

STATE REVIEWS



Indian Minerals Yearbook 2022

(Part- I)

61st Edition

**STATE REVIEWS
(Madhya Pradesh)**

(ADVANCE RELEASE)

**GOVERNMENT OF INDIA
MINISTRY OF MINES
INDIAN BUREAU OF MINES**

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MADHYA PRADESH

Mineral Resources

Madhya Pradesh is the only diamond producing State in the country and is the leading producer of copper conc., diaspore, pyrophyllite, manganese ore, limestone and clay (others). The State hosts the country's 90% diamond, 74% diaspore, 55% laterite, 48% pyrophyllite, 41% molybdenum, 27% dolomite, 19% copper ore, 18% fireclay, 12% manganese and 8% rock phosphate ore resources.

Important mineral occurrences in the State are: **bauxite** in Balaghat, Guna, Jabalpur, Katni, Mandla, Rewa, Satna, Shahdol, Shivpuri, Sidhi & Vidisha districts; **calcite** in Barwani, Jhabua, Khandwa & Khargone districts; **china clay** in Betul, Chhatarpur, Chhindwara, Gwalior, Hoshangabad, Jabalpur, Khargone, Narsinghpur, Raisen, Satna, Shahdol & Sidhi districts; **copper** in Balaghat, Betul & Jabalpur districts; **coal** in Betul, Shahdol & Sidhi districts; **diamond** in Panna district; **diaspore & pyrophyllite** in Chhatarpur, Shivpuri & Tikamgarh districts; **dolomite** in Balaghat, Chhindwara, Damoh, Dewas, Harda, Hoshangabad, Jabalpur, Jhabua, Katni, Mandla, Narsinghpur, Sagar & Seoni districts; **fireclay** in Betul, Chhindwara, Jabalpur, Katni, Narsinghpur, Panna, Sagar, Shahdol & Sidhi districts; **iron ore (haematite)** in Betul, Gwalior, Jabalpur & Katni districts; **limestone** in Balaghat, Chhindwara, Damoh, Dhar, Hoshangabad, Jabalpur, Jhabua, Khargone, Katni, Mandasaur, Morena, Narsinghpur, Neemach, Rewa, Sagar, Satna, Sehore, Shahdol & Sidhi districts; **manganese ore** in Balaghat and Jhabua districts; **ochre** in Dhar, Gwalior, Jabalpur, Katni, Mandla, Rewa, Satna, Shahdol & Umaria districts; **pyrophyllite** in Chhatarpur, Sagar, Shivpuri & Tikamgarh districts; **quartz/silica sand** in

Balaghat, Dewas, Dhar, Jabalpur, Khandwa, Khargone, Morena, Rewa & Shahdol districts; **talc/steatite/soapstone** in Dhar, Jabalpur, Jhabua, Katni, Narsinghpur & Sagar districts and **vermiculite** in Jhabua district.

Other minerals that occur in the State are: **barytes** in Dewas, Dhar, Shivpuri, Sidhi & Tikamgarh districts; **calcareous shales** (used in slate pencil) in Mandasaur district; **felspar** in Jabalpur & Shahdol districts; **fuller's earth** in Mandla district; **gold** in Jabalpur & Sidhi districts; **granite** in Betul, Chhatarpur, Chhindwara, Datia, Jhabua, Panna, Seoni & Shivpuri districts; **graphite** in Betul & Sidhi districts; **gypsum** in Shahdol district; **lead-zinc** in Betul district; **molybdenum** in Balaghat district; **potash** in Panna district; **quartzite** in Sehore district; **rock phosphate** in Chhatarpur, Jhabua & Sagar districts; and **sillimanite** in Sidhi district (Table - 1). The reserves/resources of coal along with various coalfields in Madhya Pradesh are furnished in Table - 2.

