CHAPTER - II
GRANITE DEPOSITS IN ANDHRA PRADESH

2.1 MINERAL STRENGTHS OF ANDHRA PRADESH

Mineral form as a major resource and contribute considerably to the economic growth of the state. Andhra Pradesh is renowned as the mineral store house of the south and established as a prime mineral producer in the Country. The varied geology of the state has rich and wide variety of minerals useful for mineral specific industry. 48 varieties of minerals have been identified so far and important among them are Gold, Diamond, Bauxite, Beach Sand, Limestone, Coal, Oil and Natural Gas, Manganese, Dolomite, Quartz, Feldspar, Precious and Semi-precious stones, Clays, Calcite, Stealite Iron Ore, Base Metals, Barites, Uranium, Granite, Limestone Slabs, marbles, Dimensional Stones and other Building Materials etc.

Andhra Pradesh is well known globally for variety of rocks & minerals and called as ‘Ratna Garbha’. A State endowed with variety of minerals. Many of the ancient travellers and historians have mentioned about mining of Gold, Diamond, Base Metals, and Precious Stones etc. A.P. is repository of many minerals and has tremendous potential for mining and development containing varieties of Litho units/ Rocks, which contain host of industrial and non-industrial minerals.

2.1.1 Mineral Strengths of AP at a glance

- 1st in granite reserves in the country
- 1st in production and promoting various colours of lime stone slabs for flooring
- 2nd largest store house of mineral resources in India
- 2nd in value of mineral production – 9 – 10% of country’s mineral revenue
- 2nd largest Bauxite deposits in the country
- 2nd in occurrence of uranium deposits in the country
- 2nd longer coastline of 974kms – rich beach sand resources
• 2nd largest producer or cement – 59 plants with 23 million tonnes p.a.

• World’s largest single deposit of Barites in Kadapa

Andhra Pradesh is geologically unique and consists of Igneous, Volcanic, Metamorphic and Sedimentary formations range in age from most ancient (Archean) to recent (teriaries), and contain Peninsular gneissic complex, Dharwars, Eastern ghats, Cuddapah, Pakhal, Penganaga, Bheema Kurnool (Palnadu), Gondwana, Deccan traps, Tertiary and Quaternary formations. These formations with different Litho Units/Rocks contain host of Industrial, Non-Industrial and Metallic Minerals.

Andhra Pradesh is comfortably placed in various Minerals such as Limestone (34%), Coal (10%), Mica (86%), Dolomites (11%), Bauxite (40%), Barites (96%), Clays (30%), Heavy mineral beach sand (40%), Manganese (10%), Feldspar (11%), Quartz, silica Sand Soapstone (16%), Gold, Diamonds (16%), Uranium, Oil and natural Gas, Iron Ore, semi-precious stones, Granite (40%), slates, Limestone slabs, Marbles, Dimensional and Building Stones (40%).

• The State is first in Barites, Limestone and Beach sand heavy Mineral deposits in the country.

• The State is well known for Gold, Diamond, Precious and Semi Precious stone occurrences over vast areas.

• There are huge deposits of Bauxite in East Godavari and Visakhapatnam districts.

• Krishna-Godavari on shore and off shore basin contains huge reserves of oil and natural gas.

• The State also contains huge uranium deposits in Kadapa and Nalgonda districts.

• Andhra Pradesh is the only state in entire Southern India which contains large deposits of Coal.

• The State also has number of scattered low grade iron ore deposits in Prakasam, Krishna, Khammam, Karimnagar, Kurnool and Kadapa districts.
The State is well known for exclusive granite varieties viz, Chimakurthy Black Galaxy Granite, Srikakulam Blue, Khammam and Warangal Black granite, Karimnagar Tan Brown etc.

The department of Mines and Geology is entrusted with both promotional and regulatory functions for overall development of mineral sector and also collection of mineral revenue to the State Exchequer. The department is overseeing the functions of receipt and processing of mineral concession applications, grant of leases for minor Minerals, approval of Mineral Production, Survey and Demarcation of areas, Mineral Revenue Collection, Mineral Investigations and explorations and dissemination of Mineral information.

There are 2,039 mining leases and 9052 quarry leases for Major minerals (industrial Minerals) and Minor Minerals (Construction Minerals) with an extent of 1,02,376 hectares and 30,736 hectares respectively and 35 Reconnaissance permits (Gold, Diamond, Base metals, Precious metals). Mining for coal, Limestone, Barites and Natural Gas falls under large scale mechanized sector. Granite, Dolomite, quartz, feldspar, Clays etc. nearly 90% of the Mines fall under small sector and remaining 10% falls under medium and large sectors.

