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Executive Committee of
the Multilateral Fund for the
Implementation of the Montreal Protocol
Twenty-sixth Meeting
Cairo, 11-13 November 1998

PROJECT PROPOSALS: INDIA

This document consists of the comments and recommendations of the Fund Secretariat on the following projects:

Foam

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| • Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam and integral skin foam products to water blown systems in flexible molded polyurethane foam at Joti Foam Products P. Ltd. | UNDP |
| • Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam insulation products at Galaxy FRP P. Ltd. | UNDP |
| • Elimination of CFCs with HCFC-141b (and partial water) based systems, in the manufacture of rigid polyurethane foam insulation products at Sintex Industries Ltd. | UNDP |
| • Elimination of CFCs with HCFC-141b (and partial water) based systems, in the manufacture of rigid polyurethane foam insulated thermoware at Ajay Corrugating & Plastics P. Ltd. | UNDP |
| • Elimination of CFCs with HCFC-141b (and partial water) based systems, in the manufacture of rigid polyurethane foam insulated thermoware at Jaypee Technoplast P. Ltd. | UNDP |
| • Elimination of CFCs with HCFC-141b (and partial water) based systems, in the manufacture of rigid polyurethane foam at Puff Insulators | UNDP |
| • Elimination of CFCs with HCFC -141b (and partial water) based | UNDP |

- systems, in the manufacture of rigid polyurethane foam insulation products at Duab International
- Elimination of CFCs with HCFC-141b (and partial water) based systems, in the manufacture of rigid polyurethane foam insulated thermoware at National Flask Industries Ltd. UNDP
- Elimination of CFCs with HCFC-141b (and partial water) based systems, in the manufacture of rigid polyurethane foam insulated thermoware at Jayson Industries UNDP

Refrigeration

- Elimination of CFCs in the manufacture of domestic refrigerators at Whirlpool of India Ltd. World Bank

Solvent

- Conversion of precision cleaning and coating processes from ODS to heat cleaning technologies and ODS free solvent coating at Lal Malhotra & Sons ltd. UNIDO

PROJECT EVALUATION SHEET**INDIA**

SECTOR: FOAM ODS use in sector (1991): 1,577 ODP tonnes
 Sub-sector cost-effectiveness thresholds: Integral Skin US \$16.86/kg
 Rigid US \$7.83/kg

Project Titles:

- (a) Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam and integral skin foam products to water-blown systems in flexible molded polyurethane foam at Joti Foam Products P. Ltd.
- (b) Elimination of CFCs with HCFC-141b (and partial water) based systems, in the manufacture of rigid polyurethane foam insulated thermoware at Ajay Corrugating & Plastics P. Ltd.
- (c) Elimination of CFCs with HCFC-141b (and partial water) based systems, in the manufacture of rigid polyurethane foam insulation products at Duab International
- (d) Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam insulation products at Galaxy FRP P. Ltd.
- (e) Elimination of CFCs with HCFC-141b (and partial water) based systems, in the manufacture of rigid polyurethane foam insulated thermoware at Jaypee Technoplast
- (f) Elimination of CFCs with HCFC-141b (and partial water) based systems, in the manufacture of rigid polyurethane foam insulated thermoware at Jayson Industries
- (g) Elimination of CFCs with HCFC-141b (and partial water) based systems, in the manufacture of rigid polyurethane foam insulated thermoware at National Flask Industries Ltd.
- (h) Elimination of CFCs with HCFC-141b (and partial water) based systems, in the manufacture of rigid polyurethane foam at Puff Insulators
- (i) Elimination of CFCs with HCFC-141b (and partial water) based systems, in the manufacture of rigid polyurethane foam insulation products at Sintex Industries Ltd.

