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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Twenty-fifth Meeting
Montreal, 29-31 July 1998

PROJECT PROPOSALS: BRAZIL

This document includes the comments and recommendations of the Fund Secretariat on the following project proposals:

Foam

• Phaseout of CFC-11 by conversion to water technology in the manufacture of polyurethane foam at Injebank	UNDP
• Phaseout of CFC-11 by conversion to water technology in the manufacture of polyurethane foam at Panther	UNDP
• Conversion to Hexane and LCD Technology in the Manufacture of Polyurethane Foam at Herval	UNDP
• Conversion to water based technology in the manufacture of polyurethane foam at Refratarios Isolamentos e Pinturas (RIP)	UNDP
• Conversion to HCFC-141b in the manufacture of polyurethane foam at SSM Tecnologia	UNDP
• Phaseout of CFC-11 by conversion to water and HCFC-141b technology in the manufacture of polyurethane foam at Delta Pack	UNDP
• Conversion to HCFC-141b, followed by water, in the manufacture of polyurethane foam at Caloi	UNDP
• Conversion to HCFC-141b and water-blown technology in the manufacture of polyurethane foam at Cougar	UNDP

• Conversion to HCFC-141b and water-blown technology in the manufacture of polyurethane foam at Gnatus	UNDP
• Phasing out CFC-11 with cyclopentane at Crios Industrial Ltda. (suppliers of Electrofrio Company)	UNIDO

Refrigeration

• Phaseout of CFC-11 and CFC-12 by conversion to HCFC-141b (foam) and HFC-134a (refrigerant) technology in the manufacture of commercial refrigerators and display cases at Termisa	UNDP
• Phasing out of CFC-12 with HFC-134a and CFC-11 with cyclopentane in the production of commercial refrigeration equipment at Panamante Refrigeracao	UNIDO

PROJECT EVALUATION SHEET
BRAZIL

SECTOR: FOAM ODS use in sector (1996): 2363 ODP tonnes
Sub-sector cost-effectiveness thresholds: Integral Skin/Flexible Slabstock US $16.86/kg

Project Title:

a) Conversion to HCFC-141b, followed by water, in the Manufacture of Polyurethane Foam at Caloi.
b) Conversion to HCFC-141b and Water-Blown Technology in the Manufacture of Polyurethane Foam at Cougar.
c) Conversion to HCFC-141b and Water-blown Technology in the Manufacture of Polyurethane Foam at Gnatus.
d) Phase out of CFC-11 by Conversion to Water Technology in the Manufacture of Polyurethane Foam at Injebank.
e) Phase out of CFC-11 by Conversion to Water Technology in the Manufacture of Polyurethane Foam Panther.
f) i) Conversion to Hexane and LCD Technology in the Manufacture of Polyurethane Foam at Herval.
ii) Conversion to Hexane and LCD Technology in the Manufacture of Polyurethane Foam at Herval.

Project Data	**Integral Skin**						**Flexible Slabstock**
	Caloi	Cougar	Gnatus	Injebank	Panther	Herval	Herval
ODS (CFC-11) phase out (ODP tonnes)	57.25	18.24	29.7	6	18	50	14.5
Proposed project duration (months)	24	24	24	24	24	24	24
Incremental capital cost (US$)	390,500	236,500	227,700	63,800	162,250	544,500	1,644,500
-contingency (%)	0	0	0	10	10	10	10
Incremental operational cost (US$)	131,000	60,875	102,725	22,500	225,000	(52,000)	55,475
Total project cost (US$)	521,500	297,375	330,425	86,300	387,250	443,000	1,699,175
Local ownership (%)	100	100	100	100	100	100	100
Export component (%)				0	0		
Amount requested (US$) {Original}	521,500		330,425	86,300	303,500	547,000	90,335
{Revised}							
Cost effectiveness (US$/kg.)	9.11	16.30	11.12	14.38	16.86	10.94	6.23
National Coordinating Agency	Ministry of Environment - MMA/PROZON						
Implementing Agency	UNDP						
Technical review completed?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Secretariat's Recommendations							
Amount recommended (US $)				86,300			
Project Impact (ODP tonnes)				6			
Cost effectiveness (US $/kg)				14.38			
Implementing Agency support cost (US$)				11,219			
Total cost to Multilateral Fund				97,519			

PROJECT DESCRIPTION

(a) Conversion to HCFC-141b, followed by water, in the Manufacture of Polyurethane Foam at Caloi.

