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Executive Committee of
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Implementation of the Montreal Protocol
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Cairo, 11-13 November 1998

PROJECT PROPOSALS: COLOMBIA

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

Foam

- | | | |
|---|---|------------|
| • | Elimination of CFC-11 in the manufacture of rigid polyurethane foam through the use of HCFC-141b technology at Daniel J. Fernandez & Cia. Ltda. | World Bank |
| • | Elimination of CFCl-11 in the manufacture of rigid polyurethane foam through the use of HCFC-22 technology at Master Cooler & Cia Ltda. | World Bank |
| • | Elimination of CFCs in manufacture of rigid polyurethane foam through the use of HCFC-141b technology at Indufrio | World Bank |
| • | Elimination of CFC-11 in manufacture of rigid polyurethane foam through the use of HCFC-141b technology at Friotermica S.A. | World Bank |

Fumigant

- | | | |
|---|---|-------|
| • | Demonstration project - alternatives to the use of methyl bromide in banana growing | UNIDO |
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PROJECT EVALUATION SHEET COLOMBIA

SECTOR: FOAM ODS use in sector (1992): 330 ODP tonnes

Sub-sector cost-effectiveness thresholds: Rigid US \$7.83/kg

Project Titles:

- (a) Elimination of CFC-11 in the manufacture of rigid polyurethane foam through the use of HCFC-141b technology at Daniel J. Fernandez & Cia. Ltda.
- (b) Elimination of CFC-11 in manufacture of rigid polyurethane foam through the use of HCFC-141b technology at Friotermica S.A.
- (c) Elimination of CFCs in manufacture of rigid polyurethane foam through the use of HCFC-141b technology at Indufrio
- (d) Elimination of CFC-11 in the manufacture of rigid polyurethane foam through the use of HCFC-22 technology at Master Cooler & Cia Ltda.

Project Data				
	Daniel J. Fernandez	Friotermica	Indufrio	Master Cooler
ODS phase-out (ODP tonnes)	24.4	9.5	10.71	9.3
Proposed project duration (months)	24	24	24	24
Incremental capital cost (US \$)	118,250	114,400	102,850	49,500
- including contingency (%)	9.0	9	9	10
Incremental operational cost (US \$)	66,613	40,000	60,612	21,433
Total project cost (US \$)	184,863	154,400	163,462	70,933
Local ownership (%)	100	100	100	100
Export component (%)	0	0	0	0
Amount requested (US \$) {Original}	173,822	91,611	75,548	70,862
{Revised}				
Cost effectiveness (US \$/kg)	7.83	7.83	7.83	7.83
National Coordinating Agency	Ozone Technical Unit			
Implementing Agency	World Bank			
Technical review completed?	Yes			

Secretariat's Recommendations:				
Amount recommended (US \$)	173,822	67,338	75,548	70,862
Project impact (ODP tonnes)	22.2	8.6	9.65	9.05
Cost effectiveness (US \$/kg)	7.83	7.83	7.83	7.83
Implementing Agency support cost (US \$)	22,597	8,754	9,821	9,212
Total cost to Multilateral Fund (US \$)	196,419	76,092	85,369	80,074

PROJECT DESCRIPTION

- (a) **Elimination of CFC-11 in the manufacture of rigid polyurethane foam through the use of HCFC-141b technology at Daniel J. Fernandez & Cia. Ltda.**
- (b) **Elimination of CFC-11 in manufacture of rigid polyurethane foam through the use of HCFC-141b technology at Friotermica S.A.**
- (c) **Elimination of CFCs in manufacture of rigid polyurethane foam through the use of HCFC-141b technology at Indufrio**
- (d) **Elimination of CFC-11 in the manufacture of rigid polyurethane foam through the use of HCFC-22 technology at Master Cooler & Cia Ltda.**

General

1. CFC-11 consumption in the Colombian foam industry was 330 tonnes in 1992. Consumption of CFC-11 in the country increased by 120% from 1992 to 1997, reaching 725 tonnes. Sector consumption data from 1992 indicate that about 31 % of the total consumption went to the production of rigid foams. Currently CFC-11 consumption is concentrated in the rigid foam sub-sector. Four projects have been submitted to phase out 52.6 ODP tonnes in the sub-sector. Once on-going projects are completed a total of 982 ODP tonnes will be eliminated, attaining the 1999 freeze goal. These projects and others submitted in 1998 are expected to be completed by the year 2000 and would count for the next step in the Colombian CFC reduction strategy of the reduction of 50 % levels from 1999 levels by year 2005.

