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the Multilateral Fund for the
Implementation of the Montreal Protocol

Seventeenth Meeting
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PROJECT PROPOSALS: INDIA

This document includes the Comments and Recommendations from the Fund Secretariat on the following projects:

- Phase-out of CFCs in the Manufacture of Molded PUF at Bharat Seats Ltd. World Bank
- Phase-out of CFCs in the Manufacture of Rigid PUF at SDC Polyurethane P. Ltd. World Bank

PROJECT EVALUATION SHEET

COUNTRY OR REGION: India

PROJECT TITLE: (a) Phase-out of CFCs in the manufacture of molded PUF at Bharat Seats Ltd.
(b) Phase out of CFCs in the manufacture of rigid polyurethane foam products at SDC Polyurethane P Ltd.

BUDGET: (a) Capital costs: US \$673,000
Operating costs: US \$82,000
85.9% local ownership: US \$643,200
Financial Agents' fee: US \$19,300
(b) Capital costs: US \$130,000
10% contingency: US \$13,000
Operating costs: US \$40,000
Project costs: US \$183,000
Financial Agents' Fee (3%) US \$5,500

INCREMENTAL COSTS: (a) US \$662,500¹
(b) US \$188,500

ODS PHASE-OUT: (a) 55 MT of CFC-11
(b) 24 MT of CFC-11

COST EFFECTIVENESS²: (a) US \$13.73 per kg. ODP saved
(b) US \$7.63 per kg. ODP saved

PROJECT DURATION: (a) Completed
(b) 1.5 years

IMPLEMENTING AGENCY: World Bank

NATIONAL COORDINATING AGENCY: Ministry of Environment and Forests

TECHNICAL REVIEW COMPLETED: YES X NO

¹ Including contingency (15 per cent) and Financial Agent Fee (3 per cent)

² Determined as the ratio of incremental costs to the estimated annual saving of ODP (\$/ODPkg).
For CFC-11, ODS=ODP.

SECRETARIAT'S COMMENTS

1. This evaluation sheet covers project proposals for the phaseout of CFCs in the manufacture of molded polyurethane foam (Bharat Seats Ltd.) and in the manufacture of rigid polyurethane foam products (SDC Polyurethane P. Ltd.) in India.

(a) Bharat Seats Ltd.

2. The project was completed in 1994. It resulted in the conversion of the foam blowing operations to all water blown systems, eliminating 55 tonnes of CFC-11. The capital cost of conversion involved the acquisition of high pressure foam dispenser, premix station and adjustment carrier system with mold closing and reinforcement conveyor. The project also incurred incremental operating costs.

3. During the preliminary evaluation, the Secretariat identified, on the basis of procedures already approved for the sector, certain items of capital costs which might not be eligible incremental costs, such as phase-in costs. Following discussion between the Secretariat and the World Bank's foam sector expert, it was agreed to consider the average of 3 per cent, which reflects average percentage of rejects over six months as the basis of calculation of the phase-in cost, i.e. to consider US \$160,000 as eligible phase-in cost. The cost of test equipment was also eliminated in line with the Executive Committee's decision regarding down stream testing in the foam industry in India.

4. The following costs were agreed:

Capital costs:	US \$522,000
Operating costs:	US \$82,000
Total project cost:	US \$604,000
85.19% local ownership:	US \$514,550
Financial Agent's fee (3%):	US \$15,450
Total grant:	US \$530,000
Cost-effectiveness:	US \$9.64/kg./yr.

(b) SDC Polyurethane P. Ltd.

5. During the preliminary evaluation, the Secretariat identified that the calculation of the cost-effectiveness for this project was based on future consumption, i.e. consumption for 1995 rather than 1994, the last year preceding the year in which the project was prepared. Further analysis also showed that the project's cost-effectiveness based on the net CFC-11 eliminated was US \$8.57/kg./year, since the substitute blowing agent was HCFC-141b.

6. The World Bank informed that the consumption figure as indicated was a typographical error and that the consumption figure was for 1994-5 as in other India projects. It therefore requested consideration of the project.