67 principle large and medium scale mineral based industries have been established in Public and Private sectors for manufacture of cement, steel, sponge, Iron, fertilizers, Ferro Alloys, Glass, Oil refinery, Fibre Glass, Ceramics, Refractories, zinc refinery, Chemicals etc. A.P. is the 2nd largest cement producer in the country. There are about 5,000 Granite, Marble and Limestone cutting and polishing units, Slate cutting units, mica processing units, Gem cutting and faceting units, Granite monuments manufacturing units, Pulverizing units, Stone crushers, mosaic and ceramic tile units, lime kilns and Rock stone sand units.

The mineral consumption is increasing due to promotion of various industries and manufacture of mineral based products. State produces about 100 to 110 million tonnes of Industrial minerals and 200 million cubic meters of dimensional stones and building material. A.P. stands 1st in Barites and Limestone production in the country.
The state stands first in value of minor mineral production and second in total value of mineral production in the country; contributing about 9 to 10%, (US$ 3.44 billion – 2008-09) to the country’s mineral value production.

The Mineral and Mining sector has achieved US$ 378.42 million of Mineral Revenue during 2008-09 against the target of US$ 472.10 million. Mineral revenue of US$ 180.46 million was achieved up to September 2009 against the annual target of US$ 528.68 million for 2009-10. During the 2008-09, State stands first in Mineral Revenue among the important Mineral Producing Sates of the country viz., Jharkhand (US$ 316.01 million), Rajasthan (US$ 273.09 million), Chhattisgarh (US$ 262.53 million), and Karnataka (US$ 106.35 million).

India is one of the leading countries in the production and export of granite and other stones. Granite is a very hard crystalline, Igneous or metamorphic rock primarily composed of feldspar, quartz and lesser amounts of dark minerals. India has vast resources of granite with about 110 varieties of different colours and textures such as black, grey, pink, multi coloured etc. These varieties are used to produce monuments, building slabs, tiles, surface plates etc. About 110 varieties of granites have been identified for processing as products for exports. The deposits are widely spread over the entire country. However, popular varieties are mainly found in South India.

Granite is a non-scheduled industry and hence entrepreneurs are only required to submit Industrial Entrepreneur Memorandum. Looking at its export, potential, Government of India has been encouraging setting up of 100% Export Oriented Units in this sector to promote export value added granite products.

Exports of Granite and Marble are freely allowed. Granite is mainly to Japan, USA, UK, Germany, Netherlands, Italy, and West Asia. Over the last three decades the Indian granite industry has modernised to global standards. Sculptures and monuments in India are being exported all over the world.
With its skilled manpower and stone technology, India has contributed to the world prestigious monuments such as the Holocaust Museum and the Vietnam War Memorial in Washington; Hiroshima Atom Bomb Memorial in Japan and Black Forest of Germany. However, the global recession has dampened India’s hope for bigger exports.

Today’s subdued market situation is due to several factors. The economic crisis in USA, Europe and other countries affected the exports to these countries. Also the recent introduction of synthetic stone like materials is affecting exports. The competition from China for rough blocks and finished products like slabs and monuments has contributed to the slow growth of exports from India.

However the future for the granite industry for both blocks and finished products is encouraging. India can improve its export performance as the processing capacity is very low, with less than 5% of gang saws installed in the world. The increase in export of blocks and finished products during the last year is an indication of the encouraging signs of market improvement. In spite of so many problems, the demand for granite products is increasing everywhere with consistent growth rate of consumption.

India, which is blessed with various types of unique colours and large deposits of granite, is certain to get its due share in the ever-growing world market. Many countries are worried about the strong entrance of China landed up importing more rough blocks and finished products due to high domestic demand. The world wide improvement of transportation system with more and bulk vessels will also help many countries to import more thereby boosting our exports.

The market potential is abundant and there are excellent prospects for the Indian granite industry to get due share in the world market. The professional and realistic approach towards solving the practical problems and careful planning of facilities by the industry and Government can make India the leading exporter of the world market. We have challenging years ahead but the potential for growth is beyond any reasonable doubt.
2.2 Opportunities & Threats for the Indian Granite Industry

The Factors helping the growth of the industry are:

1. Introduction of Stones for new applications and utilities etc.
2. Spurt in demand for Indian Granites Worldwide.
3. Increased domestic demand.

