

DETAILED INFORMATION
ON
BAUXITE
IN
INDIA



GEOLOGICAL SURVEY OF INDIA
1994

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Geological Survey of India

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CHAPTER - I

GENERAL ASPECTS

1.1 Introduction :

India is favourably endowed with large reserves (3037 million tonnes of insitu reserve) of Bauxite. In terms of bauxite reserves, India holds the fifth place in the world. Of all non ferrous metals, aluminium production in India is large enough to meet the growing demand within the country and has a surplus for export. During the year 1991-92, Rs.440 crores of foreign exchange was earned by the country through export of bauxite and alumina.

1.2 Distribution of bauxite deposits :

Indian bauxite resources are confined to peninsular shield excepting the occurrences in Jammu in the extra peninsular region. In the peninsular region about 85% of the total reserve is associated with 'high level' laterite occurring along the eastern and western coasts of which nearly 74% of the reserve is restricted to east coast. About 10% of the total reserve occurs amidst inland plateaus. The major bauxite deposits of India are generally associated with laterite cappings occurring as blankets on the plateaus of high elevation of 700 m to 2100 m above MSL in parts of Orissa, Andhra Pradesh, Bihar, Madhya Pradesh, Maharashtra, Karnataka and Tamil Nadu. In contrast, there are coastal and 'low level' bauxite deposits found along the coastal tracts of Gujarat, Karnataka and Kerala.

The important bauxite deposits occur with the 'high level' laterites in the following four regions of dissected table lands viz.

- (1) The Eastern Ghats Orissa and Andhra Pradesh (East Coast Bauxite Belt)
- (2) Plateaus bordering Bihar and Madhya Pradesh
- (3) Maikala range of Madhya Pradesh (Amarkantak deposits)
- (4) The Western Ghats

Besides, smaller and isolated bauxite deposits also occur at :

- (i) Shevaroy hills, Kolli hills and Kodaikanal in Nilgiri-Palni hill ranges of Tamil Nadu
- (ii) Seoni, Kaimur and Malwa plateaus and Kaskal –Bailadila range of Madhya Pradesh
- (iii) Vindhyan plateau bordering Uttar Pradesh and Madhya Pradesh
- (iv) Kharagpur hills in Mongher district, Bihar
- (v) Kumbala in Kerala
- (vi) Bauxite in Jammu, J & K State.

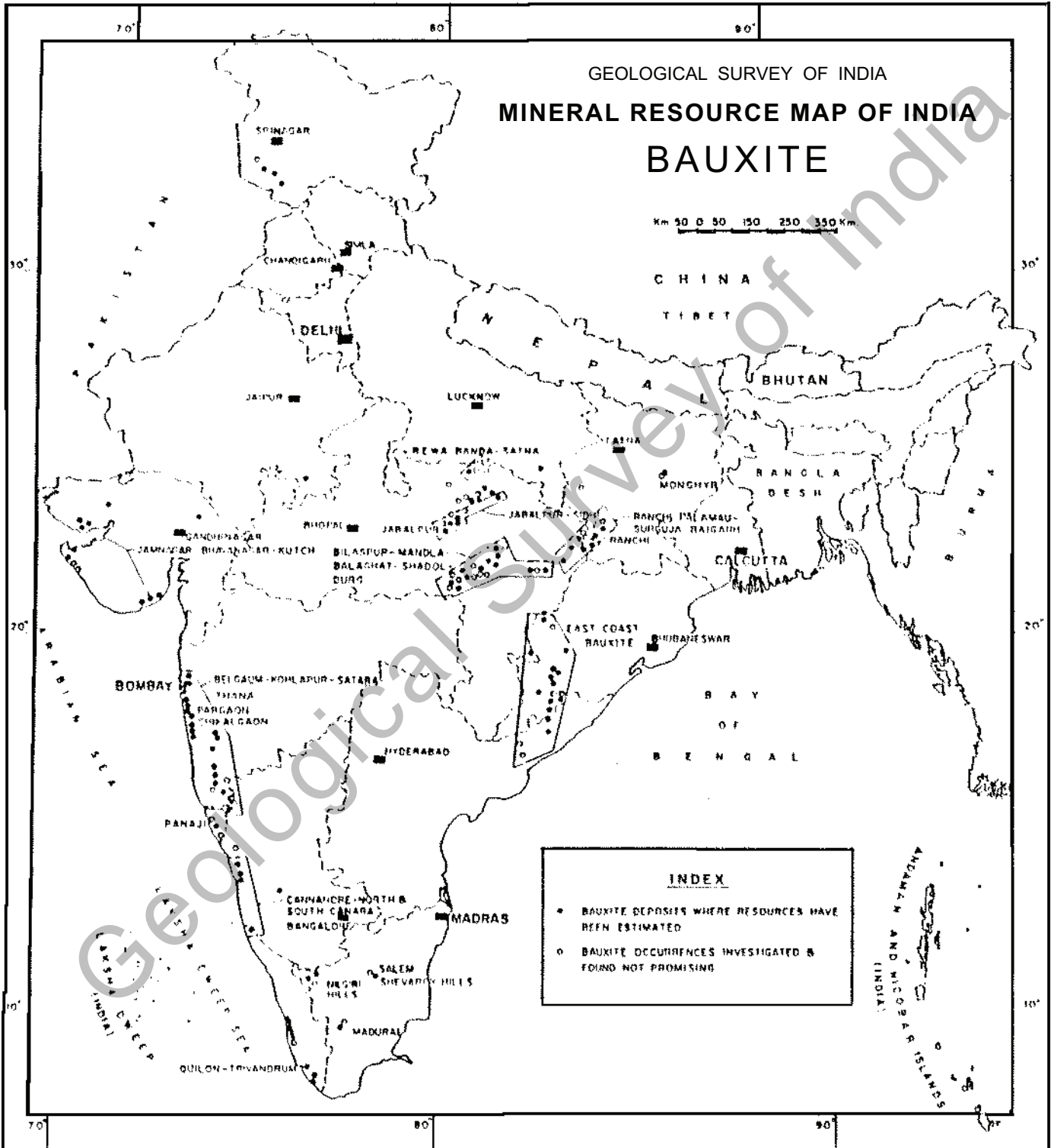
The locations of major bauxite bearing regions of India are shown in Plate-I.

Till 1970 the known bauxite reserves of India were of the order of 345 million tonnes. The major break through in the discovery of vast and massive deposits of bauxite in East Coast Belt in Orissa and Andhra Pradesh resulted in the addition of 2000 million tonnes of bauxite in the country's inventory. State-wise 'insitu' and 'recoverable' reserves of bauxite are shown in Table – 1.

The East Coast Bauxite Belt comprising widely scattered and highly dissected bauxite deposits of Orissa and Andhra Pradesh are located on the high flat top plateaus of Eastern Ghats in the districts of Koraput, Kalahandi in Orissa and Visakhapatnam and East Godavari in Andhra Pradesh. The central dissected table land extending over Ranchi and Palamau districts of Bihar and Surguja, Raigarh, Bilaspur, Durg, Mandla, Shahdol, Balaghat and Seoni districts of M.P., is a major source of bauxite. Excepting the deposits at Katni area, Jabalpur and Satna districts of M.P., all the other deposits of this area are associated with high level laterites occurring on plateau tops having elevation of 1000 m. In the southern part of India significant deposits of bauxite also occur in the dissected table lands and plateaus of Maharashtra and extend into parts of Karnataka. The important deposits of Maharashtra occur in Kolhapur, Satara, Kolaba and Thane districts. Here the low lying ranges are aligned parallel to the coast and are 250 m – 300 m above MSL and show bauxite segregations in the laterite capping. The bauxite bearing laterites also occur on the hill ranges in Belgaum, Chitradurga and Chikmagalur and coastal areas of the North and South Kanara districts of Karnataka. Bauxite occurrences in Kerala are known in Kombla area in Cannanore district. The deposits occur over small plateaus and hills rising to heights of 50 m – 220 m. Gujarat is reputed to be one of the prime bauxite bearing areas producing significant quantity of bauxite of chemical, refractory and abrasive grades. The bauxite deposits in Gujarat occur in three separate areas viz. (i) Coastal tracts of Jamnagar and Bhavnagar districts, (ii) South and south western tracts of Kutch (iii) Isolated areas of Kheda, Sabar Kantha, Valsad and Surat districts. Deposits of bauxite occur in several places in Goa coast.

The high hill ranges of Palni, Nilgiri and Shevaroy in Tamil Nadu host bauxite deposits associated with laterite cappings and are major sources of supply to alumina plants of M/s. NALCO. Significant deposits have been located on Vindhyan plateaus extending from Satna to Banda in Madhya Pradesh and Mirzapur to Varanasi in Uttar Pradesh.

Only a small part of the total identified resource has been under active mining. Recently, many entrepreneurs are venturing into mining of new deposits. As a result, the status maps of leasehold – freehold areas of the different bauxite bearing regions are fast changing. Uptodate information of the freehold properties is available with the Directorate of Mines and Geology of respective state governments and Indian Bureau of Mines, Nagpur where a consolidated account of such information is maintained.



1.3 Bauxite, laterite and parent rock relationship :

Bauxite deposits in India overlie different rock types viz. Archaean and Proterozoic metamorphics, Gondwana and tertiary sediments, Cretaceous and Eocene volcanics. Nearly 74% of the total resource occur over khondalites of Eastern Ghats, 20% occur over the Deccan traps and the rest on other rock types. Almost all major rock type contains aluminium. Under suitable conditions of weathering, chemical alteration and leaching through geological time, these rocks have given rise to laterite and bauxite residuum. The best parent rock which may give rise to bauxite are silicate rocks with high alumina and free from quartz, like syenite and basalt. Bauxite may occur as thick massive blanket type capping (East Coast Deposits of Orissa and Andhra Pradesh) or as lensoid bodies running for several hundred meters (Dhangarwadi and Udgar, Kolhapur of Maharashtra and Amarkantak area, Mandia district, Madhya Pradesh) within laterite residuum. Generally the bauxite is overlain by a thin layer of lateritic soil and hard pisolitic and ferruginous laterite. The thickness of bauxite body varies considerably even within a single deposit from less than a meter to tens of meters. A thick zone of lithomarge is invariably present between the upper bauxite zone and the parent rock below.

1.4 Mineralogy and Chemistry of bauxite :

Mineralogically, bauxite consists chiefly of hydrated aluminum oxide, namely, gibbsite, boehmite, diasporite with impurities of iron hydroxide minerals and titanium oxide. Based on the predominant mineralogy, bauxite may be classified into gibbsitic type, mixed gibbsitic boehmite type, boehmite type or diasporic type. Silica in bauxite is mainly found in the form of kaolinite and quartz. The other mineral impurities present in bauxite are hematite, goethite, anatase, rutile. The gangue minerals present in some bauxite are chamosite, pyrite, siderite, ilmenite, sphene, calcite and dolomite.

The major chemical constituents i.e. Al_2O_3 , Fe_2O_3 , SiO_2 , TiO_2 together with "Loss on Ignition" (LOI) constitute more than 99% bauxite composition. The rest is contributed by FeO, CaO, MnO, MgO, K_2O , Na_2O and P_2O_5 . The SiO_2 is present mainly in form of kaolinite and quartz respectively known as 'reactive' and 'free' silica. The bauxite, in general, has 40-50% Al_2O_3 , 4-28% Fe_2O_3 , less than 1-5% SiO_2 , 2-11% TiO_2 and LOI 18-30%. The titania content in the bauxite has a bearing on the source rock. The bauxite over basaltic rock have higher titania compared to the bauxite derived from khondalite-charnockite. The LOI is directly proportional to alumina content and inversely proportional to Fe_2O_3 . Analyses of important Indian bauxites and their approximate mineral composition by normaltive calculation are shown in Table-4.

In extraction metallurgy of aluminium the mineralogy of bauxite plays a very significant role – boehmite content in bauxite would render the digestion process more difficult as compared to one with higher trihydrate aluminium oxide or gibbsite form. Other mineral impurities of iron, titanium and silica only increase the waste thus reducing the productivity and increasing the cost of production. In Bayer's process of metallurgy bauxite with higher 'reactive' silica increases the loss of alumina and caustic soda. The gibbsitic bauxites are best suited for metallurgy of aluminium whereas the boehmitic and diasporic varieties are suitable for refractory, abrasive and chemical industries.

In a bauxite profile, the alumina content generally increases gradually downwards from the top of the bauxite horizon, reaches its maximum in the middle part and decrease towards the base. A large number of lateritic bauxite contains 4-8% total SiO_2 . There is generally a pronounced increase of the reactive silica at the bottom of the bauxite horizon. The majority of the laterite bauxite deposits contain 10-28% Fe_2O_3 . The variability of iron vis-à-vis other major chemical components is very pronounced in bauxite-laterite profile. This is best illustrated by highly ferruginous dark brown coloured duricrust with 50-65% Fe_2O_3 occurring over white bauxite containing less than 3-5% Fe_2O_3 . Commonly titania in a bauxite ranges from 1-4%. The highest range of TiO_2 content (8-10%) is reported from the basalt derived bauxite of M.P. and Maharashtra. Average "Loss on Ignition" (LOI) of the bauxite is highest 28-31% in the high alumina gibbsitic bauxite (trihydrate alumina bauxite). The lowest average loss on ignition (15-19%) is found in the deposits dominantly composed of monohydrate aluminium oxide-boehmite and diaspore. The characteristics of major Indian bauxite are summarized in Table – 3.

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CHAPTER - II

BAUXITE DEPOSITS

2.1 EAST COAST BAUXITE BELT (ORISSA AND ANDHRA PRADESH)

The bauxite deposits of Andhra Pradesh and Orissa are referred to as the 'East Coast Deposits' due to their proximity to the eastern sea coast of India. The deposits in this belt account for nearly 74% of the reserve figure in the country.

Distribution :

The East Coast Bauxite Belt of Andhra Pradesh and Orissa is bound within the north latitudes 17°47' and 19°45' and the east longitudes 81°55' and 83°30' (Toposheet Nos.65 G,I,J,K,M and N). The deposits in this belt occur scattered over a length of 400 km and width of 30 km in approximately NE-SW alignment conforming to the general trend of the Eastern Ghat hill ranges. The individual bauxite deposits explored under East Coast Bauxite Project are shown in the Plates II, III & IV.

The major bauxite deposits in the East Coast Belt are grouped as follows :

Andhra Pradesh			Orissa			
Group	Deposits		Group	Deposits		
Gurtedu	Katamrajkonda		Southern	i)	Pottangi	
				ii)	Ballada	
				iii)	Maliparbat	
Chintapalli	i)	Sapparla	Central	i)	Panchpatmali	
	ii)	Gudem		ii)	Kodingamali	
	iii)	Jarrela		iii)	Karnapadi Konda	
Anantagiri	i)	Galikonda		Northern	i)	Baphlimali
	ii)	Raktakonda			ii)	Sijimali
	iii)	Katuki			iii)	Karlapat
	iv)	Chittamgandi	iv)		Lanjigarh	

A few important deposits have also been reported (by DGM, Orissa) from Kashipur, Polingpudar and Gandhamardan plateaus and Khariar high lands. There are several other smaller prospects viz., Anamini Parbat, Taldih, Tanjiri Dongar, Kutrumali, Pasanmali, Taljhir, Korakhpur, Manjimali, Dandiwali, Chandigiri, Sunger, Gusarmali, Hatimali, Indragiri.

Geology

The belt consists of a number of 'high level' lateritic bauxite deposits located at an elevation of 900 m to 1450 m above MSL. The deposits are represented as flat topped hill with thick capping/blanket of laterite-bauxite directly overlying the khondalite and charnockite rocks of Eastern Ghat.

A type profile of East Coast Bauxite deposit is given below :

Lithounit	Thickness in meters
Ferruginous laterite duricrust	1 - 5
Bauxite with intercalation of laterite	2 - 54
Partially lateritised khondalite/charnockite or lithomarge	3 - 25
Kaolinised khondalite/charnockite	5 - 8
Unaltered khondalite/charnockite	Base

A majority of the cappings overlie the khondalites. Some cappings have vast areal spread of 3 to 5 sq. km. (Jarrela deposit, Chintapalli Group, Andhra Pradesh) to 10-15 sq.km. (Baphlimali and Panchpatmali in Orissa). The laterite/bauxite cappings (plateau tops) has generally thin vegetation whereas the slope supports thick vegetation. The bauxite deposits in Andhra Pradesh are smaller in extent but better in quality and grade compared to the deposits in Orissa. Panchpatmali deposit, Orissa alone has 317 million tonnes of bauxite.

Physical characters of bauxite :

These bauxites are hard and massive in the top 1 m – 3 m and moderately hard and spongy below. The common types include reddish brown, pink, cream and yellowish brown bauxite with crystalline and cryptocrystalline gibbsite in varying proportion. Specific gravity of bauxite ranges from 2.1 to 2.3.

2.1.1

ANDHRA PRADESH

The reserve of bauxite in the state is of the order of 657.78 million tonnes which is approximately 21.65% of the country's total reserve. The salient points of the individual deposits are summarized in Table – 5. The locations of the bauxite deposits are shown in Plates – II & III.