7. SDC will phase-out CFC-11 by converting to HCFC-141b based formulations. The capital cost is due to replacement of two existing indigenously built low-pressure foam dispensers with one high-pressure dispenser of equivalent capacity, trials and training.

8. Following discussions between the Fund Secretariat and the World Bank, the following project costs were agreed:

	US \$
Capital costs (including 10% contingency)	121,000
Operating costs	<u>40,000</u>
Total project cost	161,000
3% Financial Agent's fee	<u>4,800</u>
Total Grant	165,800
Cost-effectiveness:	US \$7.54/kg/yr.

SECRETARIAT'S RECOMMENDATIONS

9. The Fund Secretariat recommends as follows:

- (a) To approve retroactively the amount of US \$530,000 for the phase-out of CFC-11 at Bharat Seats Ltd.
- (b) To approve the project for SDC Polyurethane Products P. Ltd. in the sum of US \$165,800.

SUBPROJECT PROPOSAL

PROJECT COVER SHEET

COUNTRY : India

PROJECT TITLE : Phase-out of CFCs in the manufacture of Rigid PUF products at SDC Polyurethane P.Ltd.

SECTOR COVERED : Foam Blowing

ODS USE IN SECTOR : 1577 MT of CFCs (1991)

PROJECT IMPACT : Phase out of 24 MT of CFC-11 (Base 1995)

PROJECT DURATION : 1.5 years

PROJECT ECONOMIC LIFE : 10 years

TOTAL PROJECT COST :

Incremental Capital Cost:	US\$ 130,000
Contingency @ 10%:	US\$ 13,000
Incremental Operating Costs:	US\$ 40,000
Incremental Cost Project:	US\$ 183,000
FA fee @ 3%:	US\$ 5,500
Total Project Cost	US\$ 188,500

COST EFFECTIVENESS :

Grant Effectiveness	: US\$ 7.63/kg/y
Unit Abatement Costs	: US\$ 1.93/kg/y

PROPOSED OTF FINANCING¹ : US\$ 188,500

IMPLEMENTING ENTERPRISE : SDC Polyurethane P.Ltd.

CO-ORDINATING NATIONAL BODY : Ministry of Environment and Forests (MOEF)

IMPLEMENTING AGENCY : The World Bank

PROJECT SUMMARY

This project will phase out 24 MT of CFC-11 consumption in the production of rigid PUF products, at SDC Polyurethane P.Ltd., by converting foam operations to HCFC-141b. The project will require the replacement of existing two low pressure foaming units by a high pressure unit, trials, technical assistance and training. Increased operating costs are foreseen due to the higher costs of the HCFC-141b formulation.

TECHNICAL ASSESSMENT: This proposal has been reviewed by OORG Technical reviewer Dr. M. Jeffs, whose comments are attached.

PROJECT OBJECTIVE

The objective of this project is to phase out the use of CFCs in the manufacture of rigid PUF products at SDC Polyurethane Products P.Ltd., in Dist. Mehsana, near Ahmedabad, India.

SECTOR BACKGROUND

The Foam Sector in India consumed 1577 MT of CFCs in 1991. CFC-11 was the dominant substance followed by CFC-12. Some incidental use of CFC-113 and MCF (reported under the solvents sector) complete the consumption pattern.

The maximum consumption of CFCs was in the Rigid PUF insulating foams and refrigerants. Among the other foams (excluding rigid insulating foams for domestic refrigerators), the Flexible PUF has practically changed over to Methylene Chloride. The Molded foams are changing over to water blown technology. The higher Rigid foams, non insulating type are all water blown. The Rigid PUF for insulation applications consumes about 975 MT of CFCs and is expected to grow steadily.

The Ozone Cell, Ministry of Environment and Forests, is leading the efforts in the phase out of CFCs, in co-operation with the users/suppliers. Complete phaseout of CFCs in foams (except rigid foams) is targetted by 2000. Rigid PUF are expected to be CFC free by 2006.