Project Data	Integral Skin	Rigid							
	Joti Foam	Ajay	Duab	Galaxy	Jaypee	Jayson	National Flask	Puff	Sintex
ODS (CFC-11) phase out (ODP tonnes)	39.20	11.2	14.5	18.49	20	14	40	11.5	11.8
Proposed project duration (months)	24	24	24	24	24	24	24	24	24
Incremental capital cost (US\$)	136,290	82,500	104,500	110,000	115,500	77,000	159,500	77,000	49,500
- including contingency (%)	10	10	10	10	10	10	10	10	10
Incremental operational cost (US\$)	38,000	13,050	17,400	78,394	24,360	17,400	44,370	11,740	13,480
Total project cost (US\$)	174,290	95,500	121,900	188,394	139,860	94,400	203,870	88,750	62,980
Local ownership (%)	100	100	100	100	100	100	100	100	100
Export component (%)	0	0	0	0	0	0	0	0	0
Amount requested (US\$ {Original})	218,840	80,805	104,490	144,808	139,860	88,900	203,870	83,150	62,980
{Revised}	174,290								
Cost effectiveness (US\$/kg.)	4.64	9.26	7.83	7.83	7.83	7.32	5.52	7.32	5.79
National Coordinating Agency	Ministry of Environment and Forests								
Implementing Agency	UNDP								
Technical review completed?	Yes								
Secretariat's Recommendations									
Amount recommended (US \$)	174,290	80,805	104,490	144,808	139,860	88,900	203,870	83,150	62,980
Project Impact (ODP tonnes)	37.55	10.32	13.35	18.49	20	12.9	36.92	10.62	10.87
Cost effectiveness (US \$/kg)	4.64	7.83	7.83	7.83	7.83	6.89	5.52	7.83	5.79
Implementing Agency support cost (US\$)	22,658	10,505	13,584	18,825	18,182	11,557	26,503	10,810	8,187
Total cost to Multilateral Fund	196,948	91,310	118,074	163,633	158,042	26,503	230,373	93,960	71,167

PROJECT DESCRIPTION

Integral Skin Foam

- (a) **Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam and integral skin foam products to water-blown systems in flexible molded polyurethane foam at Joti Foam Products P. Ltd.**

Rigid Foam

- (b) **Elimination of CFCs with HCFC-141b (and partial water) based systems, in the manufacture of rigid polyurethane foam insulated thermoware at Ajay Corrugating & Plastics P. Ltd.**
- (c) **Elimination of CFCs with HCFC-141b (and partial water) based systems, in the manufacture of rigid polyurethane foam insulation products at Duab International**
- (d) **Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam insulation products at Galaxy FRP P. Ltd.**
- (e) **Elimination of CFCs with HCFC-141b (and partial water) based systems, in the manufacture of rigid polyurethane foam insulated thermoware at Jaypee Technoplast**
- (f) **Elimination of CFCs with HCFC-141b (and partial water) based systems, in the manufacture of rigid polyurethane foam insulated thermoware at Jayson Industries**
- (g) **Elimination of CFCs with HCFC-141b (and partial water) based systems, in the manufacture of rigid polyurethane foam insulated thermoware at National Flask Industries Ltd.**
- (h) **Elimination of CFCs with HCFC-141b (and partial water) based systems, in the manufacture of rigid polyurethane foam at Puff Insulators**
- (i) **Elimination of CFCs with HCFC-141b (and partial water) based systems, in the manufacture of rigid polyurethane foam insulation products at Sintex Industries Ltd.**

1. CFC-11 consumption in the rigid foam sector in India in 1991 according to its country programme approved in 1993 was 975 ODP tonnes, of which 225 ODP tonnes and 250 ODP tonnes were attributed to thermoware and general insulation, respectively. The general insulation and thermoware accounted for about 28% of the CFC-11 consumption, while the flexible and integral skin foams accounted for 14%. India has reported no recent sector consumption data. India's CFC consumption for 1996 was 6,937 ODP tonnes. Seventy-five projects amounting to US \$17.22 million, including one umbrella project for 80 SMEs, have been approved to phase out 1,930 ODP tonnes in the foam sector. 545 ODP tonnes are reported to have been phased out.