Exploration & Development

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

Production

Madhya Pradesh was the sole producer of diamond. Apart from this, Coal, Bauxite, Copper Ore & Concentrate, Iron Ore, Manganese Ore, Phosphorite and Limestone are the principle minerals produced in Madhya Pradesh State. The value of minor minerals' production is estimated as ₹ 630 crores for the year 2021-22. There were 263 reporting mines in 2021-22 in case of MCDR of minerals (Table - 4).

Mineral-based Industry

The present status of each Mineral-based Industry is not readily available. However, the important large and medium-scale mineral-based industries in the Organised Sector in the State are furnished in Table-5.

Table – 1 : Reserves/Resources of Minerals as on 1.4.2020: Madhya Pradesh

Mineral	Unit	Reserves				Remaining Resources							Total resources (A+B)	
		Proved STD 111	Probable		Total (A)	Feasibility STD211	Pre-feasibility		Measured STD331	Indicated STD332	Inferred STD333	Reconnaissance STD334		Total (B)
			STD121	STD122			STD221	STD222						
Antimony														
Ore	tonne	-	7503	7503	-	-	-	592	-	-	-	592	8095	
Metal	tonne	-	75	75	-	-	-	5.92	-	-	-	5.92	80.92	
Bauxite#	'000 tonnes	13584	631	18564	20389	13358	7138	22060	54577	50172	-	167695	186259	
Copper														
Ore	'000 tonnes	107773	-	12580	55777	100411	8824	23062	300	77938	-	266312	386665	
Metal	'000 tonnes	1422.6	-	148.44	686.05	321.31	27.35	207.45	9.78	843.88	-	2095.82	3666.86	
Diamond	carat	847400	-	159	847559	-	-	104118	-	27645359	-	27749477	28597036	
Gold														
Ore	(Primary) tonne	-	-	-	-	-	-	-	5745934	1947000	-	7692934	7692934	
Metal	(Primary) tonne	-	-	-	-	-	-	-	6.03	2.22	-	8.25	8.25	
Graphite	tonne	-	-	-	-	-	-	-	-	6254000	6386000	12640000	12640000	
Iron Ore														
(Haematite)	'000 tonnes	24363	11326	18440	30076	15080	29885	12613	3993	151523	59700	302870	356999	
Lead-Zinc														
Ore	'000 tonnes	-	-	-	129	117	-	1510	6396	7765	3150	19067	19067	
Lead Metal	'000 tonnes	-	-	-	-	-	-	26.12	5.13	5.04	-	36.29	36.29	
Zinc Metal	'000 tonnes	-	-	-	5.2	4.71	-	114.76	44.67	200.07	101.12	470.53	470.53	
Limestone	'000 tonnes	1252455	128972	311004	772476	342790	1119260	498580	791417	4128019	308205	7960747	9653178	
Manganese														
Ore	'000 tonnes	13551	2230	3777	3830	7037	4212	127	23351	1943	-	40499	60057	
Molybdenum														
Ore	tonne	-	-	-	-	-	-	-	-	8000000	-	8000000	8000000	
Contained														
MoS ₂	tonne	-	-	-	-	-	-	-	-	5020	-	5020	5020	
Potash	Million tonnes	-	-	-	-	-	-	-	1206	36	2	1244	1244	
Rock														
Phosphate	tonne	5258158	-	3772935	6460616	15688511	13880230	-	2730000	10615956	50625	49425938	58457031	
Sillimanite	tonne	-	-	-	-	-	-	-	-	-	101600	101600	101600	
Silver														
Ore	tonne	-	-	-	-	-	-	-	2096000	1120000	-	3216000	3216000	
Metal	tonne	-	-	-	-	-	-	-	150.61	9.25	-	159.86	159.86	
Vermiculite	tonne	-	-	-	197	-	66	-	-	66	-	329	329	

Figures rounded off

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

(In million tonnes)

Coalfield	Proved	Indicated	Inferred	Total
Total	15279	12457	4482	32219
Johilla	185	263	33	481
Umaria	178	4	-	181
Pench-Kanhan	2112	923	1903	4938
Pathakhera	291	88	68	447
Gurgunda	-	85	53	138
Mohpani	8	-	-	8
Sohagpur	3484	5071	278	8833
Singrauli	9021	6024	2147	17192

