly Hindi reports were reviewed. Similarly, NRO office is the Head of Lucknow TOLIC and its meetings are being conducted as per the prescribed calendar of the Official Language Department.

Inspection of GSI office by Parliamentary Official Language Committee

10.18 During the said period, official language inspection of the following two offices of the Geological Survey of India was completed successfully by the Third Sub Committee of Honorable Parliamentary Committee on Official Language:

1. State Unit: Gujarat, Gandhinagar on 10.01.2024
2. State Unit: Andhra Pradesh, Hyderabad on 22.10.2024

Indian Bureau of Mines (IBM)

10.19 Indian Bureau of Mines is implementing the policy of official language of the Govt. of India in the headquarters as well as all Subordinate offices of IBM very effectively. All the subordinate offices of IBM have achieved all the targets mentioned in Annual Programme of the Department of Official language. During 2024-25, the details of the progress and achievement related to Hindi implementation are as follows.:-

10.20 Meetings of the Departmental Official Language Implementation Committee:- The 128th, 129th, 130th and 131st meetings of the Departmental Official Language Implementation Committee were held on 08/01/24, 12/04/2024, 10/07/2024 and15/10/24 respectively. In all regional offices, the meetings of the Departmental Official Language Implementation Committee are regularly held and reports are sent to the headquarters.

10.21 Hindi Fortnight:- The Hindi Fortnight was successfully organized at IBM headquarters from 14/09/2024, to 30/09/2024. As per the directions of the department of official language, Ministry of Home Affairs, New Delhi, Hindi Diwas' was celebrated on 14th of September, 2024 at Bharat Mandapam, New Delhi in centralized way.

10.22 Hindi Translation:- During the year, different important technical and administrative documents were translated into Hindi including 100 pages of the Annual Report for the year 2023-24 received from Technical Section and also materials received from MMS Division. Also, 40 pages of English texts of IBM Manuals related to Final Mine Closure Plan received from Chief Controller of Mines Office were also translated into Hindi.

10.23 Official Language Inspection:- During the year, official language inspection was carried out in the various Divisions and Sections of IBM such as G.M Cell, MMPL& Pilot Plant, IBM, HIngna, Nagpur, Vigilance Section, General Section, Publication Section, Legal Cell, Nagpur Regional Office, Training Centre, Recruitment Section, MMS Division, Mineral Economics Division, TS Secton, CCOM Office, Store Section, Accounts Section, COM (Central) Office. In the same way, in Raipur Regional Office, Goa Regional office, Ranchi Regional Office, official language inspection was also carried out on 31/01/24, 19/06/24 and 05/09/2024 respectively.

10.24 Hindi Workshop:- In IBM Hqrs, Nagpur Hindi workshops were organized on 07/03/24, 05/06/24and 26/09/24 in which 90 officers and staff participated. In the same manner, Hindi workshops have also been organised in different regional offices of IBM such as Bhubaneswar Regional Office (30 &31/05/24), Gandhinagar Regional Office (04/06/2024 and 13 &14/08/24), Ore Dressing Laboratory, Hingna, Nagpur (14/06/24), Udaipur Zonal Office (20/06/24 and 18/09/24), Jabalpur

Regional Office (24/04/24 and 13/09/24), Benguluru Office (14/06/24 and 26/09/24), Kolkata Zonal Office (11/06/24 and 12/09/24), Chennai Regional Office (10&11/06/24 and 24 & 25/09/24), Raipur Regional Office (13/06/24 and 30/09/24), Hyderabad Regional Office (24/06/24 and 11/09/24), Ranchi Regional Office (21/06/24 and 05/09/24), Dehradun Regional Office (19/06/24 and 20/08/24), Goa Regional Office (20/06/24), Guwahati Regional Office (25/06/2024) and Ajmer Regional Office (12/06/24 and 22/08/24) .

10.25 Award for Original Noting and Drafting Hindi Encouragement Plan:- For the Year 2023-24, Under the Original Noting and Drafting Hindi Encouragement Plan, 70 officials of 15 offices of Indian Bureau of Mines were awarded.

10.26 Rajbhasha Inspection by Parliamentary Official Language Committee:- Official Language Inspection by the third sub-committee of the Parliamentary official language committee of Goa Regional office took place on 16/02/24.

10.27 Online Review meetings of Ministry of Mines on 20/03/24:- An online review meeting by Ministry of Mines related to the implementation of official language took place on 20/03/24 under the chairmanship of Economic Adviser, Ministry of Mines. In the meeting, work during 2023-24 related to official language of all Zonal/Regional offices/ Mineral processing Laboratory were reviewed including IBM Hqr. Nagpur. At the same time, online review meeting on Quarterly Reports of 3 -4 regional offices of IBM is being done in every quarter by the Ministry of Mines.

10.28 First Prize to the Hindi magazine of IBM Hqr, "Khan Bharti":- The hindi magazine of IBM Hqr, " Khan Bharti" has been given the first prize for the year 2022-23 by Town Official Language Implementation Committee, Nagpur (off-2).

10.29 First Prize to Goa Regional Office by the Official Language Department:- Goa Regional Office of Indian Bureau of Mines got the first prize for the year 2022-23 for excellent implementation of Official Language by the Department of Official Language, Ministry of Home.

10.30 All India Special Hindi Workshop in Udaipur Zonal Office under the ageis of IBM Hqr, Nagpur:- All India Special Hindi Workshop was organized on 28.08.2024 in Udaipur Zonal Office under the ageis of IBM Hqr, Nagpur.

10.31 Award to Raipur Regional Office by TOLIC:- Raipur Regional Office of Indian Bureau Of Mines got the third prize under small office category for the year 2023-24 by the Town Official Language Implementation Committee and received the Rajbhasha Shield.

National Aluminium Company Limited (NALCO)

10.32 Measures for Implementation of Official Language Policy

- The progressive implementation of Hindi is being carried out in compliance with the provisions of the Official Language Act, 1963, and the Official Language Rules, 1976.
- NALCO holds the Chairmanship of TOLIC in both Bhubaneswar and Angul. Regular meetings have been conducted at both these locations, involving all local PSU offices.
- An inspection of the Corporate Office in Bhubaneswar for the implementation of the Official Language was carried out by Sh. N. K. Dubey, Office In-charge of the Regional Implementation Office, Department of Official Language, Ministry of Home Affairs, Government of India, on 26.04.2024.

- Representatives from the Ministry of Mines completed the Official Language inspection of the Corporate Office on 20.05.2024 and the Regional Office (North), Delhi on 20.12.2024.
- The company's website is being regularly updated in both Hindi and English.
- A workshop on "Cyber Security and Best Practices for Rajbhasha" was organized on 09.05.2024 with the involvement of all member offices of TOLIC(U), in coordination with the Reserve Bank of India (RBI).
- Hindi Fortnight 2024 was observed at the Corporate Office, Production Units, and Regional Offices to promote the use of Hindi in official work, with various competitions held for employees.
- A Hindi Noting and Drafting Competition was organized for the members of TOLIC(U), Bhubaneswar, under the banner of TOLIC(U) on 20.06.2024.
- On the occasion of Hindi Fortnight 2024, a Kavi Sammelan was organized on 01.10.2024 at NALCO Corporate Office, Bhubaneswar, featuring poets of national repute.
- Faculty support on Kanthastha (Translation Tool), Unicode and tools and techniques for Hindi computing was provided to the member offices of TOLIC, Bhubaneswar.

10.33 Hindustan Copper Limited (HCL)

- The meetings of the Official Language Implementation Committee were held regularly in HCL. In addition, Hindi workshops were also organized.
- 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. The recruitment advertisement is also published bilingual. At the time of superannuation, all the employees are given Service Certificate in Hindi. The Hindi translation of Annual Report, MoU, Outcome Budget and various other jobs of the Company were done in year 2024-25.

10.34 Mineral Exploration & Consultancy Limited (MECL)

Official Language Implementation Committee:- The Corporation's Official Language Implementation Committee, chaired by the Chairman-cum-Managing Director, conducted timely meetings to review the status of Hindi activities. Necessary orders and guidelines were issued as required.

Measures for Implementation of Official Language Policy

10.35 To ensure Hindi progress, the Hindi Inspection Committee, formed by the Chairman with two members, inspects Hindi works in each office/Division based on quarterly data. They provide directives and submit inspection reports for further action. Regular one-day Hindi workshops were organized wherein technical and non-technical personnel received training on Hindi policy and language-related knowledge. The Hindi section translates important documents such as office orders, circulars, press releases, and tender notices under Section 3(3) to promote Hindi usage. Our internal Hindi magazine

"Khanij Pravah" received the first prize from Narakas (K-1), Nagpur. This award was given among 78 offices included in Narakas (K-1), Nagpur. Apart from company news, it includes self-written essays and technical articles by employees and Rajbhasha related material.

Organization of Rajbhasha Fortnight / Month

10.36 Hindi Diwas celebrated annually on September 14th followed by a successful fortnight. Employees participated in competitions aimed at promoting Hindi language usage. Awards were distributed by the Chairman-cum-Managing Director.

10.37 Special initiatives

- Introduction of the Rajbhasha Protsahan Puraskar scheme to encourage the use of Hindi in official communications.
- Establishment of an annual cash award scheme in memory of Late Shri Shankar Dayal Singh to recognize contributions to the promotion of Hindi.
- Procurement of Hindi literature books to provide employees with ample resources for enhancing their Hindi language skills and promoting its enrichment.
- Organization of an essay competition by MECL's Hindi Section and Public Relations Division to commemorate the birth anniversary of the renowned litterateur Munshi Premchand, honoring his literary contributions.
- Celebration of the Closing Ceremony of Rajbhasha Hindi Pakhwada with a Hasya Kavi Sammelan, featuring poets from various genres of Hindi literature reciting their works to foster cultural and linguistic appreciation.

10.38 Jawaharlal Nehru Aluminium Research Development and Design Centre (JNARDDC)

Progressive use of Hindi

JNARDDC continued its efforts to promote the progressive use of Hindi. The Centre celebrated Hindi Pakwhada during 11-25 September 2024.

11

Exploration Activities in the North-Eastern Region

Exploration Activities in the North-Eastern Region

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- Work done by Geological Survey of India (GSI)in the North-Eastern Region ..... Page - 205
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- Work Carried Out by MECL in North-Eastern Region ..... Page - 216

Geoscience Activities in the North-Eastern Region

Introduction

11.1 Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Tripura and Sikkim are the eight states located in the North Eastern part of the country. The geomorphological and geological setup of North Eastern Region (NER) is entirely different from other parts of country. Geologically, North-East India represents a stratigraphic succession which ranges from pre-Cambrian to Quaternary in age. The oldest geological rock unit of the region is represented by pre-cambrian gneissic complex of the Meghalaya plateau and the Karbi-Anglong plateau. The Himalayas, occupying the northern border of the region consist of varied rock types ranging in age from Proterozoic to early Palaeozoic in age whereas foot-hills of the Himalayas comprise of Tertiary rocks. The other part of the region is covered by Cretaceous-Tertiary rocks belonging to age from Eocene to Pliocene whereas the Brahmaputra valley forms the extensive Assam plains tectonically surrounded from all sides between Eastern Himalayas in the north, Indo-Myanmar Range in the east and south east and the Gneissic Complex of Shillong Plateau towards south.

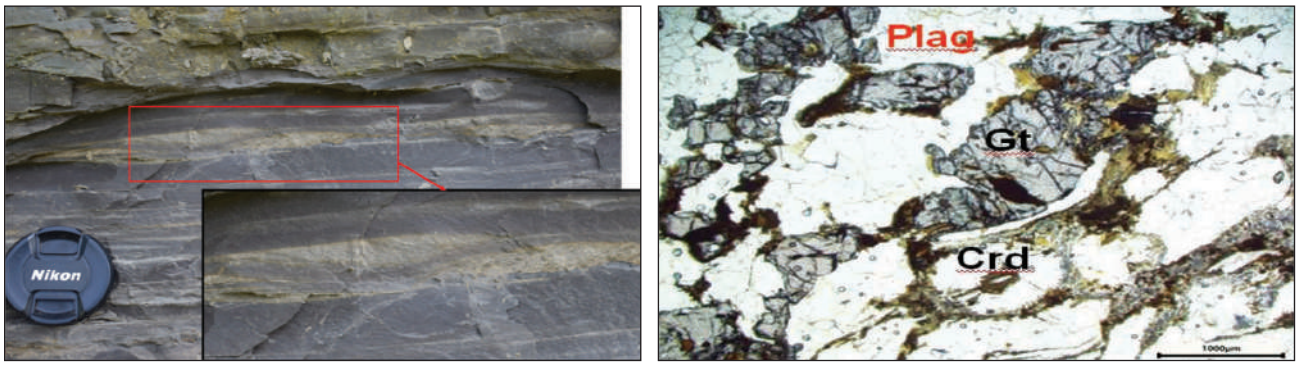
Work done by Geological Survey of India (GSI) in North Eastern Region

11.2 Major activities of Geological Survey of India (GSI), North Eastern Region (NER), include baseline data generation through geological, geochemical and geophysical mapping, mineral exploration, compilation and generation of different types of maps and publications, fundamental researches and public good geosciences 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 by virtue of training, capacity building by providing various training courses to a number of officers of State DGMs of NER. GSI, NER is perpetually extending technical and scientific supports by providing chemical analyses and petrological studies of representative samples of the different state DGMs, as per their requests.

Geological Mapping on 1:25,000 scale

11.3 During FS 2023-24, a total of seven Systematic Thematic Mapping (STM) programmes on 1:25,000 scale have been taken up in NER of which two items were taken up in Arunachal Pradesh, one in Assam, two in Meghalaya, one in Sikkim and one in Manipur and Nagaland. During the period from 1st January, 2024 to 31st March, 2024, an area of 596.5 sq km had been covered **(Annexure - 11.1)**.

11.4 During FS 2024-25, a total of thirteen Systematic Thematic Mapping (STM) programmes on 1:25,000 scale have been taken up in NER of which one item is being executed in Arunachal Pradesh, one in Assam, four in Meghalaya, six in Tripura and Mizoram and one in Sikkim. During the period from 1st April 2024 to 31st December, 2024, an area of 1562 sq km has been covered out of 2870 sq km **(Annexure - 11.2)**.



(a) (b)

(a) (b)

Fig.11.1: a. Low angle foresets, Lower Tipam Formation. b. Photomicrograph showing peak assemblage of cordierite (Crd), garnet (Gt) and plagioclase (Plag) in cordierite – garnet gneiss within AMGC, Garo hills, Meghalaya c. Cosets of planner cross -stratification in quartzite, looking towards NW d. Cross-stratification in quartzite

Geochemical Mapping (GCM)

11.5 Geochemical Mapping (GCM) is being carried out by GSI in different parts of NER to generate the baseline regional geochemical data with elemental distribution pattern. This is being done with the objective of identifying the targeting areas for search of mineral deposits.

11.6 A total of 48 items of Geochemical Mapping on 1:50,000 scale with collection of samples in grid pattern had been taken up during the FS 2023-24 in parts of Arunachal Pradesh, Assam, Tripura-Mizoram and Manipur-Nagaland. An area of 14,530 sq km has been covered during the period from 1st January 2024 to 31st March 2024 **(Annexure- 11.3)**.

11.7 Total 04 items of Geochemical Mapping on 1:50,000 scale with collection of samples in grid pattern are being executed during the FS 2024-25 in parts of Assam.

An area of 11684 sq km will be covered in FS 2024-25, out of which an area of 6392 sq km has been covered during the period 1st April 2024 to 31st December 2024 **(Annexure-11.4)**.

Geophysical Mapping (GPM)

11.8 Geophysical Mapping (GPM) has been 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 As a part of FS 2023-24 two GPM Items had been executed by GSI, NER. During the period 1st January 2024 to 31st March 2024 a total area of 1370 sq km had been covered **(Annexure - 11.5)**.

11.10 Three GPM items are being executed during FS 2024-25 and an area of 8400 sq km will be covered, out of which an area of 2185 sq km has been covered during the period from 1st April 2024 to 31st December, 2024 **(Annexure-11.6)**.

Photo Geology and Remote Sensing (PGRS)

11.11 Two items of Photo Geology and Remote Sensing (PGRS) had been taken up on 1:50,000 Scale during FS 2023-24 to carry out the spectral geological mapping in OGP areas of Assam, Meghalaya and Sikkim using ASTER data. The total target of 3060 sq km had been completed during the period from 1st January 2024 to 31st March 2024 **(Annexure - 11.7)**.

11.12 During the FS 2024-25, three items of Photo Geology and Remote Sensing (PGRS) are being executed in parts of Arunachal Pradesh, Manipur, Nagaland and Tripura states by using ASTER data. A total area of 42,249 will be covered in FS 2024-25, out of which 20,786 sq km has been completed during the period from 1st April 2024 to 31st December, 2024 **(Annexure - 11.8)**.

(a) (b)

Photo 11.2: (a) Hornblendite from Mayodia Ultramafics, near Mayodia Pass, Arunachal Pradesh (b) Malachite stains in serpentinite, Mayodia Pass, Arunachal Pradesh.

Mineral Exploration in NER

11.13 The major mineral resources in NER that are partially explored include coal, limestone, dolomite, graphite, vanadium, Rare Earth Elements (REE), lateritic bauxite, clay etc. Besides, minor occurrence of low-grade iron ore, base metal sulphides, nickel, cobalt, lithium, vanadium, molybdenum, gold, tin, tungsten, Platinum Group of Elements (PGE) are also reported.

GSI has given thrust on the mineral exploration and development activities in North Eastern Region through resource appraisal of various mineral commodities including minerals like graphite, vanadium, Rare Earth Element (REE) etc. in which our country is deficient. The entire activity is being planned to be supplemented by baseline data generation through Geochemical Mapping, Geophysical Mapping, Specialized Thematic Mapping, Photo geology & Remote sensing which are of immense help in delineating areas for systematic mineral exploration.

In addition to the accredited programmes in exploration work, GSI has also accorded priority for creation of multi-thematic database for data dissemination to invite and attract private investments in mineral sector through recently developed National Geo-science Data Repository portal.

GSI has expanded its exploration activities as part of the Government of India's Atmanirbhar Bharat initiative, recognizing the rich mineral potential of Arunachal Pradesh, Assam, Meghalaya. GSI has augmented resource of graphite, vanadium, REE and copper in Arunachal Pradesh; limestone, Iron ore, glass sand in Assam and limestone in Meghalaya which leads to handing over of 30 nos. resource bearing Geological Report (GR) and 2 nos. Geological Memorandum (GM) for consideration in the auction process after 2015.

During FS 2023-24, a total of twenty-five items (7 G3, 17 G4 and 1 RP item) were taken up in the states of Arunachal Pradesh, Assam, Meghalaya, Manipur, Nagaland and Sikkim of North East India and total 842 sq km Large Scale Mapping, 15.98 sq km Detailed Mapping and 2361.66 m drilling were done out of which during the period from 1st January, 2024 to 31st March, 2024 an area of 281.6 sq km of LSM, 1.89 sq km of DM and 969.45 m of Drilling were carried out. During FS 2023-24, G3 stage mineral resources have been augmented for limestone, REE, graphite and vanadium in parts of Assam, Arunachal Pradesh and Meghalaya.

During FS 2024-25, a total of twenty-eight items (1 G2, 4 G3, 19 G4, 3 CMAP and 1 RP item) have been taken up in the states of Arunachal Pradesh, Assam, Meghalaya, Manipur- Nagaland and Sikkim of North East India and total 586 sq km Large Scale Mapping, 5.12 sq km Detailed mapping and 3064.87 m drilling have been done during 1st April 2024 to 31st December, 2024. The commodity-wise and stage-wise details of the projects of FS 2023-24 and 2024-25 are given in **Annexure - 11.9**.

In the mining conclave held in January, 2023 at Bhopal, Madhya Pradesh GSI, NER handed over 4 nos. resource bearing reports on graphite & vanadium (Radhphu & Phop blocks, Arunachal Pradesh), REE (Lodoso East Block, Arunachal Pradesh) and limestone (Sikilangso block, Assam). In the Tranche IV for auctioning of critical mineral held in November, 2024, 4 blocks of graphite and vanadium (Depo, Radhphu, Phop and Endolin-Isholin) of Arunachal Pradesh were successfully auctioned as composite license (CL).

Photo 11.3: Drilled core sample of Graphite – vanadium bearing carbonaceous phyllite, Daba Gamlin, Arunachal Pradesh

Photo 11.4: Graphite –vanadium bearing carbonaceous phyllite, Deed blocks, Arunachal Pradesh.

Photo 11.5: Phosphatic nodule bearing carbonaceous Shale, NW of Litemori, Lr. Gondwana, Arunachal Pradesh

Photo 11.6: Coaly shale/coal exposure present near Garu village, Arunachal Pradesh

Photo 11.7: Oolitic bauxite North of Solanggiri, Meghalaya

Photo 11.8: Crystalline limestone in Lumla – Fomang section, Lumla, Arunachal Pradesh

Publications by GSI, NER

11.14(A) During the Field Season 2024-25, the following items on Publication and Maps have been taken up:

- Records of GSI, Vol. 158, Pt. 4 (Extended Abstracts for Field Season 2023-24 of North Eastern India), and two special publications titled Ultramafic-Alkaline Suits of Rocks of North East India and Ophiolites of North East India.
- Compilation and updation of District Resource Maps (DRMs) of East Jaintia Hills, West Jaintia Hills, East Khasi Hills, West Khasi Hills, South West Khasi Hill, Eastern West Khasi Hills, East Garo Hills, North Garo Hills, West Garo Hills, South Garo Hills, South West Garo Hills and Ri Bhoi Districts of Meghalaya on 1:250,000 scale in GIS Platform.
- Creation and updation of geodatabase by compilation of Specialized Thematic Maps (STM) on 1:25000 scale of North Eastern Region.
- Compilation and preparation of District Resource Maps (DRM s) of Lower Subansiri, Kra-Daadi, Kurung Kumey, East Kameng and Pakke Kessang Districts of Arunachal Pradesh on 1:250,000 scale in GIS Platform.
- Compilation and updation of District Resource Maps of Baksa, Dhemaji, Dibrugarh, Goalpara, Golaghat, Hailakandi, Karimganj, Lakhimpur, Morigaon, Nalbari, Sonitpurand Tinsukia districts of Assam on 1:250,000 Scale in GIS Platform.
- Compilation of eight (Dhalai, Gomati, Khowai, Sepahijala, North Tripura, South Tripura, West Tripura, Unakoti) District Resource Maps (DRMs) of Tripura state on 1:250,000 scale in GIS platform.
- Creation of Legacy Borehole Data Repository (LBDR) in OCBIS portal. During FS 2023-24 (from April, 2023 till March, 2024) from 28 nos. of reports a total 411 nos. borehole details have been uploaded in OCBIS Portal, whereas during FS 2024-25 (from April, 2024 till December, 2024) 3 reports with 37 boreholes have been uploaded in OCBIS Portal.

11.14 (B) Following publications were released during FS 2024-25 as a part of Public Good Geoscience:

- Geology and Mineral Resources of Sikkim (Miscellaneous Publication No. 30, Pt. IV, Vol. XIX, Revised Edition).
- Publication of GSI Records, Vol. 157, Part 4, Extended Abstracts of Progress Reports for FS: 2022-23 of North Eastern India.
- Un-priced Publications (E-News of GSI, NER, Shillong): E-News volume 33 (iii and iv) for the period of October 2023 to March 2024 (uploaded in OCBIS portal)

The following 38 nos. of DRMs (1:250000 scale) were released by Map & Cartography Division, GSI, RHQ, NER, Shillong during FS 2024-25:

- **Assam:** 16 DRMs (Udalguri, Majuli, Dhubi, Nagaon, Kokrajhar, Charaideo, Dima Hasao, Kamrup (R), Karbi Anglong, Cachar, Jorhat, Sivasagar, Bongaigaon, Barpeta, Darrang and Tamulpurdistricts of Assam)
- **Meghalaya:** 8 DRMs (East Jaintia Hills District, West Jaintia Hills District, East Khasi Hills District, West Khasi Hills District, South West Khasi Hills District, Eastern West Khasi Hills Distrct, East Garo Hills District, North Garo Hills District of Meghalaya.)
- **Arunachal Pradesh:** 5 DRMs (Siang, West Siang, Leparada, Kamle, Lower Siang District of Arunachal Pradesh)
- **Manipur:** 9 DRMs Kakching, Imphal East, Ukhrul, Tamenglong, Kamjong, Bishnupur; Thoubal, Jiribam, Imphal West of Manipur.
- **The geological maps (1st edition) in 1:** 1M scale of Manipur, Meghalaya and Assam were released.

Research and Development

Petrological Studies

11.15 Two Research items had been undertaken during FS 2023-24: (a) Systematic Mineralogical and Micro-Geochemical Characterisation of the Laterites/Lateritic Bauxite of East Garo Hills, West Khasi Hills and Ri-Bhoi districts, Meghalaya, with an aim to investigate geochemical dispersion and distribution of alkaline earth, transition elements and critical-strategic elements/ metals in primary laterite profiles, and (b) Petrological characterisation and petrogenesis of Early Cretaceous Dyke Swarm emphasizing lamprophyre dykes of Garo Hills areas, Shillong Plateau, North East India, with an aim to bring out the petrogenesis and tectono-magmatic evolution of Dyke Swarm with reference to the Cretaceous volcanism.

11.16 During current FS 2024-25, two research items are being executed, one in East Garo Hills, West Khasi Hills and Ri-Bhoi districts of Meghalaya to investigate REE, RM and strategic minerals dispersion and distribution in lateritic profiles developed over granitoids and granite gneiss, which is a continued item of

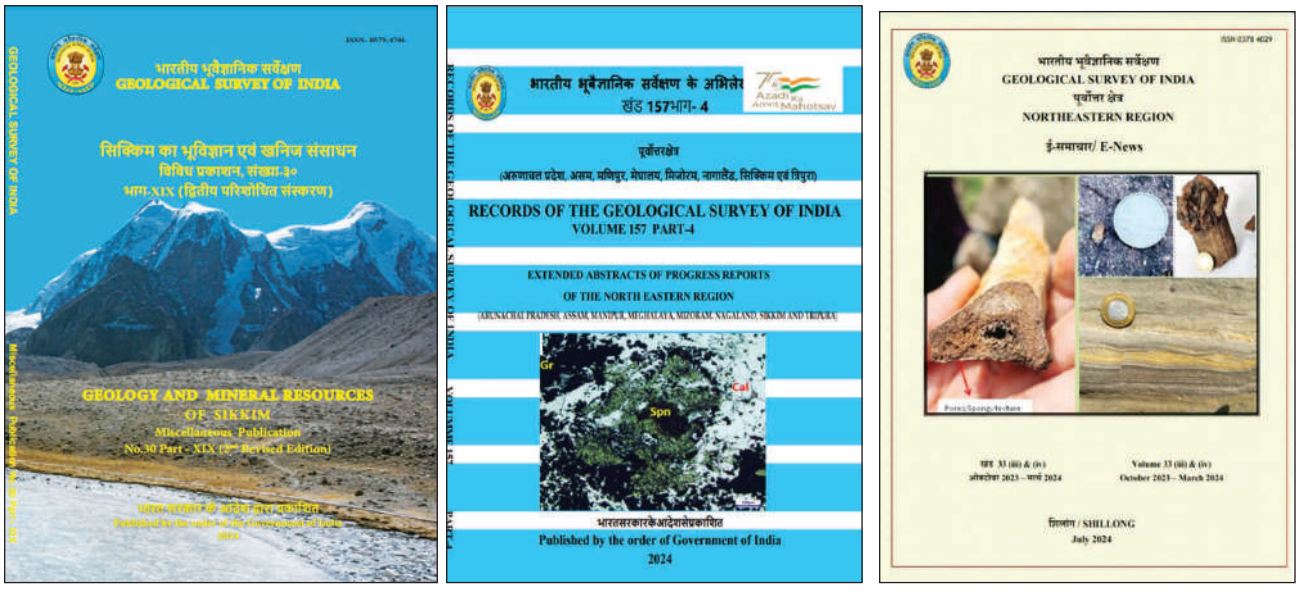


Photo 11.9: Publication of North Eastern Region

FS 2023-24. Another item i.e., Oxybarometry and Crystallization history of Trans-Himalayan Lohit Plutonic Complex (LPC) to assess the metal fertility of different components of the (LPC) based on trace element compositions of zircons and/or whole rock.