2. Eight rigid foam projects, including four thermoware (Ajay, Jaypee, Jayson and National Flask) and four general insulations (Duab, Galaxy, Puff, and Sintex) were submitted. The eight projects will eliminate 133.5 ODP tonnes of CFC-11. Of the eight projects only one, Galaxy, is being submitted for the first time, the other seven (Ajay, Duab, Jaypee, Jayson, National Flask, Puff and Sintex) were submitted late to the 25th Meeting. The Executive Committee therefore decided to defer consideration of the projects to the next meeting (26th Executive Committee)

and requested that the projects be presented together with extensive explanation of the justification for using HCFC-141b technologies. The requested justification has been provided by UNDP for each project. Three sample copies representing thermoware, spray foam and general insulation foam production activities are attached as Annex 1 to this evaluation.

3. Most of the rigid foam enterprises are currently using low pressure machines of various makes, capacities and ages, or a high-pressure machine (Sintex). In most projects it is proposed to replace the existing low-pressure machines with high or medium pressure ones. In one project (Sintex), the high-pressure machine will be retrofitted. All the enterprises will convert to interim use of HCFC-141b with final conversion to HFC. The length of the transitional period is not indicated. A 7-9 % increase in foam density is expected in most cases. More detailed descriptions of the seven projects submitted to the 25th Meeting can be found in UNEP/OzL.Pro/ExCom/25/Inf.3. The description of Galaxy is provided below.

4. One integral skin/flexible molded foam project (Joti Foam) to eliminate 37.6 ODP tonnes CFC-11 is also submitted. This project was also withdrawn from consideration at the 23rd Meeting and is being resubmitted.

5. The enterprises which are all 100% Indian owned started production between the years 1966 and 1995.

6. It is stated in the projects that the elimination of the quantities of CFC-11 targeted in the projects will help India in meeting its Montreal Protocol obligations, such as the phased reductions in ODS consumption as per the agreed schedule, including the 1999 freeze.

Integral Skin Foam

(a) Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam and integral skin foam products to water-blown systems in flexible molded polyurethane foam at Joti Foam Products P. Ltd.

7. Joti Foam Products P. Ltd. will phase out the use of CFC-11 in the production of cold-cured molded, integral skin and rigid PUF products for the furniture and automotive sectors. The company currently has two Hennecke dispensers (1983), model HK-270 and HK-1250 with maximum outputs 35 kg/min at 150 bar and 135 kg/min at 80 bars, respectively, one block-making plant for rigid PUF, and sixty fiberglass molds for molded PUF seats.

8. The manufacturing operations are to be converted to water-blown systems for cold cured molded PUF and HCFC-141b based systems for integral skin and rigid PUF. The requested capital costs include the cost of replacement of the Hennecke foam dispenser HK-1250 by a 135 kg/min high pressure foam dispenser (US \$65,000); the retrofitting of the HK-270 (US \$15,000) and the rigid block plant (US \$15,000); upgrading of the molds (US \$18,900), and the introduction of a mold heating system (US \$10,000). Trials, technology transfer and training amount to US \$40,000. Incremental operating costs of US \$38,000 are expected.

Rigid Foam

(d) Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam insulation products at Galaxy FRP P. Ltd.

9. Galaxy FRP P. Ltd. produces rigid PU foam insulation products and in-situ pouring applications. It uses one Klockner Windsor low pressure machine (1990). The company will phase out the use of the 20.30 tonnes of CFC-11 by converting to HCFC-141b foam system as an interim solution, until full development of the ODS-free water-blown technology. The capital costs cover the replacement of the low-pressure machine with a high pressure at US\$ 90,000, production trials, training, and technology transfer at US\$ 20,000. The incremental operating cost for two years amounts to US\$ 78,394.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The only available ODS sector consumption data for India dates to 1991, the information provided in the India Country Programme approved in November 1993. Since these data are obsolete, it would not be possible to ascertain the impact of the approved projects on the country's overall ODS phase-out and obligations under the Montreal Protocol.

Integral Skin Foam

2. The project was discussed within the framework of prevailing guidelines, and it was agreed that a retrofit cost of US \$25,000 rather than the replacement cost of US \$65,000 would be the eligible incremental cost relating to the company's second machine. All other costs were agreed.