*Source: Coal Directory of India, 2022-23***Table –3 : Details of Exploration Activities in Madhya Pradesh, 2021-22**

Agency/ Mineral/ District	Location Area/ Block	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
GSI Gold							
Singrauli	Mishirgawan area	1:12500	100	-	-	205	Large scale mapping of 100 sq. km. on 1:12500 scale has been carried out in the areas of Misirgawan and Kolhuwa areas of Singrauli district, Madhya Pradesh, with the objective to bring out potential zones of gold mineralisation in Mahakoshal Belt. Aerial reconnaissance survey of 700 sq. km. of the area of interest was carried out using Aster and LANDSAT imagery which was processed using Arc-GIS and ERDAS software. Total of 75 BRS samples 25 PTS, 25 PS, 20 PCS and 10 EPMA samples along with additional 50 channel samples were collected. Mineralisation in the area is observed to be associated with the secondary quartz carbonate activity within the metabasalt and BMQs. Sulphides in the form of chalcopyrite, pyrite, arsenopyrite and galena is observed within the carbonated metabasalt either associated with quartz carbonate veins or in disseminated form. Secondary fillings of quartz or carbonates within vesicular basalt also hold sulphides around its rim part of filled within the vesicles. Malachite stains have been observed within the ultramafic bodies and also within the quartz vein

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Table – 3 (contd)

Agency/ Mineral/ District	Location Area/ Block	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
							parallel to the S0 planes of BIF. Quartz vein at one place within the BMQ has given a high encouraging value of Au that is up to 7700 ppb.
PGE and basemetal							
Shivpuri	Nangali	1:12500	-	-	-	-	The study area under the item is majorly occupied by the rocks of Bundelkhand Granitoid Complex (BGC) along with the rocks of Vindhyan Supergroup towards western margin. Lithologically, the study area is characterised by presence of Tonalite-trondhjemite-granodiorite (TTG) suite of rocks, rhyolite-andesite, variants of granites which are traversed by quartz reefs, mafic-ultramafic dyke system and quartz veins. Western part of the study area is occupied by Kaimur sandstone belonging to Vindhyan Supergroup. The field components under the project included Large Scale Mapping (on 1:12500 scale), trenching, scout drilling, geophysical borehole logging and sampling for bed rock, petrochemical, groundwater, drill core analysis and petrographic & EPMA studies. A significant part of the study area is occupied by gabbro/dolerite bodies which in turn is majorly soil covered and occupies agricultural land. Observation of well section and associated dumps indicates that gabbro considerably extending subsurface also. Few locations expose textural and mineralogical variation with depth (gabbro on top followed by other mafic or ultramafic rocks with increasing depth) based on well section study. These mafic/ultramafic rocks also host sulphide mineralisation at various locations in the study area and have been targeted for basemetals, Ni, Cr & PGE analysis. Copper, molybdenum and tungsten mineralisation hosted within altered syeno-granites has been observed around Kakrauwa Alias Thuni, Umri Khurd and Kanchanpur areas located in southern part of T.S. No.54K/3. Sulphide mineralisation (chalcopyrite, arsenopyrite and pyrite) in basic/ultramafic dykes has been also observed around Umri

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Table – 3 (contd)