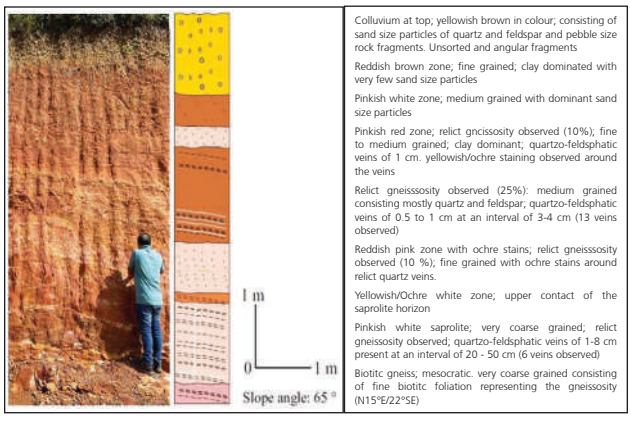
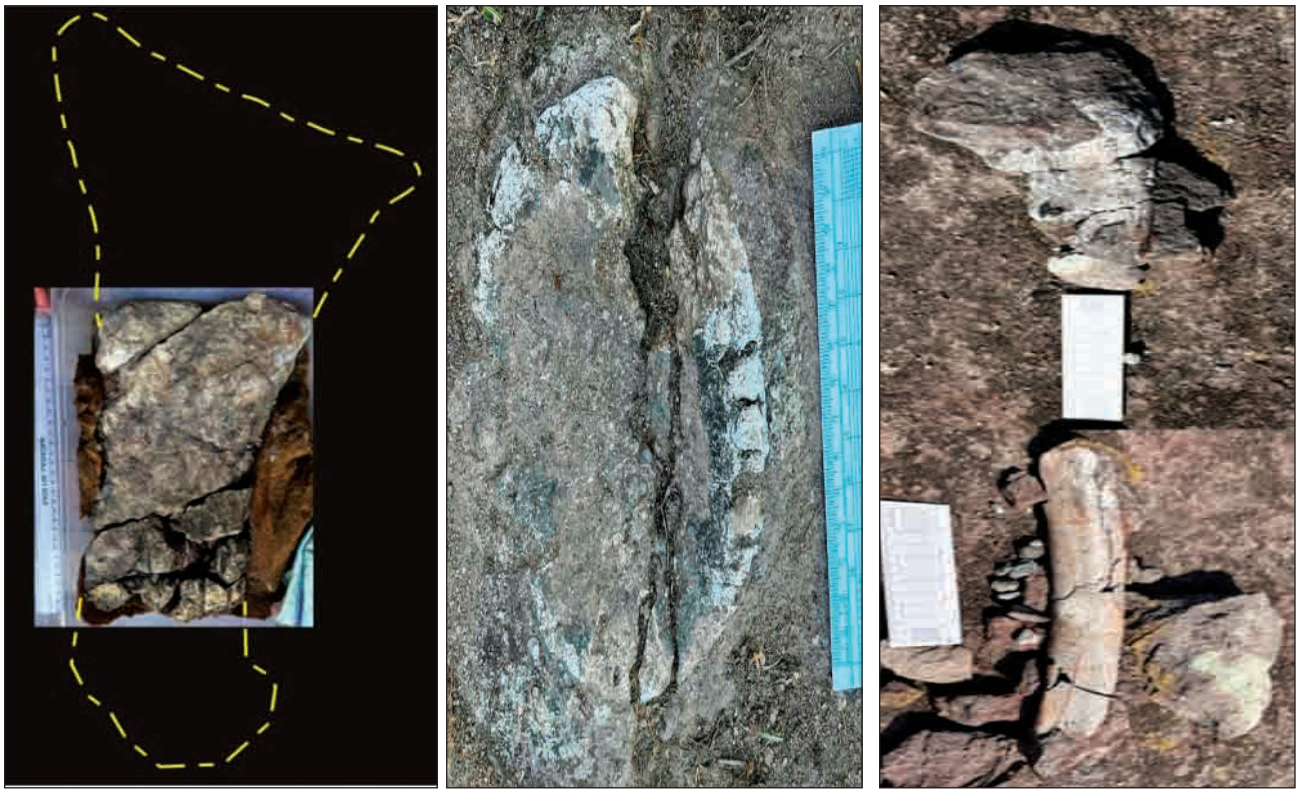


Photo 11.10: Field photograph and schematic diagram of laterite profile developed over biotite gneiss [Loc. 1.5 km south of Rambrai area].

Paleontological Studies

11.17 During FS 2023-24, one Research item on Taxonomic study of Sauropods from the Upper Cretaceous Mahadek Formation of Meghalaya had been taken up GSI, NER. The fossil remains of dinosaurs have been reported and discovered the Titanosaurian Sauropod teeth-fossils in the North-Eastern part of India.

11.18 During FS 2024-25, one research item on Palaeoenvironment and Palaeobiogeographic correlation of vertebrate and mega-invertebrate fossils of Late Eocene Kopili Formation of the Jaintia Group in Meghalaya is under execution.



(a) (b) (c)

Photo 11.11: Images of Sauropod bones. (A): Ulna, (B): Caudal vertebra, (C): Dorsal rib [Loc.Mawphuli, South West Khasi Hills District, Meghalaya].

Geotechnical Investigations

11.19 Presently the country is committed towards clean energy/green energy. North Eastern Region has a huge role towards as it has huge hydropower generation potential. 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. Arunachal Pradesh among the other states has the maximum potential. The state producing hydro power from river basins like Kameng, Subansiri, Siang, Lohit and Dibang. The total production is about 35,000 MW at 60% load factor (CEA) i.e., about 90% of the total hydropower resources of NER. GSI, NER is intimately associated with the development of all the hydel power projects. GSI, NER conducts 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. 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.

11.20 During the FS 2023-24, GSI, NER has taken up two investigations under water resource development project viz., i) Lower Kopili Hydroelectric Project (110MW), Dima Hasao and West Karbi Anglong districts, Assam and ii) Mawblei Hydroelectric Project (140MW), West Khasi Hills District, Meghalaya. The geotechnical investigation is aimed to render geotechnical advices/geological inputs to various aspects of water resource development projects for their suitability and stability. Besides, four investigations under transport and communication projects were also carried out viz., five landslide sites along Kohima-Jessami Road (NH-29) in Chizami, Phek District, Nagaland; Geotechnical assessment of Mynrieng Living Root Bridge, Pynursla, Meghalaya; proposed underground structures in parts of Sonaikuchi reserve forest area, Morigaon district, Assam and slope stability assessment at the Jamunanagar Limestone mine, Dima Hasao District, Assam.

Apart from the above sponsored projects, a pilot project on geotechnical mapping in and around New Shillong city, in parts of East Khasi Hills and Ri-Bhoi districts, Meghalaya have been initiated by GSI with objectives to mainly generate baseline geotechnical database and to suggest probable areas that may be geologically suitable / feasible for infrastructure development.

11.21 During the FS 2024-25, GSI, NER has taken up four investigations under water resource development project viz., one construction stage project: Lower Kopili Hydroelectric Project (110MW) in Assam; and four DPR stage projects: Oju HE Project (2220MW) in Arunachal Pradesh; Selim HEP (96MW) in Meghalaya; Mawblei Hydroelectric Project (140MW) in Meghalaya and Myntdu Leshka stage-II HEP (210MW) in Meghalaya. Besides Umsoo-Mootang limestone mine in Thangskai village, East Jaintia Hills District, Meghalaya was investigated under transport and communication project.

Apart from the above sponsored projects, the pilot project on geotechnical mapping in and around New Shillong city is being continued under FS 2024-25.

Photo 11.12: Exposure of granite gneiss in the right abutment exploratory drift [Loc. Mawblei HEP, Meghalaya].

Photo 11.13: Under construction Lower Kopili Hydroelectric Project (110MW) in Assam.

Landslide Hazard Studies

11.22 During FS 2023-24, Nine (9) Meso-scale Landslide Susceptibility Mapping projects have been taken up, out of which five projects are on the request of State Government. In addition, two site-specific landslide investigations have been undertaken based on the request of State Government.

Important road corridors such as Itanagar to Hollongiin, Arunachal Pradesh, Wokha to Doyang in Nagaland, Kasom to Yairipok in Manipur, Bung Bangla to Kaifang in Mizoram, Umlympung to Laittyra in Meghalaya and Toong to Mangan in Sikkim have been mapped on 1:10,000 scale under meso-scale Landslide Susceptibility Mapping (LSM) project. Under this projects, three vulnerable town areas including Japorigog and Udayachal areas in Assam, and Mon in Nagaland were also studied. Under meso-scale LSM, landslide-type specific susceptibility analysis is being carried out and areas susceptible to different landslide types are categorized as 'high', 'moderate' and 'low' class. The outputs form inputs for land use planning and disaster mitigation. Besides, detailed landslide mapping and slope stability analysis of Renging village landslide in Arunachal Pradesh and Pathing landslide in Sikkim were completed.

11.23 During FS 2024-25, Eleven (11) Meso-scale Landslide Susceptibility Mapping projects have been taken up covering part of the GSI-NDMA approved priority sectors for meso-scale landslide susceptibility mapping in NER. In addition, two site specific landslide investigations have been undertaken based on the request of State Government.

Photo 11.14: Shallow translational earth slide posing risk to settlement [Loc. Krishna Nagar, Kamrup (Metro), Assam].

Photo 11.15: Debris slide along Thaizawl– Bualte road section posing risk to the road [Loc. Near Bualte, Lunglei District, Mizoram].

Earthquake Studies

11.24 Two projects had been taken up in NER on Seismic Microzonation and earthquake studies during FS 2023-24 on the request of the State government of Assam and Tripura. The Seismic Microzonation of two towns. i.e., Udaipur City, Tripura and Tinsukia City, Assam had been carried out. The work involved integrated studies of seismic source, seismic response through geological, geotechnical and geophysical parameters and their relation to seismic susceptibility following guidelines of GSI, 2017. The results from Tinsukia city reveal that about 31% of the city and its surrounding areas falls in very high and high seismic susceptible class.

11.25 Two projects are being executed in NER on Seismic Microzonation and earthquake studies in the current FS 2024-25 on the request of the State government of Tripura and Mizoram. The Seismic Microzonation of two towns: Udaipur City in Tripura (a continued item of FS 2023-24) and Kolasib Town in Mizoram have been taken up. The projects are being carried out in line with the guidelines of GSI, 2017.

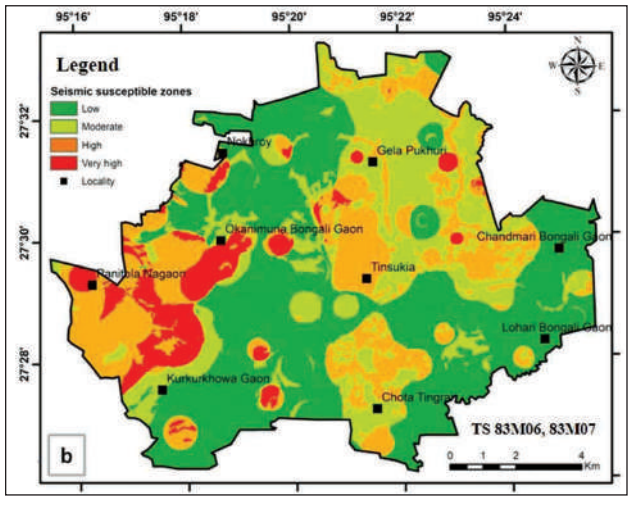
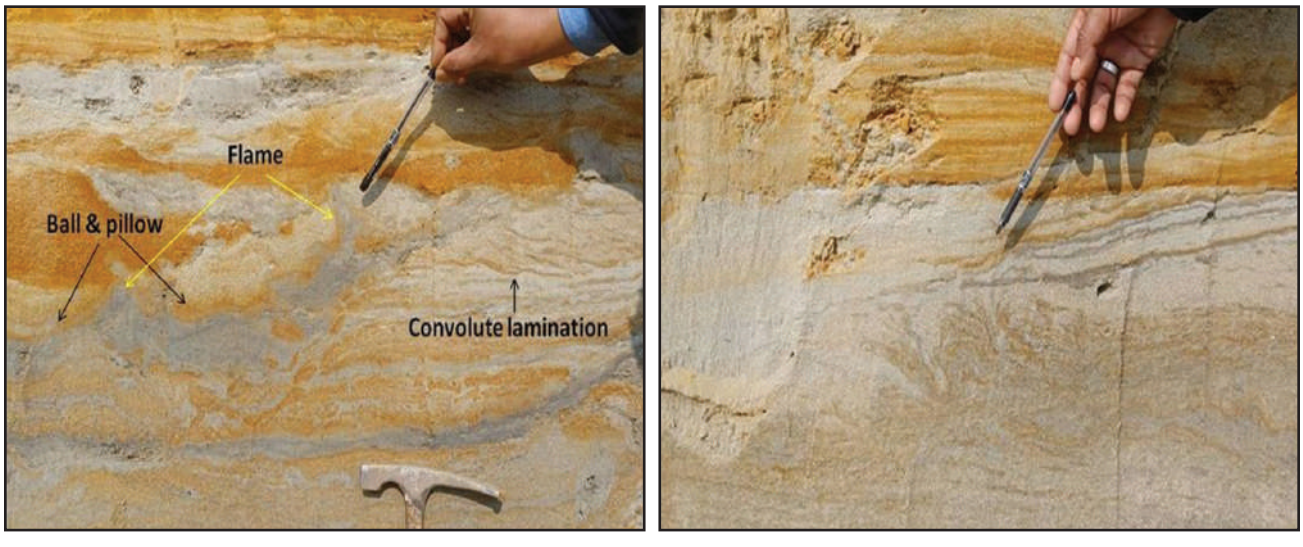


Photo 11.16: Seismic susceptibility map of Tinsukia City, Assam.



(a) (b)

Photo 11.17: Liquefaction features: (a) Ball and pillow, flame and convolute lamination, and (b) Convolute lamination [Loc. Lohari Kochari Gaon, near Tinsukia, Assam].

Environmental Geology

11.26 During FS.2023-24, the following two projects were taken up on Environmental Geology:

i) Study on Uranium, Lead, Arsenic, Fluoride and Mercury contamination of groundwater in the industrial areas of North Guwahati, Kamrup (M) District, Assam: A collaborative study by GSI and CGWB.

ii) Geo-environmental hazard study of flood and erosion-prone river banks areas of Brahmaputra river at Dibrugarh and Tinsukia district of Assam.

The industrial waste samples of North Guwahati, Kamrup (M) District, Assam show high concentration F, Pb, Cu, Ni, Cr, and Zn. The regolith/ soil samples also show moderately high values of F, Hg and Pb. The water contamination analysis is being carried out by CGWB under the joint project.

11.27 During FS.2024-25, the following two projects of FS 2023-24 are continued:

i) Study on Uranium, Lead, Arsenic, Fluoride and Mercury contamination of groundwater in the industrial areas of North Guwahati, Kamrup (M) District, Assam: A collaborative study by GSI and CGWB.

ii) Geo-environmental hazard study of flood and erosion-prone river banks areas of Brahmaputra river at Dibrugarh and Tinsukia district of Assam.

11.28 Budget and expenditure of the North Eastern Region for the Financial Year 2023-24 is given in **Table-11.1**.

Table-11.1

(Rs. in crore)

Sl. No.	Name of Activities	BE (2024-25) for NER	Actual Expenditure in NER (F.Y. 2024-25 up to 31st December, 2024)
1	2	3	4
1	Survey & Mapping (M-I)	0.75	1.39
2	Mineral Exploration (M-II)	1.40	2.39
3	Information & Dissemination (-III)	0.02	0.21
4	Research & Development (M-IVC)	0.44	0.33
5	Investigation (M-IVB)	0.30	0.30
6	Human Resource Development (M-V)	0.05	0.03
7	Schedule Caste Sub Plan (SCSP)	0.00	0.00
8	Tribal Area Sub Plan (TASP)	0.00	1.51
9	Modernisation & Replacement	0.15	0.64
10	Direction & Administration / ASA / Other Exp.	62.49	77.10
	Grand Total	**65.60**	**83.90**

Note: 1. As per MoF guideline, 10% of GBS is allotted for North Eastern Region (NER) in every financial year. However, for execution of all activities in NER, additional fund is allotted from GSI non NER budget based on requirement.

Work done by Indian Bureau of Mines in North Eastern Region

11.29 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 2024 (1st January to 31stDecember 2024), 22 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 thereof are given below:-

Parameter	Details
No. of inspections	Total - 22 Nos. MCDR– 6 Nos. MP/RoMP/FMCP–16 Nos. Check-up/ Others–00 Nos.
No. of violations issued	22 Nos.
No. of rules violated	120 Nos. [Rule 11(1), 11(4), 12(4), 14(3), 31(4), 33, 35(2), 45(7), 55(1)(3), & 56(2) of MCDR 2017]
No. of show cause notices issued	02 Nos. (incl. notices issued on the basis of office scrutiny)
No. of mines where violations not complied even after issue of show cause notice	16Nos. (In process of its compliance) – 9 Nos.
Action taken: Court case – Suspension –	 0 Nos. 0 Nos.

Work Carried Out by MECL in North Eastern Region

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.

11.30 During the year 2024-25, MECL has submitted Geological report for reconnaissance survey for Copper & REE in Temi-Tarku-Damthong block, District: East Sikkim. MECL has also received approval for two G-4 level of exploration for Tungsten, REE and Associated minerals in Nellie Area, Morigaon and West Karbi Anglong , and Langmipi - Laching Thing Area, Karbi Anglong in Assam.

11.31 Further, MECL is also carrying out detailed exploration of Coal (Promotional Coal blocks on behalf of CMPDIL) in Bishnupur Block and Nimgaon Block in Tinsukia District of Assam. Exploratory drilling is in progress in these two blocks. 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 taken exploration for Coal in Khotarda block, Mikir hills district is under progress.

12

Welfare Activities for SCs/STs, Women, Minorities & Persons with Disabilities

Welfare Activities for SCs/STs, Women, Minorities & Persons with Disabilities

- Ministry of Mines ..... Page - 219
- National Aluminium Company Limited (NALCO) ..... Page - 219
- Hindustan Copper Limited (HCL) ..... Page - 221
- Mineral Exploration & Consultancy Limited (MECL) ..... Page - 222
- Indian Bureau of Mines (IBM) ..... Page - 223
- Jawaharlal Nehru Aluminium Research Development and Design Centre (JNARDDC) ..... Page - 224
- Geological Survey of India (GSI) ..... Page - 224

Ministry of Mines

12.1 The Ministry of Mines, along with its attached and subordinate offices, Public Sector Undertakings (PSUs), and Autonomous Bodies, adheres to government guidelines for the welfare of marginalized communities. In line with these guidelines, PSUs design and implement various programs aimed at uplifting weaker sections of society in the surrounding areas of their operations.

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 have been 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 Internal Complaint Committees (ICC) have been constituted to look into cases of sexual harassment of women at work place for Ministry of Mines as well as organizations under its administrative control in accordance with The Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013.

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. The complaints received in She-Box portal are disposed on priority basis as per extant rules/ guidelines.

12.5 The Geological Survey of India (GSI), 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 have been undertaken for officials belonging to SC, ST, OBC and PwD communities for strict compliance of filling all the posts against vacancies reserved for them as per order issued by the Govt. of India/MoM/ DoP&T from time to time. Reservation has been followed strictly in case of their employment/ promotion wherever applicable.

12.7 SC/ST/OBC cells have 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 of Mines (Secretariat) and the representation of SC/ST/OBC and other weaker sections at as on 31.12.2024 may be seen at **Table 1.1**.

National Aluminium Company Limited (NALCO)

12.9 Welfare of activities for SCs/STs, Women, Economically Weaker Section (EWS), Minorities and Persons with Disabilities :

- 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-imbursement of travelling expenses for attending both written test and interviews.
  - (d) Relaxation of experience up to one year.
  - (e) Relaxation in qualifying marks for eligibility.
  - (f) Relaxation of 10% marks both in written test and interview (for posts requiring interview).
- Relaxation/concession in promotions- relaxation of 10% of marks both in written test and interview is given to SC/ ST employees in promotion up to lowest rung of Group-A.
- 10% reservation in A & B type quarters & 5% in C, D & E type quarters are 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.

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' 2017 onwards, 4% of vacancies are being reserved for persons with disabilities as provided in the Act. As on 31st December 2024, there are 92 Persons with Disability in employment of the Company in various identified posts. An 'Equal Opportunity Policy' as required under the Act has been formulated and the same has been widely circulated in addition to web-hosting. The different facilities/establishments of the Company have been made accessible as required under the Rights of Persons with Disabilities Act, 2016 and the 'Accessible India' campaign. However, these are being constantly monitored to bring about further improvement in the facilities.

12.12 Perspective Plan for Women Welfare

The Company has adopted the principle of equal opportunity to the women employees in the matter of employment and the Company

as on 31st December 2024 has 316 nos. of women employees at different levels and categories.

The ladies clubs in all units have extended necessary assistance for carrying out their various activities which in turn enhances their leadership and organizing capabilities in addition to welfare of the society.

Manpower Strength

12.13 National Aluminium Company Limited (NALCO)

Employment of SC/ST/Ex-SM/PWD/LDP/ Minorities in the Company as on 31st December 2024 is given in **Table 12.1**.

Table 12.1

Group	Total No of Employees	SC	ST	EX-SM	PWD	LDP	Minority
Executives	1710	259	150	0	36	16	57
Non-executives	3077	463	746	6	56	1188	106
Total	**4787**	**722**	**896**	**6**	**92**	**1204**	**163**

It may be seen from above that every third employee of the organization belongs to SC or ST Community.

Hindustan Copper Limited (HCL)

12.14 Welfare Activities

❖ **Employees Participation in Management**

Employees Participation in Management over the years has been the backbone of harmonious Industrial Relations in the Company. The successful operation of various Bi-partite forums at all three levels, namely, at the Apex level, Unit level and Shop floor level has immensely contributed in the smooth performance of the Company.

❖ **Perspective Plan for Women Welfare**

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**

The representation of SC, ST and OBC employees out of the total manpower of 1279 as on 30.11.2024 is 18.53%, 10.09% and 22.83% respectively.

❖ **Other Welfare Measures**

- Contributory Post-Retirement Medical Scheme (CPRMS) is in vogue and is a Medi-claim Scheme for Retired Employees, Spouse of Retired Employees & Spouse of deceased retired employees of Hindustan Copper Limited. The Scheme is renewed annually.
- 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.

12.15 Industrial Relations

Industrial Relations situation in all the Units of the Company continued to be harmonious and peaceful during the year 2024-25.

12.16 Redressal of Public Grievances

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 01.01.2024 to 31.12.2024, 178 public grievances were received and there was previous carry forward of 14 grievances as on 31.12.2024. Total 188 cases were disposed-off during the year and as on 31.12. 2024.

12.17 The Status of Implementation of the Persons with Disability Act, 1995.

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 30.11.2024 is as under: -

Group	Number of Persons with Disabilities (PwDs)
A	15
B	0
C	7
D	3
Total	**25**

12.18 Manpower Strength

The manpower strength of the Company as on 30.11.2024 is 1279 :

Category	SC	ST	OBC	General	Total
Executives (Nos.)	90	28	131	313	562
Non-Executives (Nos.)	147	101	161	308	717
Total (Nos.)	**237**	**129**	**292**	**621**	**1279**

12.19 Human Resource Development

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.

Mineral Exploration & Consultancy Limited (MECL)

Welfare of SC/ST, Women and Weaker section

12.20 The category wise employment position including General / SC / ST / OBC / Minorities/ Women (As on 31-12-2024) in the company is given in below mentioned in **Table 12.2**.

Table 12.2
Employment of personnel as on 31.12.2024

Group	Total number of employees	General	SC	ST	OBC	EWS	Minorities	Women
A	252	122	37	13	76	4	14	25
B	40	17	7	3	13		1	1
C	508	156	95	28	225	4	17	27
D	-	-	-	-	-	-	-	-
Total	**800**	**295**	**139**	**44**	**314**	**8**	**32**	**53**

**(Strength break-up category-wise excluding Directors)*

Employment under all categories (group-wise) including General/EWS/SC/ST/OBC/ Minority from 01.01.2024 to 31.12.2024

Group	Total number of employees	General	SC	ST	OBC	EWS	Minorities	Women
A	25	6	5	1	11	2	2	3
B	-	-	-	-	-	-	-	-
C	-	-	-	-	-	-	-	-
D	-	-	-	-	-	-	-	-
Total	**25**	**6**	**5**	**1**	**11**	**2**	**2**	**3**

**(Break-up category-wise of new recruitments from 01.01.2024 till 31.12.2024 excluding Directors)*

MECL upholds its commitment to gender equality by providing equal opportunities to women employees, with service rules uniformly applicable to both male and female staff. The company operates a successful creche facility to support working mothers, and women employees are entitled to maternity benefits in accordance with established rules.

Furthermore, MECL adheres to the Sexual Harassment of Women at Workplace (Prevention, Prohibition, and Redressal) Act, 2013, by maintaining an Anti-Sexual Harassment policy. An Internal Complaints Committee (ICC) has been established to address any complaints of sexual harassment, covering all employees including permanent, contractual, temporary, and trainees.

Additionally, in compliance with the Rights of Persons with Disability Act, 2016, MECL has implemented an Equal Opportunity Policy as directed by the Ministry of Social Justice & Empowerment. This policy ensures fair treatment and opportunities for individuals with disabilities within the organization.

Indian Bureau of Mines (IBM)

Reservation of Vacancies for persons with Disabilities

12.21 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 in promotion as well as direct recruitment. As on 1st January 2025, 20 physically handicapped persons were under employment in IBM.

Welfare activities for SC/ST, Women, Minorities and PWD's

12.22 Women employees constitute about 11.12 per cent. Training is imparted to women employees in the field of technical as well as administrative matters.

12.23 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 (JNARDDC)

12.24 The Centre is following the various Government guidelines w.r.t PWD, SC, ST and OBC reservation. The process for recruitment of various reserved categories of scientists and other posts were completed. The newly renovated washrooms were provided with paracolic facilities for greater accessibility to physically challenged employees. Women employees were made aware about the various aspects of "The Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013" by a workshop conducted by Senior Admin Officer of JNARDDC.

National Sports Day

12.25 JNARDDC carried forward the previous year theme "Sports are an enabler to an inclusive and fit society" and celebrated National Sports Day 2024 to honour the legacy of Major Dhyan Chand and the spirit of sportsmanship. With a view to promote physical fitness a 4-member relay team lead by Director, JNARDDC participated in the Asia's longest prestigious Cycle Race Across India 2.0 sponsored by Indian Oil, from Kashmir to Kanyakumari covering 3758kms. The team completed the race in just 6 days and 10 hours with non-stop cycling and secured the first position out of 22 teams which included participants from Poland and Kenya. The JNARDDC team was sponsored by MECL & GSB. The winning team was honoured by MECL and event sponsor Indian Oil Ltd.

Geological Survey of India (GSI)

12.26 The Geological Survey of India, an attached office of the Ministry of Mines, has undertaken several activities for the welfare of SCs/STs/OBCs/PWDs & other weaker sections and is following the rules and regulations as issued by the DoP&T from time to time so far the employment through SSC and UPSC is concerned.

12.27 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 has been 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

12.28 The 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 in the workplace. Moreover, the Nodal Officer for the SHe-Box portal has been nominated in GSI for effective implementation of the SH Act, 2013.

12.29 The total strength of employees in the GSI and the representation of SC/ST/OBC and other weaker sections during the year 2024 is given in **Table 12.3**.

Table 12.3

Class	Sanctioned Strength	Men in position	SC	ST	OBC	No.of Women	PH	Total (SC, ST, OBC, Women, PH)
Group-A	3439	3124	471	238	907	873	37	2526
Group-B (Gaz.)	912	513	103	57	127	78	8	373
Group-B (NG) (Min.)	841	632	84	63	86	131	9	373
Group-B (NG) (Tech.)	705	314	50	30	55	23	8	166
Group-C (Min.)	605	364	52	24	89	56	9	230
Group-C (Tech.)	1152	546	84	55	165	22	10	336
MTS (Erstwhile Gr-D)	1022	705	146	100	155	125	27	553
TOTAL	**8676**	**6198**	**990**	**567**	**1584**	**1308**	**108**	**4557**

13

Budget and Audit Paras

Budget and Audit Paras

- Budget Allocation for the year 2024-25 and 2025-26. ..... Page 229
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Budget Allocation for the year 2024-25 and 2025-26

13.1 Budgetary support under Revenue and Capital is allocated for various schemes and initiatives implemented by organizations/ divisions under Ministry of Mines i.e. Geological Survey of India (GSI), Indian Bureau of Mines (IBM), and Secretariat Proper (Mines). The allocation also covers revenue provisions for the Science & Technology(S&T) programmes, National Mineral Exploration Trust (NMET), Grants-in-Aid to Autonomous Bodies, other research programmes. The Demands for Grants for the financial year 2025-26 is also provided below, reflecting the financial outlay for key Organisations and projects under the Ministry, with notable increases in allocations for emerging initiatives like the National Critical Mineral Mission (NCMM) and enhanced budgetary support for mineral exploration through NMET.

