Indian Minerals Yearbook 2019

(Part- I)

58th Edition

STATE REVIEWS (Andhra Pradesh)

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GOVERNMENT OF INDIA
MINISTRY OF MINES
INDIAN BUREAU OF MINES

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ANDHRA PRADESH

Mineral Resources

Andhra Pradesh is the sole producer of apatite. The State is the leading producer of barytes, ball clay, dolomite, garnet (abrasive), laterite, limestone, quartz, quartzite, silica sand and vermiculite. It accounts for 92% barytes, 40% calcite, 41% mica, 31% each kyanite & garnet, 19% titanium minerals, 16% bauxite, 15% dolomite, 13% sillimanite and 12% each vermiculite & limestone resources of the country. Andhra Pradesh is endowed with the internationally known black, pink, blue and multicoloured varieties of granites. Krishna-Godavari basin areas in this State have emerged as new promising areas for hydrocarbons, especially natural gas.

Important minerals occurring in Andhra Pradesh are: **apatite** in Visakhapatnam district; **asbestos** in Cuddapah district; **ball clay** in West Godavari district; **barytes** in Anantapur, Cuddapah, Krishna, Kurnool, Nellore & Prakasam districts; **calcite** in Anantapur, Cuddapah, Kurnool & Visakhapatnam districts; **china clay** in Anantapur, Chittoor, Cuddapah, East Godavari, West Godavari, Guntur, Kurnool, Nellore & Visakhapatnam districts; **coal** in Godavari Valley Coalfield; **corundum** in Anantapur districts; **dolomite** in Anantapur & Kurnool districts; **felspar** in Anantapur, Cuddapah, West Godavari, Nellore & Vizianagaram districts; **fireclay** in Chittoor, Cuddapah, East Godavari, West Godavari, Kurnool & Srikakulam districts; **garnet** in East Godavari, Nellore & Srikakulam districts; **granite** in Anantapur, Chittoor, Cuddapah, Guntur, Krishna, Nellore, Prakasam, Srikakulam & Vizianagaram districts; **iron ore (haematite)** in Anantapur, Cuddapah, Guntur, Krishna, Kurnool & Nellore districts; **iron ore (magnetite)** in Prakasam district; **lead-zinc** in Cuddapah, Guntur & Prakasam districts; **limestone** in Anantapur, Cuddapah, East Godavari, West Godavari, Guntur, Krishna, Kurnool, Nellore, Srikakulam, Visakhapatnam & Vizianagaram districts; **manganese ore** in Srikakulam & Vizianagaram districts; **mica** in Nellore & Visakhapatnam district; **ochre** in Anantapur & Cuddapah, West Godavari, Guntur, Kurnool & Visakhapatnam districts; **pyrophyllite** in Anantapur, Chittoor & Cuddapah districts; **quartz/silica sand** in Anantapur, Chittoor, Cuddapah, West Godavari, Guntur, Krishna, Kurnool, Nellore, Prakasam, Srikakulam, Visakhapatnam & Vizianagaram districts; **quartzite** in Kurnool, Srikakulam, Visakhapatnam & Vizianagaram districts; **talc/soapstone/steatite** in Anantapur, Chittoor, Cuddapah & Kurnool districts & **vermiculite** in Nellore & Visakhapatnam districts. **Petroleum & natural gas** deposits of importance are located in the onshore and offshore areas of Krishna-Godavari basin of the State.

Other minerals that occur in the State are **bauxite** in East Godavari & Visakhapatnam districts; **chromite** in Krishna district; **copper** in Guntur, Kurnool & Prakasam districts; **diamond** in Anantapur, Krishna & Kurnool districts; **gold** in Anantapur, Chittoor & Kurnool districts; **graphite** in East Godavari, West Godavari, Srikakulam, Visakhapatnam & Vizianagaram districts; **gypsum** in Guntur, Nellore & Prakasam districts; **kyanite** in Nellore & Prakasam districts; **magnesite** in Cuddapah district; **pyrite** in Kurnool district; **sillimanite** in West Godavari & Srikakulam district; **silver** in Guntur district; **titanium minerals** in East Godavari, Krishna, Nellore, Srikakulam & Visakhapatnam districts; and **tungsten** in East Godavari district (Tables-1 & 2).

Exploration & Development

The details of exploration activities conducted by various agencies for minerals during 2018-19 are furnished in Table - 3.

During 2018-19, National Oil Companies (NOC) continued their operations for exploration of oil and gas in the State.

Production

Andhra Pradesh produces many important minerals. The principal minerals produced in the state were natural gas (ut.), manganese ore, garnet (abrasive), limestone, sillimanite, vermiculite etc. The value of minor minerals' production was estimated at ₹ 16,831 crore for the year 2018-19. The number of reporting mines in the state were 130 in 2018-19 in case of MCDR minerals.