(b) Conversion to HCFC-141b and Water-Blown Technology in the Manufacture of Polyurethane Foam at Cougar.

(c) Conversion to HCFC-141b and Water-blown Technology in the Manufacture of Polyurethane Foam at Gnatus.

(d) Phase out of CFC-11 by Conversion to Water Technology in the Manufacture of Polyurethane Foam at Injebank.

(e) Phase out of CFC-11 by Conversion to Water Technology in the Manufacture of Polyurethane Foam Panther.

(f) i) Conversion to Hexane and technology in the Manufacture of Polyurethane Foam at Herval (integral skin).

ii) Conversion to LCD (methylene chloride) Technology in the Manufacture of Polyurethane Foam at Herval (flexible slabstock).

1. CFC consumption in the integral skin and flexible foam sub-sectors in Brazil in 1996 according to the report on its institutional strengthening submitted to the 24th Meeting was 570 ODP tonnes. The Executive Committee has approved 16 projects to phase out 407 ODP tonnes in the sub-sector.

2. Seven integral skin/flexible molded foams are being submitted. As described in each of the seven projects, the elimination of a total of 214 ODP tonnes through the projects "is important in helping Brazil to meet the country's obligations with the Montreal Protocol."

3. All seven enterprises are 100% Brazilian-owned, established between 1959 and 1992 except Panther which is 50 years old and Caloi which is 100 years old. Six of the enterprises manufacture polyurethane flexible molded foam and/or integral skin foam for various applications, while one enterprise (Herval) manufactures polyurethane flexible molded foam for shoe soles. Herval also has a flexible polyurethane slabstock (boxfoam) production which has been included in the project. However for ease of monitoring this component is described separately.

4. Descriptions of the baseline and conversion plans of the individual companies are provided below. In three projects (Caloi, Cougar and Gnatus) where HCFC-141b is expected to be used as interim blowing agent, the interim period was reported to be 2-5 years.

5. Justification for the use of HCFC-141b has been provided in the project documents together with letters of commitment by the enterprises to bear any costs of conversion to the final technology.

6. Where counterpart funding by the enterprise is expected, a letter from the enterprise indicating its commitment to meet the necessary costs has been provided in the project document.

(a) **CALOI**

7. Caloi manufactures soft integral skin foams covered with soft PVC. Its systems are blended in-house using about 60 tonnes CFC-11 per year. It currently uses four PUMA-RPS-124 low pressure machines. It will phase out the use of CFC-11 by converting to HCFC-141b as an interim solution, with conversion to a final solution to be undertaken at the company's expense. The project capital costs include retrofit of the PUMA machines at US $45,000 each, installation of a six-component premixer at US $120,000 and a hold tank at US $20,000. Training and technical assistance (TTA), namely training, technology transfer and trials amount to US $35,000. The project also includes incremental operating costs (US $131,000) for two years.

(b) **COUGAR**

8. Cougar produces steering wheels mainly for the automotive after market. It operates three low pressure machines, one of which was purchased in 1996 while the others were purchased in 1992. Cougar will phase out the use of CFC-11 through conversion to water blown formulations with interim use of HCFC-141b for certain parts. For this conversion it is proposed to replace the two low pressure machines installed in 1992 with high pressure ones at the cost of US $160,000 while retaining the low pressure machine installed in 1996 (since it is not eligible for funding). Three mold heating ovens will also be installed at US $30,000. TTA costs amount to US $25,000. The incremental operating costs for two years amount to US $60,875.

