I. BASEMETALS (Copper, Lead and Zinc)

Under base metals, copper, lead and zinc are described together because of their close association. The principal ores of copper are sulphides, carbonates and oxides. Some of the important copper minerals are chalcopyrite (Cu FeS2), chalcocite (Cu2S), bornite (Cu5FeS4), covellite (CuS), native copper (Cu), malachite (CuCO3Cu(OH)2), azurite (2CuCO3Cu(OH)2) and cuprite (Cu2O).

Lead is soft but a heavy metal, malleable and resistant to acids and is widely used in storage batteries, cables, sanitary fittings, chemical plants, making alloys and paints. Lead is closely associated with zinc and silver. The important minerals of lead are galena (PbS), cerussite (PbCO3) and anglesite (PbSO4) of which galena is very common.

The important zinc minerals are sphalerite (ZnS), smithsonite (ZnCO3) and zincite (ZnO). Zinc is used in making brass alloy, collapsible soft tubes and pigments and for soldering and coating purposes.

Copper-lead-zinc mineralisation in A.P. is associated with the Archaean metamorphics and the Proterozoic Cumbum Formation of Cuddapah Supergroup. As many as 70 base metal occurrences are known but a majority are confined to Agnigundala, Zangamrajupalle-Varikunta, Gani-Kalva and Mailaram belts. Old workings are found at several locations in these belts. Multi-sensor airborne and integrated ground surveys carried out by the GSI followed by drilling had indicated a number of prospects in the Cuddapah Basin.

Cuddapah District: In the 50 km long N-S trending Zangamrajupalle-Varikunta belt in the south central part of Cuddapah Basin, lead-zinc mineralisation associated with copper is found at several places such as Zangamrajupalle, Gollapalle, Karredukuppa, Varikunta, Chinnarampadu, Gadageribodu, Gavulabhavi, Ankireddibhavi, Ambavaram, Nagasanapalle, Kotluru and Hulurukonda. The mineralisation is found within the dolomite intercalations and brecciated dolomite enclosed within the N10°E-S10°W to N25°W - S25°E trending Cumbum slate.

The Zangamrajupalle deposit is the most prominent one in this belt. Mineralisation in the form of galena and sphalerite with subordinate pyrite and chalcopyrite occurs as cavity fillings and breccia fillings, occurs over a length of 2 km. Width of the mineralised zone varies from a few centimetres to 3.30 m. There are five lodes in the area. The entire mineralised zone was initially explored by GSI and subsequently in detail by MECL. The reserves estimated by GSI up to 100 m and 150 m depths in two sections over a cumulative length of 1350 m are of the order of 3.07 Mt with a grade of 1.08% to 4.21% Zn and 0.86% to 2.91% Pb.

The Gollapalle deposit, located close to the Zangamrajupalle deposit, consists of three blocks and Pb-Zn mineralisation is found at the brecciated contact of dolomitic limestone with carbonaceous phyllite over a cumulative strike length of 3.3 km. Continuous mineralisation has been established over a stretch of 1.33 km in the Gollapalle deposit. With limited drilling carried out, a reserve of 3.47 Mt of lead-zinc ore has been estimated with a grade of 1.8% Pb and 1.7% Zn.

Both the Zangamrajupalle and Gollapalle deposits are likely to be submerged under the waters of PVB Reservoir, Telugu Ganga Project. Lead–zinc mineralisation is also found at Varikunta and Karredukuppa. Drilling carried out by GSI indicated that the mineralisation is persistent at the former and sparse at the latter.

Guntur District
The Agnigundala belt, which hosts important basemetal deposits, is situated near Vinukonda in the northeast of Cuddapah Basin. About 30 occurrences of copper, lead and zinc are located in a 50 km long belt and the occurrences are localised in the Cumbum Formation consisting of calcareous quartzite and dolomite. Important occurrences are located at Bandlamottu, Nallakonda, Dhukonda, Karempudi, Vummidivaram, Peddagavvalakonda, Kandrika and Malapadu, of which the first three are significant.

In the Bandlamottu deposit, copper-lead mineralisation associated with upper dolomite/dolomitic limestone could be established over a strike length of 1200 m with lodes ranging in width from 1 m to 11 m. Based on the drilling done by GSI, a reserve of 11.45 Million tonnes of lead ore (av 6.01% Pb) and 1.03 Mt of copper ore (av 1.42% Cu) up to a depth of 260 m R.L. was estimated. Subsequently, the Hindustan Zinc Ltd based on the mine data, estimated a reserve of 1.24 Million Tonnes of lead ore with an average of 5.76% Pb up to 100 m R.L.

In the Nallakonda deposit, copper mineralisation is localised in coarse grained calcareous quartzite found as intercalations within the chlorite phyllite/argillite. The mineralisation has been established over a length of 1300 m. Based on the drilling, a reserve of 3.14 Mt of ore up to 230 m depth with an average of 1.82% Cu has been estimated by GSI. Exploratory mining subsequently by HZL did not indicate significant strike and depth-wise extension of mineralisation. In the Dhukonda deposit, copper-lead mineralisation associated with quartzite and dolomite was established over a cumulative strike length of 2 km. A reserve of 2.15 Mt of ore with 1.51% Cu and 0.45 Mt of ore with 8.98% Pb has been estimated in this deposit.

Exploratory drilling in the Karempudi block indicated 0.65 Mt of ore with an average grade of 2.34% Pb+Zn up to 150 m R.L. Test drilling in Peddagavvalakonda, Vummidivaram, Papayapalem and other areas did not indicate any significant basemetal mineralisation.

Kurnool District

The well known ENE-WSW trending Gani-Kalva fault hosts the sporadic basemetal and specularhaematite mineralisation in the district. In Gani area, mineralisation is within quartz veins that were emplaced along en echelon fractures in the Tadipatri Shale, belonging to the Chitravati Group. In the Kalva area, the mineralisation is highly erratic and lenticular. An inferred reserve of 0.43 Mt of ore with 1.37% Cu was estimated in Gani area up to 100 m depth.

Prakasam District

In Gajjalakonda area, chalcopyrite and pyrite with malachite and azurite occur with baryte veins in chlorite phyllite and dolomite of the Cumbum Formation. Results of test drilling are not encouraging.

Nellore District

Sporadic occurrences of malachite, pyrite and chalcopyrite associated with quartz veins and pegmatites in mica schist and amphibolite of the Dharwar Supergroup are reported at several localities. The occurrence at Garimanipenta was investigated and the results are not encouraging.