Indian Minerals Yearbook 2022

(Part- I)

61st Edition

STATE REVIEWS
(Mizoram & Nagaland)

(ADVANCE RELEASE)

GOVERNMENT OF INDIA
MINISTRY OF MINES
INDIAN BUREAU OF MINES

Indira Bhavan, Civil Lines,
NAGPUR – 440 001

PHONE/FAX NO. (0712) 2565471
PBX : (0712) 2562649, 2560544, 2560648
E-MAIL : cme@ibm.gov.in
Website: www.ibm.gov.in

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MIZORAM

Mineral Resources

Occurrences of lignite, sandstone and pyrites are reported from the State. Major deposits of economic importance have not been reported so far in the State.

Exploration & Development

No exploration activities was reported to be carried out by any Central/State Government agency during 2021-22 in the State.

Production

No mineral production (except minor minerals) was reported from Mizoram during 2021-22. The value of minor minerals' production was estimated at ₹ 165 crore for the year 2021-22.

NAGALAND

Mineral Resources

Important mineral occurrences in the State are: **coal** in Borjan, Jhanzi-Disai, Tiesang and Tiru Valley Coalfields; **iron ore (magnetite), cobalt, dunite** and **nickeliferous chromite** in Tuensang district and **limestone** in Phek and Tuensang districts (Table-1). The various coalfields and their reserves/resources are furnished in Table-2.

Exploration & Development

Details of exploration activities conducted by GSI during 2021-22 are furnished in Table-3.

Production

No mineral production (except minor minerals) was reported from Nagaland during 2021-22. The value of minor minerals' production was estimated at ₹18 lakh for the year 2021-22.

Table – 2 : Reserves/Resources of Coal as on 1.4.2023 : Nagaland

(In million tonnes)

Coalfield	Proved	Indicated	Inferred	Total
Nagaland	**9**	**22**	**448**	**478**
Borjan	6	–	5	11.00
Jhanzi-Disai	2	22	109	133
Tiensang	1	–	2	3
Tiru Valley	–	–	7	7
DGM	–	–	293	293
Changki	-	-	32	32

Source: *Coal Directory of India, 2022-23..*

Table – 1 : Reserves/Resources of Minerals as on 01-04-2020 : Nagaland

Mineral	Unit	Reserves				Remaining resources								
		Proved STD111	Probable		Total (A)	Feasibility STD211	Pre-feasibility		Measured STD331	Indicated STD332	Inferred STD333	Reconnaissance STD334	Total (B)	Total resources (A+B)
			STD121	STD122			STD221	STD222						
Chromite	000 Tonnes	-	-	-	-	-	-	-	-	-	3200	-	3200	3200
Cobalt	Million Tonnes	-	-	-	-	-	-	-	-	-	-	5	5	5
Copper														
Ore	000 Tonnes	-	-	-	-	-	-	-	-	-	2000	-	2000	2000
Metal	000 Tonnes	-	-	-	-	-	-	-	-	-	15	-	15	15
Iron Ore (Magnetite)	000 Tonnes	-	-	-	-	-	-	-	-	5280	-	-	5280	5280
Limestone	000 Tonnes	-	-	-	-	825	-	-	-	1005500	745875	-	1752200	1752200
Nickel Ore	Million Tonnes	-	-	-	-	-	-	-	-	5	-	-	5	5

Figures rounded off.