(c) **GNATUS**

9. Gnatus produces flexible molded, integral skin and rigid integral skin foam parts for packages of office furnishings and x-ray equipment. It used premixed systems with 30 tonnes of CFC-11, operating two 10 kg/min and 15 kg/min Eqifiber low pressure machines installed in 1993 and 1994 respectively. It is proposed to replace the 10 kg/m^3 machine with another 40 kg/m^3 low pressure machine at US $90,000 (with US $10,000 company contribution) and the 15 kg/min with 40 kg/min high pressure machine. Other costs include surface coater (US $5,000) and mold heating tunnel US $10,000. It is also proposed for the company to retain the 15 kg/min low pressure machine to be replaced by high pressure with a residual value of US $3,000. The incremental operating cost amounts to US $102,725.

(d) **INJEBANK**

10. Injebank produces flexible and rigid integral skin foam for a wide variety of products, including steering wheels, computer cases, dentist chairs. It used 6 tonnes of CFC-11 preblended in chemical systems. The company operates one 30 kg/min Transtechnica low pressure dispenser commissioned in 1994 and a Transtechnica and Eqifiber 15kg/min low pressure machines commissioned in 1997. Capital costs include installation of a chemical temperature control on the 1994 machine at US $20,000, mold oven (US $10,000) and in-

mold coating applicator (US $5,000). The incremental operating cost amounts to US $22,500.

(e) **PANTHER**

11. Panther produces integral skin steering wheels for the automotive after market and decorative building fascias. 15 tonnes and 3 tonnes respectively were used to produce these products in 1997. Panther will phase out the use of the 18 tonnes of CFC-11 by converting to water-blown technology. It is proposed to install temperature control on all four machines at US $20,000 each ($80,000), an in-mold coating system ($10,000) for the rigid ISF foam. Other capital costs include trials ($20,000), technology transfer ($20,000). The incremental operating costs of ($225,000) include US $45,000 each for 10% density increase and 10% higher systems cost.

(f) **HERVAL**

12. The Madeireira Herval Ltda. project consists of two sub-sectors - integral skin and flexible slabstock (boxfoam). The ODS consumption in 1997 of the company for the two sub-sectors is 50 tonnes and 14.5 tonnes respectively. For purposes of future monitoring of the projects, the two subsectors are described separately in this project evaluation.

Integral Skin

13. The company started production of flexible molded polyurethane foams for shoe soles in 1994. Two colours, beige and black soles are produced. Systems are purchased premixed which in 1997 contained 50 tonnes CFC-11. The company operates a BGM Elite 60 and Sulpol 3005 for the shoe sole manufacturing using CFC-11. It installed a Sulpol STK 15 in 1997 to manufacture flexible molded foams using water-blown systems. After review of available shoe sole processing technologies including polyether water-based systems, polyester water-based systems, and systems using pentane, hexane or pentane/hexane blends, hexane was proposed for use for the conversion. It was indicated that polyester water-based systems would cost 15% more than polyether water based systems. The capital cost includes the cost of a hexane tank US $20,000) hexane/polyol blender (US $70,000), formulation hold tanks (US $60,000), three colour streams (US $ 60,000), explosion proof pumps sets at US $10,000 (US $60,000), ventilation and exhaust (US $85,000), hexane detection system, tie in with sensors (US $50,000), TTA (US $35,000) and safety audits US $10,000. Incremental operating saving amounts to US $52,000.

Flexible Slabstock

14. Herval currently uses methylene chloride in a boxfoam process to produce some of its slabstock foam and uses CFC-11 to produce foams such as very soft and/or very low density foams. The company intends to change to LCD technology by installing a new maxfoam machine at the cost of US $1,000,000 and an LCD metering system and associated equipment at the cost of US $390,000. Thus the capital cost of conversion to

the LCD system would be US $1,460,000. However the regular cost of conversion of the boxfoam process which has been calculated amounts to US $85,000. This is the amount the company will request, paying for the LCD conversion itself.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The main issues arising from the projects are:
   - requests for replacement of low pressure dispensers with high pressure
   - requests for installation of multi-component premixing units with intermediate hold tanks
   - reclamping of molds
   - costs associated with increase in density of water-blown foam
   - the relative costs of using water-blown and LCD technologies
   - installation of temperature control on existing equipment at the cost of US $20,000 each

2. The Secretariat received advice that neither the replacement of low pressure machines with high pressure ones nor the installation of the multi-component premixing units and intermediate tanks were dictated by the change to water-blown systems and therefore not eligible incremental costs. Detailed technical basis for these conclusions were provided to the Secretariat by the experts and communicated to the implementing agencies. The issue is described below under the relevant project (Caloi) and in the Secretariat's Overview paper.

