EXECUTIVE SUMMARY

0.1 The Midget Electrode, is an essential component of the dry cell battery; it forms the central piece of the dry cell. It belongs to the family of the carbon electrode which has a long history, dating back two hundred years.

0.2 The world saw the first commercial production of Midget Electrodes in the year 1886; in India the production started in 1965, by the then National Carbon Company, presently called Union Carbide India Ltd., in collaboration with Union Carbide Corporation, USA. Several others tried to enter the field after this, and three actually did set up manufacturing facility and started production.

0.3 At present, however, Union Carbide India Ltd. and Indo Matsushita Carbon Co. Ltd. are the only two effective manufacturers of Midget Electrodes in the country. While the former had the technology inputs from Union Carbide USA, the latter obtained technology from Japan. The other two manufacturers, who have ceased operations had their technology from the National Research Development Corporation, as developed by the National Physical Laboratory, a CSIR institution.

0.4 Union Carbide India Ltd. was a multi product company largely involved in high-technology chemical products. However, in the recent past, following a major industrial accident in Bhopal, the company has divested itself of its chemical product activity and is now only a battery and Midget Electrode manufacturing company.

0.5 Indo Matsushita Carbon Company has equity support from Matsushita Electric Industrial Company of Japan. Its Indian promoters are connected with the second largest battery manufacturing unit in India.

0.6 Between the two manufacturers, an effective production capacity of 1,800 million pieces of Midget Electrodes exists in the country, the current production level being of the order of 1,100 million Electrodes.

0.7 The market for Midget Electrodes is the dry cell industry. The dry cell industry witnessed high growth rates in the Sixties and early Seventies. As a result of this, several manufacturers entered the field, but following a slowdown in the growth of dry cell consumption in the country resulting from growth of electrification of villages, which effected the consumption of batteries for radios and flashlights — some of the new entrants into the field have been forced to close down.

0.8 For the future, a growth rate of 12.5% for penlite cells and 2.5% for the other type cells looks to be a reasonable assumption.

0.9 Since Union Carbide used to manufacture Midget Electrodes for captive consumption only, the other dry cell manufacturers had to import their Midget Electrode requirement. This import has now dropped with the advent of Indo Matsushita Carbon Company Ltd. Even so, the electrodes for penlite cells continued to be

imported until 1988, when this product was developed by Indo Matsushita Carbon Company.

0.10 The future growth rate for Midget Electrodes is projected to be of order of 4.25%. The projected demand for Midget Electrodes for the year 2000 A.D. is of the order of 2,170 million pieces per year.

0.11 It is unlikely that a third manufacturer of Midget Electrodes would come up unless a strong third group comes up in the manufacture of dry cell battery.

0.12 Manufacturer of Midget Electrodes involves various stages such as: Preparation of raw materials by way of pulverising or grinding; Mixing of raw materials using jacketed vessels for heating during mixing; extrusion of the mixed mass in a horizontal hydraulic press to obtain rods of the required diameter; baking of the green electrodes in a suitably designed batch type or continuous baking furnace, the impregnation of the baked electrode with wax or oil to achieve desired levels of porosity; cutting of the electrodes to the final size and packing. As a mass produced item requiring high levels of consistent quality, the Midget Electrode is subjected to various quality checks right from the raw material stage to the finished product, the important among them being electrical resistivity and breaking strength. Other quality checks include porosity, dimensional stability and structural defects.

0.13 The industry gives rise to atmospheric pollution from raw material preparation, mixing and baking of the electrodes. The industry has taken necessary pollution control measures and the resultant pollution is reported to be well within the limit specified by the Pollution Control Board.

0.14 Over the years, research and development, in this field have been carried out by the National Physical Laboratory, a CSIR institution and by Union Carbide India Ltd. The former developed the technology for manufacture of this product and licensed two manufacturers. Both have since ceased operations. Union Carbide's R&D effort, was aimed at unpackaging the imported technology and making it suitable for locally available raw materials.

0.15 In the world scene, Japanese companies control a major share of the world market, followed by the Eveready group which has recently been sold off by Union Carbide India Ltd.'s American principal to another American Corporation. The total world production is estimated to be of the order of 12,000 Million pieces which places the present Indian production at 9% of the total.

0.16 Expert opinion on technology trends for the future point to the direction of cost reduction, rather than any radical departure in product or profit characteristics. With the recent development of penlite battery electrodes, India can be said to have international standard products indigenously available. There is no discernible development in dry cell battery field, that will affect the prospects of this industry.

0.17 Considerable work still needs to be done in India in the area of developing local raw

materials and reducing the material cost of production. In this area joint research activity by the industry and research laboratories can be attempted. In the matter of process and plant, India can be said to be at par with international level of technology.

0.18 Estimates of minimum economic capacity for this industry have ranged from 100 Million to 300 Million in the past. It is recommended, taking into account the world scenario and the requirements of credible infrastructure for quality, technology development and R&D, a capacity of 600 Million Pieces can be regarded as preferred minimum for the future.

0.19 R&D effort within the country aimed at indigenous development of the technology from first base, did not succeed because of the mass production dynamics of the product and the limited resources applied. However, R&D aimed at adaptation of foreign technology succeeded in achieving full assimilation of technology, because of its practical feasibility and the adequacy of resources.

0.20 In overall terms, the level of technology for this product in India can be considered as lagging behind international levels, if one looks at the cost of production; Indian product is far too expensive compared to international prices.

0.21 With further development work done in the area of utilising indigenous materials and with development of plant indigenously, there is every possibility for India to become cost competitive and be a substantial net exporter of this product to the rest of the world.