Agency/ Mineral/ District	Location Area/ Block	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
							Khurd, Kanchanpur and Tori areas. Based on analytical results of bed rock samples (mainly altered granites and mafic rocks), anomalous values of Cu, Mo & W have been observed from the localities like Thuni (Cu-755-790 ppm, Mo-1597 ppm & W-1449 ppm), Kanchanpur (Cu-375-390 ppm, Mo-4800 ppm & W-21.9 ppm), Tori (Cu: 520-6000 ppm) Dargwan (Cu: 195-390 ppm) first scout borehole, namely MPBNG-1 (closing depth-99.90 m) was drilled around Tori village. It intersected sulphide mineralisation from 28.00-42.00 m (stringers, blebs and sporadic disseminations of chalcopyrite and pyrite in quartz veins and mafic rocks and from 88-92 m along the borehole (sporadic disseminations of chalcopyrite within altered granite). Based on the analytical results, a mineralised zone of 0.22% Cu was demarcated from 25.60-27.80 m along the borehole MPBNG-1. Second scout borehole, i.e. MPBNG-2 was drilled around Thuni village. It intersected alteration zones in granites hosting pyrite, chalcopyrite, molybdenite and scheelite mineralisation from 25.50 – 31.00 m, 51.50-57.00 m and from 76-82 m along the borehole.
Copper Jhabua	Balhathi- Hiri Chhota- Chotyabarari- Burkui Badi area	1:12500	-	-	-	195	Large Scale Mapping of basalts of Deccan Trap in Balhathi-Hiri Chhota-Chotyabarari-Burkui Badi area on 1:12,500 scale has been carried out in parts of Jhabua District, Madhya Pradesh in parts of toposheets 46J/10 during FS 2021-22. The main objective of the work was to search for copper and associated scandium, vanadium mineralisation in the Deccan basalts. The present study area consists of 6 different basalt flows belonging to Malwa Group of Deccan Trap Supergroup. The lava flows are Aa to compound pahoehoe type with well-developed lower and upper vesicular horizons (LVZ and UVZ). The basalt flows exposed in the present study area are massive to friable in texture. The present study area shows presence of some neo-

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Table – 3 (contd)

Agency/ Mineral/ District	Location Area/ Block	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
Alirajpur	Kosduna South Block	1:2000	1.5	4	471.0	-	<p>tectonic activities as interpreted from the sudden course-correction (almost 90°) of rivers and often steep slopes exhibited by the flows present in the study area. During this FSP, 100 nos. BRS, 30 nos. PTS, 50 nos. Soil samples and 15 nos. PCS were collected from the study area. The BRS collected from the study area show highest value of 388 ppm of Cu over Flow number 3-4 of Kalisindh Formation (Fig. 3.7) near Dhamoi. Highest value of V as 441 ppm has been reported from the contact zone between Kalisindh Flow 1 and Flow 2 near Hiri Bada. Anomalous values for Cu (270-345 ppm) have been recorded from the soil zones developed over the Flow 1 of Kalisindh Formation near Balhati-Hiri Bada areas.</p> <p>The study has been carried out with an objective to assess the potentiality of copper and associated mineralisation in the area. The detailed geological mapping of 1.5 sq. km. on RF 1:2000 scale in Kosduna South block reveals presence of Phyllite, Biotite Granite, Sheared Quartz veins and calcareous gritty, pebbly sandstone, and fossiliferous limestone of Bagh group. Biotite granite is exposed as small, isolated outcrops towards eastern part of block which is mostly non-foliated, medium to coarse grained, both grey and pink in colour and composed of mainly quartz, both plagioclase and orthoclase feldspar and mica. Both phyllite and Biotite granite is intruded by sheared quartz veins. These quartz veins show swelling, pinching and discontinuous in nature and occur in en-echelon pattern and the thickness of quartz veins varies from 10 m to 25 m which trends in N20°E-S20°W and at places it shows swerving nature. These quartz veins show evidence of copper mineralisation in the form of malachite stains and at places very fine specks of pyrite and chalcopryrite were also noticed. Both phyllite and Granite are traversed by numerous milky white quartz veins. During FS 2021-22 under G-3 stage exploration, a total of</p>

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Table – 3 (contd)