This sector accounts for about 230 enterprises, of which about 20% are large/medium sized users, with relatively sophisticated equipment. The remaining are small scale and are technically unsophisticated. The support of chemical suppliers and associations will be crucial in reaching and educating these enterprises.

ENTERPRISE BACKGROUND

SDC Polyurethane P. Ltd. is a 100% indigenous owned enterprise established in 1987. It is engaged in the production of metal-faced sandwich panels, slab/board stock, insulated doors, pre-formed insulated pipe sections, imitation wood articles such as cornices, doors, headboards, furniture parts, etc. The enterprise has reputed clientele such as L & T, Reliance, ONGC, etc.

The enterprise is poised for a major growth rate, beginning this year. The 1995 consumption of CFC-11 is about 24 MT in a total production of 150 MT of rigid PUF.

PROJECT DESCRIPTION

In this project SDC Polyurethane P.Ltd. will phase-out the use of CFC-11 by converting to HCFC-141b based formulations. The two existing low pressure foam dispensers (indigenously built) will be replaced with one high pressure dispenser of equivalent total capacity. Due to the relatively small size of this enterprise and also for achieving a better cost effectiveness in this project, the enterprise was urged not to go in for an in-house closed system pre-mix station that would be required for the new formulation. Instead, the enterprise will procure HCFC-141b formulated and pre-blended polyol from one of the system suppliers (like Expanded Incorporation). Provision for trials with the new formulation, technical assistance, and training will be needed. Increased operating costs due to the higher costs of the new formulation are foreseen.

JUSTIFICATION FOR SELECTION OF ALTERNATIVE TECHNOLOGY

The ODS phase-out technologies for rigid insulating foams are as under :

Low ODS Technologies (Interim) > Reduced CFC

> HCFCs (22, 141b, 22+142b)

ODS free Technologies(Long term) > Chemically generated CO₂ (Water blown)

> Pentanes

> HFCs (134a, 152a, 356)

The selection of the alternative technology would be governed by the following considerations :

- a) Proven and reasonably mature technology.
- b) Cost effective conversion.
- c) Easy availability of substitute blowing agent, at favorable pricing.
- d) Support from local system suppliers in terms of making the right formulation/blend available.
- e) Critical properties that have to be obtained in the end product
- f) Operational safety.

Only HCFC-22 and HCFC -141b qualify based on these criteria. Because of the problem of diffusion of HCFC-22 from the cellular structure, the company prefers HCFC-141b technology.

PROJECT COSTS

The total project cost (investment cost and incremental recurrent cost) is estimated at US\$183,000

The investment costs of US\$143,000, including 10% contingency, include capital investment in one high pressure foaming unit, trials etc. The breakdown of these, is provided in Annexure 1.

The incremental operating costs of US\$ 40,000 represent net present value of incremental operating costs for two years of operation and do not reflect growth. Details are provided in Annexure 2.

COST EFFECTIVENESS

Grant Effectiveness

The Grant Effectiveness (ratio of the total project costs to the total ODS phased out per year post-project) of this project works out to US\$7.63/kg. This has been derived from the total project cost of US\$183,000 and the total ODS phased out in the first year of operation post project of 24 MT.

Unit Abatement Costs

The unit abatement cost calculated over a 10 year life span of the project is US\$1.93 per ODP weighted kg of CFC-11 phased out. This has been derived from the incremental annualized capital costs of US\$143,000 and net annualized recurrent costs of US\$ 23,000 (first year), for the phase-out of about 24 ODP weighted MT of CFC-11.

The cost-effectiveness of this project is close to or better than other similar projects and is also within the recent guidelines from the Fund Secretariat for such projects.

REQUIRED REGULATORY ACTION

The Government of India has already waived import duties on the equipment to be used in ODS phase-out projects. Further legislations or regulations are expected. However this project does not require any specific regulatory action other than the above.

RESULTS

This project will eliminate the use of atleast 24 MT of CFC-11 in the first year of implementation.