3. With regard to the temperature control it was agreed to make provisions for it on a case by case basis where necessary information regarding the characteristics of the machine has been provided.

4. It may be noted that in some of the projects the low pressure machines similar to those for which replacements were being sought were being retained for use with water-blown systems when they were not eligible for replacement funding.

5. In the case of one project (Gnatus) which requested a replacement of a 10 kg/min low pressure dispenser with a 40 kg/min low pressure dispenser on the grounds of reduced output of the baseline machine during the conversion the Secretariat was advised that this was not eligible, since the output of the dispenser will rather increase with increased use of the isocyanate (MDI).

6. In the case of Panther it was agreed that the cost of reclamping of molds should be US $250 instead of US $500 per mold.

7. Regarding Caloi's project, some of the items of retrofit cost, namely cost of new drives at US $15,000 for a total of US $60,000 and electronics and controls (US $15,000) and labour (US

$5,000) were considered ineligible. The electronic system is not dictated by the changeover. Only one new pump on each machine (the isocyanate pump) was considered necessary.

8. With regard to the installation of the six-component premixer with intermediate tank for a total cost of US $105,000, which the Secretariat considered as ineligible, UNDP stated that the conversion of the company's existing two-component premix station to a six-component premix station would be counterproductive and expensive. However the Secretariat was advised that there was no need to retrofit the two-component premix station to a six-component premix station in order to convert to HCFC-141b or to water. The concern about exposure to HCFC-141b could be addressed by providing adequate ventilation. Exposure to methylene chloride and other toxic and/or flammable gases used in Multilateral Fund projects is addressed in the same manner. This would be the most cost-effective approach, particularly since the company needs to use HCFC-141b for a transition period of 2-5 years.

9. Since the company's existing premixer is two-component, it implies that the company is possibly blending the blowing agent into a system from the supplier, since the blending of polyols, catalysts, surfactants, and CFC-11 would require a multi-component blender also with intermediate tanks as the system being requested, rather than in a two-component blender.

10. Therefore a six-component blender suggests that the company will be blending polyols, catalysts, surfactant, and HCFC-141b or water in the development of new formulations, while continuing to operate the two-component blender for production. It is to be noted that there was no mention of the destruction of the two-component premix station. In this case the six-component blender represents increased capacity, intentional technology upgrade, and also appears to be a research and development facility.

11. The Secretariat was informed that one major system supplier is prepared to supply proven formulations for water-based flexible foams in Brazil. Therefore there may not be the need for Caloi to take 2-5 years to develop their own formulations.

12. With regard to the incremental operating costs of Panther which had claimed a total amount of US $90,000 for extra material for 10% increase in density and additional 10% material cost increase, the Secretariat was advised that the cost for density increase was not justified, while the 10% additional material cost was speculative and needed corroboration from the systems supplier.

13. On the basis of the above conclusions and the Secretariat's comments received from UNDP the eligible project cost of the six integral skin/molded foam projects were calculated by the Secretariat to be:

	Incremental Capital Cost	Contingency	IOC	Total
Caloi	135,000	13,500	131,000	279,500
Cougar	45,000	4,500	60,875	110,375
Gnatus	60,000-70,000	6,000-7,000	102,725	168,725-179,725
Injebank	38,000	3,800	22,500	64,300
Panther	60,000	6,000	-	-

Herval Project

Integral Skin Sub-sector

Production of Shoe Soles

14. The Secretariat drew the attention of the UNDP to capacities of items such as the 20 tonne hexane tank (US $20,000), hexane/polyol blender (US $70,000) and formulation hold tanks (US $20,000 each) and the overcapacities likely to be created due to the relatively low baseline CFC consumption of 50 tonnes per year which requires about 40 tonnes hexane per year.