Rigid Foam

3. The project costs, including those of Galaxy have been agreed.

RECOMMENDATION

The Fund Secretariat recommends blanket approval of the nine projects (Joti Foam, Ajay Corrugating, Duab International, Galaxy, Jaypee, Jayson, National Flask, Puff Insulators and Sintex Industries) with the level of funding and associated support costs indicated in the table below.

Project Title	Project Cost US \$	Support Cost US \$	Implementing Agency
Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam and integral skin foam products to water-blown systems in flexible molded polyurethane foam at Joti Foam Products P. Ltd.	174,290	22,658	UNDP
Elimination of CFCs with HCFC-141b (and partial water) based systems, in the manufacture of rigid polyurethane foam insulated thermoware at Ajay Corrugating & Plastics P. Ltd.	80,805	10,505	UNDP
Elimination of CFCs with HCFC-141b (and partial water) based systems, in the manufacture of rigid polyurethane foam insulation products at Duab International	104,490	13,584	UNDP
Conversion from CFC-11 to HCFC-141b technology in the manufacture of rigid polyurethane foam insulation products at Galaxy FRP P. Ltd.	144,808	18,825	UNDP
Elimination of CFCs with HCFC-141b (and partial water) based systems, in the manufacture of rigid polyurethane foam insulated thermoware at Jaypee Technoplast	139,860	18,182	UNDP
Elimination of CFCs with HCFC-141b (and partial water) based systems, in the manufacture of rigid polyurethane foam insulated thermoware at Jayson Industries	88,900	11,557	UNDP
Elimination of CFCs with HCFC-141b (and partial water) based systems, in the manufacture of rigid polyurethane foam insulated thermoware at National Flask Industries Ltd.	203,870	26,503	UNDP
Elimination of CFCs with HCFC-141b (and partial water) based systems, in the manufacture of rigid polyurethane foam at Puff Insulators	83,150	10,810	UNDP
Elimination of CFCs with HCFC-141b (and partial water) based systems, in the manufacture of rigid polyurethane foam insulation products at Sintex Industries Ltd.	62,980	8,187	UNDP

PROJECT EVALUATION SHEET INDIA

SECTOR: REFRIGERATION ODS use in sector (1996): 2,200 ODP tonnes

Sub-sector cost-effectiveness thresholds: Domestic US \$13.76/kg

Project Title:

Elimination of CFCs in the manufacture of domestic refrigerators at Whirlpool of India Ltd.

Project Data	Domestic
	Whirlpool
ODS phase-out (ODP tonnes)	364
Proposed project duration (months)	36
Incremental capital cost (US \$)	1,105,000
- including contingency (%)	10
Incremental operational cost (US \$)	4,308,000
Total project cost (US \$)	5,413,000
Local ownership (%)	42.6
Export component (%)	0
Amount requested (US \$) {Original}	2,305,938
{Revised}	
Cost effectiveness (US \$/kg)	6.8
National Coordinating Agency	MOEF
Implementing Agency	World Bank
Technical review completed?	Yes

Secretariat's Recommendations:	
Amount recommended (US \$)	
Project impact (ODP tonnes)	
Cost effectiveness (US \$/kg)	
Implementing Agency support cost (US \$)	
Total cost to Multilateral Fund (US \$)	

PROJECT DESCRIPTION

Elimination of CFCs in the manufacture of domestic refrigerators at Whirlpool of India Ltd.