The major threat areas include:

1. The Economic slowdown in major countries.
3. Frequent power disruptions and high dependency on diesel affecting the production and the cost of Raw materials and finished goods.
4. Lack of Proper infrastructure.

Risks and Concerns:

The world economic slowdown in major countries has affected the stone industry. This slow down may result in the delayed collection of receivables thereby affecting the liquidity and increasing the financial charges.

The increase in Competition at both National and international level may result in Lower profitability and reduction in selling price. Further unstable Currency Fluctuations too affect the Profitability of the company.

2.3 Granite Deposits in AP

Andhra Pradesh is well known globally for rich and variety of rocks and minerals. The relics of State Mineral Industry is well illustrated in the form of Damascus Sword, Jewellery, Monuments, Sculptures, Aesthetic forts, Palaces etc., made out of the locally available minerals and rocks. Many of the past relics speak well about Andhra Pradesh artisans their skills, entrepreneurship and craftsmanship in refinery and moulding of the stones. The past history and present explorations unravel the occurrences of vast variety of Minerals & Dimensional Stones in various geological
environs of the state. The state is a repository of many minerals and forms a tremendous potential for mining and development.

Andhra Pradesh is the second largest state in terms of mineral sources in the country, where in 48 minerals were existing with vast explored reserves of coal, limestone, bauxite, barites, beach sands, gold, diamond, mica, clays, dolomite, quartz, manganese, base metals, tungsten, semi-precious stones, steatite, feldspar, silica sand, low grade iron ore, oil & natural gas etc.

It accounts for considerable reserves of important minerals in the country, viz. Mica, barites, calcite, limestone, vermiculite garnet, feldspar, fuller’s earth, dolomite, asbestos, fire clay, ball clay, soapstone, silica sand, graphite, quartz, diamond, gold, tungsten, corundum, pyrophylite, kyanite, granite, marble, ochre, apatite, chromite, shale, slate, limeshell, limekankar, green quartz, precious and semi-precious stones etc. The state has well geological prospective for host of Industrial Minerals akin to South Africa, Australia and Canada.

The State stands second in value of mineral production, contributes 8% of the total value of mineral production in the country, produces about 800 lakh tones of Industrial minerals and 80 lakh cubic meters of dimensional and building stones, earning a mineral revenue of Rs.770 crores to the state exchequer. The minerals which are being exported to various countries from the state are barites, quartz, feldspar, mica, semi-precious stones, slates, limestone slabs, granite and decorative stones.

The Andhra Pradesh industry is one of the oldest and internationally known for exclusive varieties of stones. The usage of the stones is known throughout the historic past. Natural stones were traditionally been used as an excellent building material. The glory of Kuppm artisans, their skilful quarrying and usage of stones, speaks volumes of Andhra Pradesh stone history. Many of the monuments, sculptures well speak about the Andhra Pradesh artisans, their skills, entrepreneurship and craftsmanship in moulding the stones.
Andhra Pradesh is gifted with a vast and varied variety of decorative/dimensional stone occurring almost in all the districts of the state and is repository of granites, possessing a wide spectrum of dimensional stones viz granite, limestone, slab, marble, slate, phyllite, quartzite, dolomite etc. It is one of the important destination for vast resources of valuable and varied rocks like granite, dolerite, syenite, anorthosite granodiorite, diorite, diabase, lyptinite, charnockite, khondalite, gneiss, granulite, pyroxenite, migmatite etc.

Andhra Pradesh is globally known for exclusive and unique Chimkurthy black galaxy granite and other varieties like Warangal jet black, Khammam black, Srikakulam blue and white, Karimnagar tan brown, Ananthapur grey, Chittoor Kuppam green etc. Naturally AP Granites conform to the highest international standards and provide excellent uniformity, consistency and have been used in several well known buildings all over the world.

Slate and phyllite in various shades of colours are used as decorative building material occurs in Prakasam, Guntur and Nalgonda districts. They are being exported from the state to various countries.

Various colours of limestone slabs from Bethamcherla, Tadipatri, Macherla, Tandur, Nereducherla and Muddimanikyam of Kurnool, Ananthapur, Guntur, Ranga Reddy and Nalgonda districts respectively are well known. They are extensively quarried, widely being used throughout the country for flooring, panelling purposes and also exported to many countries.