Agency/ Mineral/ District	Location Area/ Block	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
							471.0 m drilling with 4 boreholes of 1st levels were drilled across the mineralised quartz vein at 200m strike spacing to intersect the mineralisation at 60 m vertical depth. All the boreholes have intersected copper mineralisation except borehole no. MPAK-04 even though grade is very poor. Based on the chemical analyses of drilled boreholes data, it is found that the grade of Cu mineralisation is poor in Kosduna South block. Analytical results of core samples show <0.1 % Cu. The Cu values are not significant in core samples, BRS/ Channel samples as well as in PTS samples. Dominantly dissemination and specks of pyrite noticed both in chlorite schist and quartz veins along with rare to occasional occurrence of chalcopyrite mineralisation noticed. The mineralisation is very sporadic in nature and irregular in habit. Due to poor mineralisation in the block, the project was prematurely closed as per recommendations/ suggestions from competent authority.
Tungsten Betul	Sonaghati- Chiklar-Rawanpudi- Khandara Areas	1:12500	100	-	-	-	Large-scale geological mapping of about 100 sq. km. area was carried out on 1:12,500 scale in and around Sonaghati- Chiklar- Rawanpudi- Khandara areas, Betul District, Madhya Pradesh with an objective to delineate the Tungsten and associated mineralisation in the area along with pitting and trenching of 30 cu.m., collection of bed rock samples, soil samples and petrological and petrochemical studies. The detailed field investigations through LSM reveals that the rocks exposed in the area are mainly sheared porphyritic granite, phyllite, amphibolite, quartzite, migmatite, calc silicate rock, graphite schist, garnetiferous quartz mica schist, banded iron formation, gabbro etc. For systematic geological, geochemical and mineral investigation, four Calc silicate bodies have been found for possible Tungsten mineralisation based on their distinct litho assemblages and mode of

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Table – 3 (contd)

Agency/ Mineral/ District	Location Area/ Block	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
							occurrence, viz. Chikhlar Calc silicate, Ampani nala Calc silicate, Dharakhoh Calc silicate and lensoidal Calc Silicate bodies. The Calc silicate rock found in the west of Chikhlar is 5 to 7 m thick and extends for about 25-30 m in its strike direction of ENE-WSW and shows bluish-greenish fluorescence while subjected to UV light indicating presence of Tungsten mineral. The Calc-silicate band of Ampani nala is 80-100 m thick and 350-400 m in its strike direction of ENE-WSW. It is mainly composed of fine-grained silica and thin veins of calcite. The Dharakhoh Calc silicate body is having much higher calcite than Chikhlar body but it is slightly coarser than Calc silicate of Chikhlar. Apart from these, some lensoidal calc silicate bodies having 2-3 m in length were also recorded near Ampani nala area. Chemical analysis results reveal the presence of 150 ppm of Cu, 40 ppm Pb, 155 ppm Zn for, 91 ppm Vin calc silicate rock, whereas sheared porphyritic granite, which is adjacent to calcsilicate body, records 35 ppm Cu, 45 ppm Pb, 105 ppm Zn, <1 ppm Ag and Cd. Calc silicate body records <0.5 ppm Mo, 7.11 ppm Sn, whereas, sheared porphyritic granite records 1.04 ppm Mo and 12.22 ppm Sn as reported from chemical analysis of BRS samples. Values of 1.64 ppm and 2.03 ppm for Tungsten (W) are recorded in calc silicate and sheared porphyritic granite respectively. Samples collected from the contact between calc silicate and granite are showing gold values of <25 ppb and 30 ppb. Chemical analysis of PTS samples shows 55 ppm Cu, 25 ppm Pb, 105 ppm Zn, <1 ppm Ag, Cd. The analytical results of soil samples show 75 ppm Cu, 30 ppm Pb, 90 ppm Zn, <1 ppm Ag and Cd. The XRD study reveals the presence of Wollastonite upto 35 weight percentage in few samples.
Graphite, Base Metal and REE mineralization							
Sidhi	Bahera-Goriara block	1:2000	1	8	-	90	Detail mapping of 1 sq. km area was done on 1:2000 scale. A total of 10 PCS, 10 trace element, 50 channel/

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Table – 3 (contd)