Gurtedu Group of Deposits :

The deposit comprises a cluster of hills attaining a height upto 1286 m. situated about 185 km west of Visakhapatnam. The bauxite in Katamrajkonda Block I and Block II is spread over an area of 1.80 sq.km. with an average thickness of 14.62 m. The total reserve is estimated at 42.63 million tonnes.

Anantagiri Group of Deposits :

These deposits are located about 85 km. from Visakhapatnam and close to Visakhapatnam – Kirandul section of SE Rly. Bauxite deposits of Galikonda, Raktakonda and Katuki are together known as deposits of Araku valley. Chittamgandi deposit is the only deposit in this group which falls outside Araku valley area.

Galikonda Deposit :

Elevation : 1170 m to 1446 m above MSL; the Galikonda deposit occupies a NE-SW trending plateau. The average thickness of bauxite is 19 m and 10.72 m. in the two blocks. Higher alumina content is noted in the lower part of the bauxite profile. The total reserve of the two blocks is 15.05 million tonnes of metallurgical grade bauxite.

Raktakonda Deposit :

The Raktakonda deposit occupied an area of 0.42 sq.km. on a flat topped laterite/bauxite bearing plateau and is located along the eastern side of Vizag – Araku road. The average thickness of bauxite is 11.4 m. with an estimated reserve of 8.57 million tonnes of metallurgical grade.

Katuki Deposit :

Katuki deposit occurs on a flat top plateau of elevation 1208 m to 1296 m with a small areal extent (0.14 sq.km). The reserve is 4.43 million tonnes of metallurgical grade bauxite.

Chittamgandi Deposit :

Located close to Orissa border NNW of Anantagiri town, the Chittamgandi deposit is at 1090 m to 1419 m elevation, the average thickness of the bauxite is 9.61 m. The reserve is estimated at 28.50 million tonnes.

Chintapalli Group of Deposits :

The deposits in this group can be approached from Chintapalli, situated 145 km from Visakhapatnam. Chintapalli group includes the following three main deposits.

Sapparla Deposit : This deposit consists of 12 major cappings referred as block 1 to 12. The particulars of individual blocks have been summarized in the Table – 5. A sizeable reserve of metallurgical grade bauxite with Al_2O_3 46.4% to 47.75%, SiO_2 1.13% to 3.30%, Fe_2O_3 20.22% - 23.89% and TiO_2 1.56% - 3.14% has been estimated by GSI.

Gudem Deposit : Located 16 km. west of Chintampalli, the deposit is spread over 6 blocks covering an area of about 2.63 sq.km. with bauxite capping ranging in thickness from 3.20 m to 39.5 m. GSI has estimated a total reserve of 44.41 million tonnes of bauxite of metallurgical – I grade.

Jarrela Deposit : Jarrela deposits lies 24 km. north west of Chintampalli and are close to Visakhapatnam – Kirandul section of S.E. Rly. GSI has estimated a total reserve in the four blocks of the deposit as 246.04 million tonnes of bauxite.

2.1.2

ORISSA

The bauxite reserve in the state is of the order of 1607 million tonnes which is approximately 52.9% of the country's total reserve. The salient points of the individual deposits with reserves are summarized in the Table-6. The locations of the deposits are shown in Plate – IV.

Pottangi Deposit : The deposit is located on 'Sirimanda Parbat (18°34" – 18°46" : 82°56" – 82°58") situated north of the Pottangi village in Nandapur taluka of Koraput district. The Pottangi plateau occupies an area of 4.5 sq.km. at an elevation of 1206 m to 1405 m. The total reserve of the four blocks of the deposit is 75.22 million tonnes of bauxite.

Panchpatmali Deposit : The deposit is located in Koraput district, Orissa, bounded by latitudes 18°46' and 18°55' and longitudes 82°57' and 83°04'. The deposit extends in length for 16 km. along NE-SW direction, attains a maximum width of 2 km. with an average width of 800 m. The plateau has elevation of 1180 m to 1355 m. The deposit is divided into three blocks, North, South and the Central. Of these the Central block is under development and active mining by National Aluminium Co. Ltd. (NALCO) as a captive open cast mine with an annual production capacity of 2.4 million tonnes.

The bauxite occurs at Panchpatmali as a gently sloping or nearly flat blanket type capping on khondalite. Panchpatmali deposit is the single largest deposit of bauxite in India having a total reserve of 323.3 million tonnes. Plates V – VIII depict the salient exploration attributes of Panchpatmali Central Block.

Ballada Deposit :

Coordinates	:	18°27" : 82°00"
Toposheet No.	:	65J/11
District	:	Koraput
Elevation	:	1185 m to 1264 m
Area	:	0.86 sq. km.
Thickness	:	2.05 m to 19.20 m (average 7.70 m.)

GSI has estimated a total reserve of 12.41 million tonnes of metallurgical grade – I bauxite at +40% Al₂O₃ and –5% SiO₂ cut off.

Kodingamali Deposit :

Coordinates	:	19°04' : 83°05'
Toposheet No.	:	65 M/4
District	:	Koraput
Elevation	:	1102 m to 1276 m
Area	:	5.33 sq. kms.
Thickness	:	2.55 m to 32.10 m (average 13.55 m.)

The total reserve estimated by GSI and MEC is 91.40 million tonnes of bauxite at +40% Al₂O₃ and -5% SiO₂ cut off.

Baphlimali Deposit :

Coordinates	:	19°18' to 19°22' 82°57' to 82°59'
Toposheet No.	:	65 I/5
Elevation	:	1104 m - 1094 m
Nearest Rail Head	:	Bissamcuttack, 51 km.
Area	:	9.6 Sq. Km.
Thickness	:	2.25 m to 25.8 m (average 11.98 m.)

The reserve has been estimated at 195.73 million tonnes of metallurgical grade bauxite at +40% Al₂O₃ and -5% SiO₂ cut off. At +45% Al₂O₃ cut off, the reserve is of the order of 100 million tonnes.

Maliparbat Deposit :

Coordinates	:	18°39' to 18°40' 82°53' to 82°56'
Toposheet No.	:	65 J/4
District	:	Koraput
Elevation	:	1176 m – 1399 m
Rail Head	:	Paliba, 28 Kms.
Area	:	1.09 Sq. Kms.
Thickness	:	1 m to 11 m (Average 5 m).

The reserve estimate is 9.8 million tonnes of metallurgical grade I bauxite.

Karnapadikonda Deposit :

Coordinates	:	18°46' to 18°50' 83°03' to 83°07'
Toposheet No.	:	65 N/1
District	:	Koraput
Rail Head	:	Parvatipuram, 50 Kms.
Area	:	1.93 Sq. Kms.
Thickness	:	3.6 m to 19.0 m (Average 5 m).

The reserve estimated is 17 million tonnes of metallurgical grade bauxite at +45% Al_2O_3 and -5% SiO_2 cut off.

Lanjigarh Deposit :

Coordinates	:	19°42'45" : 83°22'15"
Toposheet No.	:	65 M/6
District	:	Kalahandi and Koraput
Rail Head	:	Lanjigarh Road, 10 Kms.
Elevation	:	1016 m – 1306 m
Area	:	5.64 Sq. Kms.
Thickness	:	2 m to 18.20 m (Average 9 m).

The reserve of bauxite is 47.36 million tonnes at +40% Al_2O_3 and -5% SiO_2 cut off.

Karlapat Deposit :

Coordinates	:	19°37' to 19°41' 83°09' to 83°11'
Toposheet No.	:	65 M/2
District	:	Kalahandi
Rail Head	:	Bissamcuttack, 37 Kms.
Elevation	:	960 m –1080 m
Area	:	9.73 Sq. Kms.
Thickness	:	2 m to 15 m (Average 6.63 m).

The total reserve figure is 59 million tonnes of bauxite of metallurgical grade – I.

Sijimali Deposit :

Coordinates	:	19°28" to 19°32" 83°06" to 83°10"
Toposheet No.	:	65 M/3
District	:	Kalahandi
Rail Head	:	Bissamcuttack, 45 Kms.
Elevation	:	991 m – 1233 m
Area	:	13 Sq. Kms.
Thickness	:	3 m to 9 m (Average 6.5 m).

The reserve figure at +40% Al₂O₃ cut off is 86 million tonnes of bauxite.

Gandhamardan Deposit :

Gandhamardan deposit of Bolangir and Sambalpur district of Orissa is the second single largest deposit of bauxite in India. Though not forming part of it because of its location far away from the coast, the Gandhamardan deposit is akin to East Coast bauxites in its geological characteristics. The deposit is about 10 km. long and 0.7 km wide. The deposit has been divided into 10 blocks of which only block VIII has been explored in sufficient detail. Four blocks have been leased out to BALCO. The deposit is located 42 km from Padampur. Basement rock is khondalite, bauxite occurs as continuous blanket and as large pockets. Lateritisation and bauxitisation has taken place in situ. The plateau is 940 m – 1005 m above MSL. The details of the deposit is given below :

Coordinates	:	20°50' to 20°55' 82°30' to 82°45'
Toposheet No.	:	64 L/13
Rail Head	:	Lakhna, 20 Kms.
Elevation	:	940 m – 1005 m
Thickness	:	1.17 m to 33 m

DGM, Orissa explored the deposit. Subsequently MEC has carried out detailed exploration and assessment in a few blocks. The total reserve figure is 216.074 million tonnes of bauxite calculated at +40% Al₂O₃ and – 5% SiO₂ cut off. The average Al₂O₃ content 41.83% to 53.29%.

Apart from the important deposits of East Coast and Gandhamardan discussed above the following bauxite deposits are noteworthy. These deposits were assessed in a preliminary way by DGM, Orissa.

Deposit	Reserve at +40% Al ₂ O ₃ and -5% SiO ₂ cut off
Kalahandi District	
i) Khariar plateau (Khondmal Sainipara) Toposheet No.64 L/7 Rly. Stn: Kantabanji, 5 kms.	2 million tonnes
ii) Kisanwali (19°40' : 83°05') 40 Kms. from Bhawanipatna Toposheet No.65 M/3	13.28 million tonnes
Koraput District	
iii) Chandgiri (19°24' : 83°03') Toposheet No. : 65 M/3 Rly. Stn. : Bissamcuttack, 45 kms.	7 million tonnes
iv) Gusramali Toposheet No. : 65 I/5 Rly. Stn. : Koraput	20 million tonnes
v) Hatimali Toposheet No. : 65 M/3 Rly. Stn. : Theruvali, 35 kms.	20 million tonnes
vi) Indragiri Toposheet No. : 65 M/3 Rly. Stn. : Theruvali, 35 kms.	13 million tonnes
vii) Kathakhal – Manjimali (19°25 - 23°08') Rly. Stn. : Ambodala	20 million tonnes
Phulbani District	
viii) Anamini Parbat (19°51' : 83°40') Rly. Stn. : Muniguda, 45 kms.	30 million tonnes

2.2

MADHYA PRADESH

Bauxite reserve in the state is of the order of 277.76 million tonnes which is approximately 9.14% of the country's total reserve. Madhya Pradesh (M.P.) was the biggest repository of bauxite in India before the discovery of East Coast Bauxite in Orissa and Andhra Pradesh. Major bauxite deposits in M.P. are located in Bilaspur, Balaghat, Surguja, Rewa, Jabalpur, Raigarh, Satna and Bastar districts. Laterite cappings cover a total area of more than 1500 sq. km. The bauxite deposits located in those cappings may be grouped as follows :-

- i) Extension of Bihar plateau region into the districts of Surguja, Raigarh and Bilaspur.
- ii) The plateau region forming the Maikala Hill range (Amarkantak deposit) in the districts of Shahdol, Bilaspur, Rajnandgaon, Mandla and Balaghat.
- iii) Katni area of Jabalpur district.
- iv) Simaria, Sohawal-Nagod-Maihar areas in the districts of Rewa, Satna and Panna.
- v) Malwa plateau in Bhopal, Guna, Sahajpur and Shivpuri districts.
- vi) Keskhal and Bailadila ranges in Bastar.

Out of these, the first two areas account for 80% of the total reserve of the state. Bauxite deposits occur in the plateaus and flat top hills at elevations 700 m to 1160 m above MSL in the laterite cappings over Deccan Trap basalt. Bauxite occurs as discontinuous lenticular and tabular bodies persisting down to a depth of 10 m – 12 m from surface. Gibbsite is the main constituent mineral. Other major deposits are found in the lateritic cappings over the Vindhyan sandstone in the district of Rewa and Satna.

Two aluminium plants namely BALCO at Korba and Hindalco at Renukoot are based on the supplies of bauxite from Phutkapahar, Bilaspur district and Rakti Dadar, Nanhu Dadar, Hazari Dadar and Barli area, Amarkantak plateau. These deposits are under active mining since last three decades. The district wise details of the important bauxite deposits (as per their original assessment) are given in Table 7.

A summary of the important deposits is given below :

Balaghat District :

Bauxite deposits are clustered around Kotapahar area and Supkhar area of Balaghat.

Kotapahar

Coordinates	:	21°52" - 54" : 80°23" - 26"
Toposheet No.	:	64 C/5
Rail Head	:	50 Km. NE of Balaghat.
Thickness	:	4.2 m (Average)

Bauxite capping on Deccan Trap occurs as discontinuous lenses and pockets in the laterite profile in five individual locations. Average analysis 40% - 56% Al_2O_3 and 0.85% to 11.13% SiO_2 . GSI carried out detailed geological mapping of 4.2 sq. km., 1132 m drilling in 141 boreholes and 478 cum of pitting. The reserve is estimated at 4.49 million tonnes.

Supkhar

Coordinates	:	22°08' - 11' : 80°47' - 53'
Rail Head	:	100 Km. NE of Balaghat.

Group comprises six separate plateaus. Laterite-bauxite cappings are on Deccan Trap. The reserve is estimated at 13.52 million tonnes.

Bilaspur District :

Phutkapahar area : 32 km of north of Korba, laterite capped plateaus bordering MP and Bihar having elevation of 980 m. Bauxite profile is 20 m – 25 m thick developed on the top of Deccan Trap. Mineralogically composed mainly of gibbsite and boehmite. The ore/overburden ratio is 5:2. Reserve estimated (by drilling, pitting etc.) is of the order of 3.04 million tonnes.

Paunakhera Pahar : 8 km from Patrapale, the plateau is at an elevation of 980 m. The thickness of bauxite varies from 1 m – 3 m. High grade bauxite contains Al_2O_3 59%, SiO_2 < 1.48% and TiO_2 8.3%. Reserve is estimated as 0.4 million tonnes.

Karela Pahar : (22°33" : 82°52") The area exposes bauxite cappings on both the Deccan Trap and Kamthi sandstone (Gondwana). The bauxite is massive pisolitic type, thickness ranges from less than a meter to 1.5 m. The bauxite is having high TiO_2 upto 9.4% and analyses Al_2O_3 upto 57.83%, SiO_2 0.36% and Fe_2O_3 4.27%.

Surguja District :

Bauxite occurs in the laterite cappings in the northern part of the district in the following areas :

Jamirapat area : Prospecting by GSI in 13 blocks in Jamirapat belt established sizeable bauxite deposits. The belt is 40 sq.km. in extent. The bauxite is derived from Deccan Trap basalts. The total reserve is 36.62 million tonnes with an average 52% Al_2O_3 .

Mainpat area : (22°41' - 22°55' : 83°08' - 83°25')

DGM, Madhya Pradesh has established a reserve of 33 million tonnes of bauxite.

Rewa District :

Semaria area : (24°30' - 24°58' : 81°07' - 81°25')

Situated near M.P. – U.P. border about 45 km from Satna. This area occupies the Rewa-Satna plateau comprising Upper Vindhyan rocks. Bauxite is derived from the Upper Vindhyan sandstone. The reserve established by GSI is 10.40 million tonnes of bauxite of 43% to 48% Al_2O_3 and 3.71% to 6.00% SiO_2 .

Satna District :

Marohill (24°26' : 86°50') : 18 km SE of Satna. The bauxite capping is on Vindhyan sandstone. DGM, Madhya Pradesh carried out prospecting work in this area. 3.70 million tonnes of bauxite has been reported.

Other smaller Deposits : Most of the small deposits occurring in the district are under active mining or under leasehold. Bauxite is of metallurgical, refractory and chemical grades.

Jabalpur District :

Bauxite deposits are located near Katni, Bakarwara, Sleemanabad and Dundi area. Most of these smaller deposits are leaseholds.

Katni area : It is the most developed and exploited bauxite area of M.P. Bauxites are associated with low level laterites. The average thickness of bauxite in the leasehold of ACC varies from 2 to 12m. Bauxite is derived from Vindhyan limestone and shales. Katni bauxite has good reserve of refractory grade. The important bauxite mining areas in Katni area are Tikuri, Tikaria, Bargawan and Padarwara, Kusmi, Baghai etc.

Raigarh District :

In Jashpur subdivision of Raigarh minor occurrences of bauxite are located in many areas. These are Khuria high lands, Bijaghat (6,960 tonnes), Chichri and Ratni (127,010 tonnes), Daitpani (45,270 tonnes), Garhpahar (64,010 tonnes) and many other smaller deposits. The average thickness of bauxite is 3m. Bauxite directly rests over gneissic rock. Grade : Al_2O_3 51%-59% SiO_2 0.20%-2.34%, Fe_2O_3 2.12%-6.21%, TiO_2 9.15%-14.12%.

