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Executive Committee of
the Multilateral Fund for the
Implementation of the Montreal Protocol

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Addendum

PROJECT PROPOSALS: INDIA

This document includes:

Comments and Recommendations from the Fund Secretariat for the project proposals listed below:

- Application Development for the Conversion of CFC-11/Polyol Systems to Low/Non-ODS Formulations (Manali Petrochemical, Ltd.);

- Applications Development for the Conversion of CFC-11/Polyol Systems to Low/Non-ODS Formulations (UB Petroproducts, Ltd.); and,

- Replacement of CFC-11 Blowing Agent in Polyurethane (PU) Systems with Low and Non-ODS Materials (Expanded Incorporation).

India
Ozone Depleting Substances Phase-out Multicomponent Investment Project

General Comments

1. These three projects all involve the conversion of CFC-11-based polyol systems to low/non-ODS formulations.

2. Land costs for relocating plants was included in the original project costs, but were subsequently removed through agreement with the Bank and the Government of India.

3. The cost of equipment requested for these projects is greater than that which was approved for a similar project in China. In some cases, the equipment requested is generally used by foam producers, not polyol producers.

4. Two of the projects include incremental costs for technology transfer; however, extensive testing is still required for the imported technology. In one project, the cost of licensing was explained as a range but the price attributed to the project was greater than the highest price in the range.

5. These projects will only yield results by the earliest, in 1995; however, foam producers need the product results immediately so they can actually phase out CFC use. The three projects do not indicate any organic link between polyol and foam production as part of an integrated step-by-step strategy for phase-out in the foam sector in India.

6. Approval of the projects as presented might give rise to double-counting once projects under development in the foam sector proper are submitted and approved at future meetings.

Recommendations

7. The Secretariat recommends that all technology transfers should be funded at this time although their costs should be verified. Costs not associated with the production of new polyols under licence should be eliminated in the project for UB Petroproducts, Ltd.

8. The Secretariat also recommends that the project for Expanded Incorporation should be revised to eliminate the ineligible cost items, and given permission to proceed for further development of the project as a part of a strategy covering all producers of foam chemical systems in India.

PROJECT EVALUATION SHEET

COUNTRY OR REGION:	India
PROJECT TITLE:	Application Development for the Conversion of CFC-11/Polyol Systems to Low/Non-ODS Formulations (Manali Petrochemical, Ltd.)
BUDGET:	US $713,000 (capital cost) US $100,000 (operational cost) US $813,000 (total project budget)
INCREMENTAL COSTS:	US $813,000
ODS PHASE-OUT:	n/a
COST EFFECTIVENESS:	n/a
PROJECT DURATION:	Phase IA: 1 year Phase IB: 2 years
IMPLEMENTING AGENCY:	The World Bank

NATIONAL COORDINATING AGENCY: Ministry of Environment and Forests

TECHNICAL REVIEW COMPLETED: YES _X_ NO ___

SECRETARIAT'S COMMENTS

1. Manali is an 100 per cent-owned Indian enterprise which has been producing, under a technology transfer agreement since 1990, a broad range of polyether and polyester polyol formulations as well as propylene and propylene oxide as feedstocks.

2. The enterprise has an installed capacity of 7,500 mt/y in two plants, of which only 25 per cent is currently utilized. This is expected to increase to 65-70 per cent by 1996. Manali's own forecast for its domestic market share in 1993-1994 is 45 per cent and 50 per cent in flexible and rigid foams, respectively.

3. The company currently consumes 60 tonnes of CFC-11 annually.

4. The project consists of two phases:

   Phase I: Application of development for conversion of CFC-11/polyol systems to low/non-ODS formulations; and

   Phase II: Establishment of manufacturing and supply capability for low/non-ODS systems.

5. Funding is requested at this stage to finance Phase I of the project.

6. Phase I is further subdivided into:

1) Phase I-A: (Flexible Moulded Foams)

(a) licence technology from ARCO Inc. of USA to manufacture polyol formulations for flexible moulded foams using a water-blown system instead of CFC-11;

(b) training in and outside India; and

(c) field trials at the foam manufacturers.