Agency/ Mineral/ District	Location Area/ Block	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
							groove samples, 10 PS, 05 BRS and 05 EPMA/Ore microscopy samples were collected. A total of 08 nos. of boreholes in a series pattern were planned from Bahera to Goriara village at a 200 m interval so as to intersect mineralisation at a 30 m vertical depth. Total 03 nos. of boreholes were supported by channel/groove sampling of graphitic bearing lenses carried out during G4 stage of exploration and 50 nos. of channel/groove sampling was carried out in front of section line of remaining 05 nos. of boreholes for borehole planning. Along borehole no. MPSBG-1 detailed Geological and Geophysical logging for 82.70 m has been done. Graphitic carbonaceous phyllite intersected from 19.50 m to 23.50 m and 56.80 m to 81.30 m, totaling to 24.80 m of mineralised zone (true width 21.50m) for which sampling has been completed and samples have been submitted on priority basis. The mineralisation intersected along the borehole suggested for the continuity of graphite bearing lenses till 30 m vertical depth and ~300 m RL. Also, abundant malachite grains/encrustation were encountered during logging which suggest basemetal potentiality of the area.
Bauxite							
Dindori	Khapripani block	1:4000	5.0	28	614.00	599	Detailed geological mapping on 1:4000 scale was carried out by using Total Station over an area of 5.0 square kilometer. During this period a total of 614.00 m was drilled in 28 numbers of boreholes and 599 nos. of core samples have been generated and analysed. Samples were analysed for Al ₂ O ₃ , SiO ₂ , P ₂ O ₅ , Fe ₂ O ₃ , CaO, MgO, Na ₂ O, K ₂ O, TiO ₂ , MnO, Ga, V, REE, Reactive Silica & L.O.I. to assess the degree of laterisation and formation of bauxite and aluminous laterite. A total sum of 6.67 million tonnes (5.26 float & 1.41 insitu) of Bauxite with an average of 39.41% Al ₂ O ₃ , 47.89 million tonnes (24.63 float & 23.26 insitu) of aluminous laterite with an average of 28.61% Al ₂ O ₃ and 3.04 million tonnes (1.07 float & 1.96 insitu) of Ferruginous laterite

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Table – 3 (contd)

Agency/ Mineral/ District	Location Area/ Block	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
							with an average of 15.93% Al ₂ O ₃ resources has been estimated in Khapripani block among which 4.74 million tonnes (4.24 float & 0.50 insitu) of Bauxite, 23.07 million tonnes (15.63 float & 7.44 insitu) of aluminous laterite and 0.66 million tonnes (0.43 float & 0.22 insitu) of Ferruginous laterite having more than 0.1% (cutoff) of Vanadium mineralisation. Those mineralised zones also having some good values of Gallium (up to 129 ppm) both of them may be recovered as by products.
Coal							
Chhindwara	Andole Sector, Pench Valley Coalfield	1:10000	25	-	-	-	A total of 25 sq.km area has been geologically mapped on 1:10,000 scale. During the mapping, 4 number of lava flows has been identified in the area. Later intrusion is also observed in the area in the form of dolerite dyke trending N250°(ENE-WSW) with 2.5 to 3 m thickness and about 70-80 m long intruded in compound pahoehoe flow (Flow No-1) in the area. It is medium grained, phenocrystic in nature. Horizontal columnar joints are also observed in the dyke. A total of four boreholes (PAN-1; depth: 466.7 m, PAN-2; depth: 493.9 m, PAN-3; depth: 625.1 m and PAN-4; depth 635.80 m) were drilled in the area. The total drilling is 2221.5 m and total of 17.39 m coal is encountered in all the four boreholes. The four boreholes have encountered Talchir Formation (intersected thickness being 4.93 m+ to 14.8 m+), Barakar Formation (Intersected thickness being 42.87 m to 47.7 m), Motur Formation (220.17 m to 369.13 m thick), Jabalpur Formation (21.6 m to 31.00 m) and Deccan Trap Formation (intersected thickness being 0 m to 195.40 m). PAN-4 have also encountered Talchir Formation (intersected thickness being 0 m to 195.40 m). A complete sequence wherever preserved generally starts from coarse to very coarse-grained sandstone and ends in grey shale or coal in Barakar Formation. Motur Formation constitutes claystone and siltstone cycles separated by very fine to

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Table – 3 (concl.)