Table 13.1: Summary of Demands for Grants

(Rs.in crore)

Sl. No.	Name of the Organisation	2023-24		2024-25		2025-26
		BE	RE	BE	RE	BE
1	Secretariat (Proper)	45.00	46.20	70.48	77.35	81.85
2	Geological Survey of India	1308.60	1345.58	1300.00	1424.51	1447.45
3	Indian Bureau of Mines	122.48	113.84	135.00	129.25	135.00
4	Bharat Gold Mines Limited- Grants	6.70	5.58	8.00	8.00	8.00
5	S&T Programme/ Other Programmes (5.1 to 5.5)	28.82	28.82	27.58	27.88	30.70
5.1	NIRM	6.38	6.38	3.50	3.50	3.50
5.2	JNARDDC	11.37	11.37	11.00	11.00	11.00
5.3	IC	0.37	0.37	0.38	0.38	0.50
5.4	NMA	0.70	0.70	0.70	1.00	0.70
5.5	Other Research Programme	10.00	10.00	12.00	12.00	15.00
6	National Critical Mineral Mission	0.00	0.00	0.00	0.01	410.00
7	NMET	400.00	296.50	400.00	400.00	500.00
8	NMET Inter Account Transfer	400.00	1296.50	400.00	1466.00	925.00
9	NMET Deduct recoveries	-400.00	-296.50	-400.00	-400.00	-500.00
	Total	**1911.60**	**2836.52**	**1941.06**	**3133.00**	**3038.00**

GSI Budget Allocation

13.2 GSI has been provided Rs.1447.45 crore [Rev. Rs.1373.44 crore & Cap. Rs. 74.01 crore] against the budget demand of Rs. 1875.95 crore (Rev. Rs. 1649.80 crore & Cap. Rs. 226.15 crore) in FY 2025-26 for all activities of GSI including administrative and establishment expenditure and the committed expenditure of FY 2025-26. GSI budget grant of Rs.1447.45 crore includes Rs. 66.40 crore for all activities of NER. The budget outlay for Establishment Expenditure under Administrative support head is Rs. 1012.49 crore and Rs.125.05 crore for administrative support activities & other expenditure. The budget outlay for GSI Mission (I to V) activities is Rs.235.90 crore and Capital outlay is Rs.74.01 crore for modernization & replacement including ICT activities and Infrastructural assets (token amount) of GSI. The activity-wise budget outlay as received BE 2025-26 is presented in **Table-13.2**.

Activity-wise details of budget allocation in FY 2025-26 are summarized below-

- Under 'Survey & Mapping' (Mission-I) head an amount of Rs. 86.60 crore has been provided for operation and maintenance of three GSI vessels for 2025-26 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.
- Under 'Mineral Exploration' (Mission-II) head, Rs.68.25 crore has been provided 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.
- Under 'Information & Dissemination' (Mission-III) head, Rs. 15.00 crore has been provided, out of which Rs. 1.50 crore has been provided for printing & publication of journals, maps, reports etc., Rs. 12.25 crore has been allocated for repair & maintenance which includes payments related the operation/ maintenance of OCBIS, Oracle Annual Technical Services and other miscellaneous activities under IT in all offices of GSI and Rs. 1.25 crore has been provided under digital equipments which includes purchase of consumables and other miscellaneous activities under IT in all offices of GSI.
- Under Mission-IV, Rs. 13.00 crore has been allotted for 'Research & Development' activity; Rs. 6.15 crore has been provided for multidisciplinary specialized investigations' and Rs. 0.05 crore has been allotted for polar studies in Antarctica.
- Under 'Research & Development' head fund has been provisioned for taking up fundamental research and development programmes, execution of field work in research and development activities, AMC of the laboratory instruments and equipment of GSI and also for the expenditures towards procurement of laboratory consumables.
- 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, studies related to climate change and eco-systems, environmental, medical geology, glaciology etc. and expedition to Antarctic, Arctic regions, miscellaneous expenditure related to AMC and maintenance of seismic and Geo-technical laboratories.
- Under 'Training (Human resource development)' head (Mission-V), Rs. 2.00 crore has been provided 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.
- As per the mandatory guidelines of Government of India, Rs. 15.30 crores have been provided under 'Tribal area Sub Plan (TSP)' head and Rs. 29.55 crore has been provided 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 and capacity building programmes falling in Scheduled Tribe and Scheduled Cast dominated areas in different parts of the country.

- Under 'Modernisation & Replacement' head, capital grant of Rs.74.01 crore has been provided out of which Rs. 9.00 crore has been provided for procurement of motor vehicles to carry out field activities, Rs. 40.00 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, Rs. 23.00 crore for procurement of information, computer, telecommunication (ICT) equipment's for digital transformation of GSI's activities, Rs. 0.01 crore for Infrastructural Assets as token amount for procurement of two nos. coastal vessels for (GSI) as a replacement for the existing two coastal vessels and Rs. 2.00 crore for furniture and fixtures.
- Under the Administrative Support Activities (ASA), Rs. 125.05 crore has been provided out which Rs. 79.75 crore has been provided to meet the expenditure on domestic & foreign travel expenses, office expenses, rent, rates and taxes for land & building, professional services and Rs. 45.30 crore has been provided under 'Other Expenditure' head which includes minor civil & electrical works and repair & maintenance of different GSI buildings, supply & material, clothing & tentages, advertisement & publicity and other revenue expenditure.
- Under 'Establishment Expenditure-Administrative Support' head, Rs. 1012.49 crore has been provided out of which Rs. 510.00 crore has been provided under Salary head, Rs. 453.50 crore for allowances, Rs. 5.60 crore for leave travel concession and remaining fund has been provided for various establishment expenditures such as wages, rewards, medical treatment, Swachchta Action Plan etc.

The distribution of outlay for the allotted budget grant for 2025-26 is given in the **Table 13.2**.

Table 13.2: Allotted Total Budget Grant 2025-26

(Rs. in crore)

GEOLOGICAL SURVEY OF INDIA			
Head	**GSI**	**NER**	**Total**
Establishment Expenditure			
Administrative Support (Object Class-I)			
Salary	476.50	33.50	510.00
Wages	0.24	0.00	0.24
Rewards	2.25	0.00	2.25
Medical treatment	8.50	0.00	8.50
Allowance	429.00	24.50	453.50
Leave Travel Concession	5.55	0.05	5.60
Office Expenses (Voted)	30.00	0.00	30.00
Fuels and Lubricants	1.00	0.00	1.00

GEOLOGICAL SURVEY OF INDIA			
Head	**GSI**	**NER**	**Total**
Repair & Maintenance	0.90	0.00	0.90
Swachchta Action Plan	0.50	0.00	0.50
Total	**954.44**	**58.05**	**1012.49**
Administrative Support Activities (ASA) (Object Class III)			
Domestic Travel Expenses (DTE)	42.50	2.50	45.00
Foreign Travel Expenses (FTE)	2.25	0.00	2.25
Office Expenses (OE)	21.50	2.50	24.00
Rents, Rates and Taxes (RRT) for land & building	5.70	0.30	6.00
Professional Services	2.48	0.02	2.50
Total (A)	**74.43**	**5.32**	**79.75**
Other Expenditure (Object Class III)			
Materials & Supplies	0.78	0.02	0.80
Advertising & Publicity	4.96	0.04	5.00
Minor civil & electrical works	35.00	0.00	35.00
Other Revenue Expenditure	4.47	0.03	4.50
Total (B)	**45.21**	**0.09**	**45.30**
Total Est. Exp. + Total ASA (A)+ Total Other Expenditure (B)	**1074.08**	**63.46**	**1137.54**
Other Central Expenditure			
Activities / Mission			
Survey & Mapping (Mission-I) (Object Class III)			
Wages	4.70	0.30	5.00
Fuels and Lubricants	0.80	0.20	1.00
Repair & Maintenance	75.00	0.00	75.00
Other Revenue Expenditure	5.35	0.25	5.60
Total	**85.85**	**0.75**	**86.60**
Mineral Exploration (Mission-II) (Object Class III)			
Wages	19.40	0.60	20.00
Fuels and Lubricants	7.80	0.20	8.00
Repair & Maintenance	0.25	0.00	0.25
Other Revenue Expenditure	39.40	0.60	40.00
Total	**66.85**	**1.40**	**68.25**
Information Dissemination (Mission-III) (Object Class III)			
Other Expenditure			
Printing and Publication	1.48	0.02	1.50
Repair &Maintenance	12.25	0.00	12.25
Digital Equipment	1.25	0.00	1.25
Total	**14.98**	**0.02**	**15.00**

GEOLOGICAL SURVEY OF INDIA			
Head	**GSI**	**NER**	**Total**
Specialized Investigation (Mission-IVA) (Object Class III)			
Wages	1.38	0.12	1.50
Fuels and Lubricants	0.32	0.08	0.40
Other Revenue Expenditure	4.15	0.10	4.25
Total (C)	**5.85**	**0.30**	**6.15**
Other exploration (Antarctica) (Mission-IV B) (Object Class III)			
Other Revenue Expenditure (D)	0.05	0.00	0.05
Total Spl. Investigation + Antarctica (C+D)			
Research & Development (Mission-IVC) (Object Class III)			
Wages	1.13	0.12	1.25
Material &Supplies	4.40	0.10	4.50
Fuels and Lubricants	0.25	0.00	0.25
Repair & Maintenance	4.00	0.00	4.00
Other Revenue Expenditure	2.90	0.10	3.00
Total	**12.68**	**0.32**	**13.00**
Training (Mission-V) (Object Class III)			
Training Expenses	1.95	0.05	2.00
Tribal Sub Plan (TSP) (Object Class V)			
Other Revenue Expenditure	15.30	0.00	15.30
Scheduled Caste Sub Plan (SCSP) (Object Class V)			
Other Revenue Expenditure	29.55	0.00	29.55
Total (Revenue)	**1307.14**	**66.30**	**1373.44**
Capital Expenditure (Object Class VI)			
Motor Vehicle	9.00	0.00	9.00
Machinery & Equipment	40.00	0.00	40.00
Information, Computer, telecommunication (ICT) equipment	22.95	0.05	23.00
Infrastructural Assets	0.01	0.00	0.01
Furniture and fixture	1.95	0.05	2.00
Total (Capital)	**73.91**	**0.10**	**74.01**
GRAND TOTAL (Revenue +Capital)	**1381.05**	**66.40**	**1447.45**

IBM Budget Allocation

Indian Bureau of Mines (IBM)

13.3 The Demands for Grants i.e. sanctioned Budget Estimates for the Financial Year 2024-25 is Rs.135.00 crores including Rs.25.33 crores under IBM Activities and Rs.109.67 crores under Establishment received vide Ministry's Letter No.01/03/2023-IF (563) dated 16th January, 2024. Head-wise cum Schemewise breakup of Activities & Establishment Budget is given in **Table 13.3**.

Table 13.3

(Rupees in lakhs)

Sl. No.	Object Heads	Estt.	Activities									Grand Total
			Sch.No.1	Sch.No.2	Sch.No.3	Sch.No.4	Sch.No.5	Other Heads	Total	NER	Total Activities	
1	Salaries	5020.00	20.00	0.00	0.00	0.00	0.00	0.00	20.00	85.00	105.00	5125.00
2	Wages	8.00	1.00	1.00	1.00	1.00	0.00	0.00	4.00	0.50	4.50	12.50
3	Rewards	39.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	40.00
4	Medical Treatment	120.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	120.00
5	Allowances	4160.00	15.00	0.00	0.00	0.00	0.00	0.00	15.00	75.00	90.00	4250.00
6	Leave Travel Concession	48.00	2.00	0.00	0.00	0.00	0.00	0.00	2.00	1.00	3.00	51.00
7	Domestic Travel Expenses	175.00	5.00	5.00	5.00	5.00	0.00	0.00	20.00	5.00	25.00	200.00
8	Foreign Travel Expenses	20.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.00
9	Office Expenses	634.00	35.00	2.00	2.00	2.00	0.00	0.00	41.00	5.50	46.50	680.50
10	Rent, Rates & Taxes for Land and Buildings	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
11	Printing & Publication	0.00	0.00	0.00	18.00	0.00	0.00	0.00	18.00	0.00	18.00	18.00
12	Rent for others	60.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	60.00
13	Materials & Supplies	38.00	2.00	0.00	0.00	0.00	0.00	0.00	2.00	0.50	2.50	40.50
14	Fuels & Lubricants	0.00	11.00	1.00	1.00	1.00	0.00	0.00	14.00	0.50	14.50	14.50
15	Advtertising & Publicity	0.00	3.00	0.00	0.00	0.00	0.00	0.00	3.00	0.00	3.00	3.00
16	Minor civil & electric works	385.00	70.00	0.00	0.00	0.00	0.00	0.00	70.00	0.00	70.00	455.00
17	Professional Services	79.00	5.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	5.00	84.00
18	Repair & Maintenance	38.00	5.00	0.00	0.00	0.00	0.00	0.00	5.00	0.50	5.50	43.50
19	Other Revenue Expeuditure	43.00	3.00	3.00	0.00	0.00	0.00	0.00	6.00	0.50	6.50	49.50
20	Mining Tenement System (ORE)	0.00	0.00	0.00	0.00	0.00	700.00	0.00	700.00	0.00	700.00	700.00
21	Training Expenses	0.00	0.00	0.00	0.00	0.00	0.00	10.00	10.00	0.00	10.00	10.00
22	Swachtta Action Plan (ORE)	0.00	0.00	0.00	0.00	0.00	0.00	12.00	12.00	0.00	12.00	12.00
23	Digital Equipment (I.T.)	0.00	0.00	0.00	0.00	0.00	0.00	30.00	30.00	1.00	31.00	31.00
24	Special Component Plan for Scheduled Castes (ORE)	0.00	0.00	0.00	0.00	0.00	0.00	210.00	210.00	0.00	210.00	210.00

Sl. No.	Object Heads	Estt.	Activities									Grand Total
			Sch.No.1	Sch.No.2	Sch.No.3	Sch.No.4	Sch.No.5	Other Heads	Total	NER	Total Activities	
25	Tribal Area Sub-Plan (ORE)	0.00	0.00	0.00	0.00	0.00	0.00	109.00	109.00	0.00	109.00	109.00
	TOTAL (REVENUE) :	10967.00	177.00	12.00	27.00	9.00	700.00	371.00	1296.00	176.00	1472.00	12439.00
26	Machinery and Equipment	0.00	0.00	0.00	0.00	0.00	0.00	250.00	250.00	0.00	250.00	250.00
27	Information, Computer, Telecomunications (ICT) equipment	0.00	0.00	0.00	0.00	0.00	0.00	60.00	60.00	0.00	60.00	60.00
28	Buildings and Structures	0.00	0.00	0.00	0.00	0.00	0.00	721.00	721.00	0.00	721.00	721.00
29	Furniture and Fixtures	0.00	0.00	0.00	0.00	0.00	0.00	29.00	29.00	0.00	29.00	29.00
30	Land	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00
31	Other Capital Expenditure	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	TOTAL (CAPITAL)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1061.00**	**1061.00**	**0.00**	**1061.00**	**1061.00**
	GRAND TOTAL :	**10967.00**	**177.00**	**12.00**	**27.00**	**9.00**	**700.00**	**1432.00**	**2357.00**	**176.00**	**2533.00**	**13500.00**
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 - Computerised Online register of Mining Tenement System.											

13.3 (1) The figures of Revised Estimates for the Financial Year 2024-25 is Rs.129.25 crores received vide Ministry's Letter No.1/5/2024-IF (576) dated 11th November, 2024, However, the approval of Head-wise cum Schemewise breakup of Revised Estimates 2024-25 is awaited.

Table 13.3 (1)

(Rupees in lakhs)

Sl. No.	Object Heads	Estt.	Activities									Grand Total
			Sch. No.1	Sch. No.2	Sch. No.3	Sch. No.4	Sch. No.5	Other Heads	Total	NER	Total Activities	
1	Salaries	4675.00	20.00	0.00	0.00	0.00	0.00	0.00	20.00	85.00	105.00	4780.00
2	Wages	8.00	1.00	1.00	1.00	1.00	0.00	0.00	4.00	0.50	4.50	12.50
3	Rewards	39.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	40.00
4	Medical Treatment	120.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	120.00
5	Allowances	3905.00	15.00	0.00	0.00	0.00	0.00	0.00	15.00	75.00	90.00	3995.00

Sl. No.	Object Heads	Estt.	Activities									Grand Total
			Sch. No.1	Sch. No.2	Sch. No.3	Sch. No.4	Sch. No.5	Other Heads	Total	NER	Total Activities	
6	Leave Travel Concession	48.00	2.00	0.00	0.00	0.00	0.00	0.00	2.00	1.00	3.00	51.00
7	Domestic Travel Expenses	225.00	5.00	5.00	5.00	5.00	0.00	0.00	20.00	5.00	25.00	250.00
8	Foreign Travel Expenses	30.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.00
9	Office Expenses	734.00	35.00	2.00	2.00	2.00	0.00	0.00	41.00	5.50	46.50	780.50
10	Rent, Rates & Taxes for Land and Buildings	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
11	Printing & Publication	0.00	0.00	0.00	18.00	0.00	0.00	0.00	18.00	0.00	18.00	18.00
12	Rent for others	60.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	60.00
13	Materials & Supplies	38.00	2.00	0.00	0.00	0.00	0.00	0.00	2.00	0.50	2.50	40.50
14	Fuels & Lubricants	0.00	11.00	1.00	1.00	1.00	0.00	0.00	14.00	0.50	14.50	14.50
15	Advtertising & Publicity	0.00	3.00	0.00	0.00	0.00	0.00	0.00	3.00	0.00	3.00	3.00
16	Minor civil & Electric Works	385.00	70.00	0.00	0.00	0.00	0.00	0.00	70.00	0.00	70.00	455.00
17	Professional Services	79.00	5.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	5.00	84.00
18	Repair & Maintenance	38.00	5.00	0.00	0.00	0.00	0.00	0.00	5.00	0.50	5.50	43.50
19	Other Revenue Expeuditure	113.00	3.00	3.00	0.00	0.00	0.00	0.00	6.00	0.50	6.50	119.50
20	Mining Tenement System (ORE)	0.00	0.00	0.00	0.00	0.00	470.00	0.00	470.00	0.00	470.00	470.00
21	Training Expenses	0.00	0.00	0.00	0.00	0.00	0.00	10.00	10.00	0.00	10.00	10.00
22	Swachhta Action Plan (ORE)	0.00	0.00	0.00	0.00	0.00	0.00	37.00	37.00	0.00	37.00	37.00
23	Digital Equipment (IT)	0.00	0.00	0.00	0.00	0.00	0.00	30.00	30.00	1.00	31.00	31.00
24	Special Component Plan for Scheduled Castes (ORE)	0.00	0.00	0.00	0.00	0.00	0.00	210.00	210.00	0.00	210.00	210.00
25	Tribal Area Sub-Plan (ORE)	0.00	0.00	0.00	0.00	0.00	0.00	109.00	109.00	0.00	109.00	109.00

Sl. No.	Object Heads	Estt.	Activities									Grand Total
			Sch. No.1	Sch. No.2	Sch. No.3	Sch. No.4	Sch. No.5	Other Heads	Total	NER	Total Activities	
	TOTAL (REVENUE)	**10597.00**	**177.00**	**12.00**	**27.00**	**9.00**	**470.00**	**396.00**	**1091.00**	**176.00**	**1267.00**	**11864.00**
26	Machinery and Equipment	0.00	0.00	0.00	0.00	0.00	0.00	240.00	240.00	0.00	240.00	240.00
27	Information, Computer, Telecomunications (ICT) equipment.	0.00	0.00	0.00	0.00	0.00	0.00	60.00	60.00	0.00	60.00	60.00
28	Buildings and Structures	0.00	0.00	0.00	0.00	0.00	0.00	721.00	721.00	0.00	721.00	721.00
29	Furniture and Fixtures	0.00	0.00	0.00	0.00	0.00	0.00	40.00	40.00	0.00	40.00	40.00
30	Land	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	Other Capital Expenditure	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	TOTAL (CAPITAL) :	0.00	0.00	0.00	0.00	0.00	0.00	1061.00	1061.00	0.00	1061.00	1061.00
	GRAND TOTAL :	**10597.00**	**177.00**	**12.00**	**27.00**	**9.00**	**470.00**	**1457.00**	**2152.00**	**176.00**	**2328.00**	**12925.00**
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 - Computerised Online register of Mining Tenement System.											

13.4 Audit

As on 31.12.2024, 77 C&AG Audit Paras and 119 Internal Audit Paras are pending in the Ministry of Mines. The latest status of these Audit Paras is as under:

INTERNAL AUDIT PARAS from 01.04.2024 to 31.12.2024

Sl. No.	Organization	Balance as on 01.04.2024	Para raised during 01.04.2024 to 31.12.2024	Paras settled 01.04.2024 to 31.12.2024	Balance as on 31.12.2024
1	Sectt. Proper	11	10	10	01
2	PAO	11	130	135	06
3	GSI	74	123	124	73
4	IBM	02	65	29	38
	Total	**98**	**328**	**298**	**118**

CAG AUDIT PARAS from 01.04.2024 to 31.12.2024

Sl. No.	Organization	Balance as on 01.04.2024	Para raised during 01.04.2024 to 31.12.2024	Paras settled 01.04.2024 to 31.12.2024	Balance as on 31.12.2024
1	GSI	01	00	01	00
2	IBM	00	87	44	43
3	NALCO	10	00	00	10
4	HCL	05	00	00	05
5	MECL	19	12	12	19
6	JNARDDC	01	00	01	00
7	NMET	01	00	01	00
	TOTAL	**37**	**99**	**59**	**77**

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 advantage for the MIS websites / applications is to reduce the Ministry's workload and increase overall transparency in its function. The computerization has been done in the area of Science and Technology Schemes , Registration under Rule 45 of MCDR , Revision Applications, e - indent, Conference Hall Booking. The following MIS operational:

a) Satyabhama - a Web Portal for Science and Technology Schemes (https://research.mines.gov.in) to promote research in mining sector.

b) Revision Application System (RAS) (https://ras.nic.in)

c) Intra-mines Web portal (Covers e-Indent of various stationary items and cleaning material, online booking of Conference Rooms, also to facilitate financial support through Canteen Bill Processing System to officer for hospitality management as per Govt. of India rule). This service is operational on Local Area Network of the Ministry.

d) Non- Ferrous Metal Import Monitoring System (NFMIMS)

e) Mining Tenement System comprising 11 modules (Major Modules are Registration, Returns, Final Mine Closure Plan and Average Sale Price System)

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
- e-Office 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. EDR and UEM is installed on clients for advance protection from virus, malware etc. Exclusive Access is granted to scanning in all scanners of the Ministry of Mines. Security postures of the Ministry have been upgraded with installation of EDR/UEM to all the systems in the network as per Government of India Guidelines.

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 16 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.

Video conferencing Support

14.6 Video conferencing of the Ministry Officials with the State Governments, Subordinate Offices, PSUS and PRAGATI VC is being facilitated by the NIC-Mines team. There are 9 VC studios operational in Ministry of Mines. To cater to 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 950 VC meetings have been conducted over the video conferencing system of NIC.

VPN Cloud Support

14.7 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. NIC is also Managing Cloud Hosting of various websites of Ministry.

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) such as:

I. Indian Bureau of Mines (IBM) – Mining Tenement System

II. Geological Survey of India (GSI) – for conducting video conferencing sessions with the Ministry.

III. PSUs of Ministry of Mines-for conducting video conferencing sessions with the Ministry.

SATYABHAMA Portal

14.9 SATYABHAMA Portal is developed to monitor Research in mining sector providing end to end solution from research proposal submission to close of research project. To plan, support and coordinate mining, mineral and metal based research in public interest for enhancing the understanding of the mines and geology by mining industry partners, and devising strategies and solutions for conservation and mining protection and management, startups are promoted to involve in mining based research. Enhancement of SATYABHAMA Portal to cater this new requirements of promoting research by industry partners is being worked out. Ministry of Mines is emphasizing to Introduce Science and Technology scheme for Start-ups in Mining Sector. Therefore, a portal is emphasized by the ministry to accept research proposals and provide research grants to them.

Mining Tenement System (MTS)

14.10 Mining Tenement focuses on delivering efficient, transparent, and responsive services to citizens while involving them in decision-making.

Starting from Registration by Miners to regularly submission of Mining plan, Annual Return/ Monthly Return, Interaction with various Mining officers through online system helps the miners in executing and submitting various data, reports in a very short concise time.

There are 11 Modules. These are Registration, Return Submission, Mining Plan Approval System, Calculation of Average Sale Price System, National Directory (NMI), World Directory (WMI), Inspection, Mineral Processing, Revision and Final Mine Closure Plan. MTS Project was conceptualized in April 2024 and to be completed by April 2026. Three Modules Live Registration, Return System and Mining Plan System are introduced in 2019.

MTS project is being completed before time by March 2025.

Revision Application System

14.11 The objective of the system is to scrutinize, process, monitor and disposal of the Revision Petition filed by a person to the Central Govt. against the order of his Mining Lease/Prospecting License/Reconnaissance Permit application by the concerned State Govt. Hearing are conducted, notices are generated from the system. Decisions of Revision Authority thereafter are updated in the system. MIS Reports are generated from system for Revision Cell and Revision Authorities.

E-Office

14.12 The e-office is e-governance application and has been implemented in the Ministry of Mines from May 2013.

14.13 The following modules have been successfully adopted:

- **eFile (File Management System)–** eFile , an integral part of eoffice suite a system designed for the Government departments, PSUs and Autonomous bodies to enable paperless office by scanning, registering and routing the correspondences along with creation of file, noting, referencing, correspondences attachment, draft for approvals and finally movement along with tracking of e files. The current version of e File 7.3.9 released on Feb 1, 2024.
- **Improved PDF Viewing:** Accurate Page Numbers in Recent and TOC Sections for Enhanced Referencing.
- **Enhanced Note-to-Correspondence Referencing:** Dual Display of Individual and TOC Page Numbers for Improved Clarity.
- **Improving User Experience:** Introducing 'Loading' Functionality to Address Network Delays in Note-to-Correspondence Referencing.

eSamiksha

14.14 eSamiksha 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 eSamiksha 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 eSamiksha portal every month. Ministry of Mines has been regularly monitoring the follow-up action in respect of eSamiksha portal.

SKILL DEVELOPMENT

14.15 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 2021-22	% of total man-power	No. of apprentices engaged in 2022-23	% of total man-power	No. of apprentices engaged in 2023-24	% of total man-power	No. of apprentices engaged in 2024-25	% of total man-power
NALCO	1135	20.56	1394	26.85	1135	23.29	1450** (expected)	30.29
HCL	128*	1.93	146*	1.97	137*	1.8	214* (till Nov 2024)	2.76
MECL	65	2.7	47	2.9	45	2.7	6 (Till Jan 2025)	2.31

***In NALCO, no contractual staff engaged directly in its role.*

**Operations at Indian Copper Complex, Ghatsila, Jharkhand suspended, hence no apprentice engaged and the same has been informed to respective Regional Directorate of Skill Development & Training (RDAT).*

14.16 The Ministry of Mines has engaged the Skill Council for Mining Sector (SCMS) to undertake a study on Skill Plan for Indian mining sector for the period 2025-30. The objective of the study is to assess the status of employment and skilling in mining and non-ferrous metal sector and new-age skill sets required for the critical mineral sector in the country. This study will also generate estimates on skill requirements and skill gaps at State and all-India level along with policy framework to address the issues pertaining to skill-ecosystem of mining sector including future skill requirements, budget, training and infrastructure needed to address these issues.

Geological Survey of India (GSI)

14.17 In order to enhance the competency of the GSI employees, skill development and capacity enhancement being done through various field, laboratory modules with hands-on practices by Geological Survey of India Training Institute (GSITI). Training modules of GSITI focus on Geological, Geophysical and Geochemical Mapping; Mineral exploration and 3D-Statistical Modelling of Mineral Resources; Geo- scientific data handling techniques and integration; Fundamental and Advanced Research Methodologies in Geosciences and Public-Good Geosciences; Processing and interpretation of Aero geophysical data as well as Multi-seismic marine data; Training on Drone technology, Artificial Intelligence and Machine Learning and their applications in Geoscience; Techno-administration including Grievance and Vigilance, HR Management and Financial Management, Gender Sensitization etc.

14.18 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 with advanced software; Classroom training on Administration and Management; Domain specific (Basic, Refresher and Advanced) training through classroom lectures at field sites as well as in the laboratories; Training on Drone technology, Artificial Intelligence and Machine Learning and their applications in Geoscience; Training in collaboration with reputed agencies/academic institutes. The trainings were primarily conducted through offline, online, or blended modes. GSITI

website (https://training.gsiti.gsi.gov.in/) offers 33 asynchronous self-paced online training programmes. GSITI has onboarded 41 no. of online courses (domain, behavioural and Functions) in the iGOT Karmayogi portal.

14.19 Skills for which training is required for other stakeholders connected to GSI are Geoscientific investigations, Mineral exploration techniques and 3D-Modelling of Mineral Resources; Operation of geoscientific equipment and relevant software in the domain of geosciences; Training in NGDR; Imparting Basic, Refresher and Advanced training in a specific domain through lectures, laboratory demonstrations and field sites demonstration. Apart from the above, Ministry of External Affairs (MEA) sponsored training programmes under the Indian Technical and Economic Cooperation (ITEC) and ISRO-sponsored training programmes under the National Natural Resources Management Survey (NNRMS) are being conducted.

