Indian Minerals Yearbook 2017

(Part- I)

56th Edition

STATE REVIEWS
(Jharkhand)

(FINAL RELEASE)

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JHARKHAND

Mineral Resources

Jharkhand is one of the major mineral producing States. It is the sole producer of flint stone in the country and is one of the leading producers of coal, gold, graphite, bauxite, iron ore & limestone. Uranium ore is mined and processed by Uranium Corporation of India Ltd (UCIL) for supply as fuel to the country's nuclear power reactors through six underground mines, one opencast mine, and two processing plants. Jharkhand has the sole resources of Emerald mineral. It accounts for about 31% rock phosphate, 23% iron ore (hematite), 30% apatite, 14% andalusite, 20% cobalt ore, 20% copper ore, 9% each granite (dimension stone) & graphite and 5% silver ore resources of the country.

Important minerals that occur in the State are **bauxite** in Dumka, Gumla, Latehar, Lohardaga and Palamu districts; **china clay** in Dumka, Hazaribagh, Lohardaga, East & West Singhbhum, Sahebganj and Ranchi districts; **coal** in Bokaro, Deoghar, Dhanbad, Giridih, Godda, Hazaribagh, Palamau, Pakur and Ranchi districts; **copper** in Hazaribagh and East Singhbhum districts; **dolomite** in Garhwa and Palamu districts; **felspar** in Deoghar, Dhanbad, Dumka, Giridih, Hazaribagh, Jamtara, Koderma, Latehar, Palamu and Ranchi districts; **fireclay** in Dhanbad, Dumka, Giridih, Godda, Hazaribagh, Latehar, Palamu, Ranchi and West Singhbhum districts; **gold** in East Singhbhum district; **graphite** in Palamu district; **iron ore** (hematite) in West Singhbhum district; **iron ore** (magnetite) in Gumla, Hazaribagh, Latehar, Palamu and East Singhbhum districts; **kyanite** in Saraikela-Kharsawan and West Singhbhum districts; **limestone** in Bokaro, Dhanbad, Garhwa, Giridih, Hazaribagh, Palamu, Ranchi, East & West Singhbhum districts; **manganese ore** in East & West Singhbhum districts; **mica** in Giridih and Koderma districts; **ochre** in West Singhbhum district; **dunite/pyroxenite** in East Singhbhum district; **quartz/silica sand** in Deoghar, Dhanbad, Dumka, Giridih, Godda, Hazaribagh, Jamtara, Koderma, Latehar, Palamu, Ranchi, Sahebganj, Saraikela-Kharsawan and West Singhbhum districts; and **quartzite** in East & West Singhbhum districts.

Other minerals that occur in the State are **andalusite** and **rock phosphate** in Palamu district; **apatite, chromite, cobalt, nickel, gold** and **silver** in East Singhbhum district; **asbestos** in East & West Singhbhum districts; **barytes** in Palamu and East Singhbhum districts; **bentonite** in Pakur and Sahebganj districts; **garnet** in Hazaribagh district; **granite** in Deogarh, Dhanbad, Dumka, Giridih, Godda, Gumla, Hazaribagh, Koderma, Lohardaga, Palamu, Ranchi and East Singhbhum districts; **sillimanite** in Hazaribagh district; **talc/steatite/ soapstone** in Giridih, Koderma, Palamu, East & West Singhbhum districts; **pyrophyllite** in Saraikela-Kharaswan district; **titanium minerals** in Ranchi and East Singhbhum districts; and **vermiculite** in Giridih and Hazaribagh districts (Table - 1). The reserve/resources of coal and the various coalfields located in Jharkhand are given in Table - 2.

Exploration & Development

The details of exploration activities conducted by GSI for iron ore, REE and titanium & vanadium mineral and other agencies(MECL) for gold during the year 2016-17are furnished in Table - 3.