Mandla District :

Three important deposits are Khamera (22°36' : 81°17'), Nagarkhol (22°33' : 81°39') and Silpuri Dadar (22°32' : 81°20') have been assessed by GSI. The reserves are 2.58 million tonnes, 7.27 million tonnes and 1.00 million tonnes respectively.

Shahdol District :

Amarkantak area : Bauxite occurs in irregular and dissected plateaus (1050m – 1100m) forming a part of Maikala Range. There are altogether twelve dissected plateaus. Hazari Dadar and Rakti Dadar deposits are most extensive. The laterite-bauxite capping is 20m – 30m thick and rests on Deccan Traps. Important deposits are located at Umargaon (22°46' : 81°46'), Nanhu Dadar, Bangla Dadar. The total reserve of Amarkantak group of deposits in Shahdol district is of the order of 20.40 million tonnes of bauxite.

Rajnandgaon District :

Bodai – Daldali area (22°23' - 22°29' : 81°10' - 81°14') includes five blocks namely, Bodai, Kesmarda, Semsata, Rabda and Daldali. The area forms the central part of the Maikala range. The bauxite laterite capping is on Deccan Trap. GSI has estimated a total reserve of 8.29 million tonnes for these deposits. The Al_2O_3 ranges from 42% to 57%; thickness of bauxite varies from 1.30 m to 4.80 m.

Bastar District :

Keskal area : Occurrences of high grade bauxite over the Proterozoic Bamni Sandstone of Indravati Group were found by GSI in Keskal-Amabera area and in Pirhapal-Tarandul area. A total of 9 million tonnes of inferred reserve has been estimated in the area.

2.3

BIHAR

Bauxite reserve in the state is of the order of 111.04 million tonnes which is approximately 3.65% of the country's total reserve. Deposits in Bihar are generally found between altitudes of 960 m and 1075 m above MSL and occur in form of an extensive blanket lying below the laterite cover on the flat topped plateaus with gently undulating topography. It occurs as segregation, discontinuous boulders and in blanket form over laterite residuum. The thickness of the deposits ranges from 1 m – 18 m with an average thickness of 6 m.

The district wise list of the major bauxite deposits is given in Tables 8 and 9. The important deposits of bauxite are located in Ranchi and Palamau districts. The reserve of the deposits under the leaseholds is 20.93 million tonnes compared to the reserve of 18.24 million tonnes in the freehold parts.

Palamau District :

Jamirapat area : The bauxite bearing belt extends to adjoining areas of Madhya Pradesh. The sequence comprises a 10 m – 20 m thick profile of pisolitic bauxite sandwiched between laterites. GSI has estimated a reserve of 3.1 million tonnes of bauxite with 48% Al_2O_3 .

Ranchi District :

Richiguda (22°34" : 84°39") : In this area two types of laterite are found viz. plateau laterite and valley laterite. The plateau laterite occurs as extensive blankets on the high ridges locally known as 'pats'. Important deposits are Banorbar, Manduapat, Pakhar and Rudnipat. These deposits occur at an elevation of 1000 m to 1100 m. Bauxite is derived from granite gneiss and also from basalt. A total reserve of 7.938 million tonnes of bauxite at +45% Al_2O_3 cut off has been estimated.

Lohardaga sector : The cluster of deposits in this area is typically represented by Bagru Hill (23°29' : 84°36'), a leasehold of INDAL, where 10 m – 15 m thick section from Precambrian basement to the top of the bauxite is well exposed. Laterite and bauxite with exposed thickness of 2 m occur as cappings over infra-trappean beds. The important deposits are Maidanpat, Birhnipat and Bagru Hill. A total reserve of 7.468 million tonnes of bauxite with 46% - 53% Al_2O_3 has been recorded. There are as many as 12 leaseholds and equal number of freehold deposits.

Gumla District :

Shrendag sector (23°27" : 84°25") : Comprises cluster of deposits namely Shrendag, Jalim & Sanai, Taimu and Jillingsirra. A total reserve of 19.189 million tonnes of bauxite has been estimated.

Netarhat sector : Netarhat plateau is covered by bauxite-laterite capping. There are five leaseholds in the sector and eleven freehold deposits. Important deposits are Amtipani, Chirodih, Gurdari.

Santhal Parganas : Rajmahal hills comprise plateau of low elevation (maximum 520 m) extending from Sahebganj in the north to Dumka in the south. Laterite-bauxite profile occurs as capping over the Rajmahal Trap. Important occurrences are Banspahari, Kotarbahnil, Chotta Adra. The bauxite analyses Al_2O_3 46% to 60.25%, SiO_2 1.04% to 5.23%. The total inferred reserve is 5.6 million tonnes.

2.4

MAHARASHTRA

Bauxite reserve in the state is of the order of 102.88 million tonnes which is approximately 3.38% of the country's reserve. Important bauxite deposits are located in Kolhapur, Kolaba, Ratnagiri, Satara districts. The occurrences are confined to the top of different plateaus of Western Ghats. The deposits are associated with laterites which rest on Deccan Trap basalt. Bauxite occurs between 1000 m – 1100 m above MSL in Kolhapur and Satara districts and at 150 m – 200 m above MSL in Ratnagiri and Kolaba districts. In Kolhapur the bauxite is blanket type deposit, in other areas it is pockety and lensoid type. The thickness of bauxite ranges from 0.3 m to a maximum of 10.6 m. The particulars of the most important deposits in Maharashtra are given in Table – 10.

District wise description of a few important deposits are given below :

Kolhapur District :

The bauxite deposits are confined to the plateau tops at about 1000 m – 1100 m elevation, forming parts of Western Ghats. The deposits are confined to the western part of the district.

Kasarsada – Nagartswadi Group : Kasarsada deposit is located at Chandgad Tehsil and is situated 9 km SSE of Nagartswadi. The thickness of bauxite ranges from 3 m – 9 m (average 4.9 m). The thickness of over burden is 3 m. The average chemical analysis is Al_2O_3 52% and SiO_2 2.6%. A major part of the deposit is under leasehold of M/s. INDAL. The total reserve in the area is 4.97 million tonnes.

Dhangarwadi – Penhela Group : A cluster of deposits namely Dhangarwadi, Girgaon, Rangewadi are situated close to Kolhapur – Ratnagiri Highway. The deposits lie on a plateau, 10 km in length and 1.6 km in width. The plateau is highly dissected. The thickness of profile varies from 0.9 m to 14 m with an average thickness of 3.5 m. A major part of the deposit is without overburden. Over 5962 hectares of the deposit is leased out to BALCO. GSI estimated a reserve of the order of 16.10 million tonnes.

Udgiri : The deposit is about 1 km NW of Udgiri ($17^\circ 05' - 17^\circ 08' : 73^\circ 48' - 73^\circ 55'$). Here bauxite forms a saucer shaped continuous body of variable thickness below the laterite overburden. The deposit comprises 4 plateaus with average thickness of bauxite of 5 m. The deposit is the leasehold of BALCO. The reserve is 9.5 million tonnes. Computed average analytical value is Al_2O_3 53%, SiO_2 1.93%, Fe_2O_3 10.49% and TiO_2 5.09%.

Kolaba District :

The main bauxite deposits of the coastal districts of Maharashtra are in Kolaba, Ratnagiri and Thana. They are associated with laterite forming plateaus and extending parallel to the coast for about 48 kms in Murad and Srivardhan Mahals. Of the several laterite cappings only about 25 are found to contain conspicuous bauxite horizons. Bauxite deposits are clustered around :

- i) **Pargaon – Saigaon area** ($18^\circ 21'$ to $18^\circ 30' : 72^\circ 51'$ to $72^\circ 59'$). The individual prospects are Pargaon, Chikalgaon, Kashod, Nandgaon, Supegaon, Usroli.
- ii) **Madgarh – Jivana Bandar area.** The individual prospects are Madgarh, Gavaliwadi, Khejari, Dandgiri, Kondivili, Wakalgarh, Shekhadi, Asuf, Huneveli, Devkhol, Punirkherdi, Jivana Bandar.
- iii) **Kurwadi, AdiDharwali, Kariwane area :** Bauxite occurs as irregular pockets in laterite, average thickness 3 m.

Ratnagiri District :

The bauxite deposits are contiguous with the deposits of Kolhapur district, Maharashtra. The deposits occur at an elevation of about 150 m above MSL. The deposits are located at Dapoli taluka and Madangarh mahal. In Dapoli taluka deposits are found in Anjarle, Chikalgaon, Kavdoli, Umbershet and in few other places.

Kavdoli (17°56' : 73°06') : Bauxite occurs over a small rectangular plateau capped by laterite. Significant reserves of all grades are available in this deposit. GSI has estimated a reserve of 2 million tonnes (proved) of bauxite having 58.19% of Al_2O_3 and 2.06% of SiO_2 .

Satara District :

The bauxite deposits of this district are confined to high plateau ridges of the Western Ghats capped by thick blanket of laterite. The deposits are restricted to a narrow strip of 10 km in width and 80 km in length covering western portion of Wai, Mahabaleswar, Javil and Patan talukas. The deposits are found at Eruli in Wai taluka, Ambral, Khangral, Rajpuri in Mahabaleswar Mahal. The deposits occur on Deccan basalt at an elevation of 1000 m to 1100 m. Bauxite occurs in the form of lenses and pockets, thickness ranging from 3 m to 6.3 m. The reserve estimated by GSI in Khangral – Rajpuri sector is of the order of 1.32 million tonnes.

In Koyna valley area between Kolghar in Javli taluka to the north and Kalamba village of Patan taluk to the south over a distance of 26 kms there are several isolated deposits, the reserve of these deposits is estimated at 4.11 million tonnes of bauxite. The deposits are Alevadi, Chikhli, Deur, Jhamba, Ghatmatha, Kati, Ninaywadi etc.

2.5

GUJARAT

Bauxite reserve in the state is of the order of 142.05 million tonnes which is approximately 4.6% of the country's total reserve. The deposits of Gujarat are distributed in three separate areas :

- i) Coastal areas of Jamnagar, Junagarh, Amreli and Bhavnagar,
- ii) South and southwestern part of Kutch district,
- iii) Ahmedabad region comprising parts of Sabarkantha, Kheda and Surat districts.

Bauxite of Jamnagar, Kutch, Sabarkantha and Kheda districts is known for their superior quality specially suitable for the refractory, chemical and abrasive industries. Laterite belt in Kutch and Jamnagar districts extend for about 250 kms with a width varying from 100 m to about 6 kms. The thickness ranges from 2 m to 5 m.

Bauxite deposits of Gujarat have been formed by :

- i) Insitu alteration of Deccan Trap lava flows. (Insitu residual type)
- ii) Reworking and deposition of insitu deposit.
- iii) Lateritisation of Supratrapean limestone.

The details of the important deposits in Gujarat are summarized in Table 11. Most of these deposits/prospects were studied and examined by GSI and subsequently by DGM/MEC.

Jamnagar District :

Bauxite occurrences in this district is confined to a 52 km long NE-SW trending belt with width varying from 1 km to 6 km. Usually the bauxite-laterite zone with thickness of 0.4 to 12 m is underlain by clay followed by Deccan Traps and are underlain by a moderate to thick overburden of Gaj series (Lr.Miocene) and Miolitic limestone (Pleistocene to Recent). The composition of the bauxite of Jamnagar is Al_2O_3 45% to 58%; SiO_2 2% to 4.5%; TiO_2 2.7% to 5.7% : Fe_2O_3 3%. In Kalyanpur area the reserve estimated for the deposits under leasehold is 4 million tonnes. The total reserve for the freehold deposits in Kalyanpur area is 15.4 million tonnes. The individual deposits are Bakudi, Bhatia, Gadhri, Mahadevia, Mawasa and Nandana.

Coastal deposits in Bhavnagar, Amreli, Junagarh and Jamnagar Districts

Several small and isolated pockets of bauxite occur in laterite fringing the Deccan basalts which are overlain by Tertiary sediments all along the coastal margins of Saurashtra region between Bhavnagar and Porbandar. In Bhavnagar district significant deposits are found in a 25 km long laterite belt exposed between Bhavnagar – Talaiya and Talgajarda. In Amreli district ferruginous, siliceous and aluminous laterite occurs near Dongar and Kagvadar villages. Isolated occurrences are found near Keashav, Visavada and Tukada villages of Probandar subdivision.

Kutch District :

Approximately 270 individual prospects/deposits have been demarcated along a belt of 200 km long and 0.5 to 2 km wide. The more important deposits of Kutch are located in Abdasa, Lakhpat, Nakhtrana and Mandovi talukas. Both insitu and transported type deposits are found in this district. A reserve of 14 million tonnes of bauxite of all grades has been estimated.

Ahmedabad Region :

Bauxite deposits are confined to a discontinuous zone of laterite running parallel to 73° longitude for a length of 105 km in Sabarkantha, Kheda, Surat and Valsad districts.

Sabarkantha District :

Workable deposits of bauxite occur in laterite terrain overlying Deccan Trap in Ambaliyara-Tenpur belt and Sultanpur-Harsal belt in Bayad and Prantij tehsils. Thickness of bauxite varies from 0.6 m. to 8.81 m. with an average of 3.25 m. Bauxite is generally of low grade suitable for alum and abrasive industries.

Kheda District :

High grade bauxite occurs in pockets, many of which are leased to small mining units. In and around Kapadvanj-Kasba area (23°02' : 73°04') low grade bauxite along with aluminous laterite suitable for cement industry occurs. A total of 14 mining leases have been granted in 111.28 hectares area.

Valsad District :

Isolated deposits occur near Pathri and Ajrali villages in Gandvi taluk.

Junagarh District :

Porbandur – Veraval belt (21°39' - 21°47' : 69°31' - 69°35') : Significant deposits of bauxite have been explored by GSI during 1972-76 in this belt. A total reserve (inferred) of 28 million tonnes of bauxite has been estimated. The average grade of this bauxite is 48% to 55% Al₂O₃ and 3.7% SiO₂.

2.6**GOA**

Bauxite reserve in the state is of the order of 35.1 million tonnes which is 1.15% of the country's total reserve. Laterite cappings upto 15m thick are conspicuous in Goa. Eleven prospects of bauxite have been reported by GSI.

- i) Polem – Loliem – Galgibaga area
- ii) Dabolim – Consna area
- iii) Quelossem – Verma – Raia area
- iv) Belin – Porvorim area
- v) Porvorim area
- vi) Mopa area
- vii) Calangute area
- viii) Taleigao – Bambolim area
- ix) Pernem area
- x) Morgim area
- xi) Camorlim area

The total 'recoverable' reserve of bauxite in Goa is 28.089 million tonnes, out of which the two deposits viz. Betul area and Mopa area together account for the 23.24 million tonnes.

Deposits in Betul, Quepem and Canacona talukas :

Bauxite deposits in these areas lie over metabasalts. Bauxite is derived from the alteration and lateritisation of these rocks. It crops out along the scarp section in Aradi

(15°07' : 73°57'), Mahavir, Siroli and Cola blocks, the thickness of bauxite varies from 0 m – 9 m with an average thickness of 5 m. Bauxite contains 53% Al_2O_3 . The substantial quantity of bauxite (Al_2O_3 , 52% to 56%) was mined and exported from the area in the past.

Deposits in Pernem taluka :

The deposits in Tuem, Virouors and Pernem are leaseholds. The maximum thickness of bauxite recorded in the area is 1.5 m.

The details of the important deposits are given in Table 12. A list of a few smaller deposits of bauxite investigated by GSI is given in Table 13.

2.7

KARNATAKA

Bauxite reserve in the state is of the order of 45.49 million tonnes which is 1.49% of the country's total reserve. In Karnataka several bauxite deposits occur on the hill ranges of Belgaum and Chikmagalur districts and on the coastal areas of North and South Kanada districts. The deposits of Belgaum district are mined for captive consumption in the alumina plant of M/s Madras Aluminium Company Ltd.

Two types of bauxite deposits are found in Karnataka (i) those derived from the insitu alteration of Deccan Trap basalt (high level bauxite type occurring on the plateau top) and (ii) those derived from the metasedimentaries. The deposits associated with Deccan Trap are generally smaller compared to the similar deposits of M.P. and Maharashtra.

The details of the important bauxite deposits are given in the Table 14. Besides these important bauxite deposits in the state, GSI has also explored several smaller deposits. These are shown in table 15.

The district-wise descriptions of a few important deposits are given below :

Belgaum District :

The bauxite deposits of Belgaum occur with high level laterite cappings forming blankets on flat plateau tops which are around 1000 m above MSL. These deposits are southern extension of the deposits of Kolhapur district, Maharashtra.

Bokmur – Navge Hills :

13 km. SW of Belgaum, bauxite occurring as large pockets within laterite, which varies in thickness from 3 m to 6 m. This insitu pockets of bauxite have given rise to float ore to the south of Boknur, west of Bijarny and Hangirge. The deposit with a reserve of 0.60 million tonnes is entirely under leasehold.

Karle Hill : DGM, Karnataka estimated the reserve in this deposit to the order of 0.35 million tonnes.