Agency/ Mineral/ District	Location Area/ Block	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
							medium grained sandstone. Jabalpur Formation consists of sandstone with jasper pebbles and Deccan trap Formation with 4 number of lava flows. Barakar coal seams are moderate in thickness and fairly persistent over the Andole area. Five coal seams (Seam-I to V) of regional extent have been encountered in the area (PAN-3 & PAN-4), four coal seams (Seam-I to IV) of regional extent have been encountered in the PAN-2. PAN-1 has encountered only one Barakar coal seam which is Seam-IV. All coal seams are intersected between 445.40 m to 618.22 m depths in Barakar Formation. The cumulative thickness of the individual coal seams is varying from less than a meter to 2.24 m. The thickest coal seam in all the drilled boreholes is seam no. IV which is having thickness ranging from 0.85 (PAN-2) to 2.24 m (PAN-3).

Table – 4 : Mineral Production in Madhya Pradesh, 2019-20 to 2021-22
(Excluding Atomic Minerals)

(Value in ₹ '000)

Mineral	Unit	2019-20			2020-21			2021-22 (P)		
		No. of mines	Quantity	Value ^{\$}	No. of mines	Quantity	Value ^{\$}	No. of mines	Quantity	Value ^{\$}
All Minerals		223	-	147021686	241	-	63585432	263	-	38688990
Coal	'000t	-	125726	-	-	132531	-	-	137975	-
Natural										
Gas (ut.) +	m c m	-	345	-	-	334	-	-	290	-
Bauxite	t	20	685929	546953	21	632385	479818	18	608925	493590
Copper Ore	t	-	2544472	-	-	2239152	-	-	2442459	-
Copper Conc.	t	1	65094	4750125	1	64920	5137695	1	65022	5487137
Iron Ore	'000t	19	3343	1729068	21	4094	2146870	23	7399	4667940
Manganese										
Ore	t	42	962576	6220812	47	934548	5684482	44	849221	6831964
Phosphorite	t	5	99960	94304	5	97880	92007	6	113730	111398
Diamond	crt	2	28816	352472	2	13917	147696	3	266	18051
Limestone	'000t	134	47118	12332360	144	46099	12879609	168	50140	14782552
Minor										
Minerals		-	-	120995592	-	-	37017255	-	-	6296358

*Note : The number of mines excludes Fuel and Minor minerals.**\$ Excludes the value of Fuel minerals.**+ Coal Bed Methane*

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Table – 5 : Principal Mineral-based Industries

Industry/plant	Capacity ('000 tpy)
Aluminium/Alumina	
Hindalco Industries Ltd, Mahan Aluminium, Bargwan, Distt Singrauli	360 (Aluminium)
Asbestos Products	
Everest Building Products Ltd, Kymore	NA
Kalani Industries Pvt. Ltd, Pitampur, Dhar	NA
Ramco Industries Ltd, Maks, Distt Shajapur	NA
Calcined Lime	
Rekha Harlalka, Jukehi, Maihar	11
Padampani Tripathi, Mamalime Industries Rajarwara, Katni	9.6
Cement	
ACC Ltd, Kymore, Distt Katni	2720
Bhilai Jaypee Cement Ltd, Babupur, Satna	1300
Birla Corpn. Ltd, (Satna Cement Works & Birla Vikas Cement), Satna	2200
Birla Corporation Ltd, (Erstwhile Reliance Cement Pvt. Ltd, Maihar, Distt Satna	3000
Century Textiles & Ind. Ltd, Maihar Cement, Maihar (unit I & II), Distt Satna	4200
Heidelberg Cement (I) Ltd, Narsingarh, Distt Damoh	2000
Jaiprakash Power Ventures, Singrauli (G)	2000
Jaypee Rewa Cement Plant, Distt Rewa	2500
Jaypee Bela Cement Plant, Distt Rewa	2600
KJS Cement, Rajnagar, Distt Satna	2200
Prism Cement Ltd, (Unit I & II), Satna	6600
Satguru Cement Pvt. Ltd, Ghursal, Gandhawani	95
UltraTech Cement Ltd, Sidhee	2300
UltraTech Cement, Dhar Cement Plant, Tonki, Temarni sounul, Golpura Manawar	3500
UltraTech Cement, Vikram Cement Plant, Khor, Distt Neemuch	4500 (OPC) 4500 (PPC)
UltraTech Cement Ltd, Majhigawan, Rampur Naikin	3000
Ceramic	
Roca Bathroom Products Ltd, Dewas	NA
Govind Tiles Pvt. Ltd, Garra, Distt Balaghat	NA
Calcined Lime	
Som Lime work, Jukehi, Katni	21.6
Jai Mata Lime Industries Pathra, Katni	15.2
Dharampal Industries Pathra, Katni	6
Sampuran Singh Saluja Patra, Katni	6.07
Fertilizer	
Agro Phos. (India) Ltd, Dewas	45 (SSP)