Table – 1 : Reserves/Resources of Minerals as on 1.4.2015: Jharkhand

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						
Anadlusite	'000 tonnes	-	-	-	-	-	-	-	-	-	4000	1	4001	4001
Apatite	tonne	-	-	-	-	-	-	-	2110000	1620000	3540000	-	7270000	7270000
Asbestos	tonne	-	-	-	-	-	3871	18309	2885	5769	124059	-	154893	154893
Barytes#	tonne	-	-	-	-	-	-	-	-	-	35900	-	35900	35900
Bauxite	'000 tonnes	54471	219	8049	62740	9734	6154	15117	17883	17397	54106	55930	176321	239061
Bentonite##	tonne	-	-	609406	609406	-	3067	-	-	-	367527	-	370594	980000
China clay#	'000 tonnes	427	-	6412	6838	9338	2093	4738	3962	7363	149892	18019	195405	202244
Chromite	'000 tonnes	-	-	-	-	-	-	-	15	98	623	-	736	736
Cobalt	million tonnes	-	-	-	-	-	-	-	-	2	-	7	9	9
Copper					-								-	-
Ore	'000 tonnes	5374	-	1940	7314	13195	24511	3990	101168	103484	41726	-	288074	295389
Metal	'000 tonnes	61.33	-	20.54	81.87	142.08	255.74	45.92	1183.99	1058.42	507.38	-	3193.53	3275.40
Dolomite#	'000 tonnes	4510	-	6720	11230	10620	350	860	-	-	1857	-	13686	24916
Dunite#	' 000 tonnes	123	-	262	385	264	-	448	607	780	6121	8637	16857	17242
Emerald	kg.	-	-	-	-	-	-	0	-	-	-	55869	55869	55869
Feldspar#	tonne	68789	15402	191913	276104	-	40766	348792	32510	120388	836061	-	1378517	1654621
Fire clay#	'000 tonnes	-	-	3	3	-	1125	309	139	122	64755	-	66450	66454
Garnet	tonne	-	-	-	-	-	-	88303	-	-	21768	-	110071	110071
Gold					-								-	-
Ore (Primary)	tonne	9349	-	-	9349	-	-	-	-	5146952	4203337	767000	10117289	10126638
Metal (Primary)	tonne	0.07	-	-	0.07	-	-	-	-	3.61	10.26	0.62	14.49	14.56
Granite## (Dim Stone)	'000 cum	-	-	-	-	-	-	-	-	651300	8197110	26930	8875340	8875340
Graphite	tonne	1518581	1204423	1450550	4173555	39262	445703	1959747	5520	1856563	6639828	2440208	13386831	17560386
Iron ore (Haematite)	'000 tonnes	365111	29238	45022	439372	1081242	458866	457724	207324	597413	673009	1371468	4847045	5286417
Iron ore (Magnetite)	'000 tonnes	-	-	-	-	-	518	1986	411	3948	3722	82	10667	10667
Kyanite	tonne	426240	-	-	426240	824472	524467	881313	-	1754900	3182363	-	7167515	7593755
Laterite#	'000 tonnes	-	-	-	-	-	-	-	-	-	570	-	570	570
Limestone	'000 tonnes	88172	-	29116	117288	95008	13529	29265	89572	13220	354319	11803	606715	724003
Manganese ore	'000 tonnes	1840	-	328	2168	1710	795	1476	-	178	4177	1126	9461	11629
Mica#	kg.	-	-	-	-	-	-	-	-	-	1494430	170700	1665130	1665130
Nickel ore	million tonnes	-	-	-	-	-	-	-	-	2	7	-	9	9
Ochre#	tonne	-	-	-	-	62	-	4	-	147	-	-	214	214

(Contd.)

Table - 1 (Concld.)

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						
Pyrophyllite#	tonne	858	-	328	1185	-	-	-	-	-	-	-	-	1185
Quartz-Silica Sand#	'000 tonnes	-	-	1070	1070	534	985	4533	137	766	143053	112	150122	151192
Quartzite#	'000 tonnes	181	-	-	181	763	49	390	197	275	38854	-	40527	40708
Rock Phosphate	tonne	-	-	-	-	-	-	-	-	-	107370000	-	107370000	107370000
Silver														
Ore	tonne	-	-	-	-	-	-	-	-	-	23840000	-	23840000	23840000
Metal	tonne	-	-	-	-	-	-	-	-	-	5.22	-	5.22	5.22
Sillimanite	tonne	-	-	-	-	-	-	-	-	-	83000	-	83000	83000
Talc-Steatite-Soapstone#	'000 tonnes	336	-	83	419	-	-	54	2	4	243	16	319	739
Vermiculite	tonne	-	-	-	-	-	-	-	-	-	30048	-	30048	30048

Figures rounded off.