2. The four projects are all submitted by medium-size 100 % Colombian enterprises. All enterprises started production of rigid foams between the years 1963 and 1994.

3. All companies are currently using low pressure machines of various makes, capacities, and ages, which must be replaced by high pressure ones, except Master Cooler, which will reuse its high-pressure dispenser.

4. Three companies will convert to the interim use of HCFC-141b with final conversion to HFCs or ODS-free water-blown technology, except Master Cooler, which will be converting to the interim use of HCFC-22.

Justification for the use of HCFC-141b

5. All the available technologies for the conversion of the companies' production activities have been reviewed based on their maturity, required investment and availability in Colombia.

6. Following the review, it is concluded that:

- (a) The interim HCFC-141b solution seems to be the simplest option at a moderate investment cost. It is commercially available in Colombia, there is some experience in pre-blended HCFC-141b/polyol at the local market as the recently converted domestic refrigeration companies have also opted for this technology. For these reasons, the company will use:

- (i) HCFC-141b as an intermediate option; and
 - (ii) HFC-134a or HFC-245fa as final solutions.
- (b) The final solutions will need some time to implement, and the final decision would be taken according to the ultimate trends in the Colombian market. The company is aware that it will bear the costs of these final solutions.

7. It is stated that the Colombian Government through the Ozone Technical Unit will be responsible for verifying the disposal of the low-pressure foaming machines where these are replaced.

(a) Elimination of CFC-11 in the manufacture of rigid polyurethane foam through the use of HCFC-141b technology at Daniel J. Fernandez & Cia. Ltda.

8. Daniel J. Fernandez (DJF) produces polyurethane insulation/construction foam. It uses two low pressure machines, Decker Industries Inc. (1980), and Gusmer H-2000 (1989). The company will phase out the use of the 24.4 MT of CFC-11. The costs include the replacement of the Decker low pressure machine by a high pressure one, and the retrofit of the Gusmer LP dispenser at a total cost of US\$ 90,500. The replaced equipment will be destroyed. Production trials, training, and technology transfer costs amount to US\$ 35,000. The incremental operating costs for two years amount to US\$ 87,724, including the cost of 10 % increase in foam density.

(b) Elimination of CFC-11 in manufacture of rigid polyurethane foam through the use of HCFC-141b technology at Friotermica S.A.

9. Friotermica S.A. specializes in producing polyurethane sandwich panels for insulating and construction purposes, and evaporators, condensers, and parts for commercial refrigeration applications. The company operates one low pressure dispensing unit, Impianti OMS C-60 (1989) with a capacity of 60 Kg/min. It will phase out the use of 9.5 tonnes CFC-11. Capital costs include the replacement of the low-pressure dispenser by a high pressure one and the retrofit of molds at US\$ 88,000. The replaced equipment will be destroyed under the responsibility of the Colombian Government through OTU. Technology transfer, training, and trials amount to US\$ 35,000. The incremental operating cost (US\$ 62,443) for two years includes the cost related to a 10 % increase in foam density.

(c) Elimination of CFCs in manufacture of rigid polyurethane foam through the use of HCFC-141b technology at Indufrio

10. Indufrio produces PU sandwich panels for insulating, and equipment for commercial refrigeration, horizontal and vertical glass cabinets. The company operates one Decker DB 30 low pressure foaming machine (1984). It will phase out the use of 10.71 tonnes CFC-11. Capital costs include the replacement of the existing low-pressure machine by a high-pressure dispenser and the retrofit of molds at US\$ 75,900. The replaced equipment will be destroyed according to OTU regulations. Technology transfer, training, and trials amount to US\$ 35,000. The

incremental operating cost (US\$ 60,612) for two years includes the cost related to a 10 % increase in foam density.

(d) Elimination of CFC-11 in the manufacture of rigid polyurethane foam through the use of HCFC-22 technology at Master Cooler & Cia Ltda.