The Palnad marbles have already made a name in British Museum under the Style “Amaravathi Marbles”, likewise the Khammam marbles in natural shades of white & green with aesthetic beauty has made a home in the flooring. The pink, purple, yellow and variegated marbles from Cuddapah, Kurnool and Ananthapur districts have started to make a place in the international market.
The green aventurine of Ananthapur, green & yellow serpentine of Kurnool, Cuddapah & Ananthapur, Sullavai sandstones of Warangal and Karimnagar districts and quartzites from various districts are well known building and decorative stones from the state.

The state with abundant and wide variety of dimensional stone resources, infrastructure facilities, progressive policies and dynamic leadership collectively endeavour scientific development and opportunity for wide galaxy of entrepreneurs and consumers to source their choices.

Some of the deposits like limestone, coal, bauxite, mica, barites, and dolomite occur extensively over large areas and in huge quantities. Some like graphite, steatite, ball clay, fire clay, china clay, monazite sand, copper, lead, zinc, gold, diamonds, manganese, oil and natural gas, asbestos, iron ore, quartz and silica sand are found in localised pockets, but widely dispersed in different parts of the state and some are small and low grade deposits like corundum, garnet, kyanite, chromite, amethyst, green quartz, wolframite, feldspar, lime kankar, and lime shell are also being exploited in the state.

In addition to these economic and industrial minerals, the state is endowed with inexhaustible wealth of building stone like marble, slates and different varieties of granites suitable for cutting and polishing. The important minerals produced in the state are coal, barites, limestone, asbestos, gold, lead, natural gas, mica, quartz, dolomite and exportable quality granite and slate. Andhra Pradesh’s contribution to the nation is about 5 to 7%, ranking eighth in mineral production among the states, has a very good amount of untapped mineral resources like bauxite, natural gas, limestone, diamonds, dolomite etc., and if these resources are judicially tapped, it can scale up to 3rd to 4th position in the country. The contribution of mineral development from the state has not been very significant, but now the Government of India has announced new industrial and economic policy for fast and healthy growth and for exports. The state is gifted with a rich variety of mineral resources and hums with the accelerating tempo of industrialization.
Granite deposits occur as ridges or dykes above the ground surface. Normally such ridges with lengths at least 300 to 500 m, widths of 25 to 40 m and heights over the ground of 3 to 10 m are selected. As the quarrying operations progress, in many areas it might be necessary to work below the ground surface. Granite quarrying is essentially by open-cast mining. Production of blocks of considerable size and weight is the special feature of granite quarrying. In the first instance, the overburden is removed. Boulders that can yield marketable blocks if found during overburden removal operations are transported and stacked in the yard. The other boulders are removed and thrown in the waste dump. The exposed granite is carefully examined for its suitability to produce large blocks, if not it is drilled, blasted and the waste is removed. The rock found suitable is marked for splitting into blocks. If joints are present, holes are drilled into a joint to a suitable depth, usually controlled by horizontal joints, and suitably charged and blasted. In case no joints are present, series of holes are drilled along a chosen line of splitting at intervals of 15 to 20 cm and depths up to 30 cm. Feathers and wedges are inserted into the holes and carefully hammered in a calculated sequence so that the block spits along the line. The horizontal joint planes help in dislodging the block at its base. The operation needs sometimes to be supplemented by light blasting, taking advantage of the rift and the grain, to spring out the block. The block is then removed and transported to the yard, where it is dressed to required size and geometrical shape.

Andhra Pradesh is one of the states in the country endowed with vast resources of valuable industrial minerals and rocks. Good deposits of black granite (Dolerite as well as gray and pink granites) occur in the peninsular gneissic terrain of Andhra Pradesh. Thus, several occurrences of granite of commercially acceptable quality and quantity are found in Chittoor, Prakasam, Anantapur, Khammam, Warangal, Mahaboobnagar, Karimnagar, Srikakulam, Nalgonda, Vizianagaram, Kurnool, nizamabad, Medak and Rangareddy districts of the state. The black granite varieties occur prominently in the districts of Warangal, Khammam, Prakasam, Nalgonda and Chittoor districts while the coloured granites pink, grey and multi-coloured are
of greater incidence in the districts of Karimnagar, Nizamabad, Anantapur, Kurnool, Chittoor, Prakasam, Guntur, Srikakulam and Vizianagaram.