1. ODS consumption in the domestic refrigeration sub-sector in 1991 was 1990 MT. The updated 1996 figure provided by the Government of India is about 2,200 MT. The domestic refrigeration sub-sector in India is comprised of eight manufacturers with a combined total production capacity of over five million units annually, on twelve installed production lines. To date, the Executive Committee has approved five domestic refrigeration projects in India, with a combined ODP phase-out of 1,626 tonnes.
2. This project's impact is the phase out of 252 MT of CFC-11 and 112 MT of CFC-12.
3. The project is stated to help India to meet its obligations for the 1999 freeze in ODS consumption. Complete phase-out of CFCs in this sector is targeted by 2010.
4. Whirlpool of India Ltd. is the new name of Kelvinator of India Ltd, which was established in 1960 in association with Kelvinator, U.S.A. In 1996, Whirlpool Corp. acquired an equity in this enterprise and the name was changed to Whirlpool of India. Current domestic equity is 42.6%. It manufactures several models of household refrigerators, reporting a 30% market share. In a twelve-month period from May 1996 to June 1997, Whirlpool produced 705,087 refrigerators. The proposal indicates that production figures (achieved with a 3-shift/day and 300/day/year operation) was reported by the enterprise for June 1994-May 1995 to be 617,339 units.
5. The company proposes to convert the foaming operations to HCFC-141b and adopt HFC-134a as refrigerant.
6. The project document provides information on the production equipment baseline existed before July 1995. The foaming equipment consisted of two production lines. Line 1 was indigenously installed in 1980, including six manually operated door fixtures, six cabinet fixtures and an Elastogran foaming machine with one mixing head. Line 2 consisted of six cabinet fixtures (4 Perros and 2 CMA). The reported production for the period June 1994 – May 1995 was 617,539 units. Some unknown fraction of this production was insulated with glass wool.
7. Over the last few years, Whirlpool of India has made several additions and deletions in their installed refrigerant and foaming capacity. Production equipment, which was installed after July 25, 1995, is not part of the requested investment. Foaming equipment currently in use by the company includes a batch premixing plant, three high pressure foam dispensers, eighteen cabinet foaming fixtures, and two door drum systems. The refrigeration operation involves the evacuation and charging of procured hermetic compressors. The company uses sixty vacuum pumps (1996), four automatic charging units, four leak detectors (1996), and two controlled environment chambers for performance and reliability testing. The production capacity was increased about two-fold in refrigerant and foam operations. The latest production reported for 12 months in June 1996-May 1997 was 705,000 units, which represents 14% growth against the June 1994 –May 1995 period.

8. The analysis of available alternative technologies is provided in the proposal, including cyclopentane and liquid HFC-based systems. The company has chosen HCFC-141b as an interim technology as the system is technically mature and commercially available. The product also provides the most acceptable insulation value and energy efficiency, and the lowest investment. The project includes the statement: "Based on the above considerations and in line with the overall policy of its multinational parent, Whirlpool of India has chosen HCFC-141b based systems as an interim technology, to maintain product standards and acceptability, until the commercial introduction of liquid HFCs, which is chosen as the permanent technology. No additional investments are foreseen to be needed to convert to HFC based systems and to the extent needed, will be borne by Whirlpool."

9. The conversion of the foam system to HCFC-141b requires the retrofitting of two existing high pressure foam dispensers and mixing heads, an HCFC-141b pre-mixing station, retrofitting of an existing batch pre-mixer, an insulated and jacketed blend tank for the door line formulation, modification of interconnecting high pressure pipes and fittings for foam chemical transport, electrical works, and civil/miscellaneous works. External technical assistance, prototype trials and testing, as well as training are also listed under incremental capital costs.

10. The equipment requested to convert to HFC-134a technology includes thirty vacuum pumps, six refrigerant and lubricant charging units, two leak detectors, and a storage, dehydrating, purifying and delivery system for the polyester lubricant. External technical assistance, prototype trials and testing, as well as training are also listed under incremental capital costs.

11. The equipment listed for scrap upon replacement are thirty vacuum pumps (1990), eleven charging units (1990), and two leak detectors (1990). Two foam dispensers (1990) and one batch pre-mixer (1990) are listed to be retrofitted.

12. A fraction of the project cost is deducted for the foreign ownership.

13. The requested incremental operating costs for six months are \$4,308,000, based on production of 706,000 units/year (June 1996 – May 1997), and include the cost of foam blowing chemicals including increase in density for 8.8%, plastic liners, refrigerant, compressor, lubricant, evaporator, condenser, capillary and filter dryer costs.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The Secretariat discussed with the World Bank incremental capital and operating costs requested in the proposal. The capital cost of the project was agreed. There are still outstanding issues related to the requested operating cost. According to the project document, significant activities were undertaken by the enterprise in 1995 in relation to the installation of new production equipment. The cutoff date of July 25, 1995, was established by the Executive Committee in Decision 20/20 for determination of eligibility of incremental capital and operating costs related to production capacity growth. CFC consumption and IOC are calculated based on

production of 705,087 units for the twelve-month period (June 1996-May 1997). This level of production was achieved using equipment installed after July 1995 and, therefore, cannot serve as a basis for calculation eligible incremental costs and cost-effectiveness.