PROJECT IMPLEMENTATION SCHEDULE

TASK	Q1	Q2	Q3	Q4	Q5	Q6
1. a) MLF Approval b) ProcurementPreparation c) Vendor Selection	X X X	X				
2. a) Transportation, arrival and customs clearance b) Installation and plant modifications.			X	X		
3. a) Machine Start-up b) Trials/Training c) Certification					X X	X X

ANNEXURES

Annexure 1 : Capital Costs

Annexure 2 : Incremental Operating Costs

Annexure 3 : Cost Effectiveness

Annexure 4 : Technical Review

Capital Costs in US\$

1. High Pressure Foam Dispenser (Including freight, installation, etc.)	115,000
2. Trials	5,000
4. Technical assistance/Training	10,000
Incremental Capital Costs	130,000
Contingencies @ %	13,000
Total	143,000

Incremental Operating Costs

Assumptions

- | | |
|--------------------------|----------------|
| 1. CFC-11 Price | : US\$ 2.00/kg |
| 2. MDI Price | : US\$ 2.00/kg |
| 3. HCFC-141b Price | : US\$ 3.50/kg |
| 4. No growth considered. | |

Calculations

<u>Baseline</u>	<u>1995</u>	<u>1996</u>
Cost of 24 MT CFC-11(US\$)	48,000	48,000
Total (US\$)	48,000	48,000
<u>Post-Project</u>		
Cost of 18 MT HCFC-141b	63,000	63,000
Cost of 4 MT MDI (US\$)	8,000	8,000
Total (US\$)	71,000	71,000
Net Incremental Costs (US\$)	23,000	23,000
Discount Factor	0.91	0.83
NPV @ 10% (US\$)	20,930	19,090
For 2 years (US\$)	40,000	

Cost Effectiveness

Grant Effectiveness

A. Incremental Capital Costs	: US\$ 143,000
B. Incremental Operating Costs	: US\$ 40,000
C. Total Project Costs (A+B)	: US\$ 183,000
D. Total ODS phased out	: Kg 24,000
GRANT EFFECTIVENESS [C/D]	: US\$ 7.63/kg/

Unit Abatement Costs

A.	Incremental Capital Costs	: US\$ 143,000
B.	Annualized Incremental Operating Costs	: US\$ 23,000
C.	Project Useful Life	: 10 years
D.	ODS reduction per year	: Kg 24,000
E.	Capital Recovery Factor	: 0.16275

UNIT ABATEMENT COST [(A X E) + B] / D	: US\$1.93/kg/y
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INDIA - SDC POLYURETHANE P LTD.**TECHNOLOGY**

The enterprise manufactures a range of polyurethane rigid foam articles and proposes to convert from CFC 11 to HCFC 141b.

HCFC 141b is technically approved for all the enterprise's end applications and is in use in many markets. Of the alternative technologies considered, HCFC 22 comes closest to matching HCFC 141b but would not be suitable for insulation applications other than those covered by impermeable facers such as sandwich panels. However, the enterprise should consider the early implementation of zero ODS, for example water (CO₂) blown, technology for non insulation applications, that is, imitation wood. Such technology is available from EU raw material suppliers.

The equipment would be capable of processing water-blown systems.

ENVIRONMENTAL ISSUES

The main issue relates to the residual ODP (0-11) of HCFC 141b and the enterprise should actively pursue the evaluation on zero ODP technologies.

PROJECT COSTS

The cost effectiveness is within the EC guidelines. The capital items are justified.

The incremental operating cost calculation is clearly displayed and approved.

The project cost effectiveness is good considering the low level of ODS used.

IMPLEMENTATION TIMEFRAME

Acceptable.

RECOMMENDATION

Approval.

The enterprise should pursue non ODS technology for the imitation wood items in the short term.



GMFJA/d/7/6/95

SUBPROJECT PROPOSAL

PROJECT COVER SHEET

COUNTRY : India

PROJECT TITLE : Phase-out of CFCs in the manufacture of molded PUF at Bharat Seats Ltd.