Granites in commercial parlance include apart from granite, rocks such as syenite, anorthosite, granodiorite, quartz diorite, dolerite, diabase, gabbro and pyroxenite. Of late, lepynites of the Eastern Ghats have also come into prominence with the trade name of White Granite. In a nutshell, all rocks which are of either igneous or metamorphic origin and which take good polish are grouped under the omnibus term ‘Granite’, which are extensively quarried, polished and exported. The neighbouring states of Tamil Nadu and Karnataka also have good deposits of black and pink granites. Even while these are better in quality the deposits of Andhra Pradesh have an edge over the later quantitatively.

The black granites are being most sought after by the foreign buyers for use primarily as monuments and also for panels, because of the black colour and amenability for good polish. Black Granite of gabbroic nature occurs in Prakasam and Guntur districts. Of these, the varieties with golden yellow flakes of Bronzite occurring in Prakasam district have of late made a mark in the export market with the commercial name ‘Galaxy Granite’. White granite leptynites occur in Srikakulam and Vizianagaram district. Geologically, most of the granite deposits in the state are confined to the Arcaean gneissic terrain.

Granites are of five categories viz., black, pink, gray, white and multicoloured granites. The gray granites predominantly form in the peninsular gneissic terrain. Pink granites are younger emplacements into the latter. The multicoloured granites are product of migmatisation and present different designs and hues. Thus, they have been given different trade nomenclatures depending upon the structure, design and colour of the rock. The white granites are quartz-felspathic rock belonging to the khondalites of the Eastern Ghats. The black granites, mostly dolerite dykes, are intrusive rocks such as gabbros and pyroxenites are also grouped under black granites.
Though the granite cutting and polishing industry in Andhra Pradesh dates back into 1940’s, the quarrying of the granite in the state is rather recent. The black granites of Chittoor, Khammam and Warangal districts and the pink granites of Kurnool, Anantapur and Karimnagar districts are being exploited for the last two decades whereas coloured granites of Guntur and Prakasam District have come into prominence only recently. The white granites of Srikakulam and Vizianagaram districts have come to stay only in 1991 when commercial exploitation of the same was commenced.

The availability of different varieties of granite in Andhra Pradesh is presented district wise. The granite deposits in the districts of Andhra Pradesh are presented in the following paragraphs.

**Anantapur District:**

Vast tracks of Anantapur District are covered by coloured granite terrain which makes the district important in the context of granite terrain which makes the district important in the context of dimensional stones. Close pet granite band, running in North-North West-South-South-East direction along the western border of the district is the major litho unit for the granite quarrying in the district.

The multi-coloured granites and the patches of pink granites from this zone comprising prominent hillocks are being actively quarried in Madakasira, Kalyandurg and Rayadurg areas. The gneisses around Nassankota near Ramagiri are quarried as Grey Granites, Migmatitic pink granites are available in Uravakonda, Kamalapadu near Vajrakarur and Gotty areas. Apart from these, numerous dolerite dykes which crisscross the granite country contribute to the black granite quarrying in the district. A large portion of the multi-coloured granite produced in the district is being exported through Mangalore Port.
**Chittoor District:**

Chittoor District has become world famous because of the Granite Polishing Industry which was established at Kuppam four decades back. The latter has been supplying monuments to the world markets since a long time. Chittoor was also the first district in the state where the quarrying for granite was taken upon commercial scale.

Geologically, this district is covered by peninsular Gneissic complex consisting of gray granite gneisse, traversed by basic and ultra basic intrusive. The basic intrusive are mostly dolerites, though some dykes of gabbroic nature are also encountered.

The dolerite dykes are extensively seen in Chandragiri, Chittoor, Puttur, Bangarupalem, Changattupalli, Vayalapadu and Madanapalle areas. These dykes range in width varying from 3 to 100 meters and run discontinuously even upto a few kilometres. The prominent dyke of Gudipala and Basavapalli are extensively quarried near Gudipala, Kuppinganipalli, Basavapalli, Padumanda, Naragallu etc. The other areas where black granite is exploited are Varathuru, Devlampet, Mandalapalli etc.

Apart from black granite, gray granites are also being quarried in the district in the areas around Kuppam, the granite gneisses are greenish in colour and are being marketed under the trade name of Kuppam Green. They are being extensively quarried near Yamaganipalli, Nagaram, Yanadipalli, Rajanam etc. Apart from this, Grey Granites are being quarried and exported for use as kerb stones. Some of the multi-coloured granites from the district are being marketed under the trade name of English teak. This has a typical chocolate brown colour which has imparted a good export potential to the rock.
Karimnagar District:

Karimnagar is one of the districts in the state where pink granite is extensively quarried. These granites are often porphyritic and are intrusive into the gneissic terrain and contain alkali feldspar. The later imparts the colour to the granite which ranges from light to deep pink. Because of the massive nature of these intrusive they are amenable for producing large size blocks, due to wide spaced joint pattern inherited to them. The granite deposits are mostly confined to the belt between Huzurabad and Karimnagar. The colour of the granite varies from place to place and this contrast makes the entrepreneurs handicap with supplying large quantities of uniform coloured material. Apart from these pink granites, grey granites gneisses are also being quarried in the district.