North Kanara District :

Several small disconnected bauxite deposits occur as low level laterite capping on Precambrians along the coastal tracts between Kumta and Mangalore. Most of these deposits/pockets have been prospected by DGM, Karnataka. GSI carried out exploration for bauxite in coastal Karnataka mainly in Apsarakonda, Chikankonda, Kabri, Mudugal prospects. Many of these prospects are not economically exploitable as they contain high silica.

South Kanara District :

The bauxite deposits are located at Guppipare plateau, Paduvare, Nagankalbare and in several other places.

Paduvare Deposit : This is the most important deposit of South Kanara district and is located at a distance of 1.6 km from Baidoor Rly. Stn. The deposit is being mined by M/s Mysore Minerals Ltd. The lateritic bauxite is derived from granite gneiss. The reserve is of the order of 6 million tonnes.

2.8 TAMIL NADU

Bauxite reserve in the state is of the order of 22.59 million tonnes which is 0.74% of the country's total reserve. The deposits are located in Salem, Madurai and Nilgiri districts. These deposits of bauxite-laterite occur as cappings over charnockite-leptynite rocks of Eastern Ghats occupying the high hill and plateaus of 1400 m to 2400 m above MSL. Major group of deposits are located at Shevaroy hills, Kollimalli hills, Palni hills and Nilgiri hills. Bauxite is of medium grade and is characterized by low titania and high silica. The details of the important bauxite deposits are given in Table 16.

Salem District :

The most important deposits are located at Shevaroy hills and Kollimalli hills.

Shevaroy Hills : This deposit is 8 km north of Yercaud town and 30 km north of Salem. The deposit occurs as a chain of six high hills at elevation of 1650 m and is under active mining by M/s Madras Aluminium Co. Ltd. The estimated reserve is 5.71 million tonnes.

Kolli Hills : These deposits are located in Namkhal taluka of Salem district and occur as chain of a few flat top hills of 1064 m – 1415 m elevation. Almost the entire deposit is leased out to M/s Madras Aluminium Co. Ltd. The estimated reserve in this deposit is 3.94 million tonnes.

Madurai District :

Sizeable bauxite deposit with a reserve of 2.23 million tonnes occurs at Palni Hill about 28 km from Kodaikanal town. Elevation of bauxite capping is 2134 m, the bauxite-laterite blanket covers the leptynite parent rock. The bauxite is composed dominantly of gibbsite. Thickness of bauxite varies from a few centimeter to 9.5 m. Almost entire area is under mining lease of M/s Madras Aluminium Co.

Nilgiri District :

Several bauxite occurrences are recorded in Nilgiri district of which Kotagiri-Ellada-Ooty area is the most important, insitu bauxite has developed over charnockite. The hill slopes contain detrital bauxite float ore. The reserve of this deposit is 4.1 million tonnes with 40% to 50% Al_2O_3 , 5.70% to 11.74% SiO_2 . Part of the deposit is under leasehold.

2.9

KERALA

Bauxite reserve in the state is of the order of 13.20 million tonnes which is 0.43% of the country's total reserve. The deposits are reported from Trivandrum, Quilon, Alleppey and Cannanore districts of Kerala. There are two types of deposits (i) insitu bauxite derived from Archaeans (ii) detrital and sedimentary bauxite overlain by limestone (marine limestone, Quilon formation; Middle Moicene) and underlain by sandstone (Warkali formation; Late Miocene to Pliocene).

The bauxite deposits of Kerala are located in the coastal plains between an altitude of 50 m and 200 m above MSL. The dominant mineral is gibbsite. Bauxite of Kerala is characterized by its low iron and titania. The range of chemical Composition is Al_2O_3 45% to 57%, SiO_2 2% to 10%, Fe_2O_3 0.4% to 18%, TiO_2 0.4% to 2.3%, LOI 25% to 31%.

The particulars of the important deposits of Kerala are given in Table 17.

2.10

UTTAR PRADESH

Bauxite reserve in the state is of the order of 18.9 million tonnes which is 0.625% of the country's total reserve. The occurrences are located in Banda, Lalitpur, Mirzapur and Varanashi districts. The bauxite-laterite cappings in Rajhaun, Banda district and Chandraprabha, Varanashi district occur over Fe_2O_3 3% Vindhyan sediments. The important bauxite deposits in Uttar Pradesh are shown in Table 18.

Banda District :

Bauxite occurs on the top of Rewa sandstone along the U.P.-M.P. border. A cluster of more than 120 cappings of bauxite are found in the area around Rajhaun. A total reserve of 10.51 million tonnes with Al_2O_3 ranging from 40% to 55% and SiO_2 upto 10% has been estimated in the Rajhaun – Harbans Deori area.

Lalitpur District :

Bauxite occurrences are noticed in the area between Deogarh and Lakhanjir in Lalitpur district. Isolated occurrences of laterite/lateritic bauxite occur over the Kaimur Group of rocks (Vindhyan).

Mirzapur District :

Laterite containing pockets of bauxite occur in the Barela area on the top of Dhandraul quartzites.

Varanashi District :

Bauxite bearing laterite occur over Dhandraul Quartzite. A total of 71 cappings of bauxite have been noticed in the area around Chandra Prabha with an area of 2.5 sq km and maximum thickness of 10 m to 20 m. A total of 0.5 million tonnes of bauxite (av.43.3% Al_2O_3 and 3.9% SiO_2) has been estimated by GSI in the area.

2.11

JAMMU AND KASHMIR

Bauxite reserve in the state is of the order of 2.02 million tonnes. Important bauxite occurrences are located in Riasi tehsil of Jammu at Salal, Jangalgali, Sangar Marg, Chakkar, Panasa – Thampal areas. Bauxite is also reported at Triayath, Krol and Kothri areas. Deposits in Jammu occur as isolated pockets on the northern slopes of Sirban limestone inliers of Riasi. These bauxites are of high silica diasporic type while the bauxite of Salal area is rich in boehmite and diasporic. The bauxite is overlain by Nummulitic limestone (Eocene age) and underlain by Sirban Limestone. The bauxite shows intercalation of carbonaceous shale with plant fossil which assign Upper Cretaceous age. Bauxite has resulted from insitu transformation of aluminous clays. Bauxite of Jammu is of diasporic and boehmitic type and hence different from the other deposits of the country. The chemical composition of the bauxite is Al_2O_3 40% to 70%, SiO_2 8% to 30%, TiO_2 5%, Fe_2O_3 10%, LOI 14% to 16%.

The deposits explored by GSI in Jammu & Kashmir are indicated in Table 19.

TABLE - 1**ALL INDIA STATEWISE INSTITUE AND RECOVERABLE
RESERVES OF BAUXITE**

As on 1.4.1990

STATE	INSITUE RESERVES ('000 tonnes)		RECOVERABLE RESERVES ('000 tonnes)	
I. Orissa	1606989.7	(52.90%)	1442275.6	(57.11%)
II. Andhra Pradesh	657780.3	(21.65%)	592001.2	(23.42%)
III. Madhya Pradesh	277759.0	(9.14%)	140791.0	(5.57%)
IV. Gujarat	142048.0	(4.60%)	107743.8	(4.26%)
V. Maharashtra	102883.5	(3.38%)	87249.9	(3.45%)
VI. Bihar	111041.0	(3.65%)	61104.1	(2.41%)
VII. Goa	35112.0	(1.15%)	28089.0	(1.11%)
VIII. Karnataka	45495.0	(1.49%)	27416.1	(1.08%)
IX. Tamil Nadu	22596.0	(0.74%)	18327.0	(0.72%)
X. Uttar Pradesh	18907.5	(0.62%)	9420.0	(0.37%)
XI. Kerala	13205.0	(0.43%)	7923.2	(0.31%)
XII. Jammu & Kashmir	2025.0	(0.06%)	1783.0	(0.07%)
XIII. Meghalaya	1120.0	(0.03%)	896.0	(0.03%)
XIV. Rajasthan	528.0	(0.01%)	318.0	(0.01%)
ALL INDIA TOTAL	3037490.0	(100%)	2525338.4	(100%)

NOTE : Figures in parenthesis relate to all India percentage.

Source : Monograph on Bauxite, IBM (1992)

TABLE - 2

GRADE SPECIFICATIONS ADOPTED IN NMI '90

Based on Classification of Mineral Reserves according to end use

Grade	Specifications			
	Al ₂ O ₃	Fe ₂ O ₃	SiO ₂	CaO
1. Chemical Grade	Min. 58%	Max. 2.5%	–	–
2. Refractory	Min. 55%	Max. 4.5%	–	–
3. Abrasive	Min. 50%	Max. 4%	–	–
4. Metallurgical I	45% – 50%	–	4% (Max.) Reactive	5% (Max.) (Total)
5. Metallurgical II	40% – 45%	–	4% (Max.) Reactive	5% (Max.) (Total)
6. Low Grade	40%	–	–	–

Source : Monograph on Bauxite, IBM (1992.)

TABLE - 3

SALIENT CHARACTERISTICS OF MAJOR BAUXITE REGION

	Eastern Ghats	Western Ghats	Inland High Level Plateaus	Inland Hilllocks	Coastal Plains
Location	Andhra Pradesh Orissa Tamil Nadu	Maharashtra Karnataka	Madhya Pradesh Bihar	Madhya Pradesh Uttar Pradesh	Gujarat
Typical Deposits	Panchpatmali Distt. Koraput Orissa.	Dhangarwadi Distt. Kolhapur Maharashtra	Amarkantak Distt. Shahdol M.P.	Katni M.P.	Kutch Deposits
Al ₂ O ₃	42 – 50%	48 – 54%	46 – 52%	48 – 54%	52 – 60%
SiO ₂	1.5 – 4%	2.5 – 4.5%	3 – 4.5%	2 – 4%	1.5 – 3%
Fe ₂ O ₃	15 – 25%	9 – 16%	9 – 18%	2 – 4%	1.5 – 3%
TiO ₂	2 – 3%	3 – 6%	7 – 9%	6 – 8%	3 – 6 %
Contaminants	(P ₂ O ₅ + MnO + V ₂ O ₃ +MgO+CaO+Ca ₂ op ₃ +Na ₂ O+K ₂ O)	Low Level	Low Level	Low Level	CaO : 0.5 – 2% & MgO : .05 – 1%
Mineralogical type	Gibbsitic Bauxite (95% alumina in Gibbsitic form)	Boehmitic Bauxite	Boehmitic Bauxite with significant diaspore in some deposits	Boehmitic Bauxite	Mixed Gibbsitic Boehmitic Ore.

Source : Monograph on Bauxite, IBM (1992)

TABLE 4

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
MAHARASHTRA																						
Kolhapur																						
Dhanganwadi				51.26	3.58	4.85	13.04	-	26.89	69.6	3.6	7.0	12.8	1.4	-	1.8	0.4	-	45.2	3.1	2.8	
Dagri				51.77	2.19	4.81	11.47	-	29.76	76.7	-	4.2	-	-	13.5	4.8	0.2	-	49.8	-	1.7	
Ringewadi				49.37	3.14	4.01	13.27	-	27.88	71.5	0.4	8.0	-	-	15.8	4.8	0.3	-	46.5	0.3	2.4	
Rachanagari				52.00	3.30	5.10	1.90	-	26.70	68.3	5.8	6.3	12.8	1.4	-	5.1	0.3	-	44.4	4.9	2.5	
Idegarij				52.80	3.30	4.19	11.50	-	27.50	71.8	4.1	6.3	11.6	1.1	-	4.9	0.5	-	46.7	3.5	2.5	
Nagartas-wadi				52.10	2.70	6.10	12.20	-	26.90	69.6	5.4	5.2	12.1	1.3	-	6.1	0.2	-	45.2	4.6	2.1	
Kolaba																						
Nandgaon				57.96	1.52	2.29	5.75	-	32.20	86.7	-	3.0	-	-	6.7	2.3	0.1	-	56.3	-	1.2	
Karvine				55.55	2.12	3.66	8.79	-	29.99	82.4	0.1	4.1	8.7	1.0	-	3.7	0.2	-	53.6	-	1.6	
Rantrigiri																						
Kaudali				58.19	2.06	3.20	5.11	-	31.30	86.3	0.2	4.2	-	-	6.0	3.2	0.2	-	56.1	-	1.7	
KARNATAKA																						
Belgaum																						
Kirvale				51.30	2.30	4.30	14.20	-	27.10	17.2	3.8	5.4	12.8	1.4	-	4.3	0.3	-	45.6	3.2	2.2	
Jamboti				48.50	4.30	3.60	16.10	-	25.60	69.3	4.6	8.3	18.8	1.8	-	3.6	0.4	-	41.1	3.9	3.3	
				52.50	2.80	4.60	13.60	-	27.60	71.9	4.0	5.4	13.5	1.4	-	4.6	0.3	-	46.7	3.4	2.2	
				48.50	5.50	4.40	11.60	-	25.20	61.6	5.0	10.1	16.7	1.5	-	4.4	0.5	-	40.0	4.2	4.0	
North and South Kanara																						
Padwara				52.13	5.40	1.50	13.37	-	27.45	69.4	2.2	12.4	13.5	1.3	-	1.5	0.6	-	45.1	1.9	5.0	
Nagan-kalbara				45.15	0.90	1.85	25.50	-	25.50	64.3	2.9	1.7	25.6	2.6	-	1.0	0.1	-	41.8	2.5	0.7	
Bhatkal Plateau				48.05	4.54	1.80	19.75	-	26.60	67.7	0.4	8.8	18.7	1.9	-	1.8	0.5	-	4.01	0.3	3.5	
MADHYA PRADESH																						
Shaandol																						
Mazar-dadar				50.32	2.86	7.59	12.36	-	25.18	63.6	7.6	5.6	12.3	1.3	-	7.9	0.3	-	41.31	6.5	2.2	
Mandala				46.33	4.50	7.57	18.06	-	23.72	56.9	6.6	8.7	18.1	1.8	-	7.6	0.4	-	37.0	5.6	3.5	
Bilaspur				50.65	3.22	7.10	13.02	-	26.05	66.6	5.5	6.2	13.0	1.3	-	7.0	0.3	-	43.31	4.7	2.5	
Kabirdadar				45.65	4.39	6.83	18.65	-	24.29	59.6	4.0	8.5	18.5	1.9	-	6.8	0.4	-	38.7	3.4	3.4	
Daikisonda				52.76	4.29	6.91	13.00	-	23.05	51.3	18.7	8.3	13.0	1.3	-	6.9	0.4	-	33.3	15.9	3.3	
Pomar				46.57	6.42	6.35	18.62	-	21.68	46.5	13.3	12.4	18.5	1.9	-	6.3	0.4	-	30.2	11.2	5.0	
Siraipondi				52.60	1.80	9.14	12.13	-	23.19	56.8	16.4	3.5	12.1	1.3	-	9.1	0.2	-	36.9	13.9	1.4	
Pahar				46.84	3.55	8.42	18.86	-	22.08	49.4	13.9	6.8	16.7	1.9	-	8.4	0.3	-	32.1	11.8	2.7	
Bangladadar				50.89	2.20	6.59	13.69	-	26.57	66.9	4.8	4.3	13.7	1.3	-	6.6	0.2	-	44.8	4.1	1.7	
				46.00	3.17	6.44	19.40	-	24.46	60.2	4.4	7.1	19.4	1.9	-	6.4	0.4	-	39.1	3.7	2.8	
Bangladadar (Main)				50.74	2.39	7.87	13.16	-	25.99	66.8	6.2	4.6	13.2	1.3	-	7.9	0.2	-	43.4	5.3	1.8	
				45.55	3.94	7.40	18.66	-	24.18	59.8	4.2	7.7	18.5	1.9	-	7.4	0.4	-	38.7	3.5	2.1	