Table –1: Reserves/Resources of Minerals as on 01.04.2015: Andhra 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						
Apatite	tonnes	27715	-	1680	29395	-	-	-	-	-	200163	-	200163	229558
Asbestos	tonnes	20016	-	4617	24633	684984	40408	18355	-	1541	67392	-	812679	837312
Ball clay#	tonnes	6700417	202950	1049025	7952392	5622514	2842702	10275648	-	2279330	28044529	-	49064723	57017115
Barytes#	tonnes	48990002	49358	372296	49411656	186544	94489	988514	104322	389630	28165637	105721	30034857	79446513
Bauxite	'000 tonnes	-	-	-	-	-	-	-	188971	138120	288176	-	615267	615267
Calcite#	tonnes	16522	8098	119526	144146	8538	-	105470	8562700	5200	282204	-	8964112	9108258
China clay#	'000 tonnes	2494	953	1889	5337	1508	989	2071	511	688	51427	362	57556	62893
Chromite	'000 tonnes	-	-	-	-	-	-	-	-	-	0.4		0.4	0.4
Copper														
Ore	'000 tonnes	-	-	-	-	686	-	105	-	5791	1000	-	7582	7582
Metal	'000 tonnes	-	-	-	-	6.88	-	1.05	-	97.45	8.32	-	114	114
Corundum#	tonnes	200	-	-	200	-	7	-	-	-	-	-	7	207
Diamond	carat	-	-	-	-	-	-	-	200483	1524317	98155	-	1822955	1822955
Dolomite#	'000 tonnes	86134	11371	17539	115045	176476.97	31908	38324	22373	77	910217	4301	1183677	1298722
Felspar#	tonnes	2295253	150795	556263	3002311	4427537	50911	2379650	361444	1819937	1571271	442950	11053700	14056011
Fireclay#	'000 tonnes	1252	40	642	1934	771	1400	1574	56	417	10211	132	14562	16496
Garnet	tonnes	1183898	4500	568750	1757148	12189	232525	791238	18	8800000	5674011	-	15509981	17267129

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Table - 1 (contd)

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						
Gold														
Ore (primary)	tonnes	-	3902725	-	3902725	655133	-	889515	291000	55000	6980031	-	8870679	12773404
Metal (primary)	tonnes	-	8.49	-	8.49	2.45	-	3.57	1.08	0.17	23.78	-	31.05	39.54
Granite##														
(Dim. stone)	'000 cu. m	-	-	-	-	-	-	-	-	-	2360396	-	2360396	2360396
Graphite	tonnes	-	-	-	-	-	1195	1135	-	1122	697575	-	701027	701027
Gypsum#	'000 tonnes	-	-	-	-	-	-	-	-	-	404	-	404	404
Iron ore (hematite)	'000 tonnes	17664	273	11832	29768	40595	49589	68425	377	4666	147628	13	311294	341062
Iron ore (magnetite)	'000 tonnes	-	-	-	-	43105	-	-	13800	1266666	68527	-	1392098	1392098
Kyanite	tonnes	-	-	-	-	-	-	399	-	-	32003829	-	32004228	32004228
Laterite#	'000 tonnes	13574	680	1710	15964	23238	5107	2244	24	1107	889	.	32608	48572
Lead-zinc														
Ore	'000 tonnes	-	-	-	-	-	-	-	1000	4159	17530	-	22689	22689
Lead metal	'000 tonnes	-	-	-	-	-	-	-	28.70	119.53	688.65	-	836.88	836.88
Zinc metal	'000 tonnes	-	-	-	-	-	-	-	12.40	43.57	7.19	-	63.16	63.16
Limestone	'000 tonnes	1003483	19713	385133	1408329	269901	53722	706890	82112	268002	18666131	3466741	23513499	24921828
Magnesite	'000 tonnes	-	-	-	-	-	-	-	-	-	80	-	80	80
Manganese ore	'000 tonnes	2235	637	2086	4958	675	387	773	188	3220	6987	457	12687	17645
Mica#	kg	61942537	18293548	-	80236085	18960000	-	-	93830994	12894000	51668132	-	177353126	257589211