Cost of Phase I-A would cover: purchase of technology, foam producing equipment, foam testing equipment, travel and training.

2) Phase I-B: (Rigid Foams)

(a) enter into a technical consultancy agreement with Mitsui of Japan to provide the technical guidance in development of rigid formulations;

(b) purchase required catalysts, chemicals and alternative blowing agents (HCFC-22, HCFC-141b, HFC-134a and cyclopentane) for testing purposes;

(c) buy additional high pressure dispensing equipment and large, life-size moulds to simulate operating conditions of refrigerator producers; and

(d) buy additional testing equipment.

7. This project is similar to the other two projects submitted by India. It seeks to buy technology under agreements with a US supplier for flexible foam and a Japanese supplier for rigid foam. However, the costs of these agreements are not clear. The first is reported in the project document as a range US $50-100,000 and the latter as an estimate of US $100,000. The requested amounts are US $97,000 and US $122,000, respectively.

8. The enterprise will test a variety of blowing agents as substitutes to CFC-11 in new formulations.

9. The enterprise will test the behaviour of the different formulations under high pressure foaming machines and in moulds used in domestic refrigerators.

10. The Government of India has informed the World Bank that civil construction cost is not recommended. The Bank has duly reduced the cost by the corresponding amount.

SECRETARIAT'S RECOMMENDATION

11. The Secretariat recommends funding the cost of technology transfer from ARCO US $97,000 and Mitsui US $122,000. Both figures need verification since the first was reported in the proposal as a range US $50-100,000 and the latter as an estimate of US $100,000.

PROJECT EVALUATION SHEET

COUNTRY OR REGION:	India
PROJECT TITLE:	Applications Development for the Conversion of CFC-11/Polyol Systems to Low/Non-ODS Formulations (UB Petroproducts, Ltd.)
BUDGET:	US $824,000 (capital cost) US $105,000 (operational cost) US $929,000 (total project budget)
INCREMENTAL COSTS[1]:	US $836,000
ODS PHASE-OUT:	n/a
COST EFFECTIVENESS:	n/a
PROJECT DURATION:	Phase I: one year (1994) and Phase II: 2 years (1995-96)
IMPLEMENTING AGENCY:	The World Bank

NATIONAL COORDINATING AGENCY: Ministry of Environment and Forests

TECHNICAL REVIEW COMPLETED: YES _X_ NO ___

SECRETARIAT'S COMMENTS

1. Established in 1992, UBP manufactures polyurethane chemical systems (polyol and isocyanate) with or without CFC-11 for the foam industry. The technology is conventional and was provided by Enichem of Italy which has a 10 per cent share of ownership.

2. UBP products are used in insulated thermoware, general insulation applications, and flexible moulded foams for automotive and furniture applications. It also supplies systems, without CFC-11, to domestic refrigerator producers.

3. Utilized production capacity is 25 per cent of the 8,000 tonne/year installed capacity. Utilization of capacity is expected to progressively increase to about 55 to 60 per cent after five years.

4. The project aims at importing new technology from its Italian Partner (Enichem) which is reported to be a world leader in polyurethane systems/intermediate and has an active ongoing programme in CFC replacement in foam blowing applications.

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[1] The incremental costs differ from the budget by accounting for 10 per cent transnational ownership.

5. The project's objective is to use the imported new technology to develop formulated polyol and isocyanate foam systems that can be used with CFC alternate blowing agents.

6. The project also seeks to test and characterize polyol systems to establish a facility for high pressure polyol blending and to modify the polyol plant.

7. The project is to be implemented in two phases:

1) Phase I (1994)

This phase will consist of:

(a) transfer of technologies from Enichem for CFC-alternate based systems applicable to both rigid insulation foams and flexible moulded foams;

(b) establishing high pressure foam machinery and test facilities;

(c) evaluation of different kinds of CFC-alternatives;

(d) production of suitable, base polyols; and

(e) testing and characterization.

2) Phase II (1995-1996)

This phase will consist of:

(a) commercial production of formulated polyols;

(b) trial testing at customers end as well as adaptation of ODS-free alternate systems; and

(c) it will further train customers and technicians and provide advice.