TABLE 4

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
MADHYA PRADESH																							
Shahdol																							
Mandla																							
Chakmi-	50.77	2.52	7.68	13.52	-	25.27	63.3	8.6	4.9	13.5	1.3	-	7.7	0.2	-	41.1	7.3	2.0	-	-	-	-	
dedar	45.78	4.13	7.33	19.25	-	23.81	57.7	5.8	8.0	19.2	1.9	-	7.3	0.4	-	37.5	4.9	3.2	-	-	-	-	
Pondbahra	52.04	3.69	8.56	14.47	-	23.37	53.0	17.0	7.1	14.4	1.4	-	6.6	0.4	-	34.4	14.4	2.6	-	-	-	-	
Pahar	45.53	6.06	5.99	16.84	-	21.46	46.3	12.5	11.7	18.9	1.9	-	6.0	0.6	-	30.1	10.6	-	-	-	-	-	
Jamunadadar	45.39	4.67	6.55	21.57	-	21.31	45.4	14.5	9.0	21.5	2.2	-	6.5	0.5	-	29.5	12.3	3.6	-	-	-	-	
Raktidadar	45.62	5.77	6.51	20.86	-	20.96	43.5	15.0	11.1	20.8	2.1	-	5.5	0.4	-	28.3	12.7	4.4	-	-	-	-	
Nanmudadar	45.36	4.93	6.42	20.77	-	28.96	43.55	15.0	11.1	20.8	2.1	-	6.4	0.5	-	31.2	10.2	3.8	-	-	-	-	
Umargohan	45.39	5.06	7.14	19.33	-	22.69	52.1	8.8	9.6	19.4	1.9	-	7.3	0.6	-	33.9	7.5	3.9	-	-	-	-	
Amarkantaka	61.25	1.80	6.09	2.86	-	24.71	58.0	25.8	3.5	2.8	0.3	-	6.1	0.2	-	37.7	21.9	1.4	-	-	-	-	
	48.39	3.70	5.70	13.02	-	22.82	54.1	12.0	7.0	12.0	1.4	-	5.7	0.4	-	36.2	10.2	2.3	-	-	-	-	
	53.12	2.65	7.44	13.51	-	23.28	52.7	19.6	5.2	13.5	1.3	-	7.4	0.3	-	34.3	16.7	2.1	-	-	-	-	
	53.68	4.36	4.66	8.25	-	29.04	76.3	0.6	8.3	-	-	-	4.7	0.4	-	49.6	0.5	3.3	-	-	-	-	
	45.05	8.89	3.80	21.19	-	21.87	45.9	9.7	17.2	21.2	2.1	-	3.0	0.9	-	29.8	8.2	6.9	-	-	-	-	
	52.87	2.51	4.24	14.41	-	25.97	64.4	10.3	4.9	14.4	1.4	-	4.2	0.2	-	41.9	8.7	2.0	-	-	-	-	
	53.21	2.10	5.83	13.28	-	25.58	63.2	12.2	3.9	13.2	1.4	-	5.8	0.2	-	41.1	10.4	1.6	-	-	-	-	
	53.58	2.00	4.45	13.41	-	23.56	62.7	13.0	3.9	13.7	1.1	-	4.4	0.2	-	40.7	11.0	1.6	-	-	-	-	
Bilaspur	51.80	3.50	7.60	11.40	-	23.90	66.9	14.0	6.8	11.4	1.1	-	7.6	0.4	-	37.0	11.9	2.0	-	-	-	-	
Phutkaphar	47.08	4.50	7.20	16.60	-	23.10	54.1	9.1	8.1	16.7	1.8	-	7.4	0.4	-	35.2	8.2	3.2	-	-	-	-	
Jabalpur																							
Katni	52.51	1.97	4.62	12.97	-	27.06	70.4	5.9	3.8	12.8	1.4	-	4.6	0.2	-	45.8	5.0	1.5	-	-	-	-	
	55.72	4.85	7.65	4.00	-	26.70	68.5	8.5	9.4	3.9	0.5	-	7.6	0.5	-	44.5	7.2	3.8	-	-	-	-	
	52.62	11.69	6.01	3.67	-	24.52	57.7	7.0	22.6	3.6	0.5	-	6.0	1.2	-	37.5	5.9	9.0	-	-	-	-	
Surguja																							
Mainpat	54.19	0.86	11.89	7.77	-	24.17	62.1	15.4	1.3	7.3	1.3	-	11.9	0.1	-	40.4	13.1	0.5	-	-	-	-	
(Parpatia)																							
GUJARAT																							
Jamnagar																							
Bhatis	53.43	4.70	3.07	6.75	-	28.30	76.0	0.2	9.0	6.8	0.6	-	3.1	0.5	-	49.4	0.1	0.6	-	-	-	-	
Kennedy																							
Lsmoa																							
Virpur etc.																							
Bhopanadhi	58.50	3.41	2.43	2.94	0.62	31.10	84.5	0.7	6.6	3.2	-	-	2.4	0.3	-	54.9	0.6	2.6	-	-	-	-	
	57.69	1.72	3.00	2.57	2.61	32.36	84.9	1.1	3.4	2.9	-	-	3.0	0.2	-	55.2	0.9	1.3	-	-	-	-	
	52.42	2.70	3.06	3.14	5.97	32.72	77.1	-	5.2	-	-	-	3.7	0.3	-	50.0	-	2.1	-	-	-	-	
	59.08	2.18	1.49	4.26	1.49	31.43	82.5	4.3	3.5	2.5	-	-	4.3	0.2	-	53.6	3.7	1.4	-	-	-	-	
Karamkund	62.67	1.55	2.66	1.14	0.56	31.52	84.6	7.4	2.9	1.3	-	-	2.7	0.2	-	54.9	6.8	1.2	-	-	-	-	
	69.08	3.15	2.65	0.57	3.17	31.30	77.2	1.3	6.0	0.5	-	-	2.7	0.3	-	50.2	6.2	2.4	-	-	-	-	
	60.30	1.70	3.02	2.86	-	32.06	90.5	-	3.2	2.8	0.3	-	3.0	0.2	-	38.8	-	1.3	-	-	-	-	
	56.00	2.77	2.50	8.58	0.70	29.50	75.4	4.6	5.5	6.8	0.6	-	2.8	0.3	-	49.7	3.9	2.2	-	-	-	-	
Rewasa	56.44	3.38	4.48	4.08	3.20	27.69	62.9	16.7	6.5	4.1	0.3	-	4.5	0.5	-	40.9	14.9	2.6	-	-	-	-	
	55.90	4.10	4.19	4.69	2.89	28.66	60.2	14.5	7.9	5.2	-	-	4.2	0.4	-	39.	12.3	3.2	-	-	-	-	
Kundadhar	51.83	7.41	3.61	4.31	2.61	30.82	70.5	-	14.4	-	-	-	5.2	0.7	-	45.8	-	8.8	-	-	-	-	
Kutch																							
Gangpur	53.31	3.06	4.32	10.25	-	37.59	72.5	4.2	5.9	10.3	1.0	-	4.3	0.3	-	7.1	3.6	2.4	-	-	-	-	
Hamia																							
Punadi etc.	44.65	9.73	4.26	15.04	-	23.56	56.9	-	18.8	15.1	1.4	-	4.3	1.0	-	37.0	-	7.5	-	-	-	-	
Nakhitrana	56.88	3.17	4.98	6.41	-	27.06	69.1	10.9	6.1	6.4	0.6	-	5.0	0.3	-	44.9	9.3	2.4	-	-	-	-	
	56.38	1.74	6.42	8.23	-	26.36	66.5	13.7	3.3	8.2	0.8	-	6.4	0.2	-	43.2	11.6	1.3	-	-	-	-	
Punadi	53.18	3.92	3.10	5.05	2.58	31.05	76.6	-	7.7	-	-	-	3.1	0.4	-	49.8	-	3.1	-	-	-	-	
Ghangra	53.90	3.74	2.34	4.37	5.05	30.61	69.9	6.2	7.2	3.3	-	-	2.3	0.4	-	45.	5.3	2.9	-	-	-	-	
Tundi Wangh	48.92	6.57	4.52	11.61	1.56	26.35	61.9	4.1	12.6	12.8	-	-	4.5	0.7	-	40.2	3.5	5.0	-	-	-	-	
Ratalia etc.																							

TABLE 5
IMPORTANT BAUXITE DEPOSITS OF ANDHRA PRADESH

Sl. No.	Name of the deposit	Freehold/ Leasehold	Coordinates Toposheet no.	Railhead/ Town	Elevation of the deposit from M.S.L. (m)	Thickness of bauxite profile (m)	Area of the deposit (Sq. Km.)	Al2O3% SiO2% Fe2O3% TiO2% LOI%	Grade	Reserve (Total of all categories) in million tonnes	Geology and exploration data and other particulars	Exploring agency				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
EAST GODAVARI DT.																
1.	Dumkonda	Freehold	17°42' - 17°46' - 81°51' - 81°57'					44.51	4.00	15 to 30	3.00	-		0.256	Laterite and gibbsitic bauxite capping khondalite; large scale mapping pitting and trenching in 14 cappings	GSI
Gurteedu Group																
2.	Katamraj Konda Block I	Freehold	17°51' - 17°52' - 81°53' - 81°55'	185 Km west of Visakhapatnam	936 to 1286	6.20 to 39.25	1 Sq. Km	46.76	2.63	23.05	1.86		Met I	29.83		GSI
	Katamraj Konda Block II	Freehold	17°50' - 17°50' 30" - 81°53' 40" - 81°54' 30"	Via Chintapalle	1016 to 1174	2 to 28 (8)	0.80	49.90	1.77	19.46	1.61		Met I	12.80		
VISAKHAPATNAM DT.																
Anantagiri Group (Araku valley area)																
3.	Gailkonda Blocks I & II	: Freehold	81°16' to 81°17' 30"	85 Km. from Visakhapatnam	1170 to 1445	3.5 to 50.90 (19)	0.46	49.24	2.78	9.53	1.79	27.01	Met I			GSI
		:	81°59' to 83°02'	Close to Vizag- Kirandul Section.										15.05		
4.	Gailkonda Block III	: Freehold	Araku Valley area		10.72	11.4	0.15	48.22	2.40	20.38	2.12	26.78				
5.	Raktakonda	: Freehold					0.42	46.75	2.56	22.01	2.42	26.25	Met I	8.57		MEC/ state Dept. GSI
6.	Katuki	: Freehold			1296		0.14	49.27	1.81	17.57	1.72		Met I	2.9		
	Chittangandi	Freehold	18°22' - 82°56' 30"		1419	9.61	1.52	50.58	2.98	21.96	2.12		Met I	28.5		GSI
								46.04	2.60	22.90	1.97	25.67	Met I			GSI

TABLE 5

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
Chintapalli Group																
7.	Sappatia Subgroup	Freehold	17°53'30" to 17°55'30" and 82°08'39" to 82°09'33"	Sappatia, Turni and Narasi patnam Road 120 Kms.	985 - 1288	2.40 to 15.45 (4.65)	1.22	47.69	3.28	21.60	1.72	-	Met I	9.85	Overburden : 0.10-1.95 m of Soil ; Drilling of 20 boreholes (total 235.15 m) at 300 m interval	GSI (ECBP)
ii)	Block 2	Freehold	17°56' : 82°09' 65 K/I	...	920 - 1130	0.75 to 35.49 (12.90)	1.57	47.36	2.50	21.57	2.14	25.77	Met I	31.32	98 boreholes at 400 m x 200 m grid ; total drilling 908 m by MEC; 304 m of exploratory mining.	MEC (ECBP)
iii)	Block 3	Freehold	17°56' : 82°09' 65 K/I	...	990 - 1242	4.66 to 34.30 (13.35)	1.55	47.99	1.90	21.09	2.45	25.95	Met I	38.26	1633 M of drilling in 156 boreholes in 200 m x 100 m and 100 m x 50 m grids.	MEC (ECBP)
iv)	Block 4	Freehold	17°55'51" and 17°57'52" 18°07'52" and 82°09' 65 K/I	...	980 - 1182	2.40 to 26.90 (7.65)	0.917	46.32	3.19	22.38	1.85	-	Met I	8.4	Drilling of 313.55 m in 21 boreholes at 200 m interval.	GSI (ECBP)
v)	Block 5	Freehold	18°57'15" 18°59' 82°09'20" to 82°10'25" 65 K/I	...	974 - 1200	3.10 to 24.20 (8.42)	1.45	45.53	2.33	24.08	2.66	-	Met I	10.39	Overburden up to 6.30 m; Drilling of 23 boreholes (total 285 m) at 150 m to 400 m interval.	GSI (ECBP)
vi)	Block 6	...	17°54'55" to 17°55'30" ; 82°06'30" to 82°07'40" 65 K/I	...	980 - 1088	2.0 to 12.0 (8.0)	0.585	45.96	3.13	23.43	2.12	-	Met I	5.0	Based on measurement of scarp sections and analysis of samples	GSI (ECBP)
vii)	Block 7	...	18°58' to 18°59'30" 82°10' to 82°11' 65 K/I	...	1024 - 1125	2.10 to 15.0 (3.0)	1.41	46.88	1.13	22.60	1.86	27.42	Met I	8.5	Based on surface examination by GSI	GSI
viii)	Block 8	...	17°56'45" to 17°58'10" ; 82°05' to 82°08'15" 65 K/I	...	898 - 1262	1.10 to 27.35 (7.80)	2.58	45.34	2.34	22.12	2.58	-	Met I	26.51	446 m of drilling in 28 boreholes at 300 m interval	GSI
ix)	Block 12	freehold	17°53'30" to 17°55'45" 82°13'15" to 82°05'30" 65 K/I	...	1002 - 1272	3.0 to 20.0 (6.0)	3.85	45.98	1.92	24.56	1.48	-	Met I	45.6	Examination of scarp sections	GSI

TABLE 5

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
8.	Gudem Subgroup			16 Km west of Chintapalli												
i)	Block 1	Freehold	17°49'30" to 17°51' ; 82°09' to 82°10' 65 K/1		1034 - 1130	3.20 to 23.85 (6.25)	1.25	46.76	3.11	21.52	2.47	-	Met I	12.21	365 m of drilling in 26 boreholes at 200 m interval	GSI
ii)	Block 2, 3 and 6	Freehold			1020 - 1140			45.87	1.07	25.40	1.9		Met I	5.0		GSI
iii)	Block 4	Freehold	17°48'31" to 17°49'17" 82°08'23" to 82°09'04" 65 K/1		1026 - 1232	5.52 to 39.5 (13.20)	0.88	49.48	1.95	19.39	1.82		Met I	23.20	Overburden ranges from 0.20 - 0.60 m of soil ; 347 m of drilling in 15 boreholes at 250 m interval.	GSI
iv)	Block 5	Freehold	17°55' to 17°56' 82°13'30" to 82°14' 65 K/1				0.50	46.96	2.12	22.70	1.88	25.96	Met I	3.0	Resource estimation by mapping and examination of scarp sections	GSI
v)	Block 5A & B	Freehold						45.87	1.07	25.40	1.90		Met I	1.0	-0-	GSI
9.	Jerala Subgroup			24 Km. NW of Chintapalli												
i)	Block 1	Freehold	17°57' ; 17°58' 82°17'15" to 82°18'		1002 - 1093	1.0 to 8.0 (Scarps) (4.0)	0.85	46.03	3.02	23.16	1.45		Met I	6.8	Thickness of bauxite profile revealed from scarp sections 2 m to 10 m ; resource evaluated based on the scarp sections, pitting and sampling	GSI
iii)	Block 2	Freehold	17°59'06" to 18°01'54" 82°00' to 82°03'14" 65 J/8, K/5		916 - 1270	3.2 to 28.3 (10.80)	4.90	46.84	2.44	23.02	1.65			93.84	Overburden varies from 3.20 m to 16.35 m; 1322 m of drilling carried out in 63 boreholes at 275 m interval to evaluate the resource.	GSI
iii)	Block 3	Freehold			983 - 1266	1.2 to 31.75	4.4	46.18	2.49	23.67	1.92			69.52	Resources evaluated based on the drilling data in 58 boreholes, pitting, scarp section study.	GSI
iv)	Block 8	Freehold	17°58'30" to 18°00'30" 82°13'30" to 82°15'45" 65 K/15 J/4		950 - 1172	5.05 to 30.30 (11.99)	3.35	45.27	2.81	25.62	1.67			75.88	764 m of drilling in 38 boreholes	GSI

TABLE 6
IMPORTANT BAUXITE DEPOSITS OF ORISSA

Sl. No.	Name of the deposit	Freehold/Leasehold	Coordinates Toposheet no.	Railhead/Town	Elevation of the deposit from M.S.L. (m)	Thickness of bauxite profile (m)	Area of the deposit (Sq. Km.)	Al2O3% SiO2%	Fe2O3%	TiO2%	LOI%	Grade	Reserve (Total of all categories) in million tonnes	Geology and exploration data and other particulars	Exploring agency	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
KORAPUT DISTRICT																
1.	Pottangi South Block	Freehold	Srimanda Paribat 18°34' : 18°36' : 82°56' : 82°58' 65J/14	Rly Stn. Paliba 14 Kms; Sulur 45 Kms; Vishakhapatnam 170 Km.	1206 - 1362	5.90 to 31.90 (19.03)	0.65	46.11	2.31	23.22	1.84	24.84	Met I	220.08	Bauxite occurs in the form of continuous blanket on khondalite. Detailed exploration by GSI and MEC with large scale mapping, 3058 m drilling in 117 boreholes, 1597 cu m trenching and 817 cu m of aditing were done by GSI and MEC.	GSI/ MEC (ECBP)
	Central Block	Freehold			1239 - 1392	3.05 to 24.10 (13.46)	1.0	45.04	1.94	25.37	2.57	24.59	Met I	18.9	In central block 1495 m of drilling in 64 boreholes was done	GSI/ MEC (ECBP)
	North Block				1314 - 1405	5.7 to 36.8 (21.5)	0.40	45.68	2.11	24.84	2.22	24.84	Met I	15.61		GSI/ MEC (ECBP)
	Extension Block				1212 - 1377	2.25 to 46.70 (15.01)	0.65	45.98	2.2	24.34	2.24		Met I	18.63	In the extension Block GSI drilled 526 m in 17 boreholes.	GSI
														Sub total : Pottangi Deposit 75.12 million tonnes		
2.	Panchapatmai Central Block	Leasehold NALCO	18°46' : 18°55' : 82°57' : 83°04' 65J/13 and N/1	53 Km. by Road from Koraput Rly. Stn. Koraput	1180 - 1367	2.25 to 30.80 (13.52)	6.87	46.81	2.11	23.43	2.18	25.26	Met II	163.3	Parent rock khondalite; bauxite capping occurs as continuous blanket Central block is presently under active mining by NALCO by open cast method ; GSI carried out mapping of 6.89 sq. km. and drilled 2677 m in 102 boreholes at 100 m x 50 m and 50 m x 50 m grids. Subsequently MEC carried out more detailed exploration by drilling and deep pitting overburden (2.66 m average).	GSI and MEC (ECBP)
	North Block	Leasehold NALCO			1185 - 1289	4.7 to 31.4 (12.42)	3.55	43.96	2.75	24.50	2.69	-	Met I	83.00	In North and South Blocks, total of 3156 m of drilling in 105 boreholes at 400 m x 400 m grid.	GSI/ DCM Orissa
	South Block	Leasehold NALCO			1200 - 1355	(14.2)	4.03	45.01	2.67	24.68	1.92	-	Met I	77.00		
														Sub total : Panchapatmai 322.03 million tonnes		