SECTOR COVERED : Foam Blowing

ODS USE IN SECTOR : 1577 MT of CFCs (1991)

PROJECT IMPACT : Phase out of 55 MT of CFC-11 (Base 1993)

PROJECT DURATION : Implementation completed by the enterprise in 1994.

PROJECT ECONOMIC LIFE : 10 years

TOTAL PROJECT COST : Incremental Capital Cost : US\$ 673,000
Incremental Operating Costs : US\$ 82,000
Incremental Project Cost : US\$ 755,000
@ 85:19% local ownership : US\$ 643,200
FA fee @ 3% : US\$ 19,300

COST EFFECTIVENESS : **Grant Effectiveness** : US\$ 13.73/kg/y
Unit Abatement Costs : US\$ 2.85/kg/y

PROPOSED OTF FINANCING¹ : US\$ 662,500 as grant (≡ 85.19% local ownership)

IMPLEMENTING ENTERPRISE : Bharat Seats Ltd.

CO-ORDINATING NATIONAL BODY : Ministry of Environment and Forests (MOEF)

IMPLEMENTING AGENCY : The World Bank

PROJECT SUMMARY

This project covers the phase out 55 MT of CFC-11 consumption in the production of cold cured PUF automotive seat cushion moldings, at Bharat Seats Ltd., one of the largest of its kind in India, by converting foam operations to all water blown system. This project is being submitted for retrofinancing to the extent of the incremental costs as defined by the MLF and directly related to the phase-out of the CFCs earlier used.

TECHNICAL ASSESSMENT: This proposal has been reviewed by OORG Technical reviewer Dr. M. Jeffs, whose comments are attached.

¹ Includes 3 percent financial agent fee only, and no contingencies as this is a retrofinancing project.

PROJECT OBJECTIVE

The objective of this project is to retroactively-finance the phase out of CFCs in the manufacture of PUF automotive seat cushion moldings at Bharat Seats Ltd., Gurgaon, India.

SECTOR BACKGROUND

The Foam Sector in India consumed 1577 MT of CFCs in 1991. CFC-11 was the dominant substance followed by CFC-12. Some incidental use of CFC-113 and MCF (reported under the solvents sector) complete the consumption pattern.

The maximum consumption of CFCs was in the Rigid PUF insulating foams and refrigerants. Among the other foams (excluding rigid insulating foams for domestic refrigerators), the Flexible PUF has practically changed over to Methylene Chloride. The Molded foams are changing over to water blown technology. The higher Rigid foams, non insulating type are all water blown. The Rigid PUF for insulation applications consumes about 975 MT of CFCs and is expected to grow steadily.

The Ozone Cell, Ministry of Environment and Forests, is leading the efforts in the phase out of CFCs, in co-operation with the users/suppliers. Complete phaseout of CFCs in foams (except rigid foams) is targetted by 2000. Rigid PUF are expected to be CFC free by 2006.

This sector accounts for about 230 enterprises, of which about 20% are large/medium sized users, with relatively sophisticated equipment. The remaining are small scale and are technically unsophisticated. The support of chemical suppliers and associations will be crucial in reaching and educating these enterprises.

ENTERPRISE BACKGROUND

Bharat Seats Ltd. is a joint-venture public limited company with an indigenous shareholding of 85.19%. It commenced manufacturing operations in 1986, as an ancillary unit for Maruti Udyog Ltd., who are the largest producers of passenger cars in India, in collaboration with the Suzuki Motor Co., Japan. The enterprise produces about 120,000 car seat assemblies per annum (about 81% of its installed capacity). Its manufacturing operations include the molded PUF seats, steel frame fabrication, assembly and finishing and employs about 350 persons. The company has developed all the critical manufacturing utilities, mature production and good housekeeping methods and a well-trained staff, under guidance from its Japanese partners.

The enterprise consumed 55 MT of CFC-11 in 1993.