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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						
Ochre#	tonnes	5284990	-	64602	5349592	1404229.67	430231	1087353	347681	-	3596595	2121	6868210	12217802
Pyrite	'000 tonnes	-	-	-	-	-	-	-	-	-	880	-	880	880
Pyrophyllite#	tonnes	39376	-	9441	48817	366494	75201	311209	-	108831	737855	-	1599590	1648407
Quartz-silica sand#	'000 tonnes	94483	3429	13687	111599	32690	4039	17329	7081	6691	45661	11599	125090	236690
Quartzite#	'000 tonnes	16001	-	1389	17390	2103	8357	6418	-	3975	24797	1256	46905	64295
Sillimanite	tonnes	2045	-	37	2082	15	11278	12	267	7430300	1346988	-	8788861	8790943
Silver*														
Ore	tonnes	-	-	-	-	-	-	-	-	-	16950000	-	16950000	16950000
Metal	tonnes	-	-	-	-	-	-	-	-	-	128.13	-	128.13	128.13
Shale#	'000 tonnes	1120	162	272	1554	199	-	563	-	-	1142	90	1994	3548
Slate#	'000 tonnes	109	667	-	776	-	-	1075	-	-	1511	-	2586	3362
Talc/soapstone/ steatite#	'000 tonnes	1875	482	1001	3358	197	725	1804	184	369	3611	248	7137	10495
Tungsten*														
Ore Contained	tonnes	-	-	-	-	-	-	-	3640000	4700800	5952500	509000	14802300	14802300
WO_3	tonnes	-	-	-	-	-	-	-	5096	6574.64	8273.65	318.28	20262.57	20262.57
Vermiculite	tonnes	60892	19413	30566	110871	2040	917	5850	58396	5127	88865	-	161195	272066

Figures rounded off

 # Declared as Minor Mineral vide Gazette Notification dated 10.02.2015.

Minor Mineral before Gazette Notification dated 10.02.2015.

***Note**: The proved and indicated balance recoverable reserves of crude oil and natural gas as on 1.4.2019 in the State are 3.36 million tonnes and 63.57 billion cu. m, respectively.*

Table – 2: Reserves/Resources of Coal as on 1.4.2019: Andhra Pradesh

(In million tonnes)

Coalfield	Proved	Indicated	Inferred	Total
Total/Godavari Valley	97.12	1078.44	431.65	1607.21

Source: *Coal Directory of India, 2018-19.*

Table – 3: Details of Exploration Activities in Andhra Pradesh, 2018-19

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
GSI							
Base Metal (Copper)							
Nellore	Around Garimanipenta and Vinjamuru	1:2000	1.21	5	633.60	46	Reconnaissance survey (G4) for copper and associated mineralisation was taken up around Garimanipenta and Vinjamuru in the Nellore Greenstone belt. An area of 1.21 sqkm was mapped on 1:2,000 scale. The whole area was recorded to have thick soil cover. A cumulative of 633.60 m of drilling were carried out in five scout boreholes in the area. Three boreholes intersected a few disseminations of sulphides. The analysis of 46 core samples showed copper values up to 0.33%, 0.10% & 0.12% in Borehole APGPT-1/ CS-1, 2 & 9 and 0.52%, 0.33%, 0.62%, 0.43%, 1.40% and 0.21% in the Borehole APGPT-3/1, 5, 7, 8, 12 and 17 respectively. Continuation of exploration from previous year field study was undertaken.
	Around Udayagir and Duttaluru	1:2000	1.0	2	-	-	During reconnaissance survey (G4) for copper and associated mineralisation, an area of 1 sqkm was mapped on 1:2,000 scale in two blocks, i.e., Masyapeta block (0.8 sqkm) and Tirumalapuram block (0.2 sqkm). Geophysical survey (IP and magnetic) of 20 L. km was also carried out. In Masayapeta block, incidence of sulphides (chalcopyrite, pyrite, and covellite), malachite and azurite staining were observed over a zone of 300 m length and 60-70 m width near old. A 200 m length and 20-30 m width zone of sulphide-bearing (chalcopyrite, pyrite, covellite, digenite) ferrugenised quartzite was demarcated in Tirumalapuram block. Based on geophysical

(contd)