TABLE 6

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
3.	Bailada	Freehold	18°27' to 82°00' 65 J/11	Rly. Stn. Padwa 10 Kms.	1185 - 1264	2.05 to 19.20 (7.70)	0.86	46.69	2.48	22.77	2.27	-	Met I	12.41	292 m of drilling in 15 boreholes ; Cut off +40% Al2O3 and <5% SiO2 for reserve estimation.	GSI
4.	Kodingamali	Freehold	19°4' to 83°05' 65 M/4	Rly. Stn. Raygada 40 Kms.	1102 - 1276	2.55 to 32.10 (13.65)	5.33	46.48	2.19	24.01	1.99	-	Met I	91.40	906 m of drilling in 28 boreholes ; for estimation of reserve, cut off taken +40% Al2O3 -5% SiO2	GSI
5.	Baphimali	Freehold	19°18' to 19°22' 82°57' to 82°59' 65 I/15	Bissam Cuttack Rly. Stn. 51 Kms.	1004 - 1094	2.25 to 25.85 (11.98)	9.60	45.21	2.19	26.03	1.96	-	Met I	195.73	Laterite bauxite capping on khondalite. Basis of estimation : 52 boreholes were drilled by GSI at 400 m grid interval. Cut off +40% Al2O3 for reserve estimation. At +45% Al2O3 cut off the reserve is of the order of 100 million tonnes.	GSI
6.	Malparbat	Freehold	18°39' to 18°40' 82°53' to 82°56' 65 J/14	Rly. Stn. Palba 28 Kms.	1176 - 1399	10 m to 11 m (5.0)	1.09	43.19	2.84	26.31	1.58	-	Met I	9.8	Laterite bauxite capping on khondalite ; Large scale mapping and study of bauxite profile from scarp section	GSI
7.	Karnapadikonda	Freehold	18°49' to 18°50' 83°03' to 83°07' 65 N/1	Parvatipuram Rly. Stn. 50 Kms.	1340 - 1487	3.6 to 19.0 (5.0)	1.93	46.58	1.73	23.30	1.90	-	Met I	17.0	Bauxite capping on khondalite; preliminary investigation by GSI; reserve estimated with cut off +45% Al2O3 and -5% SiO2	GSI
KALAHANDI DT.																
8.	Lanjigarh (Part in Koraput dt.)	Freehold	19°42'45" 83°22'15" 65 M/6	Lanjigarh Rly. Stn. 10 Kms.	1016 - 1306	2.0 to 18.20 (9.0)	5.64	47.36	2.65	20.55	2.73	-	Met I	47.36	Bauxite capping on khondalite; Basis of estimation : cut off +40% Al2O3 - 5% SiO2. Large scale mapping, pitting scarp sampling and study of bauxite profile.	GSI
9.	Kariapat	Freehold	19°37' to 19°41' 83°09' to 83°11' 65 M/2	Bissamcuttack Rly. Stn. 37 Kms.	960 - 1080	2.0 to 15.0 (6.63)	9.73	43.25	4.55	28.38	1.99	-	Met I	59.0	Large scale mapping, sampling, pitting and trenching and study of 64 scarp sections done by GSI.	GSI
10.	Sijimali	Freehold	19°28' to 19°32' 83°06' to 83°10'	-	991 - 1233	3.0 to 9.0 (6.49)	13.0	42.02	2.29	49.43	1.78	-	Met I	86.0 alte hasan areal extent	Bauxite capping on khondalite of 13 sq. km. The deposit extends in NW-SE. The high areas are occupied by khondalites whereas the lower part of the capping is occupied by laterite and bauxite; cut off +40% Al2O3 for reserve estimation.	GSI

TABLE - 7
IMPORTANT BAUXITE DEPOSITS IN MADHYA PRADESH

Name of deposit	Location	Nearest Town/ Rail head	Reserve in million tonnes	Al ₂ O ₃ %	Grade SiO ₂ %	Freehold Leasehold	Forest/ non forest area	Exploring agency and prospecting work
Balaghat District								
1) Kotapahar (Warjini Dongri 2630' Bear Dongri 2570' Kolapahar 2624 Pancham Dadar Dadar Total	64 C/5 C/10	Ukwa; Balaghat 50 Km.	4.49	45.16 to 46.44	2.66 to 2.85	Freehold except an area of 40 hect.	Forest	GSI Laterite capping on Deccan Trap; 100 m., 150 m and 200m grid
2) Garhidadar	22°12' : 83°53' 64 B/16.		2.07	41.83	5.10	Freehold	Forest	
3) Kanwajhardadar	22°09' : 80°47' 64 B/16		4.6	43.90	4.60	Freehold	Forest	
4) Mundi Dadar (N)	22°09' : 80°56' 64 B/16		4.05	47.10	3.80	Freehold	Forest	
5) Mundi Dadar (S)	22°09' : 80°49'		4.05	46.70	4.00	Freehold	Forest	
Bilaspur District								
1) Phutkapahar	22°34' : 82°46'	Korba	3.04	45	0.42	Leasehold of BALCO		GSI
Surguja District								
Mainpat (Sapnadadar, Nagardadar Kudandih, Koara, Khair Kandraja, Barima)	22°41' : 22°55' 83°05' : 83°25' 64 H/1 & H/5	Ambikapur, Bishrampur 115 km.	33.00	45	-	Freehold	Partly forest	DGM, M.P.
Jamirapat (Tajjiharra - Serangdang Chirtal - Samri sector) Charhat - Kudag (Dumrakholi sector) - Jamirapat Birhapat - Kudipat	22°22' : 23°24' 52°52' : 52°55' 22°20' : 23°22' 83°53' : 83°56' 23°21' : 82°52'	Kusmi Ronkool 125 km.	36.62	47.17 to 52	2.31 to 3.5	Freehold	Forest	GSI
Total								69.62

TABLE - 8
IMPORTANT BAUXITE DEPOSITS IN BIHAR

Name of deposit	Location	Nearest Town/Railhead	Elevation of the deposit	Freehold/Leasehold	Reserve in million tonnes	Grade			Other details	Exploring agency		
						Al ₂ O ₃ %	SiO ₂ %	Fe ₂ O ₃ %				
Monghyr Dist. Kharagpur Hill, Maiva Hill, Maruk Hill, Tadi Hill	25°10' to 25°15' 86°27' to 86°33'	Dhardhara 10 Km.	-	Free hold	1.51	44 to 54	2.15 to 5.11	10.40 to 16.50	2.0 to 6.0	22.15 to 27.40	Bauxite laterite on schist and phyllite; Estimation on the basis of preliminary prospecting work.	GSI
Palamau Dist. Jamira Pat Chiro, Kukud, Orsapat Daswan Pat. Tamoligath	23°27' : 84°15' 23°29' : 84°0' 23°29' : 84°29' 23°31' : 84°16' 23°32' : 84°03'	nearest town Mahu-dadar 105 km. from Daitongani. Latehar 50 to 60 Km.	1030 M	Free hold 2 lease holds	3.1	58.0 to 63.58	0.52 to 1.76	0.98 - 1.62	10.72 to 11.98	23.96 to 27.64	Estimation based on prospecting aided by drilling. Av. grade, Al ₂ O ₃ 47.9%; Bauxite derived from trap rocks.	
Ranchi Dist. Lohardaga Sector Bagru Hill Maidan Pat Birhani Pat. Richiguda Sector Medina Pat Pakhar	23°29' : 84°36' 23°27' : 84°33' 23°32' : 53°33' 23°34' : 54°39' 23°32' : 23°34' 84°36' : 84°37'	Lohardaga 22 km Richiguda 10 - 12 Km.	1034 M 1050	Total 24 prospects 12 under Lease hold 12 free hold freehold- 3 Nos. Leasehold 4 Nos.	7.468	46- 53	3.48	7.10 17.20	8.92 9.39	23.72 25.55		
Gumla Dist. Serendag Sector Adar Sector Netarhat Sector Chain pura Sector	23°27'30": 84°25'40"	Rly. Stn. Lohardaga 30 to 40 Km. Ghagra.	1042	5 free holds 4 lease holds 5 free holds 11 free holds 5 lease holds 7 free holds	8.2 2.01 5.677 3.302 <u>19.189</u>	40- 50	- -	- -	- -	- -	Insitu - Residual lateritised bauxite derived from Trap rock, Granite gneiss Bauxite thickness 3 to 5 M	
Santhal Parganas Dist. Sahibganj			480-520	free hold	5.6	46.0 to 60.25	1.04 5.23	4.0 15.80	5.0 6.0	25.51 to 29.58	Laterite bauxite on Rajmahal Trap.	
Rohtas Dist. Adhanra				free hold	2.5							

TABLE - 9
IMPORTANT FREEHOLD AND LEASEHOLD BAUXITE DEPOSITS OF RANCHI AND PALAMAU DISTRICTS, BIHAR

Name of deposit	Location	Nearest Town/Railhead	Elevation of the deposit	Freehold/Leasehold	Reserve in million tonnes	Grade			Other details	Exploring agency
						Al ₂ O ₃ %	SiO ₂ %	Fe ₂ O ₃ %		
						Al ₂ O ₃ %	SiO ₂ %	Fe ₂ O ₃ %		
Free Holds of Ranchi District										
Barapat	23°17' : 84°25'				2.0				Pitting and drilling by GSI	
Dholuapat	23°23' : 84°3'				2.30					
Dipakuajan					9.0	48.21	4.70	16.21		
Barakdlh					2.5					
Bhagatoli	23°11' : 23°12'				1.4				GSI carried out subsurface exploration, by drilling at 100 M grid. Bauxite occurs as segregation over gneiss; Area - 0.40 sq. km; average thickness of bauxite 1.40 m	
Kokipat	84°31'				2.27					
					<u>18.24</u>					
Leaseholds of Ranchi Palamau										
Bagram hill	23°29' : 84°36'	Lohardaga			4.46					
Bhusar		17 Km.			2.50					
Jamirapat	23°27' : 84°15'	96 Km. from			2.30					
Pakhar		Lohardaga			6.02					
Tuinu Kechki					5.65					
					<u>20.93</u>					

TABLE - 10

IMPORTANT BAUXITE DEPOSITS IN MAHARASHTRA

Name of deposit	Location Co-ordinates.	Nearest Town/ Rail head	Leasehold/ Freehold	Reserve in Million Tonnes	Grade		Other details	Exploring agency
					Al ₂ O ₃ %	SiO ₂ %		
Kolhapur district								
Udgeri	17°05' - 17°08' 73°48' - 73°55' 47 G/16	64 Km. Kolhapur Rly.Stn.	Leasehold (BALCO)	9.1			Deposit comprises 4 plateaus, AV. Thickness of bauxite 5 m, plateau 1014 m high; average thickness of overburden 3.37 m. Deposit lie on a plateau 10 km. x 1.6 km. dissected at several smaller units, profile thickness 0.9 m to 14 m; average thickness of bauxite 3.5 m	GSI
Dhanganwadi Penhala Group (Dharwadi - Girgaon-Rangwadi - Panhala)	15°55' - 15°57' 73°46' - 73°51' 47 H/3.	Karad Rly. Stn. 54 km.	- 60 - over 5962 Hect. public captive	16.10				
Manbet - Inderganj Group (Manbet - Radhanagri - Inderganj)	16°20' to 27' 73°53' - 74°0'	Kolhapur 51 Km.	Group includes two leaseholds and one freehold Freehold	21.465	52.10	3.4	Manbet sector investigated by GSI, inferred reserve 3.02 million tonnes.	
Kadgaon - Savat- wadi Group (Kadgaon east and West Gavegoti - Savatwadi)	16°11' - 16°21' 74°07' - 74°12'	Kolhapur Rly. Stn. 51 Km.	Freehold	6.25	50.77			
Nagartswadi - Kasarsada Group	15°56' - 16°6' 74°5' - 74°9' (48 I/1)	Kolhapur Rly. Stn. 77 Km. near Belgaun	Leasehold	4.97	52.0	2.6		
Mogalgad.	14°49' - 74°15'	Kolhapur	Leasehold	2.74	57.35	0.56		GSI
Kolaba Dist.								
Pargaon - Saigon Group :	18°21' - 18°30' 72°57' - 72°59' Murad Tehsil	93 Km. Kalyan Rly. Stn. 96 Km. Pentrinhoon Road 29 Km.	Freehold	3.26	50.18 to 52.12	1.37 to 4.67	Capping on Deccan Traps, Bauxite varies in thickness from 1 m to 6 m	
Pargon-Chikalgaon- Keshod- Nanogaon - Supegaon - Usroli - Suva - Saigaon Mahalori area. Madgath - Jivana Bandar Group :	18°3' - 18°9'	Kalyan Rly. Stn. 124 Km.	Freehold	3.79	48.18 to 51.71	3.28	Revenue land : capping on Deccan Trap.	

TABLE - 10

Name of deposit	Location Co-ordinates.	Nearest Town/ Rail head	Leasehold/ Freehold	Reserve in Million Tonnes	Grade $\frac{\text{Al}_2\text{O}_3\%}{\text{SiO}_2\%}$	Other details	Exploring agency
Madgarh - Gavali- wadi	73°0' - 73°1'						
Khujari - Dandgiri Kondivali-Wakalgath Shekhadi-Asuf Hunevdi-Devkhol Punirkherdi Jivana Bandar	73°0' - 73°1'						
Khurwadi-Adi Dhair- wali Kariwadi Group.	18°0' - 18°13' 73°0' - 73°1'	Kalyan 199 Km north	Freehold	2.95	49.51 to 51.01 3.44 to 5.08	Capping on Deccan Trap	Preliminary examination by GSI, subsequently by DGM.
Ratnagiri District							
Umbershet	17°55' : 73°5'	Kalyan 147 Km. north	Freehold	1.15	60.6	Based on surface exploration	GSI
Chikhalagaon Harnai	1/2 Km south of Umbershet 18°39' : 73°10'	Kalyan 163 Km. Madangad Depoli - 10 Km. Kalyan 147 Km	-	1.48	55.99	1.84	
Kavdoli Satara District	17°56' : 73°06'			2.00	58.19	2.06	GSI
Khengral Kajpuri	17°55' - 73°50'	Karad Rly Stn 80 Km. Satara Khandala road 16 Km. Karad Rly. Stn. about 55 Km. Satra Karad road about 35 Km.	-	1.32	50.21 53.59	1.56 4.39	
Koynavally area Alewadi-Chikhali Kusi - Jambha Deurkas- Kolghar Kargaon-Batsavada Chatmatha- Kati-Nanai Vaghpur	17°24' - 17°45' 73°41' - 73°49'			4.11	42.13 to 52.73	0.76 12.10	

TABLE - 11
IMPORTANT DEPOSITS OF BAUXITE IN GUJARAT

District	Name of Deposit	Reserve in million tonnes	Grade		Freehold/ Leasehold	Exploring Agency
			Al ₂ O ₃	SiO ₂		
Jamnagar	Kalyanpur area	4.009	45 to 58	2 to 5	Leasehold	
			45 to 58	2 to 10		
Junagarh	Porbandar Verabal belt 21°39' - 21°47' 69°31' - 69°35'	28.00	48 to 55	3.7	Freehold	GSI
Toposheet - 41 G/10						

TABLE - 12
IMPORTANT BAUXITE DEPOSITS IN GOA

Name of deposit	Co-ordinates Toposheet no.	Location	Reserve in million tonnes	Grade Al ₂ O ₃ %	SiO ₂ %	Freehold/ Leasehold
A) Betul area	15°07' : 73°58' 48E / 16/5			44.70 to	3.3 to	Freehold 83 hect.
i) Aradl		Deposit bordered (in north and west)	16.84	58.00	6.8	Leasehold 485 hect.
ii) Shaktl	15°08' : 73°58'	by escarpment over the Arabian Sea				
iii) Mahavir	: 48E / 16/5.	Nearest Rly. Stn Marged 29 Kms.				
iv) Cola	:					Leasehold
v) Sirotl	: 15°04' : 73°59'					
B) Mopa area	15°42' to 15°46' 73°50' to 73°54'	Taluka - Quepem and Canacona	6.4	43.73		Freehold
						Flat plateau, altitude 100m - 175m bauxite area 8 sq. km. overburden 2.5 m; average thickness of bauxite 2.5m; deposit assessed by GSI by surface mapping, pitting and drilling, subsequently MEC did detailed work in a few blocks.