11. Master Cooler manufactures polyurethane sandwich panels for insulation and construction purposes. It currently uses one high pressure machine, OMS Impianti Ecomaster 100 purchased in 1994. It will phase out the use of 9.3 tonnes CFC-11. The project capital costs cover the addition of a pre-mixing unit, and the retrofit of molds at US\$ 92,000. The high-pressure machine will be reused. Technology transfer, training, and trials amount to US\$ 35,000. The project also includes incremental operating costs (US\$ 21,433) for two years. HCFC-22 has a 10-18 % lower in-place density than HCFC-141b.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The Secretariat and the World Bank discussed the four projects including their shortcomings with respect to project presentation, choice of technology and eligible incremental costs to enable the World Bank to address them in revised project documents and during project implementation. As at the time of dispatch of the documentation no revised documents had been received.

2. The costs of the four projects were discussed taking account of the baseline conditions. These discussions resulted in reduced project costs. However, the reductions did not have any effect on the grant levels as the revised project costs of all the projects were above the threshold limit.

3. Although the costs discussed and agreed did not have any impact on the project cost, it is expected that they will be considered in the projects' implementation as they would result in more cost-effective projects and reduced counterpart funding. For instance, Master Cooler which operates high pressure machines with its CFC-based production, chose to convert to HCFC-22 (without any added advantage) instead of HCFC-141b. This required installation of a premixer costing US \$80,000 which would otherwise not be necessary if it converted from the liquid blowing agent (CFC-11) to another liquid blowing agent (HCFC-141b) as in the projects of the other Colombian companies and every other Multilateral Fund project. While the choice of the HCFC-22 results in counterpart funding of US \$90,271, the choice of the more appropriate HCFC-141b technology would result in no counterpart funding (US \$71).

4. The following costs were agreed for the projects:

	Incremental Capital Cost (US \$)	Contingency (US \$)	Incremental Operational Cost (US \$)	Total Project Cost (US \$)	Eligible Grant (US \$)
Daniel J. Fernandez	107,500	10,750	66,613	184,893	173,822
Friotermica	104,000	10,400	46,270	160,270	67,338
Indufrio	93,500	9,350	60,612	163,642	75,348
Master Cooler	45,000	4,500	21,433	70,933	70,862

RECOMMENDATIONS

1. The Fund Secretariat recommends blanket approval of the four projects, D. J. Fernandez, Friotermica, Indufrio and Master Cooler with the levels of funding and associated support costs indicated in the table below.

Project Title	Project Cost US \$	Support Cost US \$	Implementing Agency
Elimination of CFC-11 in the manufacture of rigid polyurethane foam through the use of HCFC-141b technology at Daniel J. Fernandez & Cia. Ltda.	173,822	22,597	World Bank
Elimination of CFC-11 in manufacture of rigid polyurethane foam through the use of HCFC-141b technology at Friotermica S.A.	67,338	8,754	World Bank
Elimination of CFCs in manufacture of rigid polyurethane foam through the use of HCFC-141b technology at Indufrio	75,548	9,821	World Bank
Elimination of CFC-11 in the manufacture of rigid polyurethane foam through the use of HCFC-22 technology at Master Cooler & Cia Ltda.	70,862	9,212	World Bank

2. To request the World Bank to take into account the above comments and the outcomes of the discussions during the project review when implementing the projects.

PROJECT EVALUATION SHEET COLOMBIA

SECTOR: FUMIGANT

ODS use in sector (1995):
(Methyl bromide)

45 ODP tonnes

Project Title:

Demonstration project - alternatives to the use of methyl bromide in banana growing at CENIBANANO

Project Data	Methyl Bromide
	CENIBANANO
ODS phase-out (ODP tonnes)	N/A
Proposed project duration (months)	24
Incremental capital cost (US \$)	123,200
- including contingency (%)	10
Incremental operational cost (US \$)	N/A
Total project cost (US \$)	123,200
Local ownership (%)	-
Export component (%)	-
Amount requested (US \$) {Original}	123,200
{Revised}	
Cost effectiveness (US \$/kg)	N/A
National Coordinating Agency	Colombian Ministry of the Environment
Implementing Agency	UNIDO
Technical review completed?	Yes

Secretariat's Recommendations:	
Amount recommended (US \$)	123,200
Project impact (ODP tonnes)	N/A
Cost effectiveness (US \$/kg)	N/A
Implementing Agency support cost (US \$)	16,016
Total cost to Multilateral Fund (US \$)	139,216

PROJECT DESCRIPTION

Demonstration project - alternatives to the use of methyl bromide in banana growing at CENIBANANO