Table – 3 (contd)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
							survey, high chargeability zone was observed in both Masayapeta and Tirumalapuram blocks. Trench mapping was carried out in the western part of Masayapeta block to trace the continuity of mineralisation. In analytical results, higher copper values were reported in oxidised ferrugemised quartzite with sulphides, quartz vein & intercalated pelitic-psammitic sequence in both the blocks and these indicate incidence of copper and gold mineralisation. In Borehole APMAS-1, malachite staining was observed from 19.20 m to 23.30 m depth. Mineralisation was observed in the form of pockets and veins from depths 28.90 m to 76.30 m and 96.49 m to 111.49 m. Borehole APMAS-1 gave encouraging values of copper, 0.59% (30.3 m to 31.3 m), 0.54% (33.3 m to 34.3 m), an average of 1.58% over 8 m length (43.3 m to 51.3 m) in Zone-I. Zone-II reported 0.46% (96.49 m to 97.49 m), 3.07% (100.49 m to 101.49 m) and 2.46% (105.49 m to 106.49 m). In APMAS-02, oxidised sulphides were noticed from 15.46 m to 16.00 m and 17.90 m to 19.50 m.
Iron Ore							
Ananthapur	Around Obulapuram	- - -	Block 1: 0.52 Block 2: 1.64 Block 3: 3.84	- - -	- - -	- - -	General exploration of G2 stage was initiated around Obulapuram area which lies in the southeastern part of the Sandur Schist Belt. Iron ore was found to occur mainly as BMQ and BHQ in the area. Three prospecting blocks for drilling (Block 1: 0.52 sqkm, Block 2: 1.64 sqkm and Block 3: 3.84 sqkm) were identified during the detailed mapping. In Block 1, iron bands were categorised under massive haematite ore (64% to 65% Fe; length: ~450 m; width varying from 3 to 40 m), friable haematite ore (55% to 64 % Fe, length ~550 m; width varying from 20 m to 200 m) and alternate bands of haematite and argillite (47% to 49% Fe; length ~200 m; width varying from 20 m - 50 m). In Block 2, BMQ bands were 1.5 km in length with width

(contd)

Table – 3 (contd)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
							varying from 10 to 60 m and analysed 30 – 40% Fe. In Block 3, two 5.6 km long BMQ bands were demarcated (width varied from 10 m to 40 m) wich analysed 25 – 40 % Fe. All the three blocks of Obulapuram Iron Ore project come under Bellary RF and Mincheri RF. Drilling could not be started due to non-receipt of Forest Clearance.
Manganese Ore							
Vizianagaram and Visakhapatnam	Around Kondamosuru area	1:25000	100	-	-	-	G4 reconnaissance survey for manganese and graphite mineralisation was carried out in this area. The survey subsumed mapping of 100 sqkm area on 1:25,000 scale. The manganese mineralisation was present in the form of manganiferous zone, which showed intimate association with quartzite. It was found to occur as bands, lenses and floats of varying dimensions. The main manganese-rich band was of approximately 1 km strike length with varying width of 5 m to 10 m from Kondamosuru to Mulagapadu. At Silavalasa, the manganese band was observed associated with calc-granulite. The dimension of the band was around 200 m x 5 m. Some other occurrences were observed at SW of Mulagapadu 50 m x 10 m, at Allampadu 30 m x 5 m. Float ores were observed at south of Kondaluddandi with a cumulative dimension of 20 m x 5 m and at east of Gumaripadu with a cumulative dimension of 50 m x 10 m. Analytical values of manganese (Mn) in bedrock samples, collected from the Mn enriched horizons ranges from 0.03% to 39.64%.
Vizianagaram	Around Garikipenta-Vommi block	1:12500	100	-	-	-	During G4 reconnaissance survey for manganese ore in this area, an area of 100 sqkm was covered by Large-Scale Mapping (1:12,500). Manganese zone was identified in the Solipikonda hill to the north of Kondapeta. It was found to occur as continuous bands in the contact of calc-granulite and garnetiferous quartzo-feldspathic

(contd)

Table – 3 (contd)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
							gneiss of Khondalite Suite. Surface geometry of the mineralised zone appeareed as oval shaped pinching out towards NW and SE. The strike length was 309 m with width varying from 70 to 80 m. The zone comprised mainly of pyrolusite with occasional occurrence of psilomelane. The ore minerals were friable in nature. Analytical result of bedrock samples showed encouraging values of MnO up to 33.61%. Another manganese-rich zone was identified in the Gumpumkonda hill to the north east of Garikipeta. This mineralised band, lenticular in shape, showed a strike length of 110 m with exposed width of 20-25 m. Pyrolusite was the predominant ore mineral in this band. Analytical result of bedrock samples showed MnO value ranging up to 18.0%. The third manganese mineralised zone of length of about 200 m and width 30 m was identified in the south-west of Village Jaggarajupeta.
Vizianagaram	Devada block	-	0.25	1066.85	-	-	General exploration of G2 stage for manganese ore was carried out by detailed mapping of 0.2 sqkm area and drilling of 1066.85 m area in this block. The Devada block lies within the Garividi manganese belt of Vizianagaram district. The manganese mineralisation was found to occurs in the form of sub-horizontal to gently incline pocket/lensoid type bodies with pinching and swelling nature. Two lenses were delineated. The southern lense was traced for a strike length of 300 m with width of 100 m and average thickness of 30 m. The strike length of northern lense was 500 m long with 300 m width and average thickness of 48 m. Manganese mineralised zones were intersected at different depths in the boreholes of northern and southern lenses. The analytical results of core samples showed MnO, FeO, SiO_2 and P_2O_5 content varying from 1.4 to 70.2%, 0.5 to 45%, 2.3 to 52.15% and 0.6 to

