# 1. EXECUTIVE SUMMARY

1. Acetylene Black is used in the manufacture of Dry Cells - mainly to improve the depolarizing properties of manganese dioxide.

2. There are, at present, three acetylene black units. These are : Union Carbide India Ltd. (UCIL), Chembur; Travancore Electro Chemical Industries Ltd. (TECIL), Kottayam; and Panyam Cement & Mineral Industries Ltd., Nagari. Out of these, the UCIL plant is shut down and only the other two are operating.

3. The installed capacity for dry cells is 1,714 million numbers per annum. The actual production during the last five years has not exceeded 1,200 million numbers.

4. Union Carbide accounts for 45% of indigenous battery production. Indo National and Lakhanpal National together produce approx. 38% and Toshiba Anand and Punjab Anand account for approx. 9%. The remaining 8% is shared between Geep and others.

5. The depressed demand for dry cell batteries is reflected on the acetylene black industry also. The actual demand has not gone over 3,600 tonnes/annum in all these years.

6. The total installed capacity is for 4,700 TPA. However, the actual production during the past years was as follows :

| | YEAR | UCIL | TECIL | PANYAM | TOTAL |
|---|---|---|---|---|---|
| a) | 1984 | 196 | 1,500 | 200 | 1,896 |
| b) | 1985 | 200 | 1,300 | 134 | 1,634 |
| c) | 1986 | 68 | 1,000 | 440 | 1,508 |

7. The Planning Commission has estimated the demand for acetylene black by 1990 to be 6,000 tonnes. Since IPCL, Maharashtra Cracker Complex is not likely to be

implemented before 1991-92, the actual production is not likely to exceed more than 3,040 TPA, leaving a gap of around 2,960 TPA.

8. UCIL acetylene black plant had an installed capacity of 900 TPA and was based on acetylene recovered as a by-product during the production of ethylene. It's maximum yearly production was 500 tonnes, in 1972, which, over the years, dwindled to 68 tonnes in 1986 and nil in 1987.

9. TECIL based its acetylene black production on the calcium carbide route. It had a record production of 1,500 tonnes in 1984, which decreased to 1,000 tonnes in 1986. The decrease was attributed to power shortage.

10. Panyam Cement & Mineral Industries Ltd., also based its acetylene black production on the calcium carbide route. Despite their claim to the contrary, they are unable to produce a consistent product to the satisfaction of the users. Although their installed capacity is for 1,800 TPA, their production in 1986 was less than 500 tonnes. However, they have since reported, in April'88, that they have adopted an improved technology (costing an additional Rs. 16 lakhs), since June'87, and their production, during July'87 to Feb.'88, has been 851 MT.

11. The indigenously manufactured acetylene black sells at app. Rs. 50/kg., as against the imported product's CIF price of Rs. 20/kg. The import duty varies from 104% to 175%. The dry cell manufacturers claim that the indigenous acetylene black can be used only in blends with imported black, whereas, the latter could be used on its own. Low price, superior and consistent quality, and easy supply, are factors favouring imported acetylene black.

12.1. Contemporary technology abroad has registered spectacular progress. The acetylene black units are of larger capacity - over 8,000 TPA and the processes employed are continuous. Microprocessors provide finer controls, on time of residence, temperature of the furnace, etc., ensuring a product of consistent quality.

12.2. The electric furnaces used in, calcium carbide production, have large capacities (each furnace of 300 TPD). They operate on three electrodes and there is a provision to recover the furnace gas. Tapping of the furnace is done more frequently (at 20-40 minute intervals) and there is better control of operations. The coke used has a low percentage of ash and contains fewer impurities, compared to Indian coke. The quality of lime is also superior. "Dry" type acetylene gas generators are used which facilitate the recovery and recycling of lime. All these go into the manufacture of acetylene and hence the acetylene black eventually produced is not only superior

but also low priced. Despite these improvements, the calcium carbide route is energy intensive. The capital costs are also high. The modern trend abroad is therefore towards basing acetylene production on the hydrocarbons, utilising plasma, semi-combustion, or thermal decomposition methods of production.

12.3. The most successful of the electric discharge processes has been the HUEL process established in Germany, on a 100,000 TPA capacity, utilising natural gas and $C_3$-$C_4$ mixtures as feedstock. This plant has been in operation since 1940.

12.4. In the semi-combustion process of manufacture the necessary energy is imparted to the feedstock by the natural combustion of the hydrocarbon. The BASF process is the most successful of these techniques. Several plants, of capacities varying from 10,000 to 60,000 TPA and utilising naphtha or natural gas as feedstock, are operating in Europe. Other successful processes are the SBA and the MONTE-CATINI process. They are based on natural gas as feedstock and have capacities ranging from 16,000 to 50,000 TPA.

12.5. Among the well established thermal decomposition process is the WULFF process, licenced to Union Carbide and British Oxygen for 5,000 and 30,000 TPA respectively.

13. The hydrocarbon based route is superior to the calcium carbide one; in fact, for a similar capacity plant, the raw material cost is only 60% and cost of production, only 77%.

14. Modernization, of the existing units, is possible through use of low ash coke, superior quality lime, recycling of lime, more frequent tapping and efficient utilization of the tail gas from the calcium carbide furnace, recovery and utilization of hydrogen gas from the acetylene black plant.

15. To be internationally competitive, the new units should have large capacities, operate on a continous process and be fully automated. Further, acetylene production should be based on the hydrocarbons.

16. It is further recommended that R&D efforts be intensified to improve the quality of acetylene black and to devolop superior processes for its production. A scheme to modernise the existing units may also be considered.