EXECUTIVE SUMMARY

0.1 INTRODUCTION

The report is aimed at bringing out the present status of technology in the field of Linear Alkyl Benzene (LAB) in India in relation to the rest of the world. The study covers a review of operating units in India, comparison of manufacturing processes followed and the problems faced by the manufactures regarding technology. The study was conducted by contacting the existing and potential manufacturers, the technology suppliers and the users of LAB and compiling the information received from them.

LAB is the basic raw material for the world's most widely used surfactant today with the global consumption exceeding 2.3 million MT per year. Although the demand in the developed countries is saturated to an extent, LAB has an excellent scope for growth in the industially developing countries.

Presently the technology for LAB manufacture is more or less monopolisedd by one single party, namely UOP Inc., USA. The three manufacturing units in India are all based on UOP technology and the prospective entrepreneurs have also opted for the same technology.

UOP technology, based on dehydrogenation and alkylation using Hydrofluoric acid as Catalyst, is superior compared to the other processes involving chlorination. The yields are better, the product quality is superior and the pollution problems are minimum.

0.2 STATUS OF LAB INDUSTRY IN INDIA

Indian Petrochemicals Corporation Ltd. (IPCL) was the sole producer of LAB in India. Tamilnadu Petroproducts Ltd. (TPL) and Reliance Industries Ltd. (RIL) started production in 1987. Today the total installed capacity of these three plants together is 198,500 MT per year. IPCL continues to operate the plant at over 115% of their installed capacity and produce good quality LAB meeting international & specifications. TPL and RIL operate their plants at almost full capacity utilization producing LAB of quality which is readily acceptable in the international market. The production in India in the last two years was more than 2,10,000 TPA, out of which 40,000 to 50,000 TPA was exported.

The present annual demand of LAB in India is 1.9 to 2.0 Lakhs MT, which is expected to rise to 4 to 5 Lakhs MT by the turn of the

century. Evidently there is scope for expansion of the existing units and also for new plants. Nirma, Hindustan Lever and Straw Products are planning 60,000 to 80,000 TPA plants each. TPC and RIL are reportedly planning expansion of their capacities to 120,000 TPA and 150,000 TPA respectively.

LAB is not imported into the country today. There is considerable export of the same in the last few years. This trend is expected to continue in the years to come.

The manufacturing process followed by Indian manufacturers is described in detail. the manufacturers are able to control the process effectively enough to maintain the quality and quantity without any problems. The technology supplier has demonstrated the guaranteed consumption figures during test runs and all the three manufacturers i.e. IPCL, TPL & RIL are achieving the anticipated consumption norms since then.

0.3 INTERNATIONAL SCENARIO

The production, consumption, technology suppliers for LAB in the world are dealt in detail in this section. A brief review of the LAB industry in the would is presented followed by the salient features of contemporary technologies used and a comparison has been attempted. It is indicated that dehydrogenation and alkylation route has a clear edge over other route.

The size of plants producing LAB outside India are not larger than the plant capacities in India. Therefore the economics of scale is not unfavourable to Indian plants.

The latest technological breakthroughs are related to the development of better catalyst in terms of yield, ease of operation, lesser side reactions and safety.

0.4 R&D EFFORTS, TECHNOLOGY ABSORBTION AND GAPS

IPCL, TPL and RIL have adequate analytical facilities and infrastructure for technology absorbtion. RIL have sponsored a research programme to be conducted by National Chemical Laboratory, Pune (NCL). NCL have developed a zeolite based solid catalyst for producing LAB. The bench scale experiments are successful and pilot plant trials are underway.

IPCL has an elaborate facility for research and for carrying out analytical tests. They have long years of experience in the manufacture of HMW and LMW LAB. They have absorbed the technology and also adapted and assimilated it. They belive in conducting process

development work on their own. They have made several developments in respect of Molex and PACOL.

Indian Standard is available for sulphonated LAB and also for LAB. As opined by users, the testing facilities available with the manufacturers and other laboratories in the country are satisfactory for the assessment of quality of LAB.

IPCL, TPL and RIL have taken adequate steps to absorb the technology. While the major raw materials viz., Kerosene and Benzene, are available in India, some other chemicals required for processing are imported and efforts are on to indigenise the same. Most of the equipment in the process plant can be fabricated/procured indigenously with the exception of the proprietary equipment, which forms only a small fraction of the total capital cost.

Since the Indian manufacturers are using the best available technology, there are no major technological gaps, according to the experts in the field. The solid catalyst developed by UOP or by NCL may be a better choice as compared to the HF catalyst presently being used. However, this is applicable only in case future plants and no change over is expected in the running plants because of economic reasons.

Parties are now available in India to recover noble metal from spent catalyst. For example, IPCL is converting the recovered noble metal to DHC Catalyst in India.

0.5 CONCLUSION

All the manufacturers in India are using UOP technology which is considered to be the best available in the world today. The latest developments have been incorporated wherever they have proven to be economically attractive. The quality of LAB is acceptable in India as well as abroad.

The Indian manufacturers do not face any difficulty in respect of manufacturing or marketing as far as the quality of LAB is concerned. No serious technological problems or gaps related to LAB have been revealed.

However, the production cost of LAB manufactured in India, is more than that manufactured abroad. This is attributable to the high price of kerosene in India than that prevailing in the international market. Also, consistent quality of raw material results in higher return of petroleum feedback after extraction of Kerosene.

0.6 RECOMMENDATIONS

0.6.1 The Platinum Catalyst in the PACOL Units is required to be sent abroad for platinum recovery. This involves high transport cost which can be saved if the platinum metal can be leached out from the spent catalyst. The leached out platinum may be sent to the catalyst manufacturer for use in catalyst regeneration. LAB manufacturers may make use of the indigenous Platinum recovery and DHC facility available at IPCL.

0.6.2 National Chemical Laboratory, Pune (NCL) has developed a solid catalyst to be used in Alkylation step in place of the conventional HF catalyst. R & D activities leading to the commercialization of the catalyst should be expedited. Further, IPCL is also in an advanced stage of development in respect of a solid catalyst for alkylation. Their efforts may be stepped up.

0.6.3 Efforts to find out indigenous alternatives for the following imported chemicals used in the manufacture of LAB should be accelerated:

a) Iso-Octane

b) n- Pentane

0.6.4 The manufacturers opine that the refineries should procure crude preferentially for them, which can make more C_{10} - C_{13} paraffins.

0.6.5 The potential manufacturers of LAB should take necessary steps to establish their projects.

0.6.6 The small and medium industries should take initiatve in producing chemicals used in LAB manufacture, which are currently being imported. All facilities offered by the State and Central infrastructure should be utilized by them to their benefit.

0.6.7 Export potential of LAB should tapped.