(contd)

Table – 3 (contd)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
							2.8% respectively. An average of 90 m long manganese zones in southern lense and 135 m long manganese zones in northern lense (based on 10% cut-off grade of MnO) were delineated respectively. Based on availability of chemical data, resource (in part) of Devada block was estimated as 7.6 million tonnes with average grade of 23.6% Mn.
Vizianagaram	Yenubaruva block	-	-	-	-	9 (channel samples)	A G4 stage reconnaissance survey for manganese mineralisation was taken up in this area with an objective to delineate the zone of manganese mineralisation and to assess the grade and resources in the block under reference. The manganese mineralisation was found to occur discontinuously up to a length of 600 m and showed variations from 2 m to 5 m in width and 2 m to 15 m in length. Surficial coating of manganese and old pit indicated that occurrence of manganese would be as lensoidal bodies, which may be highly pinched and swelled in nature. Pyrolusite and psilomelane were the main manganese ore in the area. The analytical results of nine channel samples showed the MnO percentage to be varying from 7.94% to 16.91%.
Vizianagaram and Srikakulam	Chinnabanthupalli and Bakuruvalasa blocks	-	50 0.5 sq. m	1	-	-	Reconnaissance survey (G4) for manganese ore was taken up in this area by Large-Scale Mapping of 50 sqkm followed by detailed mapping of 0.5 sq. m In Chinnabanthupalli block, major rock types encountered were garnet sillimanite gneiss, calc granulite, pegmatite. Three old manganese pits were mapped and these were located within the weathered garnet sillimanite gneiss. Old pit examinations indicated that manganese occured as lensoidal bodies and were highly pinched and swelled type in nature. Pyrolusite and wad were the main manganese ore of the area. One borehole drilled at Chinnabanthupalli block did not intersect any mineralisation. The Bakuruvalasa

(contd)

Table – 3 (contd)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
							block (0.25 sqkm) is located in between the two active manganese mines. Manganese pit inside the block was 180 m in length and 15-20 m in width with variable depth of 8 m to 30 m. Based on the data collected from both the active mines, it was noted that the mineralisation is located at the contact between weathered feldspathic quartzites and manganiferous quartzite as narrow linear band of 3-5 m width extending over a strike length of about 500 m. These litho-contacts and mineralisation were interpolated to the block area under investigation and the inferred mineralisation was demarcated.
Srikakulam and Visakhapatnam	Ippakonda area	1:12500	100	-	-	-	During reconnaissance survey (G4) for manganese and graphite mineralisation in this area, an area of 100 sqkm was mapped on 1:12,500 scale with the objective to delineate potential zones of manganese and graphite. Disseminated graphite specks were observed at a few places in association with Khondalite. SEM analysis revealed presence of monazite, zircon, baddeleyite (rare zirconium oxide) and barium-bearing feldspar. The garnets were of pyrope, almandine, and spessartite and grossular variety. A few grains of apatite, rutile, ilmenite, pyrrhotite and allanite were also observed.
Srikakulam	Yenubaruva block	-	-	-	-	9	G4 stage reconnaissance survey for manganese mineralisation was taken up in Yenubaruva block with an objective to delineate the zone of manganese mineralization and to assess the grade and resources in the block under reference. The dimension of the manganese mineralisation occured discontinuously up to a length of 600 m varying from 2 m to 5 m in width and 2 m to 15 m in length. Surficial coating of manganese and old pit indicated occurrence of highly pinched and swelled manganese lensoidal bodies. Pyrolusite and psilomelane were

(contd)

Table – 3 (contd)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
							main manganese ore in the area. The analytical results, of nine channel samples showed MnO percentage varying from 7.94% to 16.91%.
Graphite							
Vizianagaram and Visakhapatnam	Satapi	-	-	-	-	-	At Satapi, Graphite mineralisation was observed having dimension of 500 m x 50 m. In the hand specimen, graphite observed as flakes. At places, it is zoned but mostly it is disseminated with a visual estimation of up to 10% graphite.
Heavy Minerals							
off Baruva - Borivanka		-	50	-	-	66	To evaluate placer mineral resource, an area of 50 sqkm off Baruva - Borivanka, Andhra Pradesh Coast was covered by 651 km bathymetry and 66 vibrocore samples at a grid of 1 km x 1 km within the water at depth ranges from 18.2 m up to 48.5 m were collected. The survey area characterised by sand showed variations from fine sand to very coarse sand in the surface and from clayey sand to coarse sand in the bottom of the vibrocore samples. Heavy mineral concentration was found to vary from 0.32 wt% to 20.73 wt% with an average concentration of 7.93 wt%.
REE							
East Godavari	Tapasikonda-Sitapalli area	-	3	-	-	196	Reconnaissance survey for REE and Rare Metal (RM) mineralisation was taken up in this area. In the survey area, khondalite, charnockite and migmatite suite of rocks were seen intruded by aplites, pegmatites and quartz veins. Graphite and tungsten were observed to occur as small pockets and lenses within the graphite gneiss. Disseminations of graphite were noted at places. The old workings for graphite were observed in the Tapasikonda Reserved Forest and NE of Etipalli. Weathered khondalites showing disseminated graphite grains along the foliation intruded with quartz veins in the old workings. Wolframite observed in a stray quartz vein sample