Khammam District:

Khammam district is one of the important districts in the context of occurrences of black granite. A number of dyke swarms traverse the Arhaean gneissic complex around Khammam town. They run at places for over a length of 3 to 4 kilometres with a width of 100 to 150 metres. The major deposits of black granites in the district are found within a radius of about 20 km around Khammam town. The dykes are dolerites with colour ranging from medium grey to jet black. The rocks are medium to coarse grained. Good quality black granites, some with greenish black colour are seen in and around Edulapuram, Potepalli and Arempula villages and are extensively quarried. So also are the prospects near Khanapur and Pandreguppalli villages in Mudigonda mandal. Black granites of Nelakondapalli exhibit greenish tinges due to predominance of augite in the rock. However, many of the occurrences in Khammam district are highly jointed and thus cannot yield big blocks, also some of them have defects such as blotches and flowers of plagioclases feldspar traversed by and thin veins of spidote, thus rendering the rock commercially less attractive.
**Kurnool District:**

Pink granites available in Adhoni area of Kurnool district have been in good demand and are marketed under the trade name of Adhoni Red. The western part of the district falling in the erstwhile taluks of Ahdoni, Aluru, Emmiganur, Pattikonda etc. is covered by the peninsular gneisses. Pink granite of Adhoni area is intrusive gneisses. These pink granites are extensively quarried near and around Adhoni, Ballekallu, Doddanakiri, Rangapuram etc. The inter mixing of pink granites and granites gneisses has resulted in multi coloured granites which are quarried around Kollekkollu, Manthirika, Kuppagallu etc. Apart from these, dolerite dykes are also being worked in the district as black granite occurs especially near Krishnagiri and Venkatacheruvu villages.

**Prakasam District:**

Prakasam District has come into prominence as a granite producing district in the states in recent years, thanks to the discovery of what is known as ‘Galaxy Granite’ in the Chimakurthy area of the district, this unique type won international recognition. The granite bearing areas in the district can be divided geologically into two parts, the southern part falling in the mica schist belt and the northern part forming a part of the granite terrain.

Black granite deposits around Chimakurthy area are basically anothosite gabbro pyroxenites which have intruded into biotite hornblende scheme. The rocks are of black colour and medium grained and take good polish. At places near Chimakurthy and R.L.Puram, the anothosite gabbro pyroxenite has developed crystals of bronzite. The golden yellow crystal of bronzite against the background of black gabbro given an appearance of a ‘Star stuffed sky’, hence the name Galaxy granite. This variety is being quarried around Chimakurthy and R.L.Puram, whereas the black gabbroic-pyroxenite is being quarried near Budavada. Good deposits of coloured granites occur around uppumagaluru and Kodidena. These are mainly hypersthenes granites which form extensive hillocks and these are being worked. Apart from this, syenites from Elchur are also being quarried as dimensional stones.
Srikakulam and Vizianagaram Districts:

Quarrying for granite in Vizianagaram and Srikakulam districts has gained momentum only in the last two years. White granites which are available in these districts have recently been introduced into the market and demand for the same has picked up considerably. They are sought after for use in wall panelling. These granites are associated with the Khondalite group of rocks and are basically quartzofelspathic gneisses with granites, the light blue one is another variety of granite i.e., hyper shine granulite or anorthosite. The white granite yield blocks of good size and can be cut into very thin slabs which are very light and can be used for wall panelling. Proximity of the prospects to Vishakapatnam port makes them commercially viable.

Warangal District:

Warangal District ranks high in the state for the quality of its black granite. The best part of the district is covered by granite terrain with a number of dolerite dykes cutting across. These dykes can yield good blocks of commercial value. The black granite is very much sought after by the entrepreneurs because of its uniform dark colour which makes it suitable for monuments.