14.20 Between January 2024 to December 2024, a total of 15,122 individuals underwent training. This included 3509 personnel from GSI, 7015 personnel from stakeholder organizations connected to GSI such as State DGMs, State and Central Organizations engaged in geoscientific investigations and 61 international participants from 34 countries. Additionally, 4537 participants from various academic institutions across the country received training under outreach programme Azadi Ka Amrit Mahotsav.

Indian Bureau of Mines (IBM)

14.21 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.

14.22 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. Nominations are sought in advance. After approval of the Competent Authority, training programmes are organized through classroom lectures/ presentation by the faculties drawn from IBM as well as Industry.

Presently the trainings are being conducted offline. In the last couple of years, IBM personnel had attended training programmes in outside organizations /institutes like GSITI, Kolkata National Remote Sensing Centre, Hyderabad. Further training programme, wherever necessary, will be conducted in association with these organizations/ institutions. Further, through bilateral cooperation with other countries, capacity building programme will be taken up.

Skills for which training required for other stakeholders connected to IBM

14.23 IBM imparts training to technical and non-technical officials of IBM and also to persons from the mineral industry and other agencies in India and abroad. During the year 2024-2025, 17 training programmes have been conducted, in which a total of 297 IBM personnel, 391 Industry officials and 163 from the State Government officials have participated. 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.

14.24 IBM had initiated its efforts to upload its training modules on iGOT platform, YouTube Channel and IBM website. As per the Ministry's letter No. A-33/2//2021-ESTT. Dated 05.07.2022 regarding uploading of training courses on iGOT portal, three topics/modules are identified for IBM for lecture videos i.e. (a) Mining Reforms, (b) Process of Mining Lease

to LoI & (c) Mining Plan Approval System. Therefore, IBM has initiated the process for preparing the lecture videos through Training Centre & expertise available in IBM, and prepared training videos related to the topics. So far, 02 lecture videos have been uploaded on YouTube, 06 courses on i-GoT portal and 10 lecture videos on IBM website. Further preparation is underway to upload more such videos in various platforms.

Capacity Building Plan of IBM:

14.25 As per Ministry of Mines Letter No. A-33/2/2021-ESTT. (Part-1) dated 21.09.2023 regarding "Capacity Building Plan for Employees under the administrative control of M/o Mines", IBM entrusted M/s Ernst &Young LLP to prepare the Annual Capacity Building Plan (ACBP) of IBM.

14.26 In pursuance of RFQ No. IBM/TC/2023, the said agency submitted its draft Deliverables on stipulated time and ACBP of IBM came into effect from 01.05.2024. The ACBP consists of both training & non-training interventions. Based on competency requirements identified for each cadre training interventions have been recommended across domain, behavioural & functional areas. The training centre collects, compile and monitor the ACBP progress on monthly as well as quarterly basis.

Mineral Exploration & Consultancy Limited (MECL)

Status of Apprenticeship Training at MECL

Apprentice engaged during 2021-22	% of total manpower	Apprentice engaged during 2022-23	% of total manpower	Apprentice engaged during 2023-24	% of total manpower	Apprentice engaged during 2024-25 (Till Jan 25)	% of total manpower
65	2.7	47	2.9	45	2.7	6	2.31

14.27 MECL has been steadfast in empowering its workforce through targeted skill development initiatives, focusing on excelling in mineral exploration. With a robust training framework, the organization emphasizes technical skill enhancement, leveraging collaborations with leading National Institutions and industry experts. Employees are equipped with cutting-edge knowledge in geological exploration technologies while benefiting from personalized development plans and soft skills training, fostering holistic professional growth. The adoption of digital transformation, marked by the inauguration of E-Office by Shri G. Kishan Reddy, Hon'ble Union Minister of Coal & Mines, has further streamlined workflows and enhanced operational efficiency, reinforcing MECL's commitment to innovation and governance. Notably, MECL's dedication to continuous learning is reflected in its 1st position in the National Learning Week for achieving the "Minimum 4-Hour Learning Goal."

MECL has been awarded for securing 1st position in the National Learning Week for achieving the "Minimum 4-Hour Learning Goal

Between April and December 2024, MECL conducted 680 mandays of internal training, including induction programs for new executives, technical skill-building on SAP ERP and GeM procurement, and hands-on training on MineX. Leadership Development Programs (CLDP) were held monthly to

cultivate managerial acumen. Externally, 63 mandays were dedicated to global exposure and strategic training, such as advanced core scanning in Perth, critical minerals exploration, and AI-driven predictive maintenance. These initiatives ensure employees are well-equipped to navigate evolving industry challenges while fostering innovation and excellence.

Table 14.2

Total Number of Employees trained from January to March, 2024	Total Number of Employees trained from March to December, 2024
89	786

National Aluminium Company Limited (NALCO)

Apprenticeship Training

Apprentices engaged during 2021-22	% of total manpower	Apprentice engaged during 2022-23	% of total manpower	Apprentice engaged during 2023-24	% of total manpower	Apprentice engaged during 2024-25 (Till December 24)	% of total manpower	Apprentice engaged during 2024-25 (Expected)	% of total manpower
1135	20.56	1394	26.85	1135	23.29	937	19.57	1450	30.29

14.28 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.

14.29 The Company conducts training programs for its employees on various areas like: SA 8000 awareness, Internal Audit, Productivity improvement & measurement, Quality management, Project execution skills, Contract handling skills, Presentation skills, Communication skills, Negotiation skills, e-procurement, inventory management etc.

14.30 Method for imparting training: In house training through internal faculties, external faculties of national repute from premier management/technical institute and through equipment provider.

Hindustan Copper Limited (HCL)

14.31 Skills for which training required for employees of HCL are Mines Refresher Training, Fire Fighting Training, First Aid Training, Safety Training, Soft Skills Training, Fitters, Mechanics, Riggers, Welders, Mine Surveyor Assistant, Loader & hauling operation, Blasters, Winding engine operators for underground shaft, Mining mate, HEME operators, Drilling machine operators, Ball Mill operations for beneficiations, Pump operators for mine dewatering, etc.

14.32 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.

14.33 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)

14.34 Status of Annual Capacity Building Plan (ACBP) 2024 -2025

- NIRM generated 595 certificates in the year of ACBP as on 30.12.2024
- Need-Based Domain Training Programme April 2024 – December 2025 (Completed)

- The employees of the National Institute of Rock Mechanics (NIRM) participated in the following training programs during 2024:

S.No.	Subject /Title
1	Ultrasonic testing hands-on workshop in ASNT, Chennai
2	Rock Works 2024 Advance software
3	Tunnel Construction: north India Opportunities
4	ISRM International Symposium, Advance in Rock Mechanics
5	The American Society for Non-Destructive Testing is conducting an International Conference
6	International Conference DAM safety 2024 & Workshop on Instrumentation of Dams including Seismic Instrumentation
7	Landslide Disaster Risk Reduction : Need for Coordination, cooperation Skill Enhancement and Implementation Strategy
8	Capacity Building Program on Navigating Procurement Via Government e Market Place (GeM)

14.35 The list of completed courses in IGOT up to 30.12.2024 is given below.

S. No.	Course
1.	Code of Conduct for all Government Employees
2.	Prevention of Sexual Harassment at Workplace
3.	Yoga Break at Work place
4.	Emerging Technologies -1
5.	Stay Safe at Cyberspace
6.	Mission Life
7.	Understanding of GeM Marketplace - Introduction
8.	Cyber Security and Strategy
9.	Gender Equality and Development
10.	Presentation Skills
11.	Overview of Viksit Bharat 2047
12.	Leading the Karmayogi Way
13.	Jan Bhagidar Program

14.36 The training projection up to 31 March, 2025 is as follows:

- IGOT Training on the following courses up to March 2025:

S.No.	Course Name
1	Managing Personal Relations
2	Vigilance Angle
3	Vigilance Clearance
4	Preventive Vigilance

14.37 In house NIRM Capacity Building for April 2025 to March 2026 - Domain Specific Training: Need based and focused training/ skilling on scientific and administrative domains to remain abreast to the latest industry needs for scientific solutions, latest government guidelines and procedures for implementation in due course. All scientists are taking part in training/ workshops on tunnelling, mining and specific areas related to rock mechanics and rock engineering. Apart from this, institute scientists and staff will attend the trainings or workshops sponsored by different government/ private sector organization in India and abroad.

Domain-specific training is not available on IGOT. Time to time based on requirements, employees of NIRM will be sent to training/ workshops/ conferences/ symposium.

Jawaharlal Nehru Aluminium Research Development and Design Centre (JNARDDC)

14.38 The skill development initiative of JNARDDC has focus on following:

a) 3 months internal induction training for newly recruited employees

b) Certified Courses, Training programs& Lecture Series on for Scientists/ Technologists/ Others

c) Advanced awareness training on Lab management system as per ISO/IEC 17025:2017 and ISO-17034:2016

d) Specialized Training program for industry personnel

e) Vocational training / Internship programs for PG/ B.Tech/ M.Tech students

14.39 Under the above ambit, the following programs were conducted:

- The newly recruited employees are undergoing 3 months internal induction training.
- Certificate Courses and lecture-series cum mentorship programs undertaken by JNARDDC officials for skill development are as below:-
    - NTPEL course on "Steel Quality: Role of Secondary Refining & Continuous Casting" - online by IIT, Madras in Apr 2024
    - Certificate course on "Unlock the future of mines with digitization" - online by Skill Council for mining sector, FIMI, New Delhi in May 2024
    - Lecture Series by Shri Ramdeobaba College of Engineering and Management for all employees on 22nd May 2024 on the topics (i) Industry 4.0 (ii) Training on how to say it at work: Skills to communicate with Superiors, Colleagues and External Customers (iii) Six Sigma & (iv) Project Management
    - Training Program on Low Carbon Pathways for Industrial Sectors at AAETI, Alwar by Centre for Science and Environment, CSE during 2-5 July, 2024
    - 3 days training program on Establishment & Administration at Varanasi by SIERD, Delhi at during 8-10 July, 2024
    - Training on SMART designing standards-based service for the users, identification of emerging areas of standardization, optimizing the collaboration with ISO/IEC and new digital solutions developed by BIS at National Institute of Training for Standardization (NITS), Noida, BIS on 8th July, 2024
    - Workshop on "Preventive Vigilance & Case Studies" at JNARDDC, Nagpur by Mr. Somnath Hansdah, IRRS & CVO, NALCO on 15th July, 2024
    - Refresher certificate course for BEE Certified Energy Auditors (CEA) and Certified Energy Managers (CEM) at Bombay Industries Association Hall, Mumbai by Bureau of Energy Efficiency (BEE) on 21st July, 2024.
    - Reference Material Producer (RMP)- ISO 17034:2016 Awareness Program in Nagpur by NABL & QCI on 24th July 2024.
    - Training on "Basics of GIS and its Applications" at Regional Training Division, Geological Survey of India, GSI CR, Nagpur during July 22-27, 2024

- Workshop on "Accelerating Smart Power and Renewal Energy in India" (ASPIRE)- Pathway for decarbonization and energy efficiency in aluminium industry by Bureau of Energy Efficiency, BEE at VEDANTA, Jharsuguda 29th Aug, 2024
- Workshop on "Characterization of Materials" under SICE-2024 by VNIT, Nagpur on 21st Oct, 2024
- Lecture cum mentorship IIM-program on Leadership Skill at JNARDDC, Nagpur by Dr. Bhimaraya Metri, Director, Indian Institute of Management IIM Nagpur on 24th Oct 2024
- 74 PG and Engineering students from PAN India colleges were provided short term internship training program. They included students from Kamala Nehru Mahavidyalaya, VNIT, Nagpur Institute of Technology, G.H. Raisoni Institute of Engineering & Technology, Nagpur University, G.H. Raisoni College of Engineering, Nagpur & COEP Technological University, Pune, Sant Gadge Baba, Amravati University and National Institute of Technology, Rourkela
- iGoT : All JNARDDC employees are registered on iGOT and completed their courses as per CNA including courses mandated during National Learning Week (19-27 Oct 2024)
- JNARDDC topped in X-Small organization category in the number of learning hours in Karmayogi Platform and Dr. Anupam Agnihotri, Director, JNARDDC was honoured with a certificate by Dr. Jitendra Singh, Hon'ble Minister of State (MOS) for Personnel, Public Grievances, and Pensions (PP) on 14th Nov 2024. JNARDDC was one of the top performers on iGOT with special emphasis during national learning week.

Redressal of Public Grievances

14.40 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 Under Secretary has been designated as the Nodal Officer of Public Grievances. During the period 1st January, 2024 to 31st December, 2024, 1260 Public Grievances were received and 46 pending cases were brought forward from the year 2023. A total of 1253 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.

14.41 Details of action taken on the public grievances of this Ministry and its attached / subordinate offices during the year 2024 (from 01st January 2024 till 31st December, 2024) are given in **Table 14.3**.

Table 14.3

Organization	No. of public grievances pending as on 31.12.2023	Public grievances received during 01.01.2024 to 31.12.2024	Disposed cases during 01.01.2024 to 31.12.2024	Pending cases as on 31.12.2024
Ministry of Mines	46	1260	1253	53
Geological Survey of India (GSI)	07	210	210	7
Indian Bureau of Mines (IBM)	0	98	94	4
National Aluminium Company Limited (NALCO)	1	104	103	2
Hindustan Copper Limited (HCL)	14	178	188	4
Mineral Exploration Consultancy Limited (MECL)	1	16	17	0
JNARDDC	0	5	5	0
NIRM	0	3	3	0

Vigilance cases

14.42 During the year 2024-25 (from 01st January, 2024 till 31st December, 2024) details pertaining to vigilance division of this Ministry and its attached/ subordinate offices is given below in **Table 14.4**:

Table 14.4

Organization	No. of complaints pending (As on 31.12.2023)	Complaints received during 01.01.2024 to 31.12.2024	Disposed cases during 01.01.2024 to 31.12.2024	Pending cases (As on 31.12.2024)
Ministry of Mines, New Delhi	13	23	22	14
Geological Survey of India (GSI)	04	19	22	01 (Investigation under process)
Indian Bureau of Mines (IBM)	01	18	18	01

14.43 The details of disciplinary cases arising from vigilance complaints during the year 2024-25 (from 01st January, 2024 till 31st December, 2024) are given below in **Table 14.5**.

Table 14.5

Organization	No. of Disciplinary cases	Nature of the penalty recommended against officer/officials.	Status of disciplinary cases (As on 31.12.2024)
Ministry of Mines, New Delhi	04	**Major:** 01 officer. **Minor:** 12 officer/officials.	Pending cases : 04
Geological Survey of India (GSI)	NIL	NIL	NIL
Indian Bureau of Mines (IBM)	NIL	NIL	NIL

14.44 Vigilance Awareness Week was observed from 28th October, 2024 to 3rd November, 2024 in the Ministry as well as in subordinate/attached offices of the Ministry. During the week, Essay, Quiz and Extempore competitions related to vigilance activities were organized in Ministry. During three months' campaign of Vigilance Awareness Week-2024 a seminar was also organized on preventive vigilance on 14th October, 2024.

Geological Survey of India (GSI)

14.45 A glimpse on Vigilance activities carried out at GSI during 01.01.2024 to 10.12.2024.

a) The main focus of Vigilance Division is to promote a culture of Preventive Vigilance. Accordingly, 15 (fifteen) chief technical examiner (CTE) type inspections were carried out. Further, a list of potentially sensitive sections was prepared and the said sections were inspected by a committee under the chairmanship of an officer chosen from the various other Divisions/Sections. Total 107 nos. of such Inspections were carried out. The outcome of the inspections in appropriate cases, was shared with the Competent Authority for system improvement. To promote awareness, various vigilance trainings/workshops were organised. Guidelines issued by the CVC from time to time have been circulated through online GSI portal for wide dissemination amongst employees.

b) As a prelude to Vigilance Awareness Week – 2024 three months campaign (16/08/2024 to 15/11/24) had been undertaken as per direction of Central Vigilance Commission. Vigilance Awareness Week – 2024 had been observed from 28.10.2024 to 03.11.2024 on theme **"Culture of Integrity for Nation's Prosperity"** as advised by Central Vigilance Commission. During the said occasion various seminars/ discussions/presentations and competitions amongst the employees on pertinent topics were organised, which are briefed below.

- All India seminar cum training on 'Conduct Rules' was organised at the GSI Training Institute on 11.09.2024 through hybrid mode. The lecture was delivered by Dr. Upender Vennam, IPoS, CVO, BDL & MIDHANI, Hyderabad.
- An interactive session cum training on 'Basic Cyber Security, email security & overall cyber threat awareness' was organised on 25/09/2024 at GSI, CHQ on hybrid mode. Shri Subhag Ghosh, Infra Transformation Senior Manager & Shri Sabyasachi Bose, Security delivery Manager of M/s Accenture delivered talks during the session.
- All India seminar on 'Ethics and Good Governance' was organised at GSI, CHQ on 07/10/2024 through hybrid mode. CVO, GSI addressed the employees regarding the necessity of infusing ethical values and their impact in our society.
- All India seminar on 'Preventive Vigilance' was conducted on 28/10/2024 at GSI, CHQ through hybrid mode which was conducted by CVO, GSI to aware the employees on different vigilance aspects.
- Shri Awadhesh Kumar Singh, Director (Chemical) delivered the lecture on Ethics and Governance. His insights into the importance

of ethical conduct and good governance resonated deeply with the audience.

- Dr. D. K. Mehrotra, Director (Retired) provided a comprehensive overview of the "Conduct Rules for Government Employees." His expertise and practical advice were invaluable for the attendees.
- Shri Samendra Shukla, Joint Director (P&A), GSI, NR, Lucknow has elaborated about the system and procedure of organization of central government and GSI.
- Shri Rahul Mishra, Cyber Security Advisor, UP, Police delivered the lecture on Cyber Hygiene and Security. The participants were highly benefitted by his powerful presentations. He had cleared many doubts and aware the recent challenges in cyber-crime.
- Shri Ankit Shukla, state Coordinator and Trainer (GeM) had delivered the interactive lecture. The participants were highly benefitted by his informative presentations. He had cleared many doubts and aware the procurement procedure in Government offices.
- A talk was delivered by Shri Shri Indrajit Talukder, WBCS (Exec.) Addl. Secretary, Govt. of West Bengal Kolkata on vigilance awareness.
- Lecture delivered by Shri Sabyasachi Bose, Security Delivery Manager, Accenture Managed Security Services, Kolkata on Cyber Security-Do's & Don'ts.
- A Lecture on Conduct Rules was delivered by Shri Ratnesh Prasad, Deputy Director (P&A) for fresh inductees.
- A Lecture on Preventive Vigilance was delivered by Dr. Dipali Kapoor, Director for fresh inductees.
- Lecture on 'Vigilance, Complaints and its mitigation, Ethics' conducted by GSI, SU: AP, NER, Itanagar.
- Lectures on "Financial fraud and measures to curb corruption" delivered by Shri Bipul Das, Dy.Superintendent of Police, East Khasi Hills District, Meghalaya conducted by GSI, NER, Shillong.
- Lecture on the topic "Culture of Integrity for Nation's Prosperity" by Shri. M.T.MANG, Supdt. of Police, CBI, ACB Shillong conducted by GSI, NER, Shillong
- Lecture on "Preventive Vigilance and discussion on area of Focus" by Shri Gaikungam Rongmei, Director & Vigilance Officer, GSI NER.
- Seminar on CCS (Conduct Rules) organized by GSI TI, Hyderabad.
- A Talk on CCS (Conduct Rules) delivered by Shri. Ramesh.P.J, Director & N.O(Vig.), OPEC-1, M&CSD, GSI, Kolkata and Smt. Rajee Sandhya S, Director & N.O (Vigilance), OPWC-II, M&CSD, GSI, Kochi
- Seminar on "Conduct Rules" delivered by Shri. Hariharan S, Director (P&A), M&CSD, GSI, Mangalore
- Seminar on "Role and functioning with reference to Good Governance" organized by OPEC-II, M&CSD, GSI, Visakhapatnam.

- Lecture on "Integrity for Nation's prosperity" delivered by Shri Karthick, IPS, SP, HQ, VACB
- Vigilance awareness lecture deliverd by Shri S. Gopinath, IPS (rtd.), IG Kerala police at SU: Kerala, Thiruvananthapuram.
- lecture at GSI, SU-Bihar office by Prof. Dr. Yogendra Kumar Verma, professor and Dean, Law department, Patna University on **"**Office Procedures, General Conditions of Service**"**.

c) A Newsletter "Vigilance", containing brief of activities during three-month campaign as well as VAW-2024 had been published by GSI, CHQ, Kolkata on this occasion. Various programme like slogan writing competition, essay writing competition, quiz competition, debate, poster presentation completion etc. were organised on this year theme of Vigilance Awareness Week, among the employees of Geological Survey of India in the offices located throughout India. Banners and posters on Three-month campaign along with VAW-2024 were displayed in prime locations of office premises located throughout India. As an outreach activities GSI held various Awareness Gram Sabha in remote villages to percolate the message of vigilance awareness amongst the larger sections of the society. Various competitions were organised in schools and colleges to spread vigilance awareness amongst the college and school students by GSI offices located throughout the country. Following are brief of few outreach activities.

1. Outreach activities in Gram Sabha:

Name of State	Name of City/ town/ village	Name of Gram Panchayat where "Awareness Gram Sabha" is held	Details of activities conducted
Kerala	Thiruvananthapuram	Karakulam Panchayat	Vigilance awareness campaign was organized at Karakulam Grama Panchayat
Maharashtra	Pipla, Dist- Nagpur	Besa- Pipla	Conducted a Lecture about Vigilance Awareness and PIDPI. Integrity Pledge was also administered to the participants.
Rajasthan	Banswara District	Camp Ghatol	To spread awareness and sensitized the rural citizens on the ill effects of corruption and enlightened the citizens on the importance to perform all duties with honesty. The participants were made aware about the need of vigilance awareness towards a corruption free environment and make India a developed nation.
Rajasthan	Kishangarh District	Ladera Block	

Name of State	Name of City/ town/ village	Name of Gram Panchayat where "Awareness Gram Sabha" is held	Details of activities conducted
Gujarat	Chiloda	Dashela Gram Panchayat	Gram Sabha for 35 villagers at Village Dashela and Painting Competition for 45 students.
Meghalaya	Dorbar Shnong Siejiong village	Mawpat Gram Panchayat	Activities were conducted on 23.10.2024.
Telangana	Regatta Village, Nalgonda Distrist	Regatta Gram Panchayat	Slogan Competition (29.10.2024)

2. Outreach activities in Schools:

Name of State	Name of City/ town/ village	Name of school	Details of activities conducted
GSI, SR	Hyderabad	Zilla parishad High School-Nagole	Essay Writing-Culture of integrity for nations prosperity on 01.11.2024
GSI, SR	Hyderabad	Indu international school, Bandlaguda	Essay Writing-Culture of integrity for nations prosperity on 01.11.2024
Rajasthan	Sirohi District	Students of various schools were present	Display of Vigilance Campaign Banner in the GSI stall, in an exhibition at Abu Road. (16 to 18 October, 2024).
Rajasthan	Udaipur		Display of Vigilance Campaign Banner during Special Campaign 4.0 at Geo-Heritage site of Stromatolite Park, Jhamarkotra. (17 October 2024)
Rajasthan	Jaisalmer		Display of Vigilance Campaign Banner during Special Campaign 4.0 at Akal Wood Fossil Park. (28.10.2024)
Meghalaya	Shillong	All Saints Diocesan School, IGP Point, Shillong	Vigilance Awareness outreach program on 13.09.2024
Andhra Pradesh	Visakhapatnam	GVMC High school, Madhavadhara	Vigilance Awareness talks
Andhra Pradesh	Visakhapatnam	GVMC High school, Madhavadhara	Poster with Slogan competition (on 30-10-24)

Name of State	Name of City/ town/ village	Name of school	Details of activities conducted
Karnataka	Mangalore	KendriyaVidhyalaya	Essay competition and Poster making competition
Telangana	Regatta Village, Nalgonda District	ZillaPrajaParishad High School	Slogan Competition (29.10.2024)
Tamil Nadu	Karai	Government Higher Secondary School, Karai, Perambalur District	Vigilance Awareness, role and functioning of CVC (date 11.10.2024)
Tamil Nadu	Thiruvakarai	Government Higher Secondary School, Thiruvakarai	Vigilance Awareness, role and functioning of CVC (date 24.10.2024)
Kerala	Thiruvananthapuram, Vattiyoorkavu	Govt. V& HSS Vattiyurkavu -16.10.2024	a) Conducted essay writing competition b) Distributed brochure regarding Vigilance awareness programme c) Delivered lecture on Vigilance awareness
Kerala	Thiruvananthapuram	1. Kendriya Vidyalaya, Pattom 2. Kendriya Vidyala, Peroorkada 3. Kendriya Vidyala, Pangod 4. Kendriya Vidyalaya, Akkulam, 5. Christ Nagar,Thiruvallom 6. Lecole Chempaka, 7. Green Valley International School 8. Saraswathy Vidyalaya	Conducted Painting Competition on theme 'Culture of integrity for nation's prosperity'

3) Outreach activities in colleges:

Name of State	Name of City / town / village	Name of college	Details of activities conducted
Rajasthan	Zawar, Udaipur	Delhi University, Mohanlal Sukhadia University, Udaipur, St. Wilfreds College, Jaipur	Interactive session on Preventive Vigilance and on how to lodge PIDPI complaint. Rally was held holding banners on Preventive Vigilance. (09.10.2024)
Rajasthan	Sirohi	Department of Geology, Mohanlal Sukhadia University, Udaipur	Enlightened the students on the importance to perform all duties with honesty. (15.11.2024)
Meghalaya	Shillong	Divine Savior Parish Ground, Nongthymmai, Shillong	Vigilance Awareness program on Preventive Vigilance & corruption for school and college students on 02.11.2024 by Shri GaikungamRongmei, Director & Vigilance Officer GSI NER.
Tamil Nadu	Chennai	Presidency College	Vigilance Awareness, role and functioning of CVC (date 24.10.2024) and conduct of extempore on "Vigilance leads to good governance". Students of M.Sc, Geology participated enthusiastically.
Uttar Pradesh	Lucknow	Netaji Subhash Chandra Bose Mahila Mahavidyalaya	Lecture by Shri Awadhesh Kumar Singh, Director (Chemistry) on Constitution, Governance and Vigilance
Bihar	Patna	Magadh Mahila College, Patna University	Vigilance awareness lecture on 28.10.2024

d) GSI has appointed two Independent External Monitors (IEMs) to oversee the implementation of Integrity Pact as per Standard Operating Procedure (SOP) circulated by Central Vigilance Commission (CVC). Meetings with the IEMs are held every quarter.

e) GSI has implemented e-office in all its offices throughout the country. It has digitally recorded 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 complains by the employees directly to CVO through online mode. Vigilance status of the employees are maintained online and Vigilance Clearance is processed through online mode. Annual Immovable Property Returns are examined on random basis.

f) A total number of about 1760 Vigilance clearance has been given during the period concerned as per requests raised.

g) Necessary steps have been adopted for systematic improvement towards hiring of accommodation during camping/field work by amended guidelines, which is under consideration.

h) Relevant circulars, guidelines and manuals are being followed as updated by DoPT and CVC from time to time. The circulars/guidelines/manuals are also updated time to time in the GSI portal for awareness of all employees.

i) A circular was published for necessary guidelines for smoothening the

procurement process. A database will be generated for retrieving the information about procurement related data. Online payment system to the vendors is to be created for timely payments.

j) The vigilance module has been updated in OCBIS portal to ensure the smooth functioning of vigilance clearance and lodging of complaint with a user-friendly process.

Photographs of different vigilance activities under three-month campaign and VAW-24

14.1: Integrity Pledge administered by Shri Asit Saha, DG GSI in GSI, CHQ, Kolkata.

14.2: Lecture on Ethics & Good governance by Shri Manoj Kumar Maurya ,CVO GSI in conference hall GSI,CHQ,Kolkata.

14.3: Display of Posters & Banners in the premise of GSI,CHQ office, Kolkata.

14.4: Slogan Writing Competition in GSI,CHQ, Kolkata

14.5: Lighting of lamp by Shri Asit Saha, DG GSI in GSI,CHQ,Kolkata during inauguration of VAW

14.6: Unveiling "Vigilance वाणी" by Shri Asit Saha,DG GSI & other senior officers

14.7: A talk delivered by Shri Indrajit Talukder, WBCS (Exec.) Addl. Secretary, Govt. of West Bengal Kolkata at GSI, ER on the occasion of Valediction of VAW

14.8: Capacity Building Programme conducted in GSI, NR

14.9: "Gram Sabha" conducted in Besa, Pipla, Nagpur District, Maharashtra by GSI ,CR.

14.10: Shri Lohit Matani (IPS), Dy. Commissioner of Police Zone-I, Nagpur delivered lecture on "Cyber Hyegine and Security" in GSI ,CR.