2. Data on actual number of refrigerators produced and CFC-11 and CFC-12 consumption for the twelve-month period before July 1995 should be used for the calculation of IOC and cost-effectiveness. The proposal indicates that the actual production figure (achieved with a 3-shift/day and three hundred day/year operation) was reported by the enterprise for June 1994-May 1995 to be 617,539 units. This information, however, cannot be considered as dependable for the following reasons.

- (a) The capacity of the door foaming line is a limiting factor in achieving the reported level of the total production. The installed capacity of the door line with six manually operated fixtures was reported to be 1,000 units/day (or 300,000 unit per year with three hundred working days) in the project document submitted to the 24th Meeting. This door foaming line was equipped with an Elastogran foaming dispenser (1980) of 30 kg/min capacity (with one mixing head) which also served a cabinet line. The installed capacity of door foaming operation was inadequate to support the reported production figure of 617,539 unit/year. The door line was decommissioned and replaced with a more efficient door drum system in January 1996.
- (b) The twelve-month production level achieved by the company in 1996 – 1997 was only 14% higher than that reported for 1994 – 1995 even though the company has doubled the pre-July 1995 production capacity.
- (c) Part of the company product was manufactured using glass-wool insulation before July 1995. This fraction of production should be identified and separated out from the total production figure.
- (d) The information from the enterprise on the number of days with full operation (300 days with 3-shifts/day) is very questionable. It is well known that the operation of any domestic refrigeration enterprise is uneven with seasonal production peaks. This is likely to be applicable also, to production and marketing conditions in India. It was reported in earlier submitted projects for India that the production output of domestic refrigeration manufacturers was not steady because of market demand and due to periods with extremely elevated temperatures, monsoons, and strikes. Three shifts per 200 days represents the highest possible utilization of capacity and is likely to be achieved only in optimum conditions.
- (e) The company experienced severe financial difficulties in 1995 with a loss of 278.6 million Rupees.
- (f) The credibility of information provided on behalf of Whirlpool in the past was not extremely high. The misrepresentation of information related to the date of

installation of foaming equipment caused the World Bank to withdraw the Whirlpool project just before the 24th Meeting.

3. For the above reasons and given the serious financial implications for the Fund (IOC for six months is estimated to be US \$ 4.3 million), the Secretariat requested certified information on the production level, using CFC blowing agent and ODS consumption by Whirlpool for the period of twelve month before July 1995. The World Bank requested justification from the enterprise regarding the level of production in 1994 – 1995 and ODS consumption. Information was obtained from Whirlpool showing the monthly records of production with a total of 617,333 units produced in the period April 1994 to March 1995. Certified information was provided for ODS consumption for the period June 1996 to May 1997 of 363,858 MT. Even with this additional information, the claimed production figure still cannot be reconciled with the door foaming capacity available in the enterprise at the same period, which is critical to achieve the reported output.

4. The proposal requests incremental cost for condenser and evaporator at US \$ 2,92/unit, which is much higher than cost requested and approved by the Executive Committee in similar conversion projects, including those for India. Many companies in Article 5 countries have optimized their models without, or, with minor modification of the existing condensers at a typical cost of less than US \$1.00/unit. The Secretariat has raised this issue with the World Bank. The technical reviewer has also indicated that the cost of this item is unusually high. The same issue was raised by the Secretariat last February at the 24th Meeting in relation to a domestic refrigeration project from Thailand. Incremental cost at US\$ 1.00 per unit was approved at that time. The explanation provided by the World Bank indicates that Whirlpool found neither their in-house fabrication facility for condensers and evaporators nor any Indigenous supplier of these items could meet the required cleanliness and dryness standards. Consequently, the condensers and evaporators would have to be imported, resulting in prohibitive costs.