The important black granite areas in the district fall within a radius of 40 km. from Warangal town. Among these, the deposits around Choutapalli area occurring in the villages of Choutapalli, Somaram and Medipalli are considered to the best quality black granite in the state. These are deep black in colour and can yield blocks of good sizes. The deposits around Teegalaveni, Ingurthi and Aranpalli are also considered to be good because of their capability to yield large blocks of sizes varying between 2 to 3 cubic meters and are considered to be highly valuable. Other prominent areas of commercial importance in the district are Peddapuram, Chintapalli, Yanamala and Kanaparthi. Many of these deposits are being extensively quarried and are exported to foreign countries after meeting the demand of various granite cutting and polishing units in the vicinity of Hyderabad. Apart from black granites, gray
granites are also exploited mostly around Warangal. Because of the possibility of obtaining huge blocks these gray granites have become commercially important.

It is well known that sale of any resource in raw form yields low return compared to sale of their processed and finished products. This applies to granite block sales also. One would realise much higher prices for cut and polished rocks compared to raw granite blocks. Estimates of value addition through cutting and polishing are queried differently by different industrialists, ranging from 1.6 to 4 times the value of raw blocks. Further processing of blocks through industries set up to within the state leads to new employment of educated and uneducated citizens and has its own multiplying effect. Keeping this in mind, the government of Andhra Pradesh took the initiative of helping entrepreneurs to establish granite cutting and polishing units in the state. To feed the industries to be set up, the Government issued instructions to granite mining leases to those entrepreneurs having a programme for establishing such units. At first the facility was intended only for units with 100% export oriented licenses, but more recently extended to all cutting and polishing units in the state. This is evidently because export of raw blocks abroad is not advantageous to the owner or the state, as also because raw blocks are transported to other states where they are cut, polished and exported. This measure of the State Government though might appear to create hardship to quarry owners, but it was done with the hope that a number of large/medium and small units will come up in the future.

The above analysis of the granite deposits in Andhra Pradesh makes it clear that there is abundant scope for the promotion of Granite Industry in Andhra Pradesh. The role of various organizations in promotion of granite industry is elaborated in the following paragraphs.
2.4 GEOLOGICAL SURVEY OF INDIA (GSI)

The Geological Survey of India which was established in 1851 has the proud distinction of being the third oldest Geological survey of the world, the first being the Geological survey of Great Britain and the second the Geological survey of Canada. In the domestic front too, its antiquity is not less venerable as it forms the second oldest scientific organization of the country, the first being the survey of India. The saga of the Geological survey of India as per se a reflection of the industrial growth and economic development of the country till independence, the avowed objectives as a result of which numerous sister organizations like Indian Bureau of Mines (1948), Atomic Minerals Division (1950), Oil and Natural Gas Commission (1956), Central Ground Water Board (1972) and Mineral Exploration Corporation (1972) were created drawing the core personnel for each of them from GSI. Consequently upon the creation of these Departments, it has become necessary to redefine the functions and responsibilities of GSI to avoid possible overlap of activities between different organizations.

The functions of GSI are as follows:-

a) To prepare geological, geophysical and geochemical maps of the country including the offshore areas on progressively larger scales.
b) To explore and assess mineral resources of the country including offshore areas;
c) To conduct all studies pertaining to environmental geology including systematic geotechnical surveys for assisting environmental development and projects;
d) To train scientific and technical cadres;
e) Dissemination of earth science data through maps, publications, museums and exhibitions; and
f) Provide technical service and render advice to Government and, on suitable terms, to public, on all matters related to the accredited functions of the department.
The wide-ranging scope of these accredited functions has only reaffirmed the primacy of GSI among the earth science organizations of the country.

As part of its national endeavour to cover the country by geological mapping and to explore and investigate selected areas for new mineral deposits, the GSI has been carrying out extensive geological survey in Andhra Pradesh also over the past more than one century and achieved significant results with perceptible impact on the economic growth of the state. The survey undertook several other types of investigation also covering such specialized fields as Engineering Geology, Environmental Geology etc. consistent with the demands and requirements of the development plans of the state. If Andhra Pradesh occupies a place of pride in the Mineral Map of India today, it is largely, if not solely, due to sustained efforts of GSI in the state. The discovery of barites deposit in Mangampeta, of bauxite a top Eastern Ghats – the second largest in the country – by the scientists of GSI bear eloquent testimony to this claim. Similarly the constructive role played by the survey in planning and execution of different development projects of the state, by way of tendering necessary geotechnical advice, cannot be over emphasized. The contribution is being made by GSI in environmental resource evaluation and in tackling problems of environmental pollution in the state – a formidable problem generating acrimonious debate in the world over – is no less significant. Dissemination of Earth science data through maps, publications, exhibitions etc., preservation of material of unique geological monuments, construction of prehistoric animal models are some of the other activities of GSI in the state.