14.11: Gram Sabha at Camp Ghatol organised by GSI,WR

14.12: Vigilance Awareness programme conducted for the students at All Saints Diocesan School, IGP Points, Shillong, by GSI,NER

14.13: Vigilance Awareness program on Preventive Vigilance and corruption for school and college students at Divine Savior Parish Ground, Nongthymmai, Shillong.

14.14: Gram Sabha Awareness Drive at Regatta Village, Nalgonda District, Telangana, conducted as part of VAW by GSITI.

14.46 Indian Bureau of Mines (IBM)

Inspections carried out by CVO, IBM

i) An inspection was carried out on 24.07.2024 of Mining Tenement System, Project Division of IBM and various information related to the project.

ii) The Daldali Bauxite Mines of Mahavir Mineral, Kawardha, Chhattisgarh was inspected on 30.09.2024. No shortcomings were observed with respect to mining activities.

08 Nos. of MPLN / RMPLN scrutinized under CTE Type examination during the period Jan'24 to Dec'2024

Sl.No.	CTE Type examinations
1.	08 Nos. CTE type examinations related with procedures in approval of mining plan were undertaken. In 01 case system improvement was suggested by this office regarding expeditious disposal of mining plan / modified plan / review of mining plan or scheme of mining within 45 days as per the guidelines.
2.	2 Nos. CTE type examinations related with Procurement has been scrutinized by this office: I. Field Emission Scanning Electron Microscope with Energy Dispersive Spectrometer for Value of Rs. 2,99,95,600/- case is under investigation.
	II. Godrej Diesel Engine Operated Automatic Forklift for value of Rs. 15,79,500/- was taken for investigation, the case is closed as no vigilance angle is noticed.

(iii) 02 Medical bills were scrutinized during the period. No irregularities are found and cases are closed.

(iv) 08 Nos. Training Programs on preventive vigilance for New Entrants as well as Mid-Career Training for the officers and staff of IBM were organized during the period.

(v) During the period Agreed List / ODI list is prepared for the year 2024.

(vi) 67 Annual Immovable Property Returns filed for the year ending 31.12.2023 in respect of employees of IBM were scrutinized by this office.

(vii) 169 Vigilance Clearances were issued by this office during the period.

Following preventive activities were carried out by this office during the period:

A. Following Three month special campaign as prelude to Vigilance Awareness Week – 2024 was organized in IBM during 16.08.2024 to 15.11.2024:

a) Capacity Building Programmes: 06 Training Programs for Fresh inductees and Refresher courses was organized in IBM during the campaign period.

b) Identification and implementation of Systematic Improvement measures: During the campaign period this office identified the vulnerable areas on corruption and systematic improvement on (a) Online Mining Tenement System modules for (i) Revision applications and (ii) Notices/ Reports are introduced in IBM. (b) Introduction of virtual inspections using drone images on pilot basis is introduced in Indian Bureau of Mines. The virtual inspections using drone imageries are conducted and now stored in the MIDPAS application.

c) Updation of Circulars/ Guidelines/ Manuals: Monthly Statistics of Mineral Production was published in IBM during the campaign

period. An analysis on Mineral Production and Metal Production is highlighted in the manual

d) Disposal of complaints received before 30.06.2024: 01 Complaint was disposed off during the period.

e) Dynamic Digital Presence: The website of IBM is maintained by NIC. There are different nodal officers for updation of the content of IBM website and a dedicated Chief Information Security Officer. The Monthly Statistics of Mineral Production is generated online using the data captured in the returns application of Mining Tenant System

B. Following programs were undertaken during observance of Vigilance Awareness Week held from 28th Oct.'24 to 03rd Nov.'24 :

a) On the inaugural day Administration of pledge and reading of messages received was undertaken during the inaugural day i.e. 28.10.2024.

b) An Essay competition was held on 28.10.2024 for employees of IBM.

c) An Elocution competition was organized for students in Kendriya Vidyalaya, Nagpur on 28.10.2024.

d) A Slogan writing competition was held on 29.10.2024 for employees of IBM.

e) A Drawing competition was held on 30.10.2024 for the employees of IBM.

f) A special program was held in IBM on 01.11.2024 on the theme of Moral and Vigilance ethics followed by prize distribution to motivate the employees of IBM.

g) Similar programs were held in all the Zonal / Regional offices of IBM.

Glimpses of special program organized on Vigilance Awareness Week held in IBM Headquarter, Nagpur on 01.11.2024

Swachh Bharat Abhiyan

Ministry of Mines

14.47 Ministry of Mines and PSUs/attached offices under the Ministry of Mines organized the following Swachhta fortnights/Swachhata Hi Sewa campaign 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.

(ix) 16.11.2022 to 30.11.2022

(x) 16.11.2023 to 30.11.2023

(xi) 14.09.2024 to 01.10.2024

Activities under Swachh Bharat Mission

14.48 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

14.49 The Ministry has ensured all those items which were old/ unserviceable are kept in specific space marked by CPWD. The Ministry does not have any condemned vehicle in its premises.

Seepage of condensed water of ACs

14.50 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

14.51 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

14.52 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

14.53 Ministry of Mines has ensured that daily sanitization of corridors, rooms and lift lobby in premises of Ministry of Mines, Shastri Bhawan is conducted.

Rooftop Solarisation

14.54 The Government of India launched the PM Surya Ghar: Muft Bijli Yojana on 13th Feb., 2024, which aims to popularize the adoption of rooftop solar in the country. One of the critical components of the scheme is to undertake the saturation of all Government Buildings under the administrative control of Central Ministries (including autonomous bodies, subordinate offices, CPSEs etc.) with rooftop solar. The Ministry of New and Renewable Energy (MNRE) is the coordinating Ministry for this project.

14.55 MNRE has nominated NTPC Vidyut Vyapar Nigam Ltd. (NVVN) as Renewable Energy Implementing Agency (REIA) for Rooftop Solar Plant Installations in buildings of Ministry of Mines under this Yojna. In this direction, with the concerted efforts of the Ministry and NVVN, 150 KW of Rooftop Solar Project has been installed at GSITI Hyderabad which was inaugurated by the Hon'ble Union Minister of Coal and Mines, Sh. G. Kishan Reddy on 12.10.2024. Another 100 KW Rooftop Solar project at GSI HQ Hyderabad is under construction. Further NVVN has identified feasible rooftop capacities across all the organisations of Ministry Mines and is in advance stages of Signing of agreement with HCL, JNARDDC and NALCO. The total estimated Rooftop capacities to be installed across all the field organisations of Ministry of Mines is 9.1 MW.

Right to Information Act, (RTI)

14.56 The Ministry of Mines and its subordinate office, attached office, Autonomous Bodies and Public Sector Undertaking (PSUs) have appointed Central Public information Officers and Appellate Authorities. The List of Nodal Officer, CPIOs and Appellate Authorities in Ministry of Mines is given at **Annexure 14.1**. The Ministry has also set up a 'Public Information Cell' for processing of the requests received from the public under the RTI Act, 2005 and for their monitoring. During the year 2024-25 (1st January, 2024 to 31st December, 2024), the Ministry received 763 applications under the RTI Act, which were timely responded. 55 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 field formations is given at **Table 14.6**, **Table 14.7** and **Table 14.8** respectively.

Table 14.6
RTI Applications / Request Status (w.e.f. 1st January, 2024 to 31st December, 2024)

Organization	No. of cases					Pendency			
	Previous Pendency	No. of RTI / Requests / Applications received during the period	Disposal	Information denied under section 8 (1), 9, 11, 24 & other of RTI Act	Balance	0-3 Months	4-6 Months	7-9 Months	10-12 Months
Ministry of Mines (Sect.)	20	765	742	0	43	43	0	0	0
GSI	42	688	651	59	20	17	3	0	0
IBM	20	398	356	15	47	45	2	0	0
NALCO	22	436	309	103	46	46	0	0	0
HCL	14	210	198	34	26	26	0	0	0
MECL	09	93	100	05	02	02	0	0	0
JNARDDC	0	26	18	8	0	0	0	0	0
NIRM	0	6	6	0	0	0	0	0	0

Table 14.7
RTI Appeals Status (w.e.f. 1st January, 2024 to 31st December, 2024)

Organization	No. of cases					Pendency			
	Previous Pendency	No. of 1st Appeals received during the period	Disposal	No. of Appeals rejected/ information denied under Section 8	Balance	0-3 Months	4-6 Months	7-9 Months	10-12 Months
Ministry of Mines (Sect.)	0	55	52	0	3	3	0	0	0
GSI	13	102	98	0	17	17	0	0	0
IBM	3	50	45	1	7	7	0	0	0
NALCO	4	55	59	0	0	0	0	0	0
HCL	06	54	60	14	0	0	0	0	0
MECL	0	9	9	0	0	0	0	0	0
JNARDDC	0	4	4	0	0	0	0	0	0
NIRM	0	1	1	0	0	0	0	0	0

Table 14.8
CIC 2nd Appeals Status (w.e.f. 1st January, 2024 to 31st December, 2024)

Organizations	No. of Cases				
	Previous Pendency	No. of 2nd Appeals filed in CIC	Decided		
			In favour of Appellant	In favour of Organization	Balance
Ministry of Mines	0	11	0	11	0
GSI	0	7	0	7	0
IBM	0	1	0	1	0
NALCO	0	31	4	27	0
HCL	0	4	0	4	0
MECL	0	0	0	0	0
JNARDDC	0	0	0	0	0
NIRM	0	0	0	0	0

Government e-Market (GeM) Portal

14.57 Ministry of Mines has been procuring various items it needs through GeM portal those which are available on GeM. During the period from 01.01.2024 to 31.12.2024. the Ministry procured items worth Rs.6.86 crore through GeM. Total 1113 orders were placed on the GeM portal during period from 01.01.2024 to 31.12.2024 by the Ministry of Mines.

Annexures

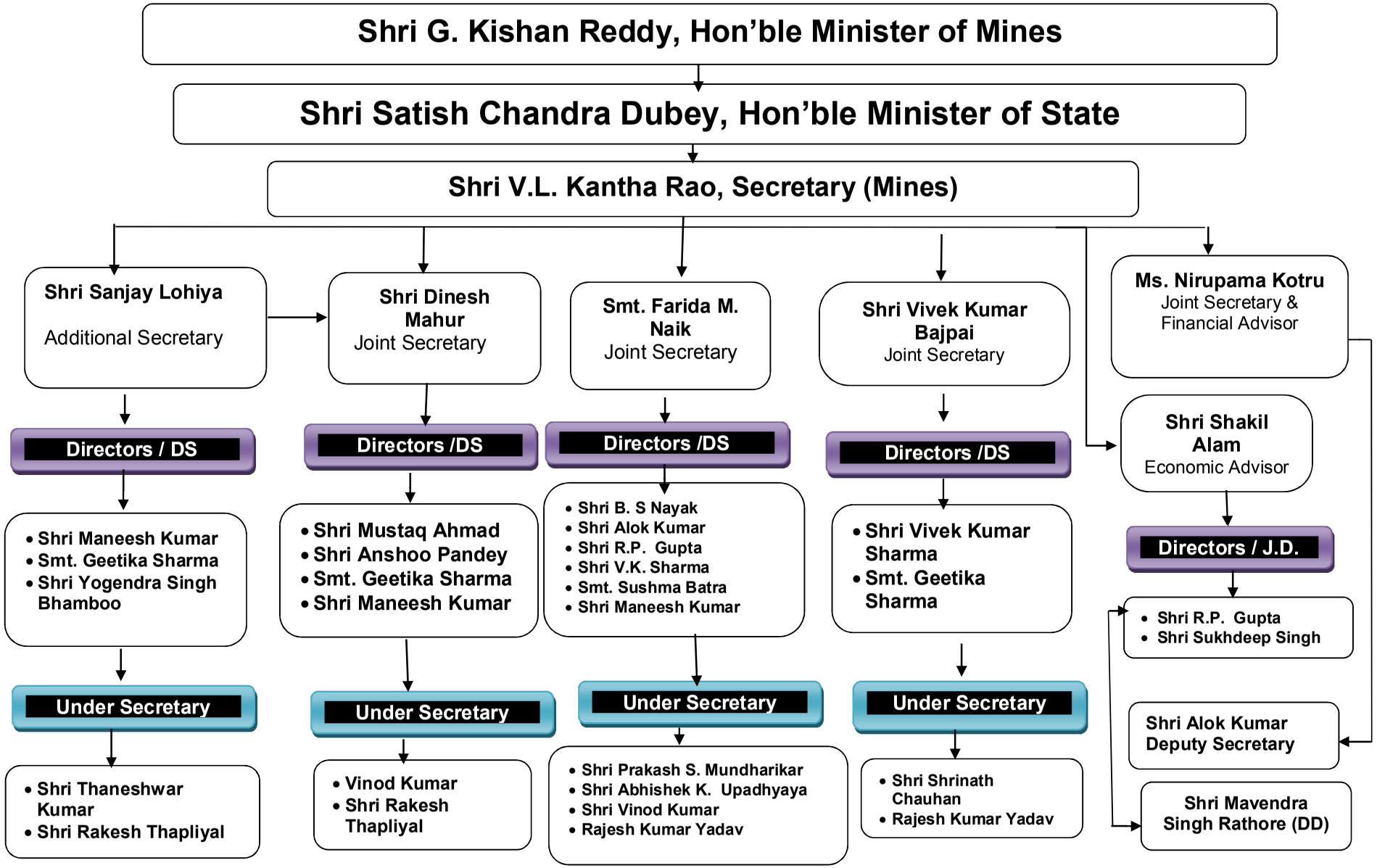
Annexures

- Annexure 1.1 Organizational Structure of Ministry of Mines
- Annexure 2.1. Production of MCDR minerals for last five years (2020-21 to 2024-25 (Estimated)) (Value in Rs crore)
- Annexure 2.2: Export (including re-export) of minerals from 2019-20 to 2023-24
- Annexure 2.3: Import (including re-import) of minerals from 2019-20 to 2023-24
- Annexure 2.4 Reserves/Resources of Minerals as on 1.4.2020 : India
- Annexure 2.5: Scenario of Mineral rich states (excluding Atomic, Fuel Minerals & Minor minerals) Note : Figures rounded off.
- Annexure 6.1: Year Wise / Activity-Wise Financial Performance of Gsi Against the Approved Budget Outlay During F.Y. 2023-24 and Re Grant and Expenditure Upto December, 2024 and Last Quarter (Jan 2025 to March, 2025) of F.Y. 2024-25 and Fund Utilization During Calendar Year 2024
- Annexure 6.2: Performance related to various regulatory and development functions of IBM during the year 2024-25 (January 2024 to March 2025)
- Annexure-6.3 : Mineral Wise Mining Lease (Other than Atomic, Hydro Carbons Energy and Minor Minerals) as on 31/03/2023(P)
- Annexure 8.1: Detailed time-lines and outcomes of ongoing and completed projects of JNARDDC, Nagpur
- Annexure 11.1: During FS2023-24, a total of seven items of Systematic Thematic Mapping (STM) on 1:25,000 scale have been taken up in NER of which two items were taken up in Arunachal Pradesh, one in Assam, two in Meghalaya, one in Manipur-Nagaland and one in Sikkim. During the period from 01.01.2024 to 31.03.2024, an area of 596.5 sq. km had been covered respectively.
- Annexure 11.2: During FS 2024-25, a total of thirteen items of Systematic Thematic Mapping (STM) on 1:25,000 scale have been taken up in NER of which one item is being executed in Arunachal Pradesh, one in Assam, four in Meghalaya, six in Tripura

and Mizoram and one in Sikkim. During the period from 1.04.2024 to 31.12.2024, an area of 1,562 sq. km has been covered.

- Annexure 11.3: A total of 48 items of Geochemical Mapping on 1:50,000 scale with collection of samples in grid pattern had been taken up during the FS2023-24 in parts of Arunachal Pradesh, Assam, Manipur-Nagaland and Tripura & Mizoram. An area of 14,530 sq km has been covered during the period from1.01.2024 to 31.03.2024.
- Annexure 11.4: Total 4 items of Geochemical Mapping on 1:50,000 scales with collection of samples in grid pattern is being executed during the FS 2024-25 in parts of Assam. An area of 6,392 sq km has been covered during 01.04.2024 to 31.12.2024.
- Annexure 11.5: As a part of FS2023-24 Two GPM Items had been executed by GSI, NER. During the period 1.01.2024 to 31.03.2024 a total area of 1370 sq km had been covered.
- Annexure11.6: A total of three GPM items have been taken up during FS 2024-25, of which two were in Assam and one was in Meghalaya. During the period from 1.04.2024 to 31.12.2024 a total area of 2185 sq km had been covered.
- Annexure 11.7: Two items of Photo Geology and Remote Sensing (PGRS) had been taken up on 1:50,000 Scale during FS 2023-24 to carry out the spectral geological mapping in OGP areas of Assam, Meghalaya and Sikkim using ASTER data. The total target of 3060 sq km had been completed during the period from 1.01.2024 to 31.03.2024.
- Annexure-11.8: During the FS2024-25, three items of Photo Geology and Remote Sensing (PGRS) are being executed in parts of Arunachal Pradesh, Manipur, Nagaland and Tripura states by using ASTER data. A total area of 20,786 sq km has been completed during the period from 1.04.2024 to 31.12.2024.
- Annexure-11.9: Details of mineral exploration items taken up in NER during FS 2023-24 and FS: 2024-25
- 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 2.1. Production of MCDR minerals for last five years (2020-21 to 2024-25(Estimated)) (Value in Rs crore)

Mineral	type	Unit of q	2020-21		2021-22		2022-23		2023-24		2024-25 (upto dec)		2024-25 (estimated)	
			q	v	q	v	q	v	q	v	q	v	q	v
Bauxite	1	t	20380548	1679.34	22494049	2528.42	23844337	2737.17	23929482	2561.10	18171233	2046.60	24228311	2728.79
Chromite	1	t	2830413	2186.28	3785625	4796.92	3557289	4663.34	3147954	4861.42	2277389	3568.91	3036518	4758.55
Copper Conc	1	t	108718	853.34	115313	1102.43	112745	1020.83	125230	1299.48	80125	896.83	106833	1195.77
Copper Ore	1	t	3272915	0.00	3569632	0.00	3326337	0.00	3782256	0.00	2583980	0.00	3445307	0.00
Gold	1	t	437669	0.00	474994	0.00	632811	0.00	760255	0.00	478765	0.00	638353	0.00
Gold (Primary)	1	Kg	1127	547.55	1407	676.10	1433	765.47	1586	965.43	1074	783.57	1431	1044.76
Iron Ore	1	000t	205041	52729.25	254099	100826.46	258312	83400.17	277339	99444.00	208373	73332.77	277831	97777.03
Lead And Zinc Ore	1	t	15455342	0.00	16338564	0.00	16744082	0.00	16521320	0.00	12220459	0.00	16293945	0.00
Lead Conc	1	t	376923	1881.05	368040	2202.57	376665	2448.85	380795	2547.36	288440	2071.10	384586	2761.47
Manganese Ore	1	t	2703313	1741.55	2692408	2206.78	2826964	2282.26	3441764	2498.15	2631804	2110.62	3509072	2814.16
Silver	1	Kg	705796	4266.44	647156	4212.69	713768	4381.44	745980	5355.94	526188	4456.14	701584	5941.52
Tin Conc	1	Kg	16865	1.04	26301	3.26	45444	5.23	22345	1.83	3091	0.25	4122	0.33
Zinc Conc	1	t	1513996	6312.71	1594085	7872.78	1670208	9121.96	1710141	8565.43	1229447	6929.09	1639262	9238.79
Metallic Minerals				72198.54		126428.42		110826.72		128100.13		96195.89		128261.18
Diamond	2	crt	13917	14.77	266	1.81	388	6.15	349	2.39	3741	22.29	4988	29.72
Fluorite	2	t	1052	0.80	1237	0.94	1155	0.62	6043	0.61	443	0.15	590	0.21
Garnet	2	t	7114	2.64	8182	2.47	9859	3.62	23835	9.49	33476	12.79	44635	17.06
Graphite	2	t	35386	8.71	62888	12.21	94789	18.02	169080	21.84	41132	8.91	54842	11.88
Iolite	2	t	16	0.01	27	0.02	0	0.00	0	0.00	0	0.00	0	0.00
Kyanite	2	t	4925	0.93	9320	1.73	2765	0.53	3324	0.80	1525	0.40	2034	0.54
Limeshell	2	t	0	0.00	100	0.02	250	0.07	891	0.26	280	0.08	373	0.11
Limestone	2	000t	349120	8648.49	392034	10202.26	405644	11122.20	451045	12338.78	323644	8566.71	431526	11422.28
Magnesite	2	t	74661	31.47	113497	55.48	107525	50.26	132005	60.84	84089	38.85	112119	51.80
Marl	2	t	2216414	41.72	1853481	32.65	1461668	31.68	1606380	33.76	1833138	40.33	2444184	53.77
Moulding Sand	2	t	14363	0.42	17583	0.53	17260	0.54	20994	0.65	12554	0.42	16739	0.56
Phosphorite	2	t	1455829	469.45	1394959	664.81	1978450	1235.46	1557783	1143.61	1236853	893.04	1649137	1190.71
Rock Salt	2	t	486	1.42	286	0.07	1002	0.48	0	0.00	0	0.00	0	0.00
Selenite	2	t	402	0.06	716	0.09	327	0.04	9353	1.38	6954	1.06	9273	1.42
Siliceous Earth	2	t	23823	1.47	33898	2.28	32070	1.74	58047	3.34	45343	3.02	60457	4.02
Sillimanite	2	t	11110	1.40	3432	0.83	1437	0.38	771	0.23	244	0.07	325	0.10
Sulphur	2	t	737337	0.00	880858	0.00	925663	0.00	976616	0.00	692640	0.00	923520	0.00
Vermiculite	2	t	1260	0.22	3060	0.38	2303	0.16	1129	0.07	2030	0.12	2707	0.17
Wollastonite	2	t	103902	12.22	108335	14.92	110793	15.18	110637	15.61	77393	11.96	103190	15.95
Non Metallic Minerals				9236.18		10993.49		12487.12		13633.68		9600.21		12800.29
Grand Total				**81434.73**		**137421.91**		**123313.84**		**141733.81**		**105796.10**		**141061.47**

Annexure 2.2: Export (including re-export) of minerals from 2019-20 to 2023-24

(Value in ₹ '000)

Super_Group_Comm_Name	unit of quantity	2019-20		2020-21		2021-22		2022-23		2023-24 (P)	
		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Abrasive (natural)	TON	92241	1568206	23411	376713	14106	236450	4689	42219	6791	89537
Alabaster	TON	27	256	4	184	++	11	52	1732	23	916
Alumina	TON	1330038	30900409	1265941	28280781	1487035	47334417	2014428	64237704	2088162	64431546
Andalusite	TON	19	1240	9	476	18	1233	19	1515	9	894
Antimony Ores And Conc.	TON	--	--	--	--	--	--	--	--	4	2415
Arsenic Sulphide (natural)	TON	++	69	277	1697	51	505	++	++	--	--
Asbestos	TON	1001	31011	299	11991	1906	68026	3286	217449	1206	81470
Ball Clay	TON	153658	398714	170915	410109	266680	664037	993811	3779211	974719	3754998
Barytes	TON	2221693	12896670	1010894	6261470	1874837	11075666	2445691	16613885	2310272	17945276
Bauxite	TON	524229	1421269	240841	951442	378081	1005256	177535	479019	164177	243541
Bentonite	TON	1647485	5674970	1557484	5215656	1585962	5850483	1375350	6607488	1660359	7791069
Borax	TON	2977	359860	2996	414601	4725	656472	4151	818305	3190	627776
Building And Monumental Stones Nes	TON	12612479	15692854	13134116	24200968	13295779	24912268	12276938	20638218	10919664	22191218
Calcite	TON	36433	273950	23867	155049	24789	163372	27892	208639	35328	283078
Chalk	TON	1317	8022	1104	6155	1129	7557	1057	7330	857	6374
Chromite	TON	33898	867910	2872	71979	2625	89710	33881	904154	2117	99434
Clay (others)	TON	50365	476744	45346	402787	49635	361745	34138	314150	28156	298809
Coal (Excl. Lignite)	THT	1045	5929549	2943	5736794	1314	11233701	1165	15001652	1543	16434833
Coal:lignite	THT	3	319838	2	234709	1	203336	1	90369	1	137261
Cobolt Ores And Conc.	TON	2	9478	--	--	--	--	--	--	--	--
Coke	TON	111507	2383337	207412	4771075	1299461	41017403	365897	15566657	137166	3827703
Copper Ores And Conc.	TON	212659	20450948	82463	7689376	34827	3964549	26336	2435371	23188	2430311
Corundum (natural)	TON	--	--	62	137	89	241	59	144	++	15
Diamond		**	1400336074	**	1258209200	**	1893641728	**	1837280521	**	1395132973
Diatomite	TON	4302	72842	3240	69439	1964	58544	1901	62622	2658	69569
Dolomite	TON	91431	349684	95892	349090	113380	391843	77124	307324	66496	292056
Earth Clay	TON	2652	18037	3881	22220	3775	53782	9432	96235	17841	173214

Super_Group_Comm_Name	unit of quantity	2019-20		2020-21		2021-22		2022-23		2023-24 (P)	
		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Emerald (cut And Uncut)		**	17387875	**	5316603	**	10808861	**	17096852	**	19355783
Felspar (cut And Uncut)		**	203185	**	198059	**	254062	**	275473	**	321240
Felspar (natural)	TON	640709	3225696	705280	3931135	763219	4194510	716776	4292153	872814	5129625
Fire Clay	TON	5172	41898	5324	43606	4473	45578	8654	48207	7686	38043
Flint	TON	1195	8014	406	2953	570	5837	976	8675	688	6274
Fluorspar	TON	1368	51562	474	22436	844	43463	1024	65899	1358	81974
Garnet(Cut And Uncut)		**	366806	**	280824	**	378455	**	484011	**	555370
Garnet(abrasive)	TON	74697	1254539	76799	1265586	81270	1433741	103398	1903765	146915	2771501
Gold Ores And Conc.	KG	--	--	++	1	--	--	--	--	--	--
Granite	TON	6678131	102248504	7522159	113279766	7572368	126460352	6632215	125512876	6026862	112450691
Graphite(natural)	TON	607	32629	716	42994	764	46963	2239	120029	708	63308
Gypsum And Plaster	TON	151722	578922	213061	723888	220634	765738	191717	574560	97329	356889
Iron Ore	THT	36625	186092710	57723	362556021	26494	241480427	21168	144299670	46376	324332446
Kaolin	TON	431536	1929478	287260	1610489	339591	2398327	490071	3440275	595762	4116922
Kieselguhr	TON	113	2399	27	917	28	516	41	3329	26	584
Kyanite	TON	143	2627	252	9033	1655	15376	297	8631	199	8627
Lead Ores And Conc.	TON	3	202	9	1076	12	1595	137	7521	58	2867
Limestone	TON	3760402	4656567	3528973	42939083	12160342	4551537	2515714	3124865	1662127	1899997
Magnesite	TON	5453	147073	5477	171020	5384	173809	5263	239139	3842	240820
Manganese Ore	TON	58198	254643	82363	974940	113606	588189	1557	21566	271	2204
Marble	TON	310613	9010909	295085	10082272	324267	11352007	265229	11941092	289787	14068344
Mica	TON	116854	4909143	144121	5733785	151706	6594832	115898	5557843	118778	6309988
Molybdenum Ores And Conc.	TON	3	3023	45	43181	++	120	60	223955	76	185324
Natural Gas	TON	52408	2202387	17992	658242	3	883	23	93848	836	112182
Nickel Ores And Conc.	TON	++	++	--	--	20	5183	--	--	19	2971
Niobium Or Tantalum Ores And Conc.	TON	361	943	++	217	++	18	105	1007	--	--
Ochre	TON	22003	992429	21489	1080320	31512	1590819	32701	2259503	60662	2447562
Other Minerals Nes	TON	20018	576099	18626	629204	27918	1808669	41838	3552794	26117	2533169
Other Preciuos Metal Ores And Concentrates	KG	--	--	187035	5273	26253	1220	70	49	29	13