15. With regard to the capacity of the tank UNDP responded that it could agree to a smaller capacity tank but the savings will be small, adding that the 20 tonne tank would enable the company to handle bulk. The savings were not indicated. However the Secretariat believes that a change from delivery in drums to bulk handling involves capacity and technology upgrade as well as material purchasing advantage which should be reflected in the capital cost and/or incremental operating cost. The Secretariat is still seeking clarification with regard to the premixer costs. The issues are still under discussion.

16. The Secretariat was advised that although water-blown polyether foam and water-blown polyester foam are both feasible options, water-blown polyester foams provide more durable substitute for CFC-blown shoe soles. It was also advised that water-blown polyester shoe soling is widely used in Brazil. Therefore, UNDP was requested to calculate the cost of alternative use of polyester water-blown option in line with the Executive Committee decision 24/58 in order to establish comparative cost-effectiveness. UNDP stated that the incremental operating cost of the polyester option would be US $1,275,000.

Boxfoam Project

17. The attention of UNDP was drawn to Executive Committee decision 24/58 which sets the limit of eligibility for LCD projects at 50 tonnes ODP per year. The company's consumption of 14.5 tonnes did not qualify for choice of LCD technology. The conversion from boxfoam to maxfoam machine involved a significant amount of technological upgrade and enhancement in capacity and technology. Furthermore the cost of the conversion to LCD amounting to US $1,495,000 (10 times the eligible cost) would distort the entire Herval project and create

monitoring difficulties. UNDP was advised that since the LCD component was a capital development project of the company which was neither eligible nor relevant to the Herval project, the project document should be revised to exclude the costs of the maxfoam and LCD development project.

18. The eligible cost of the boxfoam component was determined to be US $155,000.

19. The outstanding issues are under discussion between the Secretariat and the UNDP. The outcomes of these discussions will be communicated to the Sub-Committee on Project Review.

RECOMMENDATIONS

1. The Fund Secretariat recommends approval of the Injebank project with the level of funding and associated support cost as indicated in the table below.

Project Title	Project Cost US $	Support Cost US $	Implementing Agency
(a) Conversion to HCFC-141b, followed by water, in the Manufacture of Polyurethane Foam at Caloi.	Pending	Pending	UNDP
(b) Conversion to HCFC-141b and Water-Blown Technology in the Manufacture of Polyurethane Foam at Cougar.	Pending	Pending	UNDP
(c) Conversion to HCFC-141b and Water-blown Technology in the Manufacture of Polyurethane Foam at Gnatus.	Pending	Pending	UNDP
(d) Phase out of CFC-11 by Conversion to Water Technology in the Manufacture of Polyurethane Foam at Injebank.	86,300	11,219	UNDP
(e) Phase out of CFC-11 by Conversion to Water Technology in the Manufacture of Polyurethane Foam Panther.	Pending	Pending	UNDP
(f) (i) Conversion to hexane technology in the manufacture of show soles at Herval.	Pending	Pending	UNDP
(f) (ii) Conversion to methylene chloride in the manufacture of slabstock foam (boxfoam) at Herval.	Pending	Pending	UNDP

PROJECT EVALUATION SHEET
BRAZIL

SECTOR: FOAM ODS use in sector (1996): 2363 ODP tonnes

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

Project Titles:

(a) Phase out of CFC-11 by conversion to water and HCFC-141b technology in the manufacture of polyurethane foam at Delta Pack.
(b) Conversion to HCFC-141b technology in the manufacture of polyurethane foam at Refratarios Isolamentos e Pinturas (RIP).
(c) Conversion to water based technology in the manufacture of polyurethane foam SSM.
(d) Phasing-out CFC-11 with cyclopentane at Crios Industrial Ltda.