PROJECT DESCRIPTION

Bharat Seats Ltd., due to its commitment to environment-friendly production technologies and also compulsion from its sole customer (Maruti Udyog Ltd.), **implemented the all-water blown technology for its PUF moldings** with technical assistance from its Japanese partners. The following activities were involved :

- a) Standard conversion from CFC-11 to water-based system that includes a high pressure foam dispenser, a premix station (for premixing polyol with amines, surfactants, flame retardants, softener, water, etc) and additional mixhead with beam.
- b) Adjustment carrier system (Oval conveyor with 34 carriers) with mold closing system and reinforcement conveyor.
- c) Testing comprising of Static/Dynamic Fatigue measuring equipment and Validation tests.
- d) Trials for four formulations.
- e) Extensive training and technical assistance.

As a result of the above, the enterprise incurred operating cost increases due to the increased cost of formulation. In addition, the enterprise also incurred costs, representing the value of rejections over a period of six months, which could be allowed as **phase-in costs**, and being one-time, falling under capital costs.

JUSTIFICATION FOR SELECTION OF ALTERNATIVE TECHNOLOGY

There are numerous technologies to replace the use of CFCs in flexible molded PUF. Available replacements fall into the following categories :

- Alternative blowing agents
- Alternative chemistry
- Alternative manufacturing technologies

The enterprise has selected alternative chemistry option, comprising of all-water blown high resilience foam. This technology is well tried out and proven. The selection of the water-blown formulations has been carried out under the advice of the Japanese collaborators, with extensive indigenous support to implement all the process modifications.

PROJECT COSTS

The total project cost (investment cost and incremental recurrent cost) is US\$755,000.

The investment costs of US\$673,000 include capital investment in one high pressure foaming unit, mold modifications, phase-in costs, trials etc. The cost breakdown of these, is provided in Annexure 1 and 1A.

The incremental operating costs of US\$82,000 represent the net present value of incremental operating costs for two years of operation after this project was implemented. Details are provided in Annexure 2.

Other costs of US\$19,300 (3%) over the fees of the financial agent that will oversee disbursement and audits of the retrofinancing of this project.

The enterprise undertakes to furnish all documentation that would be necessary for evidencing the actual incurrence of the above project costs.

COST EFFECTIVENESS

Grant Effectiveness

The Grant Effectiveness (Ratio of the total project costs to the total ODS phased out per year post-project) of this project works out to US\$ 13.73/kg/y. This has been derived from the total project costs of US\$ 755,000 and the total ODS phased out in the first year of operation post project of 55 MT.

Unit Abatement Costs

The unit abatement cost calculated over a 10 year life span of the project is US\$ 2.85 per ODP weighted kg of CFC-11 phased out. This has been derived from the incremental annualized capital costs of US\$ 673,000 and net annualized recurrent costs of US\$ 47,250(first year), for the phase-out of about 55 ODP weighted MT of CFC-11.

The costs effectiveness of this project is close to or better than other similar projects, and is also within the recent guidelines of the multilateral Fund Secretariat for such projects.

REQUIRED REGULATORY ACTION

The Government of India has already waived import duties on the equipment to be used in ODS phase-out projects. Further legislations or regulations are expected. However this project does not require any specific regulatory action other than the above.

PROJECT IMPLEMENTATION SCHEDULE

This project has been already implemented.

RESULTS

This project has already eliminated the use of at least 55 MT of CFC-11 in the first year of implementation.

ANNEXURES

- Annexure 1 : Capital Costs
- Annexure 1A : Phase-in Costs Calculations
- Annexure 2 : Incremental Operating Costs
- Annexure 3 : Cost Effectiveness
- Annexure 4 : Technical Review

ANEXURE 1

Capital Costs in US\$

1. High Pressure Foam Dispenser 40kg/min & 2:1 variable ratio (Including freight, installation, etc.)	125,000
2. Additional mix-head with beam	25,000
3. Premix Station (including barrel pumps, batch unit, transfer pump)	35,000
4. Adjustment Carrier System (includes oval conveyor with 34 carriers, mold closing system and reinforcement conveyor)	137,000
5. Testing (Static/Dynamic testing equipment and validation testing)	35,000
6. Trials for 4 formulations (US\$ 5,000 each)	20,000
7. Training, technology transfer, etc.	30,000
8. Phase-in costs ¹	266,000
Incremental Capital Costs	673,000

Notes :

1. For Phase-in Cost Calculation, please refer to Annexure 1A.
2. The enterprise undertakes to furnish documents evidencing the actual incurrence of the above project costs.
3. No contingencies are considered, as this conversion project is already implemented.