(contd)

Table – 3 (contd)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
							collected from the dump material in the Tapasikonda reserved forest.
Chittoor & Cuddapah	Nadigadda block	-	3	-	-	196	Reconnaissance survey for REE and RM occurrences in Nadigadda block of Chittoor & Cuddapah districts was taken up in the earlier explored (2015-16) area in which the total REE values were observed to vary from 107.42 ppm to 2,162.4 ppm and 18 composite samples out of 196 showed values more than 1,000 ppm. The source rock for REE in the study area was alkali feldspar granite and pegmatite which was found to occur in the southern margin of the study area and have intrusive contact with other granitoids of the area. The main intrusion observed in east of Malapalle was found to extend for about 3 sqkm area. Petrographic study indicated the concentration of REE minerals to be more in alkali granite and pegmatite. Monazite and allanite were the REE-bearing minerals identified. They were seen to occur as primary and secondary concentration in both alkali granite and pegmatite. The secondary concentration was observed as fracture filling within quartz grain. In all the samples, the HREE value was less than the LREE value. The total REE values of BRS was in the range from 2 to 517 ppm, PCS ranged from 6 to 943 ppm, SSS ranged from 19 to 2,448 ppm, PTS ranged from 25 to 986 ppm and SS ranged from 235 to 1,043 ppm. These higher REE values located over biotite granite and biotite granite gneiss, were rich in pegmatite in the central part of the study area.
Rashtriya Ispat Nigam Ltd.(RINL)							
Limestone							
Krishna	Jaggayyapetta mine, Budawada village, Jaggayyapetta Mandal	-	12.95	83	4000.00	-	The tentaive total geological resources was estimated at about 900 million tonnes. The final reserves/resources estimation are in progress.

(contd)

Table – 3 (concld)

Agency/ Mineral/ District	Location	Mapping		Drilling		Sampling (No.)	Remarks Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
Manganese							
Vizianagaram	Garbham Manganese Mine, Merakamudidam (264.5 ha)	-	-	28	1547.0	-	Exploration for manganese was carried out over an area of 264.54 ha in Garbham manganese mine, Merakamudidam, Vizianagaram district. A total of 1574.00 m core drilling was carried out in 28 boreholes in the potential areas of mining lease. The central and west Garbham areas were identified to be mineralised. The tentative total resources estimated in the area were 15 million tonnes. The final resources estimation are in process.
Quartz							
Visakhapatnam	Kintada quartz mine (3.24 ha), Sy.No.153, Kintada village, K.Kotapadu Tahsil	-	-	-	-	5	Chip sampling was carried out in lease area. The total geological resources available in the area was placed at 1.91 million tonnes.

Table-4: Mineral Production in Andhra Pradesh, 2016-17 to 2018-19 (Excluding Atomic Minerals)

(Value in ₹'000)

Mineral	Unit	2016-17			2017-18			2018-19 (P)		
		No. of mines	Quantity	Value$	No. of mines	Quantity	Value$	No. of mines	Quantity	Value$
All Minerals		**136**		**135816123**	**135**		**179748794**	**130**		**181237545**
Natural Gas (ut.)	m c m	-	868	-	-	959	-	-	1046	-
Petroleum (crude)	'000t	-	276	-	-	322	-	-	296	-
Gold	kg	1	-	-	1	-	-	1	-	-
Iron Ore	'000t	22	485	264799	20	674	402892	16	655	419460
Manganese Ore	t	26	232257	729003	27	172174	706314	27	293279	1238252
Apatite	t	1	-	-	1	-	-	-	-	-
Garnet (abrasive)	t	2	51243	565747	2	111513	1283793	2	72521	1031030
Sillimanite*	t	-	37109	321945	-	53749	472024	-	31243	289278
Limestone	'000t	79	35515	7446888	80	38889	8567180	80	48290	9944351
Vermiculite	t	5	7225	2441	4	4790	2891	4	2456	1474
Minor Minerals@		-	-	126485300	-	-	168313700	-	-	168313700

Note : *The number of mines excludes Atomic, Fuel, and minor minerals.*

$ Excludes the value of Fuel minerals.