***Note**: The proved and indicated balance recoverable reserves of Coal Bed Methane (CBM) in the state as on 01.04.2016 were 28.91 billion cu m.*

*** Resources of ilmenite, rutile, leucoxene and zircon, as per Department of Atomic Energy, are provided in the respective Mineral Reviews.*

 # Declared as Minor Mineral vide Gazette Notification dated 10.02.2015.

Minor Minerals before Gazette Notification dated 10.02.2015.

Table – 2 : Reserves/Resources of Coal as on 1.4.2017: Jharkhand

(In million tonnes)

Coalfield	Proved	Indicated	Inferred	Total
Total	**44340.59**	**31876.40**	**6222.53**	**82439.52**
Raniganj	1538.19	466.56	31.55	2036.30
Jharia	15127.97	4302.09	-	19430.06
East Bokaro	3497.43	3922.80	863.32	8283.55
West Bokaro	3761.25	1308.71	33.66	5103.62
Ramgarh	756.11	742.08	58.05	1556.24
North Karanpura	10319.44	6300.92	1864.96	18485.32
South Karanpura	5176.08	1312.28	1143.28	7631.64
Aurangabad	352.05	2141.65	503.41	2997.11
Hutar	190.79	26.55	32.48	249.82
Daltongunj	83.86	60.10	-	143.96
Deogarh	326.24	73.60	-	399.84
Rajmahal	3211.18	11219.06	1691.82	16122.06

Source: *Coal Directory of India, 2016-17.*

Production

Coal is the principal mineral produced in Jharkhand state. The other important minerals produced in the state were bauxite, copper ore and concentrates, gold, iron ore, manganese ore, graphite and limestone.

The value of minor minerals' production was estimated at ` 40 crore for the year 2016-17.

The number of reporting mines in Jharkhand was 56 during 2016-17 in case of MCDR minerals.Details are furnished in Table – 4.

Mineral-based Industry

The present status of each mineral-based industry is not readily available. However, the principal large and medium-scale mineral-based industries in the organised sector in the State are given in Table - 5.

Table – 3 : Details of Exploration Activities in Jharkhand, 2016-17

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
GSI							
Bauxite							
Gumla	Risahattoli block, Serangdag Plateau	1:4000	5.2	12	485.0	-	G-3 stage preliminary exploration for bauxite and associated minerals (Ti, V, Ga etc.) was carried out in Risahattoli block. Thickness of the bauxite zone intersected in the boreholes varies from 3.2 to 14.75 m with an average thickness of 9.78 m. The bauxite zone is found to reach up to a maximum depth of 27.09 m. Alumina (Al_2O_3) content ranges from 43.04 to 47.60% with SiO_2 varying from 4.74 to 9.26%. The main ore mineral is gibbsite with anatase and goethite. Content of TiO_2 in bauxite zones varies from 10.18 to 11.09 %, Vanadium (V) from 594 to 704 ppm and Gallium (Ga) from 38 to 62 ppm.
Chromium, Nickel & PGE							
West Singhbhum	Ranjrakochajanoa-Jojohatu-Tonto area	-	-	-	-	-	G4 stage reconnaissance survey for Cr, Ni & PGE was taken up in this area. The chromite mineralisation occurs as pods and disseminated grains within dunite and harzburgite in the Jojohatu and Tonto Blocks. In the Ranjrakocha block, the mineralisation is in the form of disseminated grains. The chromite mineralisation in the Janoa block occurs as disseminated grains in the ultramafic rocks and also within the metabasic rocks as large grains. PGE mineralisation is mainly associated with the ultramafics. PGE concentration shows a maximum value of 0.8 ppm while the highest value of chromite is 38 wt % and the value of Ni is 5.14 wt %.
Manganese Ore/Phosphate/Barium							
Saraikela-Kharsawan	Niponitola-Chamta-Bangora area	1:12500	100	-	-	-	G4 stage reconnaissance survey was taken up for manganese, phosphate and barium mineralisation. The area is a part of arcuate shaped North Singhbhum Mobilebelt (NSMB). Three manganese bands have been delineated within the interlayered sequence of acid volcanic/tuff and quartzitic rocks, having strike lengths of 1150 m, 2300 m and 600 m and exposure widths of 25 m, 30 m-60 m and 4 m.