Project Data	**Rigid**			
	Delta Pack	RIP	SSM	Crios
ODS phase-out (ODP tonnes)	27.5	12	15	46
Proposed project duration (months)	24	24	24	24
Incremental capital cost (US $)	143,000	148,500	88,000	357,270
- including contingency (%)	10	0	10	10
Incremental operational cost (US $)	114,500	56,400	67,500	
Total project cost (US $)	257,500	204,900	155,550	357,270
Local ownership (%)	100	100	100	100
Export component (%)	0	0	0	0
Amount requested (US $) {Original}	215,325	94,000	106,500	672,198
{Revised}				357,270
Cost effectiveness (US $/kg)	7.83	7.83	7.83	14.60
National Coordinating Agency	Ministry of Environment - MMA/PROZON			
Implementing Agency	UNDP			UNIDO
Technical review completed?	Yes	Yes	Yes	Yes

Secretariat's Recommendations:				
Amount recommended (US $)				357,270
Project impact (ODP tonnes)				46.0
Cost effectiveness (US $/kg)				7.76
Implementing Agency support cost (US $)				46,445
Total cost to Multilateral Fund (US $)				403,715

PROJECT DESCRIPTION

(a) Phase out of CFC-11 by conversion to water and HCFC-141b technology in the manufacture of polyurethane foam at Delta Pack.
(b) Conversion to HCFC-141b technology in the manufacture of polyurethane foam at Refratarios Isolamentos e Pinturas (RIP).
(c) Conversion to water based technology in the manufacture of polyurethane foam SSM.
(d) Phasing-out CFC-11 with cyclopentane at Crios Industrial Ltda.

1. The ODS consumption in 1993 was estimated at 8,918 ODP tonnes. Last consumption figures reported to the Ozone Secretariat show an increase from 9,484 ODP tonnes in 1995 to 12,654 ODP tonnes in 1996 of which CFCs were 11.696 tonnes. Best estimate of the foam sector consumption for 1996 was reported by the Ozone Unit as 2,363 ODP tonnes with 1,150 ODP tonnes still to be covered by projects in the sector.

2. The project document indicates that, so far, 86 activities have been approved for Multilateral Fund financing, which would eliminate 3,511 ODP tonnes per year. While these projects will contribute to Brazil meeting its 1999 freeze requirements, additional efforts will have to be made to enable it to comply with the 1999 freeze and further ODS decreases as required by the Montreal Protocol. The document further indicates that the elimination of the 53 tonnes from the three projects is important in helping the country to meet its obligations with the Montreal Protocol.

3. All four enterprises are 100% Brazilian owned. Delta pack was established in January 1995, while SSM was founded in 1989. The date of establishment of RIP was not stated.

(a) **DELTA PACK - Phase out of CFC-11 by conversion to water and HCFC-141b technology in the manufacture of polyurethane foam.**

4. Deltapack manufactures packaging foam for electronic products and dentistry. It consumed 28 tonnes of CFC-11 in 1997 and used 3 locally made 5 kg/min low pressure dispensers. Its chemicals are blended in-house in open-top drums. The company will phase out the use of CFC-11 in the manufacture of rigid foam for packaging applications by converting to water blown technology (75%) supplemented by HCFC-141b (25%) for density reduction. It is proposed to retrofit the three existing machines for variable ratio capability and compatibility with HCFC-141b ($30,000), and install a premixer with service tank ($65,000). Other costs include trials ($15,000), technology transfer ($20,000) and incremental operating costs ($114,500).

(b) **RIP - Conversion to HCFC-141b technology in the manufacture of polyurethane foam.**

5. The company, Refratarios Isolamentos e Pinturas (RIP), manufactures rigid spray foam for building applications. It consumed 12 tonnes of CFC in 1997. The reported formula for the foam system is 100% polyol; 120% isocyanate and 46% CFC-11. The company is

reported to have begun experimentation with water-based systems. The company operated 11 portable 4 - 20kg/min low pressure machines, one of which was installed in 1997. Six of the machines are self-made. It is proposed to replace the 10 low pressure dispensers with 4 high pressure dispensers. Cost of trials, training an technology transfer is US $15,000. Incremental operating costs amount to US $42,600.