ANNEXURE 1A

Calculation of Phase-in Costs

During 1993-94, the cost of PUF automotive seat moldings, per day have been obtained as under :

VEHICLE MODEL	RATE	QUANTITY	AMOUNT
Car 800cc	2458.66	275	676,131.5
Car 3B Dx	3178.21	70	222,474.7
Car YE2	3034.70	40	121,388.0
Gypsy	2492.34	40	99,693.6
TOTAL		425	1,119,687.8

Note : Figures are in Indian Rupees. Exchange Rate : 1US\$ = Rs. 31.50

TOTAL PER DAY (US\$)	35,545.0
TOTAL PER MONTH @ 25 DAYS (US\$)	888,625.0
TOTAL FOR SIX MONTHS (US\$)	5,331,750.0
PHASE-IN COSTS : 5% OF ABOVE ¹ (US\$)	266,000.00

Note :

1. The rate of rejections steadily decreased from 10% to below 1% over a period of six months. For the first two months, the rejections averaged 6% to 8%, for the next two months around 5% and the last two months about 1% to 3%. Hence, the phase-in or learning curve has been averaged at 5% over six months period.

ANNEXURE 2

Incremental Operating Costs

Assumptions

- 1. CFC-11 Price : US\$ 2.00/kg
- 2. MDI Price : US\$ 1.85/kg

Calculations

<u>Baseline</u>	<u>1994</u>	<u>1995</u>
Cost of 55 MT CFC-11(US\$)	110,000	110,000
Total (US\$)	110,000	110,000
<u>Post-Project</u>		
Cost of 85 MT MDI (US\$)	157,250	157,250
Total (US\$)	157,250	157,250
Incremental Costs (US\$)	47,250	47,250
Discounting Factor (10%)	0.91	0.83
Net Incremental Costs (US\$)	43,000	39,000
NPV @ 10% for 2 years (US\$)	82,000	

ANNEXURE 3

COST EFFECTIVENESS

Grant Effectiveness

A. Incremental Capital Costs	US\$	673,000
B. Incremental Operating Costs	US\$	82,000
C. Total Project Costs (A+B)	US\$	755,000
D. Total ODS phased out	Kg	55,000

GRANT EFFECTIVENESS [C/D]	US\$	13.73/kg/y
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Unit Abatement Costs

A. Incremental Capital Costs	US\$	673,000
B. Annualized Incremental Operating Costs	US\$	47,250
C. Project Useful Life	10 years	
D. ODS reduction per year	Kg	55,000
E. Capital Recovery Factor		0.16275

UNIT ABATEMENT COST [(A X E) + B] / D	US\$	2.85/kg/y
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INDIA - BHARAT SEATS LTD.**TECHNOLOGY**

The enterprise is seeking retroactive funding having converted its production of flexible moulded polyurethane foams automotive seating from CFC 11 to an all water blown technology.

This is now a well proven technology which has been used for many years and is now the industry norm. Whilst the enterprise has reviewed other technologies - such an exercise is academic.

ENVIRONMENTAL ISSUES

There are no significant environmental issues.

PROJECT COSTS

The project cost effectiveness is within the EC recommended limits.

The production related equipment listed is justified.

The phase in costs must be backed by an independent audit of the enterprise's records to verify the figures presented. (This will be carried out by the World Bank at the implementation phase).

The incremental costs are approved.

IMPLEMENTATION TIMEFRAME

Not applicable.

RECOMMENDATION

Approval.



GMFJ/kd/7/6/95