(Contd.)

Table - 3 (Concld.)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
Gold							
Ranchi	Birgon block	1:1000	2	-	-	-	G4 level investigation for Gold was covered by mapping and geophysical survey along with PS, BRS, SSS and PTS sampling. The geophysical contour map indicated an anomalous zone of possible sulphide mineralisation at a depth of 25-30 m. Gold mineralisation is being targeted in the quartz veins within the quartz mica schist and the contact zones of amphibolite & mica schist. Analytical results show a maximum Au content of 0.25 ppm in BRS and PTS samples.
Ranchi	Birgon block	1:12500	100	-	-	3	G4 level reconnaissance survey for Gold in and around Ghagri-Asangibera-Dubrajpur-Jurgu areas, Saraikela-Kharsawan & Ranchi. Gold mineralisation has been observed in brecciated quartzites and quartz veins showing limonitisation, silicification, leaching of sulphides, shearing in the form of brecciation etc. A bedrock sample shows an anomalous concentration of 2.4 ppm of gold. In trench samples, gold values ranges from 60 to 320 ppb. Pit samples yielded a maximum value of 110 ppb of Au. Out of 10 panned stream sediment samples, visible specks of gold were recovered in 3 samples. The total REE value of bedrock samples ranges from 3 to 3363 ppm and three samples show high value of 3363 ppm, 2673 ppm and 2399 ppm, respectively.
West Singhbhum	Tiring-Dubrajpur area	1:12500	100	-	-	-	G4 level reconnaissance survey for Gold, Arsenic and Antimony was carried out in Tiring-Dubrajpur area. Gold mineralisation is found to be associated with the host rocks, viz., chlorite schist, mica schist, metabasic rocks, brecciated quartzite/ quartz reefs and numerous quartz veins and veinlets of grey to whitish colour and smoky quartz veins having leached out limonitised surface. Bedrock samples showed a maximum of 60 ppb of Au value and pit /trench samples showed.

Table – 4 : Mineral Production in Jharkhand, 2014-15 to 2016-17 (Excluding Atomic Minerals)

(Value in `'000)

Mineral	Unit	2014-15			2015-16			2016-17 (P)		
		No. of mines	Quantity	Value	No. of mines	Quantity	Value	No. of mines	Quantity	Value[$]
All Minerals		**226**		**219359985**	**202**		**206522854**	**196**		**18871425**
Coal	'000t	152	124143	193135100	140	121067	187369900	140	126435	-
Bauxite	t	23	2040519	1330002	19	2111227	1399189	18	2289825	1318549
Copper Ore	t	-	179036	-	-	267251	-	-	313856	-
Copper Conc.	t	2	5903	198641	2	8574	286142	2	9803	334348
Gold Ore	t	-	3999	-	-	4153	-	-	5581	-
Gold	kg	1	11	30615	1	13	35871	1	15	45424
Iron Ore	'000t	22	19237	23649275	21	19198	16494215	19	21335	16204479
Manganese Ore	t	5	4448	20508	5	509	3161	4	510	3562
Dolomite[#]	t	1	135319	194994	-	-	-	-	-	-
Felspar[#]	t	1	3252	714	-	-	-	-	-	-
Flint Stone	t	2	244	79	1	253	76	1	26	8
Graphite (r.o.m.)	t	3	41424	22733	2	36270	22914	1	10343	11410
Kaolin[#]	t	1	70623	17655	-	-	-	-	-	-
Limestone	'000t	9	792	355281	11	1076	509938	10	1146	552197
Quartz[#]	t	3	14730	2940	-	-	-	-	-	-
Quartzite[#]	t	1	-	-	-	-	-	-	-	-
Minor Minerals[@]		-	-	401448	-	-	401448	-	-	401448

Note: *The number of mines excludes minor minerals.*

$ Excluding Fuel minerals.