Super_Group_Comm_Name	unit of quantity	2019-20		2020-21		2021-22		2022-23		2023-24 (P)	
		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Precious And Semi-precious Stones (cut And Uncut):total		**	12083066	**	23463605	**	50616826	**	20516238	**	22933748
Quartz And Quartzite	TON	944041	6087293	772127	6213690	965159	7559270	1069301	9221459	1485741	23512490
Rock Phosphate	TON	257	2015	825	5602	540	11316	532	19359	534	3171
Rock salt	TON	539856	558987	317376	489122	139164	277009	225595	621445	310132	811417
Salt (Other Than Common Salt & Rock Salt)	TON	11141849	13122162	7943537	10082621	8724616	13116708	13406235	23673306	13473826	24463925
Sand (excl. Metal Bearing)	TON	1894	32610	1178	13630	619	17107	2761	4882	57961	76035
Sandstone	TON	795763	10434171	794445	11220825	691771	11282294	406815	5822370	415344	5956257
Silica Sand	TON	2391	14934	43061	63008	825	4928	767	5944	187	2255
Sillimanite	TON	1025	14961	4998	94359	3120	64355	2161	73954	3293	115853
Silver Ores And Conc.	KG	--	--	73140	161	++	45	26000	269	--	--
Slate	TON	61143	1983349	66335	2453970	68569	2733090	50909	2505184	48643	2403474
Steatite	TON	250649	3583316	283303	4364076	324593	5201974	338297	5626721	281381	4643882
Sulphur (exc. Sublimed Precipite-dAnd Colloidal)	TON	802175	3872834	802713	4328627	1290620	21010532	1554999	33267617	1185636	10346076
Tin Ores And Conc.	TON	++	1	--	--	--	--	++	17	--	--
Titanium Ores And Conc.	TON	246203	4995763	246534	5348323	215910	6155343	143607	7288953	224756	7915287
Tripoli Earth	TON	--	--	--	--	--	--	10	556	--	--
Tungsten Ores And Conc.	TON	--	--	--	--	13	7139	--	--	--	--
Vanadium Ores And Conc.	TON	10	10801	--	--	--	--	--	--	--	--
Vermiculite	TON	634	7902	853	11573	1263	21780	989	12888	843	17551
Witherite	TON	++	156	++	104	++	128	11	762	--	--
Wollastonite	TON	14582	298591	13716	311809	11705	282266	12847	365656	12285	348673
Zinc Ores And Conc.	TON	317	15828	399	20716	1762	46757	43877	182437	19902	64126
Zirconium Ores And Conc.	TON	1	78	++	21	++	180	43	15779	198	50059
Grand Total		**	1893741021	**	1963932864	**	2576402469	**	2420095296	**	2137405283

Source: DGCI&S, Kolkata
(P): Provisional -- : Nil ; ++ : Negligible ** : Not Additive

Annexure 2.3: Import (including re-import) of minerals from 2019-20 to 2023-24

(Value in ₹ '000)

Super_Group_Comm_ Name	unit of quantity	2019-20		2020-21		2021-22		2022-23		2023-24 (P)	
		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Abrasive (natural)	TON	4234	59872	3221	55212	3718	78311	1994	65016	1601	51218
Alabaster	TON	1040	32801	826	27872	1572	59681	2388	113198	1729	94617
Alumina	TON	1844483	49829384	2334786	57491719	2549567	82447635	2407867	89152924	2411907	83475392
Andalusite	TON	17618	425962	15217	428831	10419	344730	14168	599795	14454	847210
Antimony Ores And Conc.	TON	7656	1265983	5977	1072406	4555	1499919	6460	2708869	4069	1623894
Arsenic Sulphide (natural)	TON	7	995	4	570	18	2119	12	448	5	272
Asbestos	TON	361163	12432333	308506	11851124	437511	16631390	404154	22940349	465449	23260379
Ball Clay	TON	126794	1115239	65828	765439	93855	1134427	34761	715449	33137	654590
Barytes	TON	15436	427967	11691	313860	16577	523859	14241	476940	16642	503402
Bauxite	TON	2246681	10817757	3034041	13709540	3009079	18963241	3596098	23423723	4492899	28197412
Bentonite	TON	72618	882272	90933	1019395	142010	2131123	119280	1861091	135448	2058659
Borax	TON	176421	5644322	194448	6337254	223368	7973967	198719	10161598	202250	10661154
Building And Monumental Stones Nes	TON	47971	523956	16327	360034	44482	422105	545687	926601	1990580	1711400
Calcite	TON	63458	302799	67643	374975	41688	290721	55362	381332	94848	592070
Chalk	TON	105	4131	66	2661	64	2197	41	2191	11	975
Chromite	TON	124693	2065047	156211	2257733	245710	4232459	111291	2969916	172411	4563915
Clay (others)	TON	20961	317309	12562	241521	14245	279441	7152	355004	13231	263789
Coal (Excl. Lignite)	THT	248545	1527478152	215260	1160506410	208636	2288189160	237678	3836139804	264545	3102453301
Coal:lignite	THT	1	5170	1	5746	1	9495	2	19282	1	16920
Cobolt Ores And Conc.	TON	2	9253	++	325	1	6917	++	1766	1	820
Coke	TON	2912775	61067396	2463036	44821773	2501153	81047701	3639296	136398611	3972082	115539531
Copper Ores And Conc.	TON	821555	86675247	415136	59071579	1018934	223814328	1178921	273744293	1016303	259512343
Corundum (natural)	TON	--	--	1	79	++	10	++	9	2	399
Diamond		**	1487354319	**	1283511854	**	2056382187	**	2077695939	**	1787312382
Diatomite	TON	4950	152229	7099	212766	1787	94373	3722	243082	2396	166678
Dolomite	TON	5539814	6555288	3505151	5075300	5510404	9682992	5672340	9944292	5754760	10302045
Earth Clay	TON	2	343	3	450	2	247	--	--	--	--
Emerald (cut And Uncut)		**	24403510	**	7997796	**	16560915	**	32333990	**	34739081

Super_Group_Comm_ Name	unit of quantity	2019-20		2020-21		2021-22		2022-23		2023-24 (P)	
		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Felspar (cut And Uncut)		**	83631	**	8094	**	22005	**	43069	**	53818
Felspar (natural)	TON	8198	101216	13187	78978	2795	54485	2107	52870	2002	50966
Fire Clay	TON	1896	100241	2326	100595	898	58418	1137	61115	237	16112
Flint	TON	6279	62362	9209	85170	8611	83205	7874	82200	9616	72884
Fluorspar	TON	239589	7225937	220573	6090596	286224	7792038	310173	11509548	256110	10416654
Garnet(Cut And Uncut)		**	184466	**	97335	**	183591	**	303072	**	488685
Garnet(abrasive)	TON	391	6189	345	14712	140	1789	30	929	3086	67440
Gold Ores And Conc.	KG	273	736	10742	48481	799178	2376524	2464467	7336354	3619767	8675743
Granite	TON	56169	1846960	37304	1320021	35032	1279464	38427	1660364	36150	1480546
Graphite(natural)	TON	41405	1863220	40153	1808218	54047	2651642	45994	2939533	54784	3203146
Gypsum And Plaster	TON	5460746	8415195	4762012	7372934	5632758	11823817	6128694	13798597	7397750	15730513
Iron Ore	THT	1245	9409772	766	8445221	6683	35389345	1790	15947473	4960	43968382
Kaolin	TON	231662	3933899	237144	4431804	223127	5048415	220124	7423589	176944	5748095
Kieselguhr	TON	66	9247	10	1543	++	64	6	520	26	2413
Kyanite	TON	1112	33476	1238	42080	1668	53418	1354	63110	1691	81361
Lead Ores And Conc.	TON	3283	166725	5473	325104	5325	255224	5558	294381	4877	363290
Limestone	TON	25639508	37429909	22797801	32911759	27582767	49014650	29736036	62593636	33809129	66157693
Magnesite	TON	365053	9468163	364577	7657838	510898	13106490	502837	15431256	479521	14872734
Manganese Ore	TON	4316572	41282100	4058590	55242138	6500149	96424799	4641809	82621009	5592880	77503284
Marble	TON	951361	17923694	645253	12032307	1073654	21110673	1453668	29835923	1372012	28750974
Mica	TON	3645	1280925	2987	1252020	3338	1319896	4068	1594113	5348	2006895
Molybdenum Ores And Conc.	TON	7901	9809780	9177	8848441	9114	15470962	10436	23316669	13481	34312389
Natural Gas	TON	24416607	684667281	25054872	583289424	23417029	1005206968	19852386	1372095889	23996378	1109940174
Nickel Ores And Conc.	TON	++	204	37	6404	106	16165	20	369	++	11
Niobium Or Tantalum Ores And Conc.	TON	16	21764	2	489	2	488	1	242	--	--
Ochre	TON	27260	2131922	27924	2257650	25314	2502368	25243	2976109	27385	3132508
Other Minerals Nes	TON	641451	2993378	544180	2319944	678353	4311144	1154973	4703439	1701205	5211599
Other Preciuos Metal Ores And Concentrates	KG	--	--	1	28	++	120	--	--	203	672
Petroleum (crude)	THT	220869	7281122511	188182	4396561618	220034	9139168005	236665	13027071596	231462	11535300059
Precious And Semi-precious Stones (cut And Uncut):total		**	41191154	**	47935435	**	128825205	**	229220056	**	25535318

Super_Group_Comm_ Name	unit of quantity	2019-20		2020-21		2021-22		2022-23		2023-24 (P)	
		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Quartz And Quartzite	TON	1155	40682	1098	50333	7792	211384	5854	306024	47859	467916
Rock Phosphate	TON	7654867	54205952	7781423	53709109	9659818	104667349	9091591	151370002	8810954	126829600
Rock salt	TON	60441	226758	52651	252159	42396	258506	45106	363389	37760	339688
Salt (Other Than Common Salt & Rock Salt)	TON	4822	239412	45391	393335	27153	253890	53880	545064	94868	926054
Sand (excl. Metal Bearing)	TON	198862	502131	57812	400291	5121	348319	5717	319717	1776	57520
Sandstone	TON	28	693	16	480	130	2691	28	1709	222	2860
Silica Sand	TON	21392	218841	21356	238740	57095	527973	162087	747250	145715	845219
Sillimanite	TON	609	10781	606	11571	801	13972	58	3424	13	3128
Silver Ores And Conc.	KG	--	--	--	--	--	--	77361	10001	1	++
Slate	TON	111	3818	49	3784	109	5741	83	6744	40	4026
Steatite	TON	5809	325939	5332	344649	9978	407255	10395	545770	10525	563345
Sulphur (exc. Sublimed PrecipitedAnd Colloidal)	TON	1235102	8239656	1463291	10948268	1895211	35362092	1337789	26766634	1708664	17365951
Tin Ores And Conc.	TON	++	206	2	899	++	299	++	366	++	242
Titanium Ores And Conc.	TON	138042	3965292	78747	3440562	111653	5292058	68000	4969119	89920	6409133
Tripoli Earth	TON	19	1116	--	--	19	1174	++	2	23	987
Tungsten Ores And Conc.	TON	447	69234	121	9104	151	14800	423	142414	74	25679
Vanadium Ores And Conc.	TON	7006	349104	999	77967	5869	436744	3661	209238	325	77069
Vermiculite	TON	416	11024	696	17234	1096	25520	2292	73873	627	19588
Witherite	TON	7	263	++	10	--	--	--	--	--	--
Wollastonite	TON	22616	294800	24049	370375	30625	675667	41436	877192	62410	1037583
Zinc Ores And Conc.	TON	101	2667	804	9530	720	24772	1041	39415	455	10666
Zirconium Ores And Conc.	TON	56166	6073420	68675	6993378	94839	11260337	82831	15163201	82257	13937396
Grand Total		**	11517396882	**	7915372383	**	15516147570	**	21638813090	**	18630671856

Source: DGCI&S, Kolkata
(P): Provisional -- : Nil ; ++ : Negligible ** : Not Additive

Annexure 2.4 Reserves/Resources of Minerals as on 1.4.2020 : India

Mineral	Unit	Reserves				Remaining Resources								Total
		Proved	Probable		Total	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	Resources
		STD111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Andalusite	000 Tonnes	0	0	0	0									
Antimony	0	0	0	58040	56210	11800	126050	126050						
Ore	Tonne	0	0	7503	7503	0	0	592	0	0	10588	0	11180	18683
Metal	Tonne	0	0	75	75	0	0	5.92	0	0	174	0	179.92	254.92
Apatite	Tonne	27715	0	1680	29395	499149	0	0	2281521	11481250	5801338	1017646	21080904	21110299
Asbestos	Tonne	0	0	0	0	2488022	3113446	4062376	100687	2527959	10557777	57800	22908067	22908067
Bauxite	000 Tonnes	560865	15553	70076	646493	268398	128409	316835	526286	843058	2044653	184116	4311754	4958248
Borax	Tonne	0	0	0	0	0	0	0	0	0	0	74204	74204	74204
Chromite	000 Tonnes	40635	15229	22672	78535	52696	10545	44395	1630	53008	70440	20435	253150	331685
Cobalt (Ore)	Million Tonnes	0	0	0	0	0	0	0	30.63	2	0.28	12	44.91	44.91
Copper														
Ore	000Tonnes	128267	20045	15580	163891	83102	111376	41368	135884	340902	778987	5360	1496979	1660870
Metal	000Tonnes	1664.12	313.64	183.81	2161.57	873.59	428.09	246.48	1655.35	2748.95	4051.37	31.69	10035.52	12197.09
Diamond	Carat	847400	0	159	847559	0	0	0	304601	1524317	29047514	0	30876432	31723991
Diatomite	000Tonnes	0	0	0	0	634	0	0	0	0	2251	0	2885	2885
Emerald	Kilogram	0	0	0	0	0	0	0	0	0	0	55869	55869	55869
Fluorite	Tonne	228393	163860	11988	404241	9340556	771934	768573	1727945	6239589	1578067	161575	20588239	20992480
Garnet	Tonne	8539521	50946	5	8590472	1835546	1624128	4622014	138905	10226601	28066885	902574	47416654	56007126
Gold														
Ore(Primary)	Tonne	20271400	3420000	36700	23728100	4498133	3821500	1741321	9658248	109446798	238863938	126476333	494506270	518234370
Metal(Primary)	Tonne	79.26	13.44	0.06	92.76	16.93	9.11	5.64	22.05	159.41	236.26	65.1	514.5	607.26
Ore(Placer)	Tonne	0	0	0	0	0	0	0	0	2552000	23569000	0	26121000	26121000
Metal(Placer	Tonne	0	0	0	0	0	0	0	0	2.29	3.57	0	5.86	5.86
Graphite	Tonne	4386467	0	4176944	8563411	7964326	3461288	6166401	796464	10679490	31827080	142165128	203060176	211623587
Iron Ore (Heamatite)	000 Tonnes	4559856	508158	1141020	6209034	3181005	2404790	2005363	1010484	1805532	4827512	2614185	17848870	24057905
Iron Ore (Magnetite)	000 Tonnes	71930	385	130508	202823	307652	16082	72127	1513168	2036982	6383274	695507	11024791	11227614
Kyanite	Tonne	393358	331193	122314	846865	1331061	940452	1864398	561680	3577402	96560462	0	104835455	105682321
Lead & Zinc														

Mineral	Unit	Reserves				Remaining Resources								Total
		Proved	Probable		Total	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	Resources
		STD111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Ore	000Tonnes	28791	63331	11153	103275	4627	23663	13784	51613	196911	368094	4530	663222	766497
Lead Metal	000Tonnes	503.70	1188.47	208.02	1900.19	140.42	534.83	286.02	1117.33	2283.43	6607.77	0	10969.80	12869.99
ZincMetal	000Tonnes	2356.56	4592.03	489.46	7438.05	448.15	1121.12	599.62	3540.38	5840.74	14080.66	101.65	25732.32	33170.37
Lead+ZincMetal	000Tonnes	0	0	0	0	0	0	0	0	0	120.76	22.37	143.13	143.13
Limestone	000 Tonnes	14701910	1065305	3261256	19028470	7665106	6442697	9261072	7528921	32250068	135833401	9579524	208560789	227589259
Magnesite	000 Tonnes	57934	6354	1782	66070	80983	24858	40132	59010	59652	128104	309	393047	459118
Manganče Ore	000 Tonnes	61510	6081	7450	75041	76106	51162	80580	29600	61205	117986	11944	428583	503624
Marl	Tonne	50825000	17210000	110000	68145000	26474477	4189000	0	0	0	390000	0	31053477	99198477
Molybdenum														
Ore	Tonne	0	0		0	0	1500000	0	2382000	3269204	19884394	167800	27203398	27203398
Contained MoS2	Tonne	0	0	0	0	0	1050	0	1599.54	1733.29	12457.39	50.34	16890.56	16890.56
Nickel Ore	Million Tonnes	0	0		0	0	21	21	31	53	63	0	189	189
Perlite	000 Tonnes	0	0		0	140	683	595	0	0	0	988	2406	2406
Platinum Group of Metals Tonnes of metal	0	0		0	0	0	0	0	0	11.66	7.4	1.86	20.92	20.92
(PGM)	contained													
Potash	Million Tonnes	0	0	0	0	0	0	0	0	18151	4125	814	23091	23091
Pyrite	000 Tonnes	0	0	0	0	27129	0	32597	9590	77729	1527356	0	1674401	1674401
Rare Earth Elements (REE) Tonne	0	0	0	0	0	0	0	0	430353	3604349	3332	459727	459727	
Rock Phosphate	Tonne	37103158	0	3772935	30876093	13669080	29796846	34536541	3879833	3539750	1866s7066	9308275	280377392	311253485
Rock Salt	000 Tonnes	0	3860	0	3860	3360	940	4620	0	0	0	0	8920	12780
Ruby	Kilogram	0	0	0	0	0	429	3296	0	0	1623	0	5349	5349
Sapphire	Kilogram	0	0	0	0	0	0	0	0	0	450	0	450	450
Sillimanite	Tonne	7968445	3655	290200	8262300	503301	23406	20549508	4771654	17630364	16115664	4411195	64005091	72267391
Silver														
Ore	Tonne	61604192	67971000	40870828	170446020	2330000	18445543	53914460	41320000	70926000	211261729	0	398197732	568643752
Metal	Tonne	2155.3	4981.73	570.04	7707.07	172.2	824.44	663.67	3881.88	4575.73	12442.92	0	22560.84	30267.91

Mineral	Unit	Reserves				Remaining Resources								Total
		Proved	Probable		Total	Feasibility	Pre-feasibility		Measured	Indicated	Inferred	Reconnaissance	Total	Resources
		STD111	STD121	STD122	(A)	STD211	STD221	STD222	STD331	STD332	STD333	STD334	(B)	(A+B)
Sulphur (Native)	000 Tonnes	0	0	0	0	0	0	0	0	0	210	0	210	210
Tin														
Ore	Tonne	2075	0	25	2101	22594540	3213	31330134	168457	561080	29063370	0	83720794	83722895
Metal	Tonne	963.19	0	10.8	973.99	33384.66	1116.41	54089.46	813.29	231.63	13147.46	0	102782.91	103756.9
Titanium	Tonne	15914697	64860	19068	15998625	10928991	91828	0	2610618	49666080	344212444	3598565	411108526	427107150
Tungsten														
Ore	Tonne	0	0	0	0	2230000	0	173063	23276152	23259954	23912049	16581246	89432464	89432463.7
Contained WO3	Tonne	0	0	0	0	3568	0	450	19298.8	16994.84	99772.15	4566.28	144650.07	144650.07
Vanadium														
Ore	Tonne	0	0	0	0	276530	1720000	4108100	0	232000	18297225	0	24633855	24633855
Contained V2O5	Tonne	0	0	0	0	1106.12	2835	6032.4	0	487.2	54133.29	0	64594.01	64594.01
Vermiculite	Tonne	1562108	0	28888	1590996	76900	71397	25956	9800	20179	552279	8716	765227	2356223
Wollastonite	Tonne	2388641	190739	101598	2680978	4563016	1245009	8559760	0	3325042	4597200	137461	22427488	25108466
Zircon	Tonne	669466	0	0	669466	422758	4225	0	140926	39300	1019770	47456	1674435	2343901

Note : Figures rounded off.P : Provisional

Annexure 2.5: Scenario of Mineral rich states (excluding Atomic, Fuel Minerals & Minor minerals)Note : Figures rounded off.

Sl. No.	State	Value of mineral production in 2023-24 in Rs 000	Number of reporting mines in 2023-24	Share of state in country's production (in%) of MCDR minerals
1	ODISHA	635946661	154	Chromite (100), Bauxite (73.52), Iron Ore (53.71), Graphite (40.25), Sulphur (26.35), Man-ganese Ore (18.91), Limestone (1.76)
2	RAJASTHAN	219237322	125	Wollastonite (100), Zinc Conc (100), Garnet (100), Lead And Zinc Ore (100), Lead Conc (100), Selenite (100), Siliceous Earth (100), Silver (99.98), Fluorite (87.05), Phosphorite (84.79), Copper Conc (44.2), Copper Ore (32.56), Limestone (22.88), Iron Ore (0.55), Man-ganese Ore (0.14), Magnesite (0)
3	CHHATTISGARH	201058650	140	Moulding Sand (100), Tin Conc (100), Iron Ore (16.6), Limestone (10.93), Bauxite (4.32), Graphite (0.6)
4	KARNATAKA	160666641	188	Limeshell (100), Gold (Primary) (97.89), Gold (94.24), Iron Ore (14.78), Manganese Ore (10.32), Limestone (9.05), Magnesite (5.16), Silver (0.02), Kyanite (0)
5	JHARKHAND	58199909	68	Graphite (12.28), Bauxite (8.56), Iron Ore (8.26), Kyanite (6.32), Gold (Primary) (1.76), Gold (1.33), Copper Ore (0.13), Limestone (0), Copper Conc (0)
6	MAHARASHTRA	55264309	110	Sillimanite (100), Kyanite (93.68), Manganese Ore (30.01), Fluorite (12.95), Sulphur (5.18), Bauxite (4.42), Limestone (4.29), Iron Ore (3.87)
7	MADHYA PRADESH	38912473	399	Diamond (100), Copper Ore (67.31), Copper Conc (55.8), Manganese Ore (30.23), Phos-phorite (15.21), Limestone (13.87), Bauxite (2.43), Iron Ore (2.18)
8	ANDHRA PRADESH	15373503	186	Vermiculite (99.82), Limestone (13.31), Manganese Ore (10.21), Gold (4.43), Gold (Pri-mary) (0.34), Iron Ore (0.05)
9	TAMIL NADU	9177215	225	Magnesite (59.15), Graphite (46.88), Marl (32.65), Limestone (5.91), Vermiculite (0.18)
10	GUJARAT	7455049	292	Marl (67.35), Sulphur (13.89), Bauxite (6.75), Limestone (5.17), Fluorite (0)
11	TELANGANA	5771767	49	Limestone (5.94), Manganese Ore (0.18)
12	MEGHALAYA	4755587	23	Limestone (2.23)
13	HIMACHAL PRADESH	3020899	36	Limestone (3.03)
14	UTTAR PRADESH	700792	3	Sulphur (5.45), Limestone (0.64)
15	ASSAM	655376	4	Sulphur (0.94), Limestone (0.44)
16	BIHAR	413637	1	Sulphur (1.66), Limestone (0.22)
17	JAMMU AND KASHMIR	312406	21	Limestone (0.26)
18	KERALA	305586	1	Sulphur (22.13), Limestone (0.08)
19	UTTARAKHAND	110253	3	Magnesite (35.68)
20	GOA	12	53	Iron Ore (0.0045)
	INDIA	1417338051	2081	

Source: MCDR Returns

Annexure 6.1: Year Wise / Activity-Wise Financial Performance of GSI Against the Approved Budget Outlay During F.Y. 2023-24 and Re Grant and Expenditure Upto December, 2024 and Last Quarter (Jan 2025 to March, 2025) of F.Y. 2024-25 and Fund Utilization During Calendar Year 2024

(Rs In crore)

	F.Y. 2023-24						F.Y. 2024-25					Calendar Year 2024	
	Total BE Grant	Total RE Grant	Expenditure (April, 23 to Dec, 23)	Available RE Grant from Jan,24 to Mar, 2024	Expenditure from Jan, 24 to Mar, 2024	Total Expenditure	Total BE Grant	Total RE Grant	Expenditure (April,24 to Dec 24)	Anticipated Expenditure from Jan, 25 to Mar, 25)	Anticipated Total Expenditure	Budget from Jan 2024 to Dec., 2024	Expenditure from January 2024 to Dec, 2024
	1	2	3	4 (2-3)	5	6 (3+5)	7	8	9	10	11 (9+10)	12 (4+9)	13 (5+9)
Survey & Mapping (Mission-I)	135.00	123.40	118.13	5.27	5.05	123.18	74.75	171.30	70.80	100.50	171.30	76.07	75.85
Mineral Explo-ration (Mis-sion-II)	63.00	66.15	50.72	15.43	15.34	66.06	65.75	66.90	52.86	14.04	66.90	68.29	68.20
Information Dissemination (Mission-III)	23.60	10.70	10.23	0.47	0.45	10.68	17.25	31.18	15.56	15.62	31.18	16.03	16.01
Spl. Invest & Other Explora-tion (Antarcti-ca) (Mission-IV)	3.50	3.34	1.84	1.5	1.36	3.20	3.25	3.21	2.25	0.96	3.21	3.75	3.61
R&D (Mis-sion-IV)	16.50	17.40	13.05	4.35	4.25	17.30	10.95	11.05	8.39	2.66	11.05	12.74	12.64
HRD (Mis-sion-V)	2.10	2.10	1.40	0.70	0.70	2.10	1.80	1.70	1.37	0.33	1.70	2.07	2.07
Tribal Area Sub Plan (TSP)	17.50	18.40	17.46	0.94	0.91	18.37	11.08	11.08	8.86	2.22	11.08	9.80	9.77
Schedules Caste Sub Plan (SCSP)	33.50	35.24	24.23	11.01	10.92	35.15	21.36	21.36	10.89	10.47	21.36	21.90	21.81
Administrative Support Activi-ties (ASA) and OE	105.30	109.83	95.69	14.14	13.95	109.64	91.45	92.48	82.71	9.77	92.48	96.85	96.66
Establishment Expenditure	836.50	888.37	736.73	151.64	147.52	884.25	967.60	979.49	804.87	174.62	979.49	956.51	952.39
Total Revenue Fund	1236.50	1274.93	1069.48	205.45	200.45	1269.93	1265.24	1389.75	1058.57	331.18	1389.75	1264.02	1259.02
Capital (Mod-ernization & Replacement)	72.10	71.52	38.66	32.86	32.75	71.41	34.76	34.76	23.72	11.04	34.76	56.58	56.47
Total GSI Fund (Rev + Capital)	1308.60	1346.45*	1108.14	238.31	233.20	1341.34	1300.00	1424.51	1082.30	342.21	1424.51	1320.61	1315.50
% of Fund utilized against RE						99.62%			83.23%				

* Total RE grant received Rs.1345.58 crore for F.Y 2023-24. An additional amount of Rs. 0.87 crore [Adv. & Publicity-Rs. 0.70 crore; Rs. 0.17 crore] has been provided to GSI vide Re-appropriation dated 01.02.2024 and 22.03.2024over and above RE-2023-24[Rs.1345.58 crore]

Annexure 6.2: Performance related to various regulatory and development functions of IBM during the year 2024-25 (January 2024 to March 2025)

Sl. No.	Item	Annual Target	Achievement
1	Inspections (MCDR/ MP/RMP/FMCP)	1449	1533
2	Updating of National Mineral Inventory (NMI) adopting UNFC.	Release of NMI for all the minerals	Quinquennial updation of NMI as on 01.04.2020: The work involved processing, generation of outputs and preparation of comparative statements for finalization of NMI as on 01.04.2020 in respect of 46 major minerals was completed. The two publications titled "National Mineral Inventory as on 01.04.2020-At a glance" and "National Mineral Inventory as on 01.04.2020 - An overview" have been completed and uploaded on IBM website.
3	Drone Application	Use of Drone Technology.	A register of receipt of drone/ satellite data submitted by the lessees under rule 34A of MCDR 2017 is being maintained at IBM. During the year 2024-25 as on 31/12/2024, 1368 mining leases data was received. Till December 2024, thirteen training programs over 132 days involving 173 nos. of technical officers have been provided for effective use of digital images by the officers. A Drone Data Management System (DDMS) application has been developed in-house by IBM under Mining Tenement System project for online submission of Digital Aerial Images under Rule 34A of MCDR 2017 and was commissioned since 01.06.2023
4	MSS	Generation of Triggers, sending to State Govt. for field verification	In fourth phase (2023-24), 157 Triggers for Major Minerals have been generated andF sent to respective state Governments for field verification.