**Associated with Garnet (abrasive).*

@ Figures for earlier years have been repeated as estimates because of non-receipt of data for 2018-19.

Mineral-based Industry

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

Table – 5 : Principal Mineral-based Industries

Industry/plant	Capacity ('000 tpy)
Asbestos/Cement sheets	
Hyderabad Industries Ltd, Ibrahimpatnam, Distt Krishna	3000
Ramco Industries, Ibrahimpatnam, Distt Krishna	NA
Cement	
ACC Ltd, (formerly, Encore cement), Vishakhapatnam (G)	300
Andhra Cements Ltd, (Visaka Cement Works), Durga Nagar, Distt Visakhapatnam (G)	540
Andhra Cements Ltd, Durga Cement Works, Dachepalli, Distt Guntur	2310
Anjani Portland Cement Ltd,Chintalapalem, Mellacheruvu	1925
Bharthi Cement Corp. Pvt. Ltd, Nallingayapalli, Distt Cuddapha	5000
Bhavya Cement, Thangeda, Distt Guntur	1400
BMM Cement Ltd, Gudipadu, Yediki	950
Dalmia Cement (Bharat) Ltd, Cuddapha	4060 2600(Clincker)
Deccan Cement Ltd,Ravipahad, Nareducherla	1800
Deccan Cement Ltd,Ravipahad, Palakeedu Nalgonda	1800
Greygold Cement Ltd, Hyderabad	91
Himadri Cement Ltd,<Vedadri, Jaggyyapet	247.5
India Cements Ltd, Chilamkur, Distt Cuddapha	1460
India Cements Ltd, Malkapur, Tandur	2900
India Cements Ltd, Vishnupuram Work, Wadapally, Mariyalaguda	3500
India Cements Ltd, Yeraguntla, Distt Cuddapha	1000 540(Clincker)
My home Industries Pvt. Ltd, Mellacheruvu, Nalgonda	3200
UltraTech Cements Ltd, Jaypee Balaji Cement, Budawada, Distt Krishna	5000
JSW Cement Ltd, Nandyal, Distt Kurnool	4800
JSW Cement Ltd, Bilakalagudur, Gadivemula	4800
KCP Ltd, Macherla, Distt Guntur	825
KCP Ltd, Muktyala, Distt Krishna	1860
KCP Ltd, Muktyala, Jaggayyapeta Unit II	3520
KakatiyaCement Sugar and Industries Ltd, Dondapadu, Melacheruvu	297
My Home Cement Industries Ltd, Mulakapalli, Distt Visakhapatnam (G).	2000
NCL Industries Ltd, Kondapalli, Distt Krishna (G).	990
Orient Cement Ltd,Devapur, Kasipet.	5000
Panyam Cements & Mineral Industries Ltd, Cement Nagar, Distt Kurnool.	1000
Parashakti Cement, Jettipalem, Distt Guntur.,	1260
Penna Cement Industries Ltd, Talaricheruvu,, Tadipatri, Distt Anantapur.	2200
Penna Cement Industries Ltd, Boyareddypalli, Distt Anantapur.	2000
Penna Cement Industries Ltd, Ganeshpahad Damarcherla	1200
Prism Cement Ltd, Kotapadu, Kolimigundla.	4800
Rain Commodities Ltd, (Rain Cements), Boincheruvupalli, Peapully, Distt Kurnool	2770
Rain Cements, Ltd, Ramapuram, Mellacheruvu	1500
Ramco Cement Ltd, (formerly, Madras Cements), Jayantipuram, K.S. Rajanagar, Distt Krishna.	3650
Ramco Cement Ltd, Vizag Grinding Unit, Distt Visakhapatnam.	950
Shree Jayajothi (Subs. of Myhome Cement Ind.) Yanakandala, Distt Kurnool.	3200
Shri Chakra Cements Ltd, Alamada, Distt Vizianagaram (G).	260
Shri Chakra Cements Ltd, Narsimhapuri, Distt Guntur.	310
Sagar Cements Bayyavaram, Distt Visakhapatnam (G)	200
Sagar Cements Mattampally	2350
Sagar Cement Ltd, BMM Cement Anantapur,	1000
UltraTech Cements Ltd, (APCW), Tadipatri, Distt Anantapur.	9000
Zuari Cement, Krishnanagar, Yerranguntala, Distt Cuddapha.	3800
Zuari Cement, Ltd, Sitapuram Dondapadu Mellacheruvu	1200
Chemical	
Andhra Sugars Ltd, Saggonda, Distt West Godavari.	400 TPD (caustic soda) 99 (H_2SO_4)
Shree Rayalseema Alkalies & Allied Chem. Ltd, Gondiparla, Distt Kurnool.	156.95 (Total) 69.5 (caustic soda) 49.8 (Cl) 24.7 (HCl) 23.1 (KOH)
Shree Rayalseema High Strength Hypo Ltd, Gondiparla, Distt Kurnool.	14.85 (bleaching powder) 49.5 (H_2SO_4) 15 (Oleum)

(Contd.)