2.5 NATIONAL MINERAL DEVELOPMENT CORPORATION LIMITED (NMDC)

NMDC one of the earliest public sector undertakings in the field of mining was incorporated on 15th November, 1958, in accordance with the Industrial Policy Resolution of 1956. Its character at the time of formation included development of all minerals other than coal, oil and atomic minerals. NMDC began its tryst with destiny by taking up development of its first project in Kiriburu Iron ore mine in
Singhbum District, Bihar, a major open cast iron ore mine in the country for export to Japan. Almost simultaneously NMDC was given the gigantic task of development of one of the biggest iron ore mining complex in remote Bailadila range of Bastar District, Chattisgarh. This included development of two large mechanized iron ore mines. NMDC was also assigned the task of the most ambitious copper project at that time of Khetri mining complex which required processing, smelting and other facilities. To this was added the development of Rakha Copper Project in Singhbum district, Bihar, Kudremukh magnetite complex and Mussorie Rock phosphate. Consequent to the transfer of NMDC to Ministry to Steel, besides its operations in the field of diamond, NMDC concentrated more in the development of iron ore mine and various input minerals for steel industries as well as minerals which require much needed high technology requirement for development.

The State of Andhra Pradesh has a special status in the activities of NMDC. This can be visualized by the fact that the corporate office of NMDC and its centralized R&D laboratory which is one of the best in the country is located in Hyderabad. From its corporate office and R&D laboratory NMDC takes up the challenging task of development of some of the key mineral deposits of Andhra Pradesh.

2.6 ANDHRA PRADESH MINERAL DEVELOPMENT CORPORATION LTD (APMDC)

The Andhra Pradesh Mineral Development Corporation Limited, formerly known as A.P. Mining Corporation Limited, acquired a new role and is charged with the responsibility of developing mineral deposits and promotion of mineral based industries in the state, in addition to its continuing functions of mining of important deposits.

Consequently, an Industrial Consultancy Department has been started as a nucleus for further expansion in this direction. The department has three divisions namely Exploration, Mines Planning and Mines and Mineral Based Industries Division. The Department plans to extend free and chargeable consultancy assistance to the
entrepreneurs, mine owners and industrialists. Thus, the Corporation plans to achieve both through their own staff and with the help of expert consultants in particular fields that they are recognized. The functions of the Corporation are detailed below:

i. Search for suitable deposits for particular mineral based industries;
ii. Estimation of reserves and quality;
iii. Mine planning;
iv. Help in obtaining mining leases;
v. Selection of mining equipment and mining methods;
vi. Overseeing mining aspects; and
vii. Marketing of ore.

Besides the above activities, the corporation provides the entrepreneurs of granite cutting and polishing industries by identifying suitable decorative stones, estimation of their reserves, quality, mine planning, leasing, mining methods, equipment and overseeing mining aspects. Similarly the APMDC extends its facilities for preparation of techno-economic feasibility reports, in deciding location of the industry, designing the plant, choice of machinery, overseeing production and its marketing. If desired, it would help the entrepreneurs by providing escorts services for obtaining quarry leases and industrial licenses.

The APMDC has recognized about 28 areas in the districts of Warangal, Khammam and Nalgonda for black granite. It is at present mining and is planning to mine from some more areas. However, APMDC hope to utilize the rest of the areas in tie-ups with industrialists for supply of raw materials. The APMDC monitors through computer assistance the available locations of suitable decorative stones in the state, details regarding existing industries, equipment manufacturers and marketing outlets. It specifically wishes to offer assistance to industrialists in the field of marketing, with a view to obtain the best possible price about which it would have data readily available.
The Corporation’s endeavour is to encourage small entrepreneurs in setting up of tiny units for indigenous consumption. From several of the quarries, rocks, smaller in size than those utilized by cutting and polishing units for panels, monument etc., would is lying unutilized. These otherwise waste rocks of minimum dimensions of approximately one to one and half feet could be used in production of tiles. This would be in the direction of conservation of mineral wealth. The Corporation has already prepared a techno-economic feasibility study for small tile manufacturing units, which it hopes to set up at Warangal shortly, utilizing the waste blocks available at Choutapally and Bodduchintalapally mines.