Sl. No.	Item	Annual Target	Achievement
5	Generation of Land use classification of mining leases on GIS platform:	As per Ministry's direction, the information on Land use classification in shape/ KML files received from the lessee through Regional Offices was processed on GIS platform & finalized for each lease separately.	Cumulative progress is: i) Total valid data received (.kml/.shp file) from lessee- 1229 Nos. (899Nos. Working; 330 Nos. Nonworking) ii) Data processed in GIS- 1229 Nos. iii) land use classification map of 85 mining leases has been generated till Dec. 2024.
6	OD Investigations	45	44.75
7	Chemical Analysis (No. of radicals)	35000	26836
8	Mineralogical Studies	2500	2778
9	In Plant Studies/ Plant visits	---	---
10	Technical Consultancy & Mining Research Activity	---	In 2024-25, IBM Technical Consultancy and Mining Research Division also associated in formulation of offshore areas rules. The following four rules have been notified so far. (i) Offshore Areas (Existence of Mineral Resources) Rules on 06.06.2024. (ii) Offshore Areas Mineral Trust Rules, 2024 on 09.08.2024. (iii) Offshore Areas Mineral (Auction) Rules, 2024 on 14.08.2024. (iv) Offshore Areas Operating Right Rules, 2024 on 16-10-2024. Further, the following three rules were under preparation. (i) Offshore Areas Mineral Conservation and Development Rules, 2024 (final stage) (ii)Offshore Areas (Prevention of Illegal Mining, Transportation and Storage) Rules, 2024 (Draft) (iii) Offshore Areas Operating Right Rules for Atomic Minerals, 2024

Sl. No.	Item	Annual Target	Achievement
11	Training programmes by IBM.	18	18 training programmes have been conducted, in which a total of 297 IBM personnel, 451 Industry officials and 198 from the State Government officials have participated. ● 6 videolecutres of domain modules uploaded on iGoT platform ● 10 video lectures of domain modules uploaded on IBM website ● 2 video lectures uploaded on IBM you tube channel ● Draft Capacity Building Plan prepared by engaging EY
12	Development of various modules of MTS	Development of MTS	Registration, Returns and Mining Plan Modules of MTS were launched in 6th Mining Conclave on 12.7.2022. Development, testing & rolling out of following modules during 2024-25: ● Mine Imagery Data Processing & Analysis System Module - Launched on 20/08/2023 ● Average Sale Price Module - Launched on 23/01/2024 ● ML Directory/ WMI/ NMI Module – Launched on 28/03/2024 ● Star Rating System Module- Launched on 01/04/2024 ● Final Mine Closure Plan Module – Launched on 10/06/2024 ● Exploration licence/ Composite licence/ Prospecting licence Module- Launched on 07/08/2024

Annexure-6.3 : Mineral Wise Mining Lease (Other than Atomic, Hydro Carbons Energy and Minor Minerals) as on 31/03/2023(P)

Sl. No.	Mineral	No. of Leases	Lease area (Hect.)
1	Amethyst	2	5.83
2	Apatite	1	13.47
3	Bauxite	318	22334.73
4	Borax	1	159
5	Chromite	19	3293.08
6	Copper Ore	9	3916.85
7	Diamond	2	275.96
8	Emerald	1	46.32
9	Epidote	1	4.05
10	Fluorite	10	489.86
11	Garnet	23	133.29
12	Gold	10	6934.46
13	Graphite	32	1314
14	Iolite	4	59.24
15	Iron Ore	319	51817.41
16	Kyanite	14	223.81
17	Lead & Zinc Ore	11	7274.25
18	Limeshell	25	1072.15
19	Limestone	1815	165118.97
20	Magnesite	34	2303.79
21	Manganese Ore	216	10535.84
22	Moulding Sand	6	39.24
23	Perlite	1	144.88
24	Rock Phosphate	7	1534.24
25	Rock Salt	1	8.12
26	Sapphire	1	673.4
27	Selenite	4	625.3466
28	Semi-Precious Stones	16	251.88
29	Siliceous Earth	21	186.75
30	Sillimanite	2	33.34
31	Stibnite	1	40.47
32	Tin	15	319.17
33	Vermiculite	52	914.65
34	Wollastonite	13	258.69
	Total	**3007**	**282356.54**

Sources: Information received from respective State Government Departments and Regional Offices of IBM for minerals (excluding atomic minerals, hydrocarbon energy minerals and minor minerals).

P: Provisional

Annexure 8.1: Detailed time-lines and outcomes of ongoing and completed projects of JNARDDC, Nagpur

Completed projects: 06

S.No.	Project Title	Outcomes
1.	S-38: Red mud valorisation to achieve zero waste, conversion of residue into diagnostic x-ray shielding tiles after recovery of scandium (CSIR-AMPRI, Bhopal): Mar 2022 (2˝ yrs)	The project aimed to convert red mud into economically useful, high-energy X-ray and gamma-ray shielding blocks suitable for building radiation therapy bunkers, nuclear power plants, food sterilization plants, etc., and thereby promote the zero-waste concept. Based on the encouraging results, the project partner CSIR-AMPRI is commissioning a semi-pilot plant for the fabrication of joint free radiation shielding bricks under normal atmosphere. The way forward is to replace conventional lead concrete with the developed joint-free radiation shielding material to build radiation shielding walls from the X-ray diagnosis room upto the nuclear power plants.
2.	S-41: Production of Onyx grade ATH (sodium bicarbonate route) using low-grade Bauxite from Kutch region of Gujarat. S&T(Mines) (Kalinga Institute of Industrial Technology, KIIT, Bhubaneshwar and industry partner- NIKNAM Chemicals Pvt. Ltd) July 2022 (2 yrs)	The project aimed to develop a novel process for obtaining onyx-grade ATH with whiteness greater than 96% through the bicarbonate route using the kutch bauxite for its use in synthetic marble/onyx application. The whiteness of the product developed was only up to 90% through this sodium bicarbonate route. Hence, the proposed method is not technically viable for its application in synthetic marble and cannot be scaled up.
3.	S-42: Fabrication of Al2O3 containing cellulose-based Ag NPs encapsulated collagen dressing and investigation of its therapeutic opportunities in diabetic wound healing (Kalinga Institute of Industrial Technology, Bhubaneshwar) Dec 2022 (2 yrs)	Chronic wounds are conventionally addressed using various FDA-approved silver-based formulations and other biomaterials. To overcome this issue an alternative material viz alumina (Al2O3) was developed for wound management devices. R&D on Al2O3 was done at JNARDDC and KIIT used its facility at the School of Biotechnology for tests and validation related to animal toxicity and sourcing biological samples from its hospital (KIMS) for the developed healing material. The product is being taken up with suitable pharma firms by KIIT.
4.	N-50: Kinetic study of different unit operations like digestion and desilication. NALCO, Bhubaneshwar Jul 2023 : (1 ˝ yr)	Detailed studies were undertaken of the digestion kinetics of process bauxite of NALCO and a mixture of process and desilicated bauxite at various parameters. Desilication kinetics was also studied. The findings have been handed over to NALCO for its evaluation using a suitable software at NALCO
5.	N-51: Detailed Thermal / Heat Balance study of the cast house furnaces to increase furnace efficiency, NALCO June 2023 (1 ˝ yr)	Comparative studies including detailed thermal balance analysis of two cast house furnaces (highly efficient and low efficient) were undertaken with a view to explore the possibilities for improvement in energy efficiency. Suitable recommendations have been submitted to NALCO in the final report.

S.No.	Project Title	Outcomes
6.	P-68 : Evaluation of CGM (Crystal growth modifier) Kiberlite Chemicals Pvt Ltd. Bangalore Apr-2024 : 3 months	Project work was undertaken to evaluate performance and dosages for optimization of CGM. Based on the findings of the study, Kimberlite Chemicals Pvt Ltd suggested the optimised dosages to the Alumina Refinery to get the desired coarsening in the product hydrate with improved productivity.

Ongoing projects : 19

SN	Project Title with timeline	Outcomes / Remarks	Completion target
1.	S-37 / P-63: Technology Development for Holistic Utilization of Red Mud for Extraction of Metallic Value & Residue Utilisation [NML, Jamshedpur, IMMT, Bhubaneshwar, NALCO, HINDALCO & VEDANTA] under the aegis of NITI Aayog Mar 2022 (3 yr)	Under the NITI Aayog initiative, the primary industries and 3 R&D labs have joined hands to develop feasible processing options for all metal extraction and REE enrichment from red mud and further research, development and commercialization to other industries. The outcome will lead to the development of a Master Flowsheet for selected grades of red mud with energy and material balance equipped with techno-economic feasibility.	Mar-2025
2.	S-39: Development of medium strength Al-Mg-Si (AA6082 based) alloy for high-end strategic applications (extruded or drawn tubes) (IIT Gandhinagar) May 2022 (2 y 10m)	The aluminium tube industry is currently battling with low strength of the finished product using AA6082 alloy. This project aims to develop a medium-strength Al-Mg-Si (AA6082) based alloy with optimized composition and heat treatment schedule and achieve higher mechanical properties. Developing and indigenization of material for national space, aerospace and defence applications.	Mar-2025
3.	S-46: Development of low-cost filler material utilizing Lithomargic clay for the paint industry as per IS 68 2006 standard: (Industry partner: Mundle Paint and Chemicals, Bhandara) Mar 2023 (2 yrs)	The bauxite deposits of Central India are associated with lithomargic clay resources. However, these resources are not used by mine owners as well as the aluminium industry. The project aims to utilize Lithomargic clay for the development of low-cost filler material for the paint industry as per IS:68 (2006) standards and to validate the product (filler) as per norms of Indian standards for the paint industry.	Mar-2025

SN	Project Title with timeline	Outcomes / Remarks	Completion target
4.	S-47: Development of prototype aluminium seat frame for passenger buses. (Joint project with Automotive Research Association of India) Jan 2023 (2 yrs)	The existing seat structure is made of steel material for a 2x2 passenger bus seat frame which weighs about 15-18 Kg per seat. The project aims to design and develop lightweight aluminium seat frames for passenger bus applications. Replacing it with medium-strength alloys such as AA6061, and AA6082 will bring a saving of 5-6 Kgs/seat. With the collaboration of ARAI, it is proposed to simulate the die design, die fabrication and extrude the profiles and validate the prototype of aluminium seat frame for passenger vehicles as per AIS 023 standard.	Jan-2025
5.	S-48 : Process for production of ATH with high whiteness using non-metallurgical grade bauxite by following soda sintering process : S&T(Mines) (With Institute of Chemical Technology (ICT) Mumbai Indian Oil Campus Bhubaneswar and Industry Partner : NIKNAM Chemicals PVT. Ltd) Jan 2024 (2 yrs)	Project aims for production of ATH with high whiteness using non-metallurgical grade bauxite by following soda sintering process leading to value addition	Jan-2026
6.	S-49 : An optimal approach for the retrieval of value-added substances from secondary aluminum black dross : S&T(Mines) Sri Ramakrishna Engineering College, Coimbatore Industry Partner : Phoenix Alloys Jan 2024 (2 yrs)	Project aims for retrieval of value-added substances from secondary aluminum black dross	Jan-2026

SN	Project Title with timeline	Outcomes / Remarks	Completion target
7.	S-50 & P-66 : Utilisation of aluminium dross in synthetic slag preparation for secondary steel making : S&T(Mines) & VNIT Nagpur. Industry Partner : Daiki Aluminium (India) Pvt Ltd, Tirupati, Andhra Pradesh Sep 2024 (1 yr)	The project aims to develop synthetic slag for steel desulphurisation using aluminium dross residues and also develop SOP for synthetic slag preparation from aluminium dross residue. It will address the problem of utilization of aluminium dross which is an important requirement in secondary steel manufacturing.	Sep-2025
8.	S-51 : Extraction of Gallium from Titanium and Iron ore Industrial wastes" : S&T(Mines) & CSIR NIIST Industry Partner : V.V Titanium Pigments Pvt. Ltd., Thoothukudi, TN Sep 2024 (2 yrs)	The objective is to achieve extraction and separation of gallium from secondary sources such as (i) chlorinator waste and ETP sludge waste from the TiO2 pigment processing plant, and (ii) Iron ore tailing Wastes. It will be followed by development of a chemically modified silicaaerogel sorbents adsorption technology to enrich the gallium content. The way forward would include setting up a a pilot scale demonstration plant in titanium industry to the level of 50 to 100 L capacity to extract the gallium and demonstrate the process to Ministry of Mines.	Sep-2026
9.	S-52 : Sustainable Manufacturing of automobile engine pistons with 100 percent recycled aluminium alloys with extended Fe-impurity tolerance" : S&T(Mines) & BML Munjal University, Gurugram Industry Partner : Motocast Power Alloys Private Limited, Rajasthan Sep 2024 (2 yrs)	Develop a two-wheeler automotive piston prototype by recycling friendly aluminium alloy containing high iron followed by validation of piston prototypes with industry partner.	Sep-2026
10.	S-53 : Recovery of Nickel from Secondary Steel Industry waste. S&T(Mines) Industry Partner : Hydromet Research and Recovery LLP, Jinal Apartment, Chinchpada, Maharashtra Sep 2024 (1˝ yrs)	Recovery of Nickel from secondary steel industry electric arc furnace cyclone dust and to achieve high purity (99.5%) grade Nickel salt for its various applications.	Feb-2026

SN	Project Title with timeline	Outcomes / Remarks	Completion target
11.	S-54: Lead contamination in recycled aluminium cookware-Identifying sources and developing strategies for lead removal : S&T (Mines) Industry : Pure Earth Lab, USA Oct 2024 (1 yr)	To identify the source and level of contamination of lead in Aluminium cookware specifically manufactured from recycled aluminium. To develop efficient lead removal techniques from molten aluminium and to assess the effect of anodizing in minimising the leaching of lead from cookware.	Oct-2025
12.	S-55 : Conformal Cooling strategies for minimising Peripheral Coarse Grain growth in High-Strength Aluminium alloy extrudates : S&T(Mines) Industry : Bharat Forge Oct 2024 (2 yrs)	To develop computational model based on influential processing parameters on peripheral grain growth followed by design of 3D printed conformal cooling channels for improved productivity and quality. Project also aims to demonstrate the 3D printed cooling channels for production of prototype profile for the benefit of the industry.	Oct-2026
13.	S-56 : Triazine Derived g-C3N4 Based Separation of Niobium and Tantalum from the Tin Slag- A Fully Scalable Fluoride-Free Process: S&T (Mines) & Banaras Hindu University, Varanasi Industry : LOHUM, Greater Noida Nov 2024 (2 yrs)	Project activity includes beneficiation of the tin slag containing Nb/Ta from the Industry/mines followed by facile dissolution of tinslag by alkali fusion with upscaling option. The aim is to ensure recovery of the Nb/Ta from the concentrate and overall up scaling of the process to the pilot plant level.	Nov-2026
14.	N-48: Development of DC cast Al Alloy for Yoke in automobile applications, NALCO Bhubaneshwar (with ARAI Pune) May 2022 (2˝ Years)	An automotive yoke is usually made of steel or cast iron. Aluminium alloys are widely used in automotive applications due to their excellent strength-to-weight ratio, significantly reducing fuel consumption and enabling them to meet emission norms. The project aims to develop a new DC cast Al Alloy followed by the development of the prototype yoke used in automobile applications.	Dec-2024

SN	Project Title with timeline	Outcomes / Remarks	Completion target
15.	P65:EE:53 Recycling coal mine to reuse as a value-added building material to promote a circular economy, Ministry of Coal (CPMDIL, BIT Mesra & VNIT): Sept 2023 (2 yrs)	The project aims to develop mix designs from coal mine overburden (COM) in homogenized slurry form for making building elements (panels, bricks and concrete) by heat treatment and geopolymer processes for their prospective use in urban and rural housing.	Sep-2025
16.	P67: Coal mine overburden alkali-activtated composites (CMOAAC) for pre-fabricated 3D volumetric construction elements & system thereof (3DVCES) (CPMDIL, IIT-BHU & VNIT): Dec 2023 (2 yrs) :	The objective is to review, design & develop the coal mine overburden alkali activated construction products (CMOAAC) for pre-fabricated 3D elements of viscoelastic materials by using alkali based additives which has prospective use in mass housing applications.	Dec-2025

Annexure 11.1: During FS2023-24, a total of seven items of Systematic Thematic Mapping (STM) on 1:25,000 scale have been taken up in NER of which two items were taken up in Arunachal Pradesh, one in Assam, two in Meghalaya, one in Manipur-Nagaland and one in Sikkim. During the period from 01.01.2024 to 31.03.2024, an area of 596.5 sq. km had been covered respectively.

FS:2023-24

Sr. No.	Item Type	TitleofthetItem	State	Target Achieved from 01.01.2024 to 31.03.2024 (insqkm)
1	STM	Specialized Thematic Mapping to establish lithostratigraphy, tectonic setting, geochemistry and geochronology of Pari Mountain Gneiss, Bomdila Group and Dibang Group of rocks and assess economic potentiality in Lalpani-Tidding-Wakro areas, Lohit district Arunachal Pradesh	Arunachal Pradesh	75
2	STM	Specialised Thematic Mapping to establish tectonic setting, geochemistry and geochronology of Lumla Formation with respect to SeLa and Bomdila groups and assess economic potentiality in Tawang-Lumla areas, Tawang District, Arunachal Pradesh	Arunachal Pradesh	80
3	STM	Specialized Thematic Mapping in Kaphitali-Daboka-Parokhuwa areas of KarbiAnglong district, Assam to establish igneous complex and to bring out the structural implication of Kaliyani shear zone for possible mineralization.	Assam	70
4	STM	Specialized Thematic Mapping around Phutamati–Jangrapara-Dandarigiri area to unravel the tectono-metamorphic evolution in western part of AMGC, North and West Garo Hills district, Meghalaya.	Meghalaya	84
5	STM	Specialized Thematic Mapping in parts of the Palaeogene Sediments of Jaintia and Garo Groups, in parts of South West Khasi Hills and South Garo Hills districts.	Meghalaya	48
6	STM	Specialised thematic mapping around Kohima-Viswema-Kezoma area, Nagaland to resolve the conundrum of Disang-Barail contact	Manipur-Nagaland	114.5
7	STM	Specialized Thematic Mapping of Rangit Window and to demarcate the geometry & kinematics of associated duplex system vis a vis characterization of the alkaline ultra-potassic syenite/Lamprophyres patches in the area of South and West Districts (Namchi, Gyalshing and Soreng Districts) of Sikkim.	Sikkim	125

Annexure 11.2: During FS 2024-25, a total of thirteen items of Systematic Thematic Mapping (STM) on 1:25,000 scale have been taken up in NER of which one item is being executed in Arunachal Pradesh, one in Assam, four in Meghalaya, six in Tripura and Mizoram and one in Sikkim. During the period from 1.04.2024 to 31.12.2024, an area of 1,562 sq. km has been covered.

FS:2024-25

Sr. No.	Item Type	Title of the Item	State	Target Achieved from 01.04.2024 to 31.12.2024 (in sq km)
1	STM	Specialized Thematic Mapping to characterise the Ziro Gneisses in and around Ziro Valley, Central Arunachal Himalaya.	Arunachal Pradesh	127
2	STM	Specialized Thematic Mapping in Umpanai-Rong Jangphong-Umsero areas of West Karbi Anglong district, Assam to establish the evolution of the Shillong Group and emplacement history of granitoids along with for possible mineralization.	Assam	115
3	STM	Specialised Thematic Mapping to characterize the deformational pattern of Sumer-Sonidan shear zone, Ri-Bhoi and East Khasi hills district, Meghalaya.	Meghalaya	110
4	STM	Specialized Thematic Mapping in and around Dinganpara - Bikonggiri areas to unravel the tectono-metamorphic evolution in north-western part of AMGC, West Garo Hills district (TS 78K/01), Meghalaya.	Meghalaya	110
5	STM	Specialised Thematic Mapping around Rongrenggiri – Resogiri-Gabil Songma - Bibragiri area to evaluate the deformation -metamorphic evolution in western part of AMGC, East Garo Hills district, Meghalaya	Meghalaya	100
6	STM	Systematic Themathic Mapping of Mendal-Bajengdoba-Hatigaon villages to unravel the tectono-metamorphic evolution in parts of North & West Garo Hills district, Meghalaya.	Meghalaya	110
7	STM	Specialized Thematic Mapping for delineation and characterization of Gorubathan Formation for occurrences of base metal and associated minerals by mapping in the parts of Namchi, Gangtok and Pakyong districts of Sikkim.	Sikkim	125

Sr. No.	Item Type	Title of the Item	State	Target Achieved from 01.04.2024 to 31.12.2024 (in sq km)
8	STM	Sepcialised Thematic Mapping through facies analyses of the Surma and the Tipam Groups of rocks in and around Khamrang-Kawnpui-Zanlwan area, Kolasib and Mamit districts, Mizoram.	Mizoram	125
9	STM	Specialised thematic mapping in Tripura-Mizoram Fold belt in parts of Khowai District of Tripura to elucidate the depositional history of Dupitila	Mizoram	135
10	STM	Specialised Thematic Mapping of Surma and Barail Groups in parts of Saitual, Khawzawl and Champhai districts of Mizoram for facies characterisation and implications for provenance, depositional environment and tectonic setting	Mizoram	123
11	STM	Specialized Thematic mapping in Gandacharra-Nutanbazar-Rushyabari area, Dhalai district, Tripura: An appraisal on its lithostratigraphy and structure	Tripura	133
12	STM	Specialised Thematic Mapping in Santir Bazar and Jolaibari area, parts of south Tripura district for reappraisal of lithostratigraphy and sedimentary basin evolution and to identify probable zones suitable for hydrocarbon occurrence.	Tripura	105
13	STM	Specialised Thematic Mapping in Chawmanu area, parts of Dhalai and North Tripura districts for reappraisal of lithostratigraphy and sedimentary basin evolution and to identify probable zones suitable for hydrocarbon occurrence.	Tripura	144

Annexure 11.3: A total of 48 items of Geochemical Mapping on 1:50,000 scale with collection of samples in grid pattern had been taken up during the FS2023-24 in parts of Arunachal Pradesh, Assam, Manipur-Nagaland and Tripura & Mizoram. An area of 14,530 sq km has been covered during the period from1.01.2024 to 31.03.2024.

FS.2023-24

Sr. No.	Item Type	Title of the Item	State	Target Achieved from 1.01.2024 to 31.03.2024 (in sq km)
1	NGCM	Geochemical mapping in toposheetnos. 83N/5 & 83N/9 covering parts of Longding, Tirap and Changlang districts of Arunachal Pradesh	Aruna-chal Pradesh	252
2	NGCM	Geochemical mapping in toposheet No. 83G/06 covering parts of Karbi Anglong East and Dima Hasao Districts, Assam & Peren District, Nagaland.	Assam	0
3	NGCM	Geochemical mapping in toposheet No. 83G/07 covering parts of Dima Hasao District, Assam and Peren District, Nagaland & Tamenglong district, Manipur.	Assam	274
4	NGCM	Geochemical mapping in toposheet No. 83J/03 covering parts of Jorhat & Golaghat Districts, Assam and Wokha District, Naga-land	Assam	175
5	NGCM	Geochemical mapping in toposheet No. 83J/06 covering parts of Jorhat District, Assam and Mokochung District, Nagaland.	Assam	214
6	NGCM	Geochemical mapping in toposheet No. 83D/11 covering parts of Hailakandi and Aizwal districts, Assam and Mizoram.	Assam	322
7	NGCM	Geochemical mapping in toposheet No. 83D/10 covering parts of Cachar, Hailakandi and Karimganj districts, Assam.	Assam	240
8	NGCM	Geochemical mapping in toposheet No. 83F/01 and 83F/05 covering parts of Biswanath Dis-trict of Assam and Pekka Kessang and Papum Pare Districts of Arunachal Pradesh.	Assam	351
9	NGCM	Geochemical mapping in to posheet No. 83H/01covering parts of Cachar, Dima Hasao districts of Assam and Jiribam, Noney & Tamenglong districts of Manipur.	Assam	332
10	NGCM	Geochemical mapping in toposheet no. 83D/14 covering parts of Cachar and Hailakandi district of Assam	Assam	227

Sr. No.	Item Type	Title of the Item	State	Target Achieved from 1.01.2024 to 31.03.2024 (in sq km)
11	NGCM	Geochemical mapping in Toposheet No. 83D/9 & part of toposheet no 83D/5 coveringparts of Cachar, Hailakandiand Karimganj districts, Assam.	Assam	380
12	NGCM	Geochemical mapping in toposheet no. 83F/9 covering parts of Sonitpur, Lakhimpur, and Sibsagar districts of Assam and East Kameng district of Arunachal Pradesh	Assam	521
13	NGCM	Geochemical mapping in parts of Toposheet No. 83D/05 & 06 covering parts of Cachar, Karimganj and Hailakandi Districts, Assam	Assam	432
14	NGCM	Geochemical mapping in Toposheet No. 83D/07 covering parts Karimganj and Hailakandi districts of Assam and North Tripura District of Tripura	Assam	230
15	NGCM	Geochemical mapping in Toposheet No. 83G/13 covering parts of Golaghat district of Assam and Dimapur, Kohima and Wokha districts of Nagaland	Assam	255
16	NGCM	Geochemical mapping in T.S. No. 83G/11 in parts of Peren District, Nagaland and Tamenglong District, Manipur	Manipur-Nagaland	256
17	NGCM	Geochemical mapping in Toposheet No. 83G/8 in parts of Tamenglong District, Manipur and Cachar District, Assam	Manipur-Nagaland	216
18	NGCM	Geochemical mapping in Toposheet No. 83G/10 in parts of Peren and Chumukedima districts, Nagaland and Karbi Anglong district, Assam	Manipur-Nagaland	187
19	NGCM	Geochemical mapping in Toposheet no. 83G/12 in parts of Peren district, Nagaland and Tamenglong district, Manipur	Manipur-Nagaland	282
20	NGCM	Geochemical mapping in Toposheet no. 83G/14 inparts of Kohima, Chumukedima and Peren districts of Nagaland and Senapati district of Manipur	Manipur-Nagaland	219
21	NGCM	Geochemical mapping in Toposheet no. 83H/12 and 83E/09 in parts of Churachandpur district of Manipur	Manipur-Nagaland	246
22	NGCM	Geochemical mapping in parts of Imphal West, Imphal East and Kangpokpi districts of Manipur in T.S. No.83H/13.	Manipur-Nagaland	240

Sr. No.	Item Type	Title of the Item	State	Target Achieved from 1.01.2024 to 31.03.2024 (in sq km)
23	NGCM	Geochemical mapping in parts of Imphal West, Imphal East, Thoubal, Bishnupur, Kakching and Senapati districts of Manipur in T.S. No. 83H/14	Manipur-Nagaland	228
24	NGCM	Geochemical mapping in Toposheet no. 83J/07 in parts of Mokokchung, Wokha districts of Nagaland and Sibsagar District of As-sam	Manipur-Nagaland	223
25	NGCM	Geochemical mapping in Toposheet No. 83J/10 in parts of Mokokchung, and Longleng districts of Nagaland and Sibsagar district of Assam	Manipur-Nagaland	208
26	NGCM	Geochemical mapping in T.S.No. 83L/6 in parts of Kamjong & Tengnoupal districts of Manipur.	Manipur-Nagaland	254
27	NGCM	Geochemical mapping in toposheet no. Parts of 84E/05 & 84E/06 covering parts of Champhai & Khawzawl districts of Mizoram.	Tripura-Mizoram	347
28	NGCM	Geochemical mapping in parts of toposheet no. 84A/7, 84A/8 and 84B/5 covering parts of Lunglei and Mamit districts of Mizoram.	Tripura-Mizoram	408
29	NGCM	Geochemical mapping in toposheet no. parts of 84E/07 & 84E/08 covering parts of Champhai & Khawzawl districts of Mizoram.	Tripura-Mizoram	361
30	NGCM	Geochemical mapping in toposheet no. 84A/12 covering parts of Lunglei, and Serch-hip districts of Mizoram.	Tripura-Mizoram	236
31	NGCM	Geochemical mapping in Toposheet No. 83G/13 covering parts of Golaghat district of Assam and Dimapur, Kohima and Wokha districts of Nagaland	Tripura-Mizoram	349
32	NGCM	Geochemical mapping in toposheet no. 84A/16 covering parts of Lunglei, Serchhip and Hnahthial districts of Mizoram	Tripura-Mizoram	273
33	NGCM	Geochemical Mapping in parts of Toposheet no. 84A/06 & 84A/07, covering parts of Mamit district, Mizoram.	Tripura-Mizoram	501
34	NGCM	Geochemical mapping in toposheet no. 84B/09 covering parts of Lunglei, district of Mizoram.	Tripura-Mizoram	382
35	NGCM	Geochemical Mapping in toposheet no. 78P/15 and 83D/03, covering parts of Unnakoti, North Tripura district, Tripura & Karimganj district, Assam.	Tripura-Mizoram	235

Sr. No.	Item Type	Title of the Item	State	Target Achieved from 1.01.2024 to 31.03.2024 (in sq km)
36	NGCM	Geochemical Mapping in Toposheet no 84B/12 and 84B/16, covering parts of Saiha and Lawngtlai Districts of Mizoram.	Tripura-Mizoram	423
37	NGCM	Geochemical mapping in Toposheet no. 84E/3 covering parts of Serchhip, Khawzawl and Champhai districts of Mizoram	Tripura-Mizoram	336
38	NGCM	Geochemical Mapping in Toposheet no 84E/01, covering parts of Saithul, Khawzawl and Champai districts of Mizoram	Tripura-Mizoram	309
39	NGCM	Geochemical Mapping in toposheet no 84F/03 and 84F/04, covering parts of Saiha Districts of Mizoram.	Tripura-Mizoram	395
40	NGCM	Geochemical Mapping in toposheet 84B/11 & B/12, covering parts of Lawngtlai district of Mizoram	Tripura-Mizoram	448
41	NGCM	Geochemical mapping in Toposheet no. 84E/4 covering parts of Hnahthial, Serchhip, Khawzawl and Champhai districts of Mizoram.	Tripura-Mizoram	284
42	NGCM	Geochemical Mapping in toposheet no. 84B/15, covering parts of Lawngtlai & Saiha Districts of Mizoram.	Tripura-Mizoram	445
43	NGCM	Geochemical Mapping in toposheet 84F/01&02, covering parts of Hnahthial, Lawngtlai & Saiha Districts of Mizoram	Tripura-Mizoram	406
44	NGCM	Geochemical mapping in toposheet no. 83D/15 covering parts of Aizawl and Kolasib districts of Mizoram and Cachar district of Assam	Tripura-Mizoram	374
45	NGCM	Geochemical mapping in toposheet no. 84B/10covering the parts of Lunglei and Lawngtlai districts of Mizoram.	Tripura-Mizoram	273
46	NGCM	Geochemical mapping in toposheet no. 84B/13 covering parts of Lunglei and Saiha districts of Mizoram.	Tripura-Mizoram	270
47	NGCM	Geochemical mapping in toposheet no. 84B/14 covering parts of Lunglei, Saiha and Lawngtlai districts of Mizoram.	Tripura-Mizoram	381
48	NGCM	Geochemical mapping in toposheet no. 84E/2 covering parts of Saitual, Khawzawl and Champhai districts of Mizoram.	Tripura-Mizoram	330

Annexure 11.4: Total 4 items of Geochemical Mapping on 1:50,000 scales with collection of samples in grid pattern is being executed during the FS 2024-25 in parts of Assam. An area of 6,392 sq km has been covered during 01.04.2024 to 31.12.2024.