5. The proposal requests incremental operating costs associated with compressors. These costs cannot be recommended for approval pending a decision of the Executive Committee.

RECOMMENDATION

The Fund Secretariat recommends this project for individual consideration by the Sub-Committee for Project Review.

PROJECT EVALUATION SHEET INDIA

SECTOR: SOLVENT ODS use in sector (1991): 4,876 ODP tonnes

Sub-sector cost-effectiveness thresholds: CFC-113 19.73 US \$/kg
TCA 38.50 US \$/kg

Project Title:

Conversion of precision cleaning and coating processes from ODS to heat cleaning technologies and ODS free solvent coating at Lal Malhotra & Sons Ltd. (Calcutta)

Project Data	CFC-113
	Lal Malhotra Sons
ODS phase-out (ODP tonnes)	16.0
Proposed project duration (months)	18
Incremental capital cost (US \$)	422,290
- including contingency (%)	10
Incremental operational cost (US \$)	(113,391)
Total project cost (US \$)	308,899
Local ownership (%)	100
Export component (%)	-
Amount requested (US \$) {Original}	314,509
{Revised}	308,899
Cost effectiveness (US \$/kg)	19.30
National Coordinating Agency	Min. of Env., Ozone Cell
Implementing Agency	UNIDO
Technical review completed?	Yes

<i>Secretariat's Recommendations:</i>	
Amount recommended (US \$)	308,899
Project impact (ODP tonnes)	16.0
Cost effectiveness (US \$/kg)	19.30
Implementing Agency support cost (US \$)	40,157
Total cost to Multilateral Fund (US \$)	349,056

PROJECT DESCRIPTION

Provided by UNIDO

Conversion of precision cleaning and coating processes from ODS to heat cleaning technologies and ODS free solvent coating at Lal Malhotra & Sons Ltd. (Calcutta)

1. The project will phase out the use of 20 MT of CFC-113. It has application in blade cleaning and blade edge coating. The cleaning process is used for thorough cleaning of razor blades to remove greases, oil, warf, abrasive, wax, etc. The ODS solvent is utilized as a degreasing agent in a three-stage degreaser. In blade coating process CFC-113 is used as a carrier for PTFE (teflon) which is sprayed on to the edges of razor blades under an electrostatic charge.
2. Solvent-based cleaning will be replaced by a heat cleaning process. Iso-propyl-alcohol will be used as an alternative solvent to deposit PTFE for coating the razorblades.
3. In 1996 the company procured 6 small heat cleaning furnaces to phase out 10 MT of CFC-113 used for cleaning. The major costs in the project are retroactive payment for the six furnaces (US \$120,000), the incremental portion of the cost of a new vacuum furnace (US \$99,000), an IPA-based coating system (US \$120,00) and ancillary equipment (US \$23,000). The project has annual incremental operating savings (US \$35,770).
4. Impact of the project: When implemented as scheduled, the CFC consumption eliminated from the solvent sector, which currently constitutes 40% of the country's ODS consumption, will contribute to the India CFC freeze target of 6,689 MT.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. Initially the project requested the full cost of a new vacuum furnace capable of meeting the full production capacity of the enterprise. However, the enterprise phased out part of its consumption in 1996 with the purchase of six small furnaces, so the full cost of the new furnace was not eligible.
2. After discussions with UNIDO to clarify production capacity and production levels, the incremental costs for the project were established as the retroactive cost of the six furnaces previously purchased plus funding for the new furnace in proportion to the production capacity not already converted.
3. It was also established that the company had not converted any of its production capacity for blade coating (although it had a laboratory test rig to test modern technology). The cost of one new blade coating system to replace the two machines in the baseline was established as incremental.
4. Operating savings did not change after the project review.

RECOMMENDATION

The Fund Secretariat recommends blanket approval of the project with associated support cost at the funding levels indicated below:

Project Title	Project Cost US \$	Support Cost US \$	Implementing Agency
Conversion of precision cleaning and coating processes from ODS to heat cleaning technologies and ODS free solvent coating at Lal Malhotra & Sons Ltd. (Calcutta)	308,899	40,157	UNIDO