Table – 3: Details of Exploration Activities in Nagaland, 2021-22

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling	Remarks
		Scale	Area (sq km)	No. of boreholes	Meterage	(No.)	Reserves/Resources estimated
GSI							
Shale Gas							
Kohima	Chedema-Dihoma area	1:12500	100	-	-	-	Reconnaissance survey for shale gas around Chedema-Dihoma area, Kohima District, Nagaland has been undertaken to evaluate hydrocarbon potentiality of shale horizon within Disang Formation in part of T.S. 83K/02. The study area falls within the latitudes 25°40'40"N - 25°45'00"N and longitudes 94°07'20"E - 94°15'00"E. Large-scale mapping on 1:12,500 scale has been carried out covering 100 sq km area. The study area forms a part of the Inner Palaeogene Fold belt of Nagaland-Manipur. The rocks exposed in the area comprise of shales, phyllites, slates, siltstones and minor sandstones. The Disangs (Late Eocene to Upper Cretaceous) is the oldest formation. It is sub-divided into Lower and Upper Disang formations. The rocks of the Lower Disang Formation have undergone low-grade metamorphism as evident by phyllitic shale and slate. Slates are dark grey with ubiquitous crisscrossed quartz veins. It can be easily broken into thin sheets due to well-developed foliations. The lower Disang Formation has a gradational contact with Upper Disang Formation. Exotic coralline limestone is also observed within the dark grey shales, which are exposed on the left bank of Sedzu River. The Upper Disang Formation is argillaceous dominant and comprises alternate layers of monotonous thick sequence of dark grey to, laminated/splintery grey shale with thin interbands of bedded sandstones and siltstone. Spheroidal weathering is common within the Disang shale. The arenaceous units appreciably increase towards the upper part. To evaluate the unconventional hydrocarbon system, it is indispensable to understand various key geochemical (organic matter abundance, type and maturity) and geological parameters (mineral composition, porosity,

Table – 3 (Contd)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling	Remarks
		Scale	Area (sq km)	No. of boreholes	Meterage	(No.)	Reserves/Resources estimated
							permeability and gas content) to determine the potentiality for shale gas generation. Because of high organic matter abundance and stratigraphic continuity in the Disang Group, it is imperative to assess the viability of shale gas prospects in the present study area. The total organic carbon (TOC) of Disang shales ranges from 0.02% to 0.66% mg/g (av. 0.347 mg/g), suggesting poor to fair generating potential. The S1 concentration ranges between 0.01 and 0.04 mg/g (avg. 0.018 mg/g) and S2 concentration ranges between 0.06 to 0.32 mg/g (avg. 0.107 mg/g). The rock-eval parameters reflect that the Disang shales have poor generative potential. The plot of TOC vs. Hydrogen index (HI) of the seven shale samples indicates that one sample of Upper Disang Fm. and one sample from Renji Fm falls under gas and oil field, one sample of Upper Disang Fm. falls under fair oil-prone field, and three samples Upper Disang Fm. and one sample of Renji Fm fall under no source field. TOC vs. S1 indicates that all the samples are characterised by autochthonous hydrocarbon. The TOC vs. S2 diagram indicates that four samples Upper Disang Fm., one sample of Renji Fm falls under the Type-IV field, one sample of Renji Fm falls under Type-III kerogen field and one sample of Upper Disang Fm. falls under Type-II & III suggesting the kerogen of the Disang shale are Type-III & IV dominant which are potential source of gas. The plot of HI vs. Oxygen index (OI) indicates that four samples of Upper Disang Fm. and one sample of Renji Fm fall under Type- IV fields, one sample of Renji Fm falls outside field below Type-I kerogen and one sample of Upper Disang Fm. falls under Type II & III. The Tmax vs. HI diagram indicates that three samples of Upper Disang Fm. and one sample of Renji Fm fall under dry gas window and one sample of Upper Disang Fm., and one sample of Renji

(Contd)

Table – 3 (Concld)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
							Fm falls under immature field. The Tmax vs. PI diagram indicates that five samples of Upper Disang Fm. falls under dry gas zone and two samples of Renji Formation fall under stains or shows. The Tmax value of the study area ranges from 427°C – 506°C and PI ranges between 0.15 -0.22 indicating that the maturity of the organic matter in Disang shale falls within wide limitfrom immature to postmature (gas generation). During the course of large-scale mapping extensive area of shale was delineated which could prove to be a good reserve of shale gas/oil. The low TOC (< 0.5%) can be attributed to oxidation of organic matter during outcrop weathering. Therefore, drilling is warranted to obtain core samples from greater depth to establish the shale gas reserve.