SECRETARIAT'S RECOMMENDATIONS

8. Only costs associated with the production -under licence- of new polyols are eligible for funding. The Secretariat therefore recommends approval and funding for the technology transfer part of the project in the amount of US $200,000 subject to verification of cost.

9. The World Bank should be requested to revise the remaining eligible components of project costs for consideration at future meetings.

PROJECT EVALUATION SHEET

COUNTRY OR REGION:	India
PROJECT TITLE:	Replacement of CFC-11 Blowing Agent in Polyurethane (PU) Systems with Low and Non-ODS Materials (Expanded Incorporation)
BUDGET:	US $513,000
INCREMENTAL COSTS:	US $513,000
ODS PHASE-OUT:	n/a
COST EFFECTIVENESS:	n/a
PROJECT DURATION:	Phase I: 30 months and Phase II: 18 months
IMPLEMENTING AGENCY:	The World Bank

NATIONAL COORDINATING AGENCY: Ministry of Environment and Forests

TECHNICAL REVIEW COMPLETED: YES _X_ NO ___

SECRETARIAT'S COMMENTS

1. This 100 per cent owned Indian enterprise has been producing rigid polyurethane foam chemical systems since 1983. The chemicals produced, essentially polyurethane polyols, polyester polyols and amino polyols, have wider applications in the refrigeration, roof spray and packaging industries. The plant has an annual production capacity of 2,400 mt of formulated systems, and has a market share of 45 per cent based on Indian production. The enterprise relies on its own technology, and has already initiated work on new polyols to be used with locally available HCFC-22 as the blowing agent instead of CFC-11. All testing of formulation has been done in outside laboratories.

2. The objectives of the proposed project are: (a) to eliminate CFC-11 from pre-blended polyol systems manufactured by Expanded Incorporation, and (b) to promote phase out of CFC-11 at foam producers by developing new polyols and systems for processors who normally make their own blends.

3. The project is divided into two phases:

1) Phase 1

(a) To set up an application technology centre in a separate building where development, testing, trials and demonstration of CFC-free foam systems

will be carried out as per end-user requirements under local conditions. New polyols suitable for blowing agents, e.g., the HCFC-22 blend, HCFC-141b, cyclopentane, HFC-134a will be evaluated.

(b) This phase seeks to install new equipment in a new building to house essential laboratory equipment in addition to other equipment strictly related to foam production and foam application, as well as foam testing equipment. This phase will be implemented over a period of two years.

2) Phase 2

(a) The existing polyol plant will be modified to produce new base polyols suitable for production of CFC-free rigid foams.

4. The direct impact of the project is the elimination of 72 mt/y of ODP as a result of replacing CFC-11 with alternate blowing agent in blended polyol systems manufactured at Expanded Incorporation.

5. The project is supported by the Government of India and the OORG reviewer who recommends the 100 per cent elimination of CFC-11.

6. The substitute blowing agents (HCFC-22, HCFC-141b, and cyclopentane) are viable blowing agents and were subjected to rigorous testing in industrialized countries. Furthermore, the Executive Committee has approved projects for the use of both an HCFC-22 blend and HCFC-141b as blowing agents in more than one Article 5 country.

7. The enterprise seeks to acquire equipment that are generally used by the foam producer, not the polyol producer. High pressure foaming machines, moulds and fixtures are necessary equipment in the manufacturer of refrigerators, rigid polyurethane sheets, etc. Therefore, they are not eligible for funding for polyols production.

8. Since the enterprise is a polyol systems producer and not a foam manufacturer, foam testing equipment are not eligible for funding.

9. Government of India has informed the World Bank that a plot of land and construction of a building should not be included in project costs. The Bank has duly reduced the cost by the corresponding amount.

SECRETARIAT'S RECOMMENDATIONS

10. The Secretariat recommends that the project should be revised to eliminate the ineligible cost items, and grant the World Bank a permission to proceed with further development of the project as a part of a strategy covering all producers of foam chemical systems in India.