** Includes mine waste obtained while dressing of crude mica.*

@ Figures for earlier years have been repeated as estimates because of non-receipt of data.

 # Declared as Minor Minerals vide Gazette Notification dated 10.02.2015

Table – 5 : Principal Mineral-based Industries in Jharkhand

Industry/plant	Capacity ('000 tpy)
Alumina	
Hindalco Industries Ltd, Muri.	450
Asbestos Products	
Hyderabad Industries Ltd, Jasidih, Distt. Deogarh.	60
Cement	
ACC Ltd, Chaibasa, Distt. Singhbhum.	870
ACC Ltd, Sindri, Distt. Dhanbad (G).	900

(Contd.)

Table - 5 (Contd.)

Industry/plant	Capacity ('000 tpy)
Bokaro Cement Plant (formerly JV of Jaypee Cement & SAIL), Bokaro (G).	2100
Lafarge, Jojobera, Distt. Singhbhum.	4600
Ceramic	
Bihar Industrial Corp. Ltd, Madhupur, Distt. Deoghar.	0.48
Maithan Ceramics Pvt. Ltd, Dhanbad.	NA
Chemicals	
Bihar Caustic & Chemicals Ltd, Garhwa Road, Distt. Palamu.	92.75 (caustic soda lye)

(Contd.)

Table - 5 (Contd.)

Industry/plant	Capacity ('000 tpy)
Copper Smelter	
HCL, ICC, Ghatsila, Distt. Singhbhum (East).	20.5 (copper smelting) 18.5 (copper cathode) 84 (fabricated wire bar) 54(H_2SO_4), 390 t ($NiSO_4$) 480 kg ($CuSO_4$) 14.6 kg (selenium) 9868 kg (Ag), 698 kg (Au)
Iron & Steel	
Bokaro Steel Plant, Bokaro.	6900 (sinter) 4585 (pig iron) 4360(Crude/liquid steel) 35.5 (H_2SO_4) 27.2 (ammonium sulphate)
Tata Steel Ltd, Jamshedpur.	6000 (pellets) 7700 (sinter) 9700 (Crude/liquid steel)
Usha Martin Ltd, Jamshedpur.	500 (Sponge iron) 1200 (pellets) 715 (sinter)
Orissa Manganese & Minerals Ltd, Kandra, Sarai Kharsawan.	1200 (pellets)
Pig Iron	
Usha Martin Industries, Jamshedpur.	110
Sponge Iron	
Ashirwad Steel & Industries Ltd, Gamharia, Jamshedpur.	30
Bihar Sponge Iron Ltd, Chandil, Distt. Saraikela-Kharsawan.	210
Brahmaputra Metallics Limited, Kamta, Gola, Distt. Ramgarh.	105

(Contd.)

Table - 5 (Concld.)

Industry/plant	Capacity ('000 tpy)
Jai Durga Iron Pvt. Ltd, Jhumari Tellaiya, Distt. Koderma.	36
Zoom Vallabh Steels Ltd, Dugdha, Distt. Saraikela-Kharsawan.	120
Ferro Alloys	
Anjaney Ferro Alloys Ltd, Mihijam.	12
Gautam Ferro Alloys Ltd.	5.5
Tin Plates	
The Tin Plate Co. of India Ltd, Jamshedpur.	379
Glass	
IAG Co. Ltd, Bhandainagar.	66.8
Refractory	
Allied Refractories (P) Ltd, Amaghata.	7.2
SAIL Refractory Unit (formerly Bharat Refractories Ltd), Ranchi Road, Ramgarh.	7.5
SAIL Refractory Unit (formerly Bharat Refractories Ltd), IFICO, Ramgarh.	42
SAIL Refractory Unit (formerly Bharat Refractories Ltd), Bhandaridah, Distt. Bokaro.	26
Jharia Firebricks Pottery Works (P) Ltd, Dhansar, Distt. Dhanbad.	20
Mineral & Chemical Products, Kendposi, Distt. West Singhbhum.	1.5 (calcined china clay)
Raj Refractory (P) Ltd, Hardag, Distt. Ranchi.	6

G; Grinding Unit

Note: *Data, for Cement Industries on respective websites, is taken from Survey of Cement Industry & Directory, 2016.*