Table - 5 (Contd.)

Industry/plant	Capacity ('000 tpy)
Ceramic	
Sentini Ceramica Pvt. Ltd, Kanukollu, Distt Krishna (JV with H R Johnson (I) Ltd)	58 mill. sq.m
Spartek Ceramics India Ltd, Narsingapuram, Distt Chittoor.	NA
Kajaria Ceramics Ltd, Vijayawada.	2.9 (mill. sq m)
Elcetrode	
Indus Elctrode Gundlapalli, Maddiapdumandal.	0.90
Magnarc Elcetrodes Pvt. Ltd, Pendurthy.	1.8
Fertilizer	
Agri Green Fertilizers & Chemicals Pvt. Ltd, Cuddapah.	30 (SSP)
Bhaskar Fertiliser (P) Ltd, Anantapur	45 (SSP)
Coromandel International Ltd, Visakhapatnam.	1300 (NP/ NPKs)
Coromandel International Ltd, Kakinada, Distt East Godavari.	1925 (DAP)
GDS Chemicals & Fert. Pvt. Ltd, Anakapalli, Visakhapatnam	36 (SSP)
K. P. R. Fertilizers Ltd, Biccavolu, E. Godavari	11300 (SSP)
Krishna Industrial Corpn. Ltd, Nidadavole, Distt West Godavari.	45 (SSP) 33.5 (H_2SO_4)
Nagarjuna Fertilizers & Chemicals Ltd, Kakinada, Distt East Godavari (Unit I & II)	1500 (Urea)
NG Fertilizers & Chemicals Pvt. Ltd, Kodurupadu, Distt Krishna	200 (SSP)
Prathyusha Chems and Fertilisers Ltd, Parwada, Visakhapatnam	100 (SSP)
Subhodaya Chemicals Ltd, Gauripatnam, Distt West Godavari	42.9 (SSP)
Pesticides	
Jayalakshmi Fertilizers, Tanuku, Distt West Godavari	2000
Glass	
Triveni Glass Ltd, Kondagudem, Distt West Godavari	10 (mill. sq. m)
Iron & Steel	
Visakhapatnam Steel Plant, Visakhapatnam	8856 (sinter) 3400 (pig iron) 6300 (crude/liquid steel)
Sponge Iron	
Amoda Iron and Steel Pvt. Ltd, Jayanthipuram, Jaggayyapet Mandal, Aggayyapet	60

(Contd.)

Table - 5 (Contd.)

Industry/plant	Capacity ('000 tpy)
Apple Industries Ltd, Dhiral, Anantapur	150
Maa Mahamaya Industries Ltd, Vizianagaram	112
Pushpit Steel Pvt. Ltd, Merlapaka,Yerpendu, Chittor	86.4
SLV Steels and alloys Pvt. Ltd, Anantapur	60
Sri Sai Sindhu Industries Ltd, Tadpatri	52.5
Steel exchange India Ltd, Srirampuram,Visakhapatnam	250
Sree Rayalseema Green Steloy Ltd, Gooty, Distt Anantapur	36
Pig Iron	
Rishrtriya Ispat Nigam Ltd, Vishakhapatanam, Andhra Pradesh	6300
Sathavahana Ispat Ltd, Haresamudram, Distt Anantapur	210
Pellets	
Essar Steel Ltd, Visakhapatnam	8000
Ferroalloys	
Berry Alloys Ltd, Kothavalasa, Distt Vizianagaram	40 (Fe-Mn) 32 (Si-Mn)
Deccan Ferro alloys (P) Ltd, Pendurthi, Visakhapatnam	30 (Si-Mn) 10(Fe-Mn)
FACOR Alloys Ltd, Shreeramnagar, Distt Vizianagaram	90.3
Jindal Stainless (Hisar) Ltd, Kothavalasa, Distt Vizianagaram	40
Maithan Alloy Ltd, Atchutapuram	120
Hira Elector Smelters Ltd, Bobbili, Distt Vizianagaram	NA
Nava Bharat Ventures Ltd, Paloncha	125
Rhodium Ferro-alloy Pvt. Ltd, Gollapuram	8
Siri Smelters & Energy Pvt. Ltd, Bobbili	8.5
Petroleum Refinery	
HPCL, Vizag	8300
ONGC, Tatipaka, Distt East Godavari	66

Note: *Data, not readily available for fertilizer and cement Industries on respective website, is taken from Indian Fertilizer Scenario, FAI Statistics, and Survey of Cement Industry & Directory, respectively.*