FS:2024-25

Sr. No.	Item Type	Title of the Item	State	Target Achieved from 01.04.2024 to 31.12.2024 (in sq km)
1	NGCM	Geochemical mapping in toposheet no. 78N/2, N/3, N/4, N/6, N/7 & N/8 covering parts of Bajali, Baksa, Nalbari. Kamrup and Barpeta districts of Assam	Assam	1760
2	NGCM	Geochemical mapping in toposheet nos. 78N/10, N/11, N/13, N/14 & in parts of and 83B/01 covering parts of Baksa, Tamulpur, Nalbari, Kamrup,,Udalguri, Darrang districts of Assam and West Ka-meng district of Arunachal Pradesh.	Assam	1400
3	NGCM	Geochemical Mapping in toposheet nos. 78J/2, 78J/4, 78J/6, 78J/10,78J/14 and 78J/15 and in Baksha, Bongoigaon, Bar-peta, Chirang, Dhubri, Goalpara,& Kokrajhar districts of Assam	Assam	1296
4	NGCM	Geochemical mapping in Toposheet nos. 83J/01, 83J/02, 83J/05 83J/09and 83F/14 covering Jorhat, Sivasagar, Golaghat and Majuli districts of Assam	Assam	1936

Annexure 11.5: As a part of FS2023-24 Two GPM Items had been executed by GSI, NER. During the period 1.01.2024 to 31.03.2024 a total area of 1370 sq km had been covered.

FS.2023-24

Sr. No.	Item Type	Title of the Item	State	Target Achieved from 01.01.2024 to 31.03.2024
1	GPM	Ground Gravity-Magnetic Surveyunder National Geophysical Mapping Programme in Toposheet Nos.78K/11 (Part), 78K/12, 78G/14, 78G/15 covering parts of South, East Garo Hills districts, Meghalaya, Dhubri District, Assam	RHQ	670
2	GPM	Ground Gravity-Magnetic Survey under National Geophysical Mapping Programme in Toposheet Nos. 78O/4, 78O/12, 83C/6 covering parts of East Khasi Hills, East Jaintia hills districts of Meghalaya, Karbi An-glong district of Assam	RHQ	700

Annexure11.6: A total of three GPM items have been taken up during FS 2024-25, of which two were in Assam and one was in Meghalaya. During the period from 1.04.2024 to 31.12.2024 a total area of 2185 sq km had been covered.

FS:2024-25

Sr. No.	Item Type	Title of the Item	State	Target Achieved from 1.04.2024 to 31.12.2024 (in sq km)
1	GPM	Ground Gravity-Magnetic Survey under National Geophysical Mapping Programme in Toposheet Nos. 83C/14, 83C/15, 83G/02 and 83G/05 covering parts of Dima Hasao, Hojai, Karbi Anglong and West Karbi Anglong districts of Assam and East Jaintia Hills district of Meghalaya.	RHQ	800
2	GPM	Ground Gravity-Magnetic Survey under National Geophysical Mapping Programme in Toposheet Nos. 83C/7, 83C/8 (part), 83C/11, 83C12 (part) and 83C16 (part) covering parts of East Jaintia Hills, West Jaintia Hills districts of Meghalaya and Cachar, Dima Hasao districts of Assam.	RHQ	700
3	GPM	Ground Gravity-Magnetic Survey under National Geophysical Mapping Programme in Toposheet Nos. 83F/10, 83/F11, 83F/15 and 83F/16 covering parts of Karbi Anglong, Golaghat, Biswanath districts of Assam.	RHQ	685

Annexure 11.7: Two items of Photo Geology and Remote Sensing (PGRS) had been taken up on 1:50,000 Scale during FS 2023-24 to carry out the spectral geological mapping in OGP areas of Assam, Meghalaya and Sikkim using ASTER data. The total target of 3060 sq km had been completed during the period from 1.01.2024 to 31.03.2024.

FS:2023-24

Sr. No.	Item Type	Title of the Item	State	Target Achieved from 1.01.2024 to 31.03.2024 (in sq km)
1	PGRS	Spectral Geological/Surface mineral mapping using spaceborne multispectral ASTER data on 1:50,000 scale in OGP areas of As-sam Meghalaya Gneissic Complex, Shil-long Group, Alkaline Complexes	RHQ	220
2	PGRS	Spectral Geological / Surface mineral mapping using spaceborne multispectral ASTER data on 1:50,000 scale in OGP areas of Sikkim Himalayan belt, Assam Meghalaya Gneissic Complex, Sylhettraps.	RHQ	2840

Annexure-11.8: During the FS2024-25, three items of Photo Geology and Remote Sensing (PGRS) are being executed in parts of Arunachal Pradesh, Manipur, Nagaland and Tripura states by using ASTER data. A total area of 20,786 sq km has been completed during the period from 1.04.2024 to 31.12.2024.

FS:2024-25

Sr. No.	Item Type	Title of the Item	State	Target Achieved from 1.04.2024 to 31.12.2024 (in sq km)
1	PGRS	Spectral Geological/Surface mineral mapping using space borne multispectral ASTER data on 1: 50,000 scale in OGP areas of Siang Group, Siwaliks and Bomdila Gneisses of Arunachal Pradesh.	RHQ	12,586
2	PGRS	Spectral Geological/Surface mineral mapping using space borne multispectral ASTER data on 1: 50,000 scale in OGP areas of Lohit Granitoid Complex, Dibang Group, Roinggneisess of Arunachal Pradesh and Manipur ophiolite complex of Manipur and Nagaland.	RHQ	7,000
3	PGRS	Spectral Geological Mapping over Gandhari-Manubazar, Kumarghat-Longtharai areas in Tripura using ASTER and Landsat OLI Data for identifying priority areas for hydrocarbons.	RHQ	1,200

Annexure-11.9: Details of mineral exploration items taken up in NER during FS 2023-24 and FS: 2024-25

FS 2023-24

Sl. No.	FS Year	State	Title of the Geological Report	Stage	Commodity
1	2023-24	Arunachal Pradesh	Preliminary exploration for vanadium, graphite and associated minerals around **Kugitago - Miya** areas, Lower Subansiri district, Arunachal Pradesh (G3)	G3	Vanadium, graphite
2	2023-24	Arunachal Pradesh	Preliminary exploration for vanadium, graphite, limestone and associated mineralisation in the metasedimentary sequence of Bomdila Group of rocks in **DabaGamlin block**, West Siang District, Arunachal Pradesh (G3)	G3	Vanadium, graphite , Limestone
3	2023-24	Arunachal Pradesh	Reconnaissance survey for REE in and around **Dha Hills and Kamporijo area**, Kamle District, Arunachal Pradesh (G4)	G4	REE
4	2023-24	Arunachal Pradesh	Reconnaissance survey for limestone of Chilliepam Formation of Bomdila Group in and around **Hugu and Sakehugu** area KurungKumey district, Arunachal Pradesh (G4)	G4	Limestone
5	2023-24	Arunachal Pradesh	Reconnaissance survey for limestone in and around Puging-Paling-**Janbo - Likor** areas, Upper Siang district, Arunachal Pradesh. (G4)	G4	Limestone
6	2023-24	Arunachal Pradesh	Reconnaissance survey for phosphorite mineralisation in Lower Gondwana rocks in **Garu - Gensi** area, Lower Siang District, Arunachal Pradesh. (G4)	G4	phosphorite
7	2023-24	Assam	Preliminary exploration for REE and associated minerals in **Krogaon** block, Jashora Alkaline Complex, West KarbiAnglong district, Assam. (G3)	G3	REE
8	2023-24	Assam	Preliminary exploration for limestone in **Krungming** Block, Dima Hasao district, Assam (G3)	G3	Limestone
9	2023-24	Assam	Reconnaissance survey for REE and associated mineralisation in **Chelear - Rongpham** area, West KarbiAnglong District, Assam. (G4)	G4	REE

Sl. No.	FS Year	State	Title of the Geological Report	Stage	Commodity
10	2023-24	Assam	Reconnaissance survey for placer gold in and around **Dikrang River** basin, Lakhimpur and Sonitpur districts, Assam. (G4)	G4	Gold
11	2023-24	Assam	Reconnaissance survey for REE and associated minerals in coal and associated clay beds in and around **Lido-Tikok - Tipangpani**area, Tinsukia District, Assam. (G4)	G4	Coal
12	2023-24	Meghalaya	Reconnaissance survey for re-appraisal for base metal in the Shillong group of rocks around **Mawlong** block, East Khasi Hills District, Meghalaya. (G4)	G4	Base metal
13	2023-24	Meghalaya	Reconnaissance survey of REE, Li and associated mineralisation in central parts of South Khasi Batholithnear **Pariong, Sohma areas** in South West Khasi Hills district, Meghalaya(G4)	G4	REE, Li
14	2023-24	Meghalaya	Reconnaissance survey of REE, Sn, Li and associated mineralization around **Mawphir area** of South Khasi Batholith in East Khasi Hills district, Meghalaya. (G4)	G4	REE, Sn, Li
15	2023-24	Meghalaya	Reconnaissance survey for REE, lithium and associated mineralization around **Kyllang Nongthymmai and Mawjasksaw,** West Khasi Hills district, Meghalaya. (G4)	G4	REE, Li
16	2023-24	Meghalaya	Reconnaissance survey for REE and associated mineralization in and around **Purduwa area**, Ri-Bhoi district, Meghalaya. (G4)	G4	REE
17	2023-24	Meghalaya	Reconnaissance Survey for limestone to the west of **Siju** Area, South Garo Hills District, Meghalaya. (G4)	G4	Limesone
18	2023-24	Meghalaya	Reconnaissance survey of limestone around **Chokpot** Area, South Garo Hills District, Meghalaya. (G4)	G4	Limesone
19	2023-24	Meghalaya	Preliminary Exploration for Limestone in **Khunti** Block, Litang Valley, East Jaintia Hills District, Meghalaya. (G3)	G3	Limesone

Sl. No.	FS Year	State	Title of the Geological Report	Stage	Commodity
20	2023-24	Meghalaya	Reconnaissance survey for lithium and associated mineralisation in **Darang area**, South Garo Hills and East Garo Hills District, Meghalaya. (G4)	G4	lithium
21	2023-24	Nagaland	Petrogenesis of gold bearing mafic-ultra-mafic rocks of Naga Hills Ophiolite (NHO) around **Sutsu - Washello,** Phek District, Nagaland: Constrain from mineral chemistry, geochemistry and isotopic studies (RP)	RP	Gold
22	2023-24	Nagaland	Preliminary investigation of iron ore around **Purr-Sutsu**, Phek District, Nagaland(G3)	G3	iron ore
23	2023-24	Nagaland	Preliminary exploration for nickeliferous laterite in Naga Hills Ophiolite near **Mollen**, Phek, Nagaland (G3)	G3	Nickel
24	2023-24	Nagaland	Reconnaissance survey for coal around **Lakhuti, Akuk and Mekola**, Wokha District, Nagaland (G4)	G4	Coal
25	2023-24	Sikkim	Reconnaissance survey for gold and associated minerals in between **Lingdum and Tumin area**, Gangtok district Sikkim. (G4)	G4	Gold

FS 2024-25

Sl. No.	FS Year	State	Title of the Geological Report	Stage	Commodity
1	2024-25	Arunachal Pradesh	Preliminary exploration for vanadium, graphite and associated minerals around **Deed**, Keyi Panyor district, Arunachal Pradesh (G3)	G3	Vanadium, graphite
2	2024-25	Arunachal Pradesh	Preliminary exploration for vanadium and graphite in and around **Pith village**, Lower Subansiri District, Arunachal Pradesh (G3)	G3	Vanadium, graphite
3	2024-25	Arunachal Pradesh	Reconnaissance survey for coal in the Gondwana sequence of rocks of Lower Gondwana Group in **Garu-Rilu-Daring area**, Lower Siang district, Arunachal Pradesh. (G4)	G4	Coal

Sl. No.	FS Year	State	Title of the Geological Report	Stage	Commodity
4	2024-25	Arunachal Pradesh	Reconnaissance survey for limestone and vanadiferous carbonaceous phyllite in and around **Lumla-Mokhtur areas**, Tawang district, Arunachal Pradesh (G4)	G4	Limestone
5	2024-25	Arunachal Pradesh	Reconnaissance survey for base-metal and associated mineralization in and around **New Neelam area**, Lower Subansiri District, Arunachal Pradesh. (G4)	G4	Base metal
6	2024-25	Arunachal Pradesh	Reconnaissance survey for phosphoritem in eralisation in the Lower Gondwana rocks in **Gensi-Taramori area**, Lower Siang District, Arunachal Pradesh. (G4)	G4	phosphorite
7	2024-25	Arunachal Pradesh	Preliminary exploration for vanadium, graphite, limestone and associated mineralisation in the metasedimentary sequence of Bomdila Group of rocks in **Daba Gamlin block**, West Siang District, Arunachal Pradesh (G3).(Continued from FS 23-24)	G3	Vanadium, graphite , Limestone
8	2024-25	Arunachal Pradesh	To evaluate the origin and occurrence of vanadium and its economic viability in the carbonaceous phyllite of proterozoic sequence of Arunachal Himalaya, Arunachal Pradesh. (RP)	RP	Vanadium
9	2024-25	Assam	Reconnaissance survey for REE and associated mineralisation in and around **Hakomari-Kardeguri** area, Kamrup District, Assam. (G4)	G4	REE
10	2024-25	Assam	Reconnaissance survey for Rare earth elements and Rare Metals in southern part of **Chakrasila hill**, Kokrajhar District, Assam (G4)	G4	REE & RM
11	2024-25	Assam	Reconnaissance survey for placer gold in Himalayan foothill sediments of **Ranga, Bagi river** sub-basins of Subansiri basin, Lakhimpur district, Assam. (G4)	G4	Gold

Sl. No.	FS Year	State	Title of the Geological Report	Stage	Commodity
12	2024-25	Assam	Reconnaissance survey for REE and associated mineralisation in and around **Samcham-pi-Samteran** alkaline-carbonatite complex, Karbi Anglong District, Assam. (G4)	G4	REE
13	2024-25	Assam	General exploration for REE and rare metals in **Krogaon North block**, Jashora Ultramafic Alkaline Complex, West Karbi Anglong district, Assam. (G2)	G2	REE
14	2024-25	Meghalaya	Critical mineral assessment programme in **Mynsain area**, Ri Bhoi district, Meghalaya. (CMAP)	CMAP	Critical mineral
15	2024-25	Meghalaya	Reconnaissance survey for Bauxite and associated trace elements in and around **Solanggiri and Rongmasogiri**, West Garo Hills district, Meghalaya. (G4)	G4	Bauxite
16	2024-25	Meghalaya	Reconnaissance survey for limestone in **Narongkolgre, Nengkong&Newaram** areas of South Garo hills district, Meghalaya. (G4)	G4	Limestone
17	2024-25	Meghalaya	Reconnaissance survey for Titaniferrous Vanadiferous Magnetite and REE in and around **Aradonga area,** West Khasi Hill district, Meghalaya. (G4)	G4	TVM, REE
18	2024-25	Meghalaya	Reconnaissance survey of REE and associated mineralization in Northeastern parts of South Khasi Batholith near **Nongspung, Wallang area** in South West Khasi Hills district, Meghalaya (G4)	G4	REE
19	2024-25	Meghalaya	Reconnaissance survey for Copper and associated mineralization around **Mawphlang and Mawkdok** area, East Khasi Hills district, Meghalaya (G4)	G4	Copper

Sl. No.	FS Year	State	Title of the Geological Report	Stage	Commodity
20	2024-25	Meghalaya	Reconnaissance survey for **gold** and associated mineralization around northern part of **Mawkynrew area**, East Khasi and West Jaintia Hills Districts, Meghalaya. (G4)	G4	Gold
21	2024-25	Meghalaya	Reconnaissance survey for **REE** and associated mineralization in **Jaluk Paham-Umsohpai area**, Ri Bhoi districts, Meghalaya and Kamrup District of Assam. (G4)	G4	REE
22	2024-25	Meghalaya	Reconnaissance survey for REE, W and associated mineralization in and around **Mawrang area**, Ri-Bhoi district, Meghalaya. (G4)	G4	REE, W
23	2024-25	Meghalaya	Preliminary Exploration for Limestone in **Um Phyrluh East** Limestone Block, Litang Valley, East Jaintia Hills District, Meghalaya. (G3)	G3	Limestone
24	2024-25	Sikkim	Reconnaissance Survey for gold and associated minerals in **Makha-Simik-Rumtek area,**Gangtok and Namchi Districts, Sikkim. (G4)	G4	Gold
25	2024-25	Tripura	Reconnaissance survey for REE and associated mineralization in plastic clay in and around **Kumarghat area** of Tripura (G4)	G4	REE
26	2024-25	Manipur	Critical Mineral Assessment Programme in and around **Hangkau Village**, Naga Hills Ophiolite Belt, Kamjong district, Manipur (CMAP)	CMAP	Critical mineral
27	2024-25	Manipur	Critical Mineral Assessment Programme in and around **Nampisha area**, Naga Hills Ophiolite Belt, Kamjong district, Manipur (CMAP)	CMAP	Critical mineral
28	2024-25	Nagaland	Reconnaissance survey of phosphate potentiality in Disang shale, **Tseminyu-Kontsonyu** area, Tseminyu District, **Nagaland** (G4)	G4	Phosphate

Annexure 14.1 List of Nodal Officers, CPIOs and Appellate Authorities in Ministry of Mines

Nodal Officer (RTI)	CPIO (RTI)	ACPIO (RTI)
Smt. Sushma Batra **Deputy Secretary** Room No.: 338-A Wing, III Floor, Shastri Bhawan, New Delhi - 110 001 Tel No.: 23382159 E-mail: sushma.batra@gov.in	**Sh. Abhishek Kr. Upadhyaya** **Under Secretary** Room No.: 314-D Wing III Floor, Shastri Bhawan, New Delhi - 110001 Tel No. : 23384743 E mail- ak.upadhyaya@nic.in	**Sh. Adesh Tyagi** **Section Officer** Room No.: 301-D Wing, III Floor, Shastri Bhawan, New Delhi – 110 001 Tel No.: 23384225 Email: adesh.tyagi@nic.in

SNo.	CPIO	Subject matter dealt (Section)	Appellate Authority
1	**Sh. Prakash S. Mundharikar** **Under Secretary** Room No.: 303-D Wing, III Floor, Shastri Bhawan, New Delhi - 110001 Tel No.: 23381631 E-mail: prakash.m69@nic.in	Establishment	**Shri Bhawani Shankar Nayak** **Deputy Secretary** Room No.: 312-D Wing, III Floor, Shastri Bhawan, New Delhi – 110001 Tel No. :23387223 E-mail : bs.nayak@nic.in
		Administration (including Cash, Library & Records, R & I) ACC/Board level posing for PSU/ Attached Offices/ subordinates offices/ Autonomous Bodies.	
2	**Sh. Vinod Kumar** **Under Secretary** Room No.: 303-D Wing, III Floor, Shastri Bhawan, New Delhi - 110001 Tel No. : -23383946 E-mail : vinod.kr71@nic.in	Vigilance	**Shri R. P. Gupta, Director** Room No.: 101-D Wing, Ist Floor, Shastri Bhawan, New Delhi - 110 001 Tel No.: 23388487 E-mail: rp.gupta01@nic.in
		Mines VI Desk (Area Reservation & Relaxation) and Court Cases pertaining to Mines-VI Section (Act, Legislation & Policy issues) Monitoring and Coordination of all legal matter. All Rule and Policy related work LIMBS. 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-VI:- Auction by Central Govt, Work related to Administering Authority under OAMDR Act.	**Smt. Geetika Sharma, Deputy Secretary** Room No.: 309-D Wing, III Floor, Shastri Bhawan, New Delhi – 110001 Tel No.: 23387223 E-mail: geetika.sharma@gov.in

SNo.	CPIO	Subject matter dealt (Section)	Appellate Authority
3	**Sh. Rakesh Thapliyal** **Under Secretary** Room No.: 303,D Wing III Floor,Shastri Bhawan, New Delhi - 110001 Tel No. : 23380610 E mail- rakesh. thapliyal83@nic.in	Mines IV Section: Review of Auction by State Government: Asset Monetization, Review of operationalization of blocks,	**Shri. Anshoo Pandey,** **Director** Room No.: -307 D Wing III Floor, Shastri Bhawan, New Delhi - 110001 Tel No.: - 23382737 E-mail: anshoo.pandey@gov.in
		Mines IV Section : Auction by Central Government: Work related to designated Officer under Auction of Critical Mineral. DMF, PMKKKY, NITI Aayog's related references, Sand Mining, PM Gati Shakti	**Shri. Maneesh Kumar, Deputy Secretary** Room No.: 315-D Wing, III Floor, Shastri Bhawan, New Delhi – 110001 Tel No. : 23385189 E-mail: maneesh.mkr@gov.in
		Mines I: (Exploration Matters, MECL, GSI), All Technical matters including exploration and Survey, National Geo-science Award, Budget, FSP etc. (Including IGC matters)	**Shri Yogendra Singh Bhamboo, Director** Room No.: 306-D Wing, III Floor, Shastri Bhawan, New Delhi - 110001 Tel No.: 23385329 E-mail dirtech.mom@nic.in
4	**Sh. Shrinath Chauhan** **Under Secretary** Room No.: 115-A, F Wing, I Floor, Shastri Bhawan, New Delhi - 110001 Tel. No: 23382516 E-mail **:** shrinath. chauhan@gov.in	Metal-I (Aluminium & Bauxite matters and NALCO 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
		Metal-II (Other Metals related matters and BGML, HZL etc.)	
		Metal-III (Copper & related matters, HCL, etc.)	
5	**Sh. 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	Parliament	**Smt. Sushma Batra, Deputy Secretary** Room No.: 338-A Wing, III Floor, Shastri Bhawan, New Delhi - 110 001 Tel No.: 23382159 E-mail: sushma.batra@gov.in
		Coordination	
		Public Grievance & Public Information Cell and RTI Matters	
6	**Sh. Rajesh Kumar Yadav** **Under Secretary** Room No.: 314-D Wing, III Floor, Shastri Bhawan, New Delhi - 110001 Tel No. : -23070376 E-mail : rk.yadav74@nic. in	Information Technology	**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
		International Cooperation (including KABIL, G20 Matters etc)	**Smt. Geetika Sharma, Deputy Secretary** Room No.: 309-D Wing, III Floor, Shastri Bhawan, New Delhi – 110001 Tel No. : 23387223 E-mail: geetika.sharma@gov.in

SNo.	CPIO	Subject matter dealt (Section)	Appellate Authority
7	**Sh. Thaneshwar Kumar** **Under Secretary** Room No.: 302 D Wing III Floor, Shastri Bhawan, New Delhi – 110001 Tel No.: - 23382818 E-mail: k.thanshwar@nic.in	Mines II (GSI Establishment matters)	**Shri. Maneesh Kumar, Deputy Secretary** Room No.: 315-D Wing, III Floor, Shastri Bhawan, New Delhi – 110001 Tel No. : 23385189 E-mail: maneesh.mkr@gov.in
		Mines III (IBM Matters, IBM Estt. & Budget Matters, MTS, MSS, Star Rating etc.	**Smt. Geetika Sharma, Deputy Secretary** Room No.: 309-D Wing, III Floor, Shastri Bhawan, New Delhi – 110001 Tel No. : 23387223 E-mail: geetika.sharma@gov.in
		Integrated Finance	**Shri Alok Kumar, Deputy Secretary** Room No.: -303 D Wing, III Floor, Shastri Bhawan, New Delhi - 110001 Tel No.: 23385189 E-mail: aalok.kumar@nic.in
8	**Smt. Bandana M Tirkey** **Deputy Director** Room No.: 301-D Wing, III Floor, Shastri Bhawan, New Delhi - 110001 Tel No. : 23383085 E-mail: bandana.m@gov.in	Official Language Hindi	**Shri Alok Kumar, Deputy Secretary** Room No.: -303 D Wing, III Floor, Shastri Bhawan, New Delhi - 110001 Tel No.: - 23385189 E-mail: aalok.kumar@nic.in
9	**Shri Kaustubh Rajput, Assistant Director** Room No. 304-D Wing, III Floor, Shastri Bhawan, New Delhi - 110 001. Tel No. 23387919 E-mail: kaustubh.rajput@gov.in	Economic, Statistical and Planning Section: Mining sector growth analysis and Economic scenario building, Trade issues (FTAs) & Economicinputs on all matters concerned, GST matters, Production, import, exportdata and its analysis, PublicProcurement (Preference to Make in India), Skill Development, SGOS matters, tatistical Publications of the ministry related to metal and mineral and statistical inputs for policy formulation and Vision document, Mineral / Metal wise vision plan.	**Shri Sukhdeep Singh, Joint Director** Room No.: 315-A, D Wing, III Floor, Shastri Bhawan, New Delhi - 110 001 Tel No.: 23073046 E-mail: sukhdeep.singh1@gov.in

SNo.	CPIO	Subject matter dealt (Section)	Appellate Authority
10	**Smt. NainaVaish** **Section Officer** Room No.: 101-D Wing, III Floor, Shastri Bhawan, New Delhi - 110001 Tel No. : 23382859 E-mail : naina.arora@nic.in	Revision Cell	**Shri R. P. Gupta, Director** Room No.: 101-D Wing, Ist Floor, Shastri Bhawan, New Delhi - 110 001 Tel No.: 23388487 E-mail: rp.gupta01@nic.in
11	**Shri. Nitin Bharti** **Section Officer** Room No.: 301-D Wing, III Floor, Shastri Bhawan, New Delhi - 110001 Tel No. : 23384225 E-mail : mines5.mom@nic.in	Mines V Royalty Study Group, DGFT matters, Illegal Mining, 5G implementation, Minor Mineral Cell including matter related to Granite & marble Development Council	**Shri. Maneesh Kumar, Deputy Secretary** Room No.: 315-D Wing, III Floor, Shastri Bhawan, New Delhi – 110001 Tel No. : 23385189 E-mail: maneesh.mkr@gov.in
		Mines V Policy matters, Critical Mineral Mission	**Shri. Anshoo Pandey, Director** Room No.: -307 D Wing III Floor, Shastri Bhawan, New Delhi - 110001 Tel No.: - 23382737 E-mail: anshoo.pandey@gov.in
12	**Shri. Yogesh Agarwal** **Assistant** Room No.: 114-F Wing, I Floor, Shastri Bhawan, New Delhi – 110 001 Tel No.: 23071006 E-mail: nmet-mines@gov.in	NMET Cell	**Smt. Geetika Sharma, Deputy Secretary** Room No.: 309-D Wing, III Floor, Shastri Bhawan, New Delhi – 110001 Tel No. : 23387223 E-mail: geetika.sharma@gov.in
13	**Shri. Manvendra Singh Rathore** Deputy Director Room No.: 115A-F Wing, I Floor, Shastri Bhawan, New Delhi – 110 001 Tel No.: 23385187 E-mail: manvendra.sr@gov.in	Metal- IV (Science and Technology projects & institutions including NIRM, & JNARDDC and matter related to circular economy.	**Shri R. P. Gupta, Director** Room No.: 101-D Wing, Ist Floor, Shastri Bhawan, New Delhi - 110 001 Tel No.: 23388487 E-mail: rp.gupta01@nic.in

सत्यमेव जयते

Government of India

Ministry of Mines

Shastri Bhawan, Dr. Rajendra Prasad Road,
New Delhi-110001

https://mines.gov.in