TABLE - 13
LIST OF A FEW SMALLER DEPOSITS IN GOA

Deposit	Co-ordinates	Reserve in million tonnes	Al ₂ O ₃	Grade	SiO ₂	Remarks
Consus	15°22' : 73°55'	1.17	55	2.86		600 m x 300 m (Areal extent)
Dargalim	15°39' : 73°49'	0.2	38 to 54	10		
Ibrampur	15°42' : 73°55'	0.3	48			
Korgaon	15°40' : 73°54'	1.88	51			
	48E/15					
Pornam	15°40' : 15°44'	1.32	40-45			Overburden av.2.5 m
	73°45' : 73°50'					
Polem	14°55' : 14°57'	Resource not estimated				
Loliem	74°04' : 74°05'					
Quelassem	15°18' : 15°24'	Resource not estimated				
-Varva	&					
-Raia	73°50' : 73°59'					

TABLE - 14

IMPORTANT BAUXITE DEPOSITS IN KARNATAKA

Deposit	Location	Leasehold/ Freehold	Reserve in million tonnes	Al ₂ O ₃ %	Grade SiO ₂ %	Fe ₂ O ₃ %	TiO ₂ %	Other details	Exploring agency
Belgaum Dist.									
Boknur Navge Hill	15°48' : 74°26'	Leasehold	0.60	50 to 55	1-5	2-18	4-11	Plateau type bauxite on Deccan trap. The bauxite occurs as large pockets within laterite. The thickness of bauxite pockets 3 m to 6 m. The deposit has given rise to float ore south of Boknur, west of Bijamy and SW of Hangirge. 6 m thick bauxite, considerable float ore on the western slope of the hill.	DGM, Karnataka
Karte Hill	15°46' : 74°25' Tehsil : Khanapur Rly. Stn. Belgaum	Freehold	0.35	52-55	1.8	7-13	6.8		
	15°46' : 74°25' Khanapur Taluka 20 Km from Belgaum 15° : 74°20'	Freehold	0.11	53	1.28	8.83	7.8	Area of the deposit, 40,000 Sq m	
Bailur	15°45' : 74°20' Khanapur Taluka Janboli 8 Kms.	Freehold	0.11	53	1.28	8.83	7.8		
Kinaye and Korals	Belgaum 23 Km	Leasehold							
Kirvala	...	Leasehold							
Jamboli	... 25 Km	Freehold	1.8	43	1.8				DGM, Karnataka
Mendli-Telavadi	15°32' : 79°19'	Freehold							
Rajhansgad	15°46' : 74°31'	Freehold							
Chikmagalur Dt.									
Kemmannugundi	13°24' : 74°43'	Freehold	0.2	51	1.9				DGM, Karnataka
North Kanara									
Apsarkond :	14°02' : 74°34'	Freehold	1.5	42.5	8.5				
Bhatkal	14°03' : 74°32'	...	0.8	40-60	8-10			Basis of estimation : Drilling, pitting and trenching.	GSI DGM, Karnataka
Maladipura	14°19' - 14°21' 74°21' - 74°28'	...	1.2	45	6				
Lurta	14°25' - 14°27' 74°25' - 74°29'	...	0.31	48	5				
Mudelli	13°38' : 74°33'	...	1.71	48					
Navilgam	14°21' : 74°26'	...	0.36						
Nitadgi	14°13' : 14°15' 74°28' : 74°29'	...	1.34	47	10				
Swamagudda	14°22' : 74°29'	...	0.60	47	6				
Talgod	13°58' : 74°03'	...	1.58	50	8				
		Total	6.30						

TABLE - 14

Deposit	Location	Leasehold/ Freehold	Reserve in million tonnes	Grade			Other details	Exploring agency
				Al ₂ O ₃ %	SiO ₂ %	Fe ₂ O ₃ % TiO ₂ %		
South Kanada								
Doddahara	13°45' : 74°53'	Freehold		1.4	40-50	6		...
Guppipara	13°45' : 74°55'	...		1.3	40-50	1.5 to		...
Karki	14°18' : 74°21'	...		0.1		12.5		GSI
Kundadaka	13°13' : 75°0'	...		0.05				DGM, Karnataka
Mudgalpara	13°43' : 75°43'	...		0.5	45	2.1		...
Manipal	12°45' : 74°41'	...		minor deposit				...
	Mangalore 80 Km							
Nagan Kalbare	13°43' : 74°53'	...		0.58	45	0.9		...
Paduware	13°14' : 74°39'	...		6.0	52	6.4		...
	Bairdu Rly. Str. 1 km							
				9.93				

Geological Survey of India

TABLE - 15
A FEW OTHER DEPOSITS IN KARNATAKA

Name of Deposit	Location	Leasehold/ Freehold	Reserve in million tonnes	Al ₂ O ₃	Grade	SiO ₂	Basis of estimation	Exploring Agency
North Kanara								
Apsarkond	14°02' : 74°34'	Freehold	1.5	42.5	8.5		By mapping	GSI
Chikkankod	2.2	44.52	7.04		By pitting trenching and mapping	GSI
Kabri	14°15' : 74°35'	...	2.3	44.6	4.7		...	GSI
Mudugal	13°43' : 74°51'	...	0.5	43.3	3.54		Drilling at 100 m interval	GSI
			6.5					
South Kannada								
Kudarka & Belmana	0.5	> 40	-		By pitting and trenching	GSI
Kollamandukuru	13°04' : 74°55'	...	0.4	< 45	-			GSI
Niddodi	13°10' : 74°52'	...	1.45					GSI
			2.35					

TABLE - 16
IMPORTANT BAUXITE DEPOSITS IN TAMIL NADU

Name of Deposit	Co-ordinates	Nearest town/ Railhead	Reserve in million tonnes	Al ₂ O ₃	Grade SiO ₂	Freehold/ Leasehold	Remarks
Madurai District							
Palni Hill	10°09' - 10°17' 77°19' - 77°24'	Palani Rly Stn. 80 Km : Kodaikanal Road 80 Km	2.23	42.55	12.38	Leasehold	Capping on charnockite (DGM, Tamil Nadu carried out prospecting work)
Nilgiri District							
Kotagiri - Ellada	11°20' - 11°30' 76°20' - 76°55'	Rly. Stn Coonoor (10 Km) ; Ooty (10 Km)	4.11	40 to 50.0	5.70 to 11.74	Part of Kotagiri is leasehold	DGM, Tamil Nadu carried out prospecting work.
Salem District							
Kolli Hills area	11°12' - 11°20' 78°20' - 78°23' Namakhalataluka	Salem Rly Stn 70 Km	3.94	35 to 50	5.0 to 7.0	Mostly Freehold partly leasehold	-do-
Shevaroy Hills	11°38' : 78°14'	Yercaud town 30 Km North of Salem	5.71			Leasehold	

TABLE - 17

IMPORTANT BAUXITE DEPOSITS IN KARNATAKA

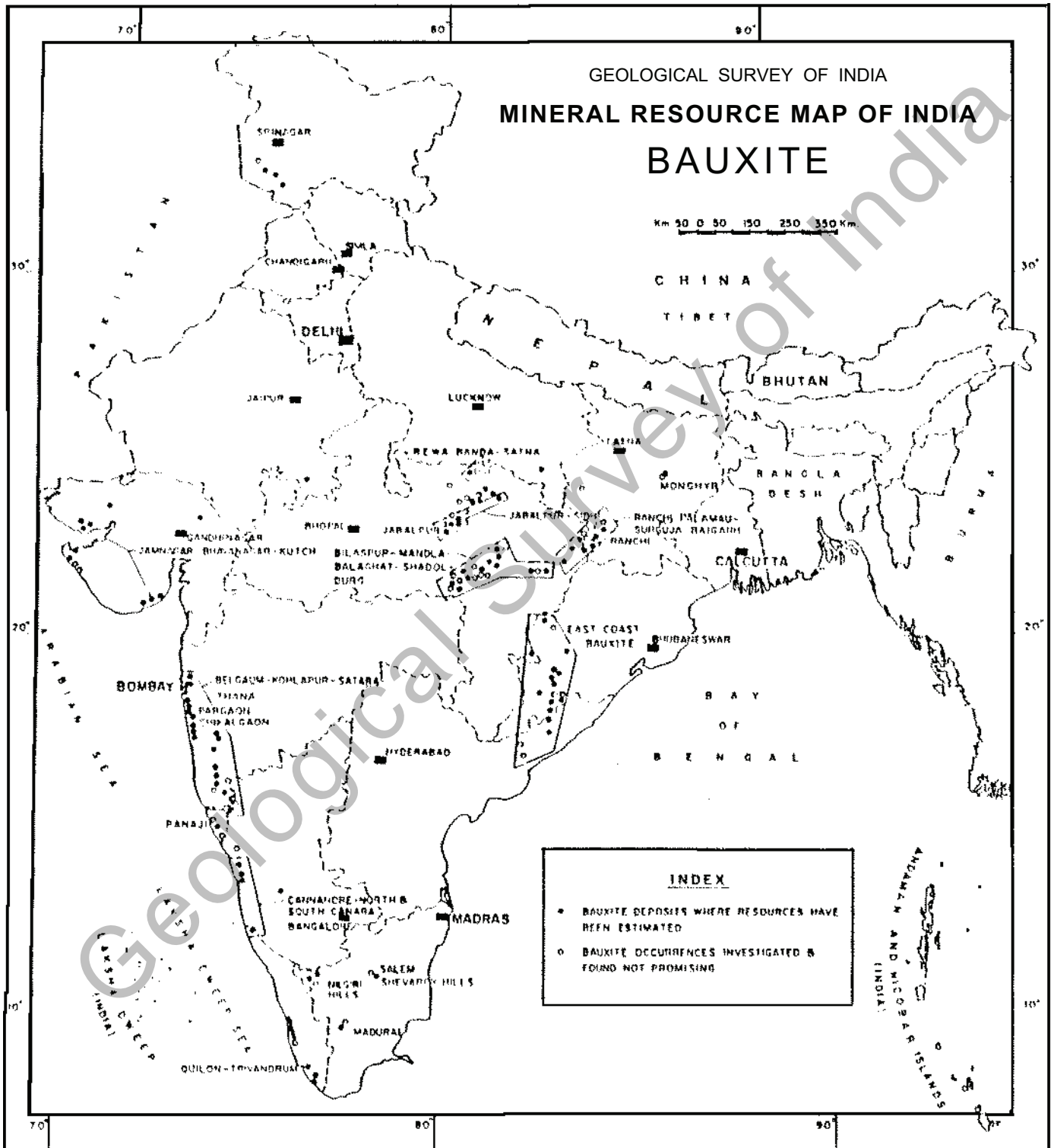
	Co-ordinates and toposheet nos.	Reserve in million tonnes	Freehold/ Leasehold	Al ₂ O ₃ %	Grade SiO ₂ %	Fe ₂ O ₃ %	TiO ₂ %	Remarks ; other details, Basis of estimation, exploring agency, geology
Quilon District								
Adichanlur	8°53' : 76°44' 58 D/9	0.26	Freehold	50.02	6.28	16.1	0.89	Pitting trenching and drilling by GSI
Chittavattam	9°0' : 76°40' 58 D/9	0.51	...	47.96	8.87	15.10	1.13	-do-
Cherukad- vadakkamuri	9°6' : 76°40' 58 C/12	2.01	...	50-60	5.4	9.8		Testpits at selected places; GSI
Cannanore District								
Anantapurugudda Kanhangad	Kasargod Taluka 12°22' to 12°30' 75°03' to 75°30' 48 P/16	0.07	..	40-45				
Kumbala	12°39' : 75°07' 48 N/4	1.83	...	40-50 + 40	1 to 9	10-26	-	Thickness of bauxite ranges upto 8.5 m pitting, trenching and drilling by GSI Parent rock charnockite, pyroxene granulite; deposit assessed by pitting, drilling by GSI and MEC.
Nileshwar Blocks (Four blocks)	12°14' to 12°49' 75°01' : 75°15' (48 P/3) Nileshwar Rly. Stn 5 Km to 10 Km	6.1						
Taliperamba		1.52		40-50				
Trivandrum dist								
Ambalam	8°37' : 76°54' 58 D/14			43-62				
Attipara	8°32' : 76°53' 58 D/14	0.9						Basis of estimation : Through prospecting work of pitting, trenching and limited drilling by GSI
Mangalpur Chilampil Sasthavattam	8°37' : 76°51' 58 D/14 8°38' : 76°49' 58 D/14							

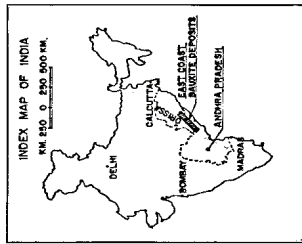
TABLE - 18
IMPORTANT BAUXITE DEPOSITS OF UTTAR PRADESH

Name of the District and the Deposit	Location	Reserve in million tonnes		Grade		Freehold/ Leasehold	Remarks
		Al ₂ O ₃	SiO ₂	Al ₂ O ₃	SiO ₂		
Banda District	25°05' : 25°34'	10.51	upto	40.00	upto	Leasehold	Residuum on upper Rewa sandstone
Rajahuan deposits (Four blocks)	80°45' : 81°15'	55.00	10%				
Harbans - Deori	Tehsil - Karwi Rly. Stn. : Manikpur 2 Kms					Freehold (3 blocks) Leasehold	
Lalitpur District							
Deogarh - Lakhanjir		4.00	Refractory grade			Freehold	Residuum on Vindhyan
Varanashi District							
Chandra Prabha		0.5	43.3	3.9		Freehold	Bauxite laterite capping on Dhandrul quartzite ; prospecting by GSI revealed a total of 71 cappings with areal extent of 25 sq km. Thickness of residuum 10 m - 21 m.

TABLE - 19
BAUXITE DEPOSITS IN JAMMU & KASHMIR INVESTIGATED BY GSI

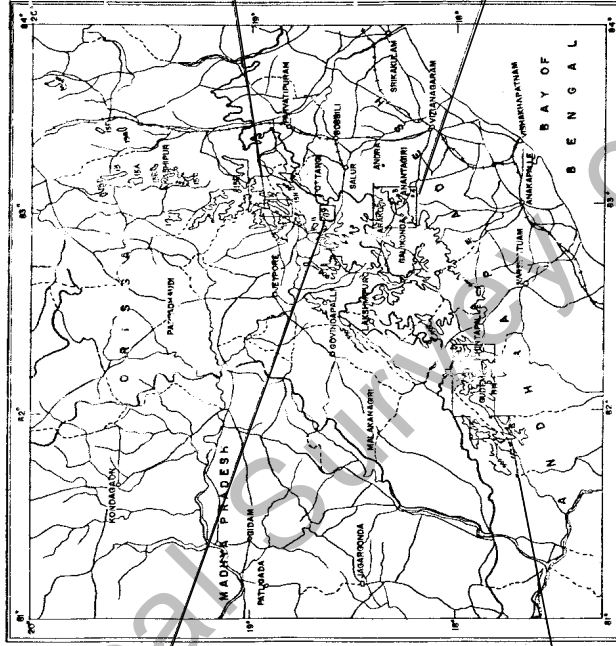
Name of the deposit	Freehold/ Leasehold	Reserve in tonnes	Analytical data	Remarks
Riasi				
Krul-Khori	Freehold	162,000	Al ₂ O ₃ 44.60-72.34% SiO ₂ 8.00-26.80%	
Ransuh 33°00' : 74°39'				
Triyath-Thangrate-Cantha 33°00' : 74°39'	...	30,000	Al ₂ O ₃ 44.60-72.34% SiO ₂ 8-26.80%	
Balna Gura 33°10' : 74°49'	...	300,000	Refractory Grade	
Panasa-Thampal Capping 33°10' : 74°45'		...	Al ₂ O ₃ 40-60% SiO ₂ 10-44%	Av. thickness of bauxite 3-5 m
Saroda bas 33°10' : 74°40'	...	1,460,000	Al ₂ O ₃ 40-50% SiO ₂ 19-44%	Av. thickness of bauxite 3 m trenching and pitting at 100 m interval.