1. In 1995, methyl bromide consumption in Colombia was estimated at 45 metric tonnes; by 1997, based on a survey conducted by UNDP, consumption significantly decreased to about three tonnes. However, the Banana Research Centre (CENIBANANO), operating in Carepa, in Urabá region, estimates a current consumption of twenty-five metric tonnes, solely in banana growing.
2. Banana cultivation for export started in Colombia at the end of the 19th Century in the coastal region of the state of Magdalena. Banana production also started in the state of Antioquia and Urabá, main banana regions in Colombia. These two regions, which function independently of each other, are the main growing regions in the country (28,000 ha in Antioquia and 14,000 ha in Magdalena).
3. Methyl bromide consumption has shown that this fumigant is used for the control of the moko disease, which can cause severe losses in production of banana if control measures are not undertaken. Methyl bromide is the fumigant of choice for the control of the moko disease, although growers in the Urabá region have found alternatives.
4. At present there is a moko eradication campaign implemented by the Association of Banana Growers (AUGURA) and supervised by CENIBANANO, in both growing regions of Urabá and Santa Martha. This campaign has focused on prevention by tool disinfection, healthy plant material and isolation of infected areas. Training and information are also provided to growers and field workers.
5. The project is to demonstrate the technical and economic feasibility of an Integrated Pest Management (IPM) programme, in combination with application of low doses of dazomet (a soil fumigant) and glyphosate (a non-selective herbicide), as a methyl bromide alternative for control of the moko disease.
6. IPM process and pre-treatment of soil with dazomet, will be performed simultaneously and compared with an area treated with methyl bromide as the control trial. Use of glyphosate will be considered as a third treatment. Trials will be conducted over a period of one year to cover a complete growth cycle. Plots will have a surface of one hectare, which is representative of actual commercial conditions. The field workers will closely observe the trials and data will be registered in detail.
7. The project will be implemented in co-ordination with the organizers of the moko eradication campaign, at the CENIBANANO premises in Urabá and Santa Martha regions.
8. A national project coordinator, a specialist in banana production and IPM, will be recruited for managing and supervising the demonstration project, including designing the tests, collecting, and analyzing the data, supervising field activities, and coordinating the services of

project personnel. Also, national agro-economists and agronomists will be hired. The total cost of human resources is US \$97,000 including a subcontract for fumigation (US \$85,000) and internal travel (US \$2,000), representing 86.6 per cent of the cost of the project. The total cost of the equipment is US \$10,000.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The project was submitted to the 24th Meeting of the Executive Committee. The Committee decided to defer the proposal, "it being understood that it could be resubmitted for consideration at the end of 1998, when the Executive Committee would be taking stock of the use made of the funds allocated, should the US \$29 million not have been totally used. At that time, consideration might be given to approving projects for crops not on the priority list" (Decision 24/13 (b)).
2. Colombia ratified the Copenhagen Amendment on 5 August 1997.
3. Methyl bromide consumption for 1996 was 234.2 tonnes as reported by the Government to the Ozone Secretariat, while the project proposal indicates a consumption of forty-five tonnes in 1995. UNIDO explained that its consultant collected the data reported in the proposal from well-known sources and represents total consumption in agricultural uses. The discrepancy in the data might be because the amount consumed in critical uses is not known.
4. While methyl bromide has already been phased out in banana plantations in the region of Uraba by glyphosate technology, in the Santa Martha region banana growers are still opposed to the use of this technology since it does not appear to be cost-effective. By allowing CENIBANANO to fully demonstrate the proposed alternatives in Santa Martha, the project would lead to a complete phase out of methyl bromide in Colombia.
5. UNIDO indicated that if this technique proves to be successful, its use can be disseminated within the moko eradication campaign currently being undertaken by CENIBANANO, "reducing substantially and maybe eliminating totally the use of methyl bromide."
6. The project document states that, during project preparation, special emphasis was placed in working with larger banana growers as well as representatives from the two main growers' associations in Colombia.
7. UNIDO indicated that it has made every effort to reduce the cost and number of international consultants (as was agreed during the review of the projects submitted to the 25th Meeting of the Executive Committee).

RECOMMENDATION

1. Taking into consideration the above comments, the Fund Secretariat recommends blanket approval of the project with associated support costs at the funding level shown in the table below:

Project Title	Project Cost US \$	Support Cost US \$	Implementing Agency
Demonstration project: alternatives to the use of methyl bromide in banana growing at CENIBANANO	123,200	16,016	UNIDO