(c) **SSM - Conversion to water based technology in the manufacture of polyurethane foam.**

6. SSM Tecnologia's production is low density rigid foam for packaging, while 20% is rigid foam for picnic coolers and 5% is for energy absorbing foam for bumpers. The company operates 2 low pressure machines installed in 1994. The production is to be converted to HCFC-141b as an interim solution. It is proposed to retrofit one of the dispensers to produce the packaging foam and bumpers and replace the other to produce the picnic coolers.

(d) Phasing-out CFC-11 with cyclopentane at Crios Industrial Ltda.

7. Crios Industrial in Curitiba was established in 1994. The enterprise is manufacturing panels and doors to be used in commercial refrigeration and other industrial sectors. The project will phase out 100% of the use of CFC-11. The enterprise has no operations with CFC-12 refrigerant. Cyclopentane will replace CFC-11 as blowing agent. An old low-pressure foaming machine has to be replaced by a high pressure foaming machine including a premixing station, a mobile storage tank for cyclopentane and the appropriate safety equipment including pentane sensors, ventilation system, and safety certification. The products manufactured by Crios are exclusively used on the domestic market.

8. Incremental operating costs are not requested.

9. Due to late submission the project will not contribute to reach the 1999 freeze target in Brazil.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

(a) Phase out of CFC-11 by conversion to water and HCFC-141b technology in the manufacture of polyurethane foam at Delta Pack.
(b) Conversion to HCFC-141b technology in the manufacture of polyurethane foam at Refratarios Isolamentos e Pinturas (RIP).
(c) Conversion to water based technology in the manufacture of polyurethane foam SSM.

1. With regard to the RIP project, the attention of the implementing agency was drawn to the fact that the production of rigid spray foam did not necessitate the use of high pressure machines.

Furthermore, the company acquired a new low pressure machine as recently as 1997 when it was still experimenting with water-blown systems, a machine which the company intends to use after the conversion, confirming the capability of the low pressure machines to process the substitute chemicals. Hence it was proposed to consider retrofit costs instead of replacement with high pressure machines.

2. With regard to the installation of a new premixer at Delta Pack to replace the company's current blender at the cost of US $65,000, which is a result of the anticipated 2-5 year interim use of HCFC-141b, it was proposed that UNDP explored the possibility of retrofitting the existing premixing facility since HCFC systems can be premixed in the CFC facility. An amount of US $10,000 was mentioned based on a proposal from another UNDP project for another country. The retrofit would mainly be to provide ventilation to ensure safer working conditions in the premixing area and replace seals and gaskets, if any. UNDP responded that the enterprise's baseline did not include a premixer.

3. With regard to the SSM project, UNDP was informed that, as in other thermoware projects the replacement of the low pressure machine with high pressure was not justified. Furthermore the claim of 10% density increase needed to be justified.

4. The justification for the use of HCFC-141b has been provided in the analysis of available phase-out technologies.

5. Each project includes a letter form the enterprise indicating its commitment to provide funding to meet any counterpart funding required, to phase out the CFC, to use HCFC only to the required extent and to agree to destroy any replaced equipment.

6. More detailed information on the issues raised in paragraphs 1-3 above has been provided in the Secretariat's Overview Paper.

7. The projects are still under discussion with UNDP. The outcomes of the discussion will be communicated to the Sub-Committee on Project Review.

(d) Phasing-out CFC-11 with cyclopentane at Crios Industrial Ltda.

1. The proposal was submitted by UNIDO as a commercial refrigeration project. Since the enterprise has no operations with the refrigerant the project was reclassified as a rigid foam project. The company has a low capacity low pressure machine which was locally manufactured in 1987. The Secretariat has discussed the cost of replacement of this dispenser with a high pressure machine designed for cyclopentane. The costs of safety equipment have also been discussed.

2. The list of equipment to be scrapped and the scope of the financial contribution of the enterprise to the implementation of the project were provided by UNIDO.

RECOMMENDATION(S)

1. The Fund Secretariat recommends blanket approval of the Crios project with the level of funding and associated support cost as indicated below.