(Contd)

Table-5 (concl'd)

Industry/plant	Capacity ('000 tpy)
Arihant Ferts. & Chems. India Ltd, Kanawati, Neemuch	66 (SSP)
Basant Agro Tech (India) Ltd, Jawad, Neemuch	45 (SSP)
Coromandel International Ltd, (Formerly, Liberty Urvarak Ltd.), Nirmani Khargone	100 (SSP)
Indra Industries Ltd, (Formerly, Swastik Ferts & Chems Ltd.), Indore, Dhar	66 (SSP)
KMN Chemicals & Fertilizers Ltd, Diwanganj, Raisen	60 (SSP)
Khaitan Chemical & Fertilizers Ltd, Nimrani, Distt Khargone	400 (SSP) 115.5 (H ₂ SO ₄)
NFL, Vijaipur (Unit I & II), Distt Guna	2066.1 (Urea)
Krishna Phoschem Ltd, Meghnagar, Jhabua	120 (SSP)
Madhya Bharat Agro Products Ltd, Rajoa, Sagar	60 (SSP)
Madhya Bharat Phosphate Pvt. Ltd, (Unit I), Diwanganj, Sanchi, Raisen	132 (SSP)
Madhya Bharat Phosphate Pvt. Ltd, (Unit II), Meghnagar, Jhabua	165 (SSP)
Mexican Agro Chemical Ltd, (Formerly, Asha Phosphates Ltd.), Jaggakhedi, Mandsaur	60 (SSP)
Mukteswar Fertilizers Ltd, Narayankhedi, Ujjain.	60 (SSP)
Rama Phosphates Ltd, Indore	250 (SSP)
	102 (H ₂ SO ₄)
Suman Phosphates and Chemicals Ltd, Indore	330 (SSP)
Varun Fertilizers Pvt. Ltd, Dewas	100 (SSP)
Ferroalloys	
Crescent Alloys Pvt. Ltd, Seoni	4.5
Jalan Ispat Castings Ltd, Meghnagar, Distt Jhabua	12
MOIL Ferro Manganese Plant, Bharveli, Distt Balaghat	10
Petroleum Refinery	
Bharat Oman Refineries Ltd, Bina, Distt Sagar	6000
Refractory	
ACC Refractories, Katni	65
Calderys India Refractories Limited	78
Katni Refractory Works, Katni	30 (Binder)
Murwara	9 (Grout)
Mahakoshal Refractories Pvt. Ltd, Katni	61.09
Mahakoshal Refractories Pvt. Ltd, Gudri, Bohariband	31
Premier Refractories India Pvt. Ltd, Katni.	50

G; Grinding Unit

Note: Data not readily available for fertilizer and cement industries on respective websites, therefore it has been taken from Indian Fertilizer Scenario, FAI Statistics and Survey of Cement Industry & Directory, respectively.