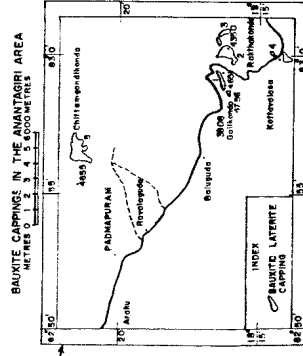
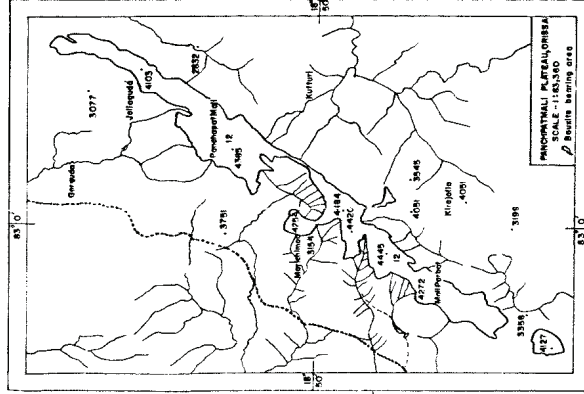
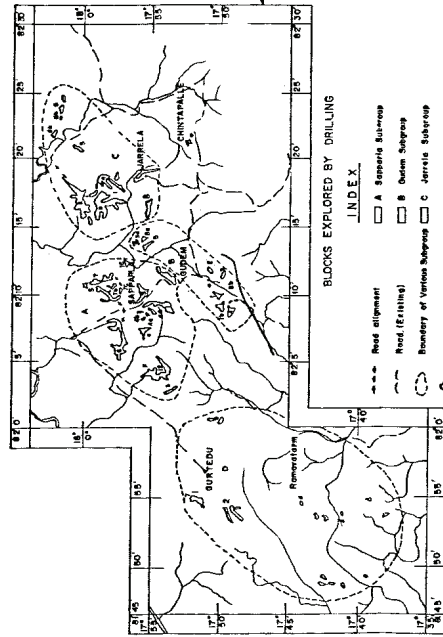
EAST COAST BAUXITE PROJECT, ANDHRA PRADESH

SCALE - 1:253,440



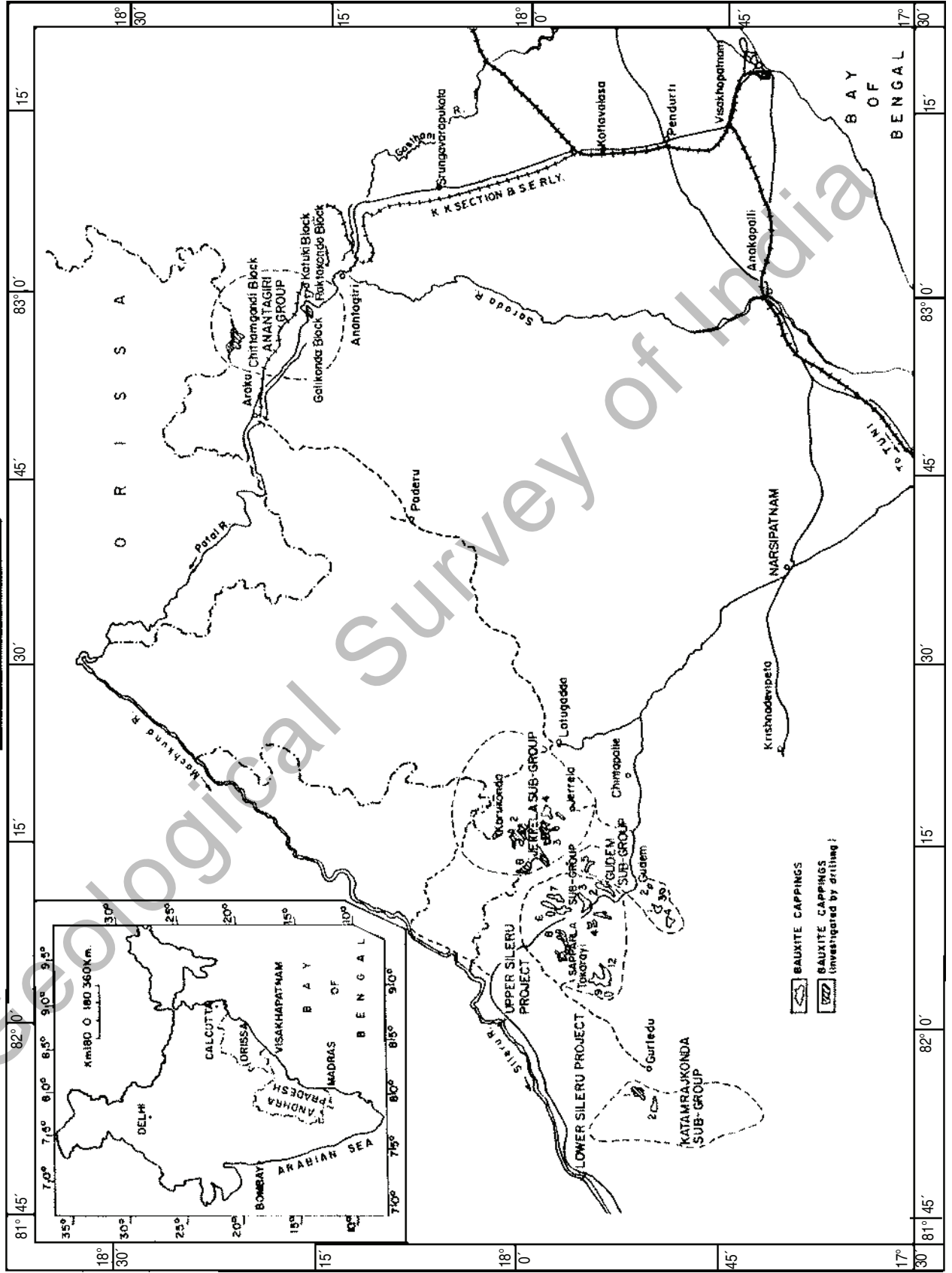
1. GAIKHONDA, 2. RAKTHONDA, 3. MATUNI, 4. KOTTAWA SA, 5. DOTTAMUNI, 6. 8.7. KETUPHONDA SURGROUP, 8. A. SIPPAPALA SURGROUP, 9. 10. GUDUM SURGROUP, 11. JAPRELA SURGROUP & P.O. 7A, 11. 10. PADMA, 12. HALLI PARBAT, 13. MANCHPATWALI, 15. KARLAPAT, 14. BIPALWALI, 16. A. B. JIJALI, 17. JUPURWALI, 18. 20. BARAHUMALI, 19. K. S. A. MALI, 15E. KODHIBAMALI 19F. LANGUDAN, 20. BISSAM CUTTACK, 15H. KANAPURKHONDA.

--- STATE Boundary
○ Bauxite bearing areas



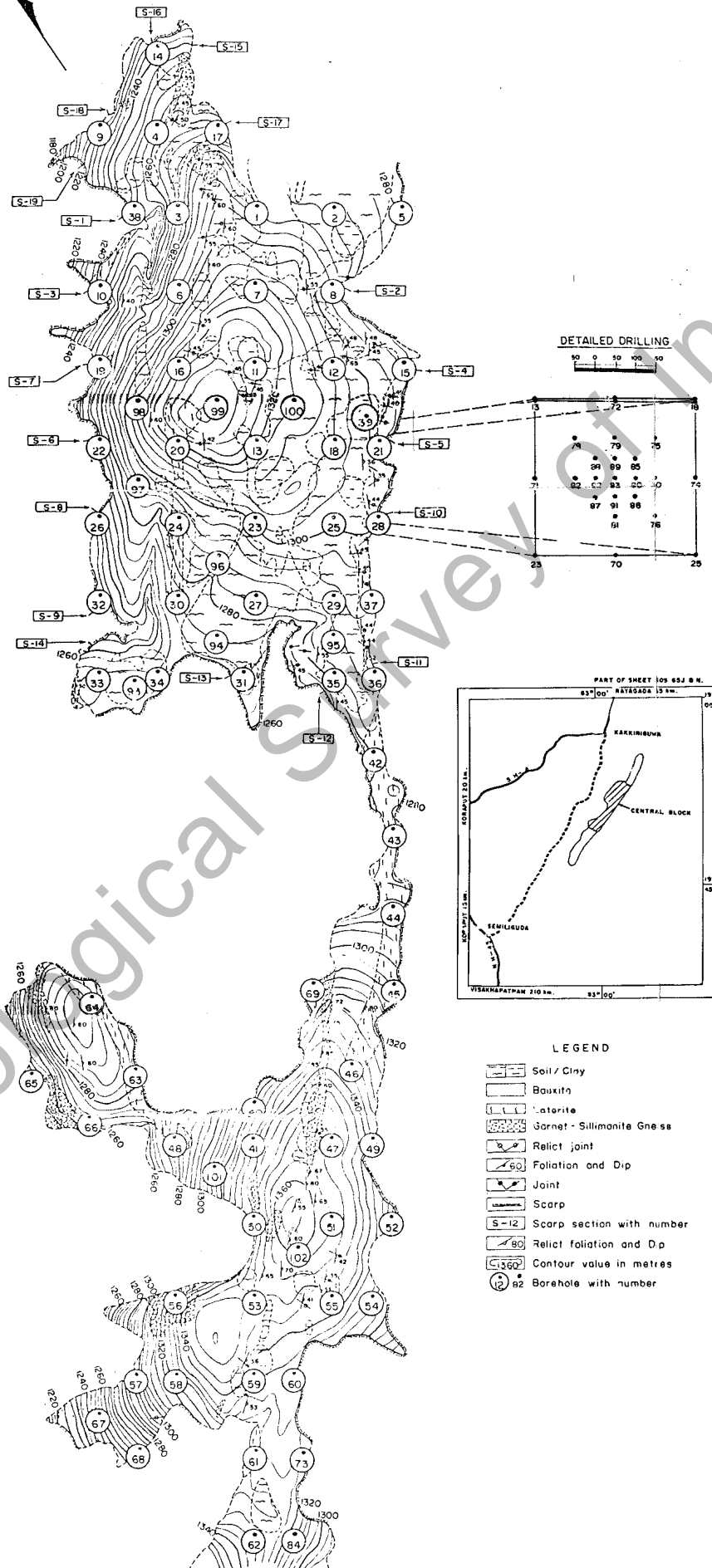
EAST COAST BAUXITE PROJECT, ANDHRA PRADESH
LOCATION MAP SHOWING THE BAUXITE CAPPINGS
INVESTIGATED IN ANDHRA PRADESH

Plate No. III



GEOLOGICAL SURVEY OF INDIA
EAST COAST BAUXITE PROJECT (ORISSA)
GEOLOGICAL CUM TOPOGRAPHICAL MAP OF
PANCHAPATMALI (CENTRAL BLOCK)

100 0 100 300 500 Metres
Contour Interval 4 metres



DETAILED DRILLING

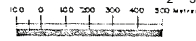
PART OF SHEET 109 85 J & N

LEGEND

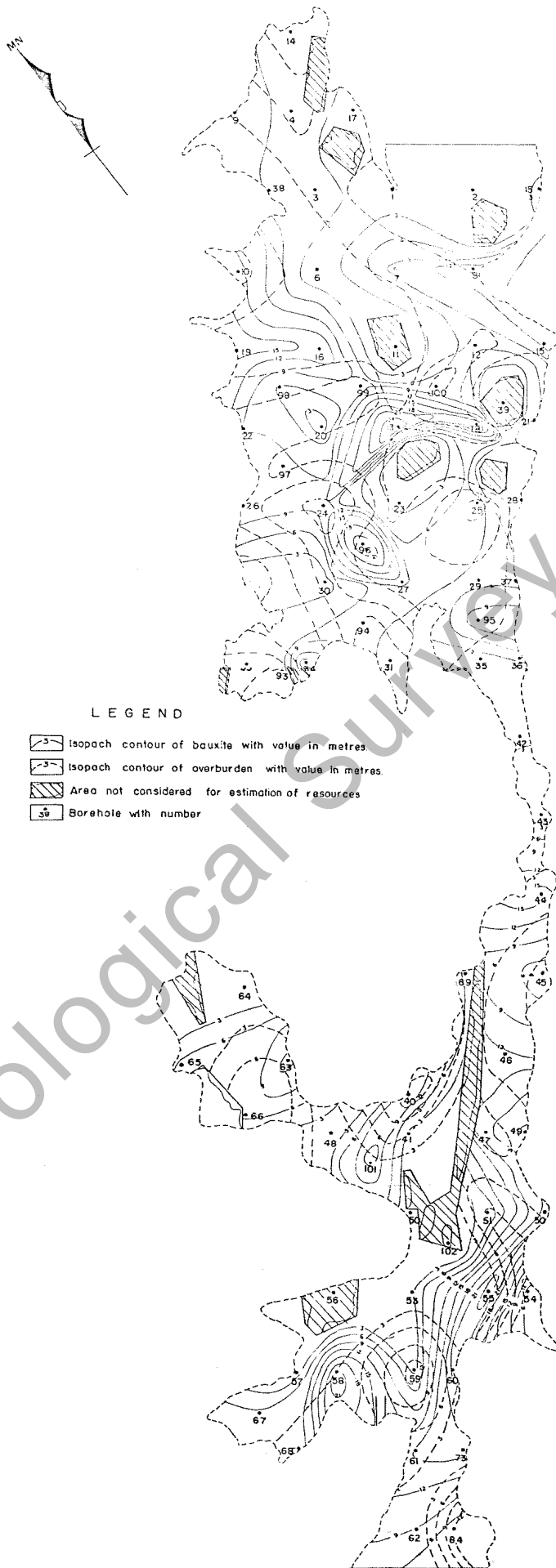
- Soil / Clay
- Bauxite
- Laterite
- Garnet - Sillimanite Gneiss
- Relict joint
- Foliation and Dip
- Joint
- Scarp
- S-12 Scarp section with number
- Relict foliation and Dip
- 1560 Contour value in metres
- 82 Borehole with number

GEOLOGICAL SURVEY OF INDIA
EAST COAST BAUXITE PROJECT (ORISSA)
PANCHPATMALI BAUXITE DEPOSIT (CENTRAL BLOCK)

ISOPACH OF $>45\% \text{Al}_2\text{O}_3$



CONTOUR INTERVAL 3 METRES

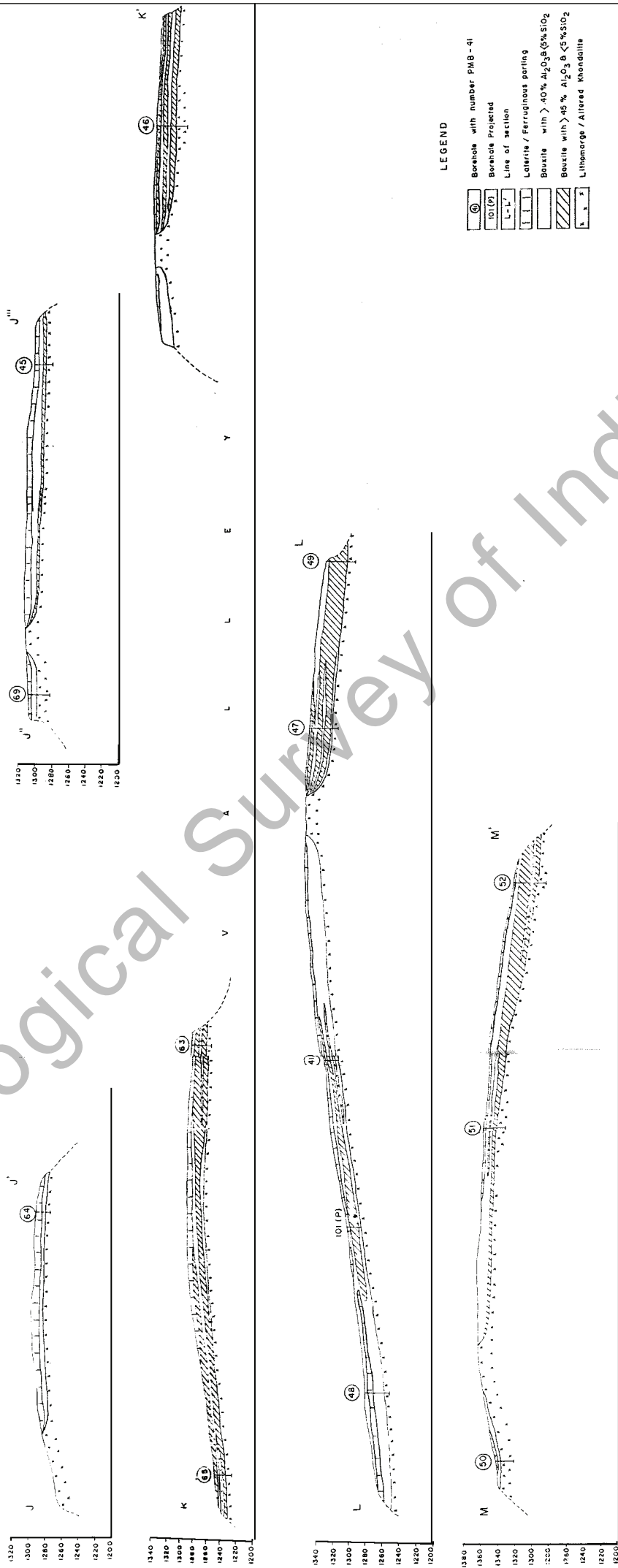


LEGEND

- Isopach contour of bauxite with value in metres
- Isopach contour of overburden with value in metres
- Area not considered for estimation of resources
- Borehole with number

GEOLOGICAL SURVEY OF INDIA
 EAST COAST BAUXITE PROJECT (ORISSA)
PANCHPATMALI BAUXITE DEPOSIT (CENTRAL BLOCK)
 CROSS-SECTIONS FOR RESOURCE ESTIMATION

20 0 20 60 100 METRES



LEGEND

- 63 Borehole with number PWB-41
- (P) Borehole Projected
- Line of section
- Laterite / Ferruginous parting
- Bauxite with $> 40\% \text{Al}_2\text{O}_3$ & $< 5\% \text{SiO}_2$
- Bauxite with $> 45\% \text{Al}_2\text{O}_3$ & $< 5\% \text{SiO}_2$
- Lithomarge / Altered Khondalite

GEOLOGICAL SURVEY OF INDIA
EAST COAST BAUXITE DEPOSIT (ORISSA)
PANCHPATMALI BAUXITE DEPOSIT (CENTRAL BLOCK)
ASSAY HISTOGRAMS OF BORE HOLES