Project Title	Project Cost US $	Support Cost US $	Implementing Agency
Phase out of CFC-11 by conversion to water and HCFC-141b technology in the manufacture of polyurethane foam at Delta Pack	Pending	Pending	UNDP
Conversion to HCFC-141b technology in the manufacture of polyurethane foam at Refratarios Isolamentos e Pinturas (RIP)	Pending	Pending	UNDP
Conversion to water based technology in the manufacture of polyurethane foam SSM	Pending	Pending	UNDP
Phasing-out CFC-11 with cyclopentane at Crios Industrial Ltda.	357,272	46,445	UNIDO

PROJECT EVALUATION SHEET
BRAZIL

SECTOR: REFRIGERATION ODS use in sector (1996): 7,293 ODP tonnes

Sub-sector cost-effectiveness thresholds: Commercial US $15.21/kg

Project Titles:
(a) Conversion to CFC-free technology in the manufacture of refrigerators and display cases at Termisa.
(b) Phasing out CFC-12 with HCFC-134a and CFC-11 with cyclopentane in the production of commercial refrigeration equipment at Panamante Refrigeraçao.

Project Data	**Commercial Refrigeration**	
	Panamante	Termisa
ODS phase-out (ODP tonnes)	26.1	27
Proposed project duration (months)	24	24
Incremental capital cost (US $)	410,102	195,050
- including contingency (%)	10	10
Incremental operational cost (US $)		160,175
Total project cost (US $)	410,102	355,225
Local ownership (%)	100	100
Export component (%)	0	0
Amount requested (US $) {Original}	463,415	355,225
{Revised}	315,700	
Cost effectiveness (US $/kg)	15.15	13.16
National Coordinating Agency	Ministry of Environment - MMA/PROZON	
Implementing Agency	UNIDO	UNDP
Technical review completed?	Yes	Yes

Secretariat's Recommendations:		
Amount recommended (US $)	315,700	
Project impact (ODP tonnes)	26.1	
Cost effectiveness (US $/kg)	12.09	
Implementing Agency support cost (US $)	41,041	
Total cost to Multilateral Fund (US $)	356,741	

PROJECT DESCRIPTION

Background for refrigeration sector in Brazil

1. Total ODP consumption in the refrigeration sector is estimated at 7,293 ODP tonnes for 1996 in the report on institutional strengthening submitted by Brazil to the 24th Meeting of the Executive Committee. This total consumption includes: 2,068 ODP tonnes in production of domestic refrigerators; 594 ODS tonnes in manufacturing new equipment in the commercial refrigeration sub-sector: and 4,631 ODP tonnes in servicing the refrigeration equipment. The Executive Committee approved 17 projects in the domestic subsector phasing out 696 ODP tonnes, 14 commercial refrigeration projects phasing out 562.7 ODP tonnes, and one demonstration (UNDP) and one investment project at the 7th Meeting of the Executive Committee at US $ 2,000,000 for the World Bank to improve domestic refrigeration servicing and CFC recycling in repair shops.

(a) Conversion to CFC-free technology in the manufacture of refrigerators and display cases at Termisa

2. The sector description in the project document contains the following information:
"The projects will eliminate the use of 27 ODP tonnes, and as such is important in helping Brazil to meet the country's obligations with the Montreal Protocol"

3. Termisa is a 100% Brazilian enterprise. The company was founded in 1987. The annual production is 5,800 of commercial refrigerators and display cabinets. Under this project, Termisa will phase-out the use of 29 ODP tonnes of CFC-11 and CFC-12. The enterprise has two low pressure foaming machines of low capacity for the foaming operations, two refrigerant charging boards and three vacuum pumps for the refrigerant operations. The enterprise does not have electronic leak detection equipment. The production is to be converted to HCFC-141b as an interim step for the foam applications, and HFC-134a for the refrigerant. The project includes equipment replacement, including the acquisition of a high capacity foam machine, as well as trials, training, technology transfer and contingency. The project also includes incremental operating costs for two years.

4. Several substitute technologies in the foam operation have been considered by the enterprise, including cyclopentane. The enterprise has selected HCFC-141b-based technology. The investment costs to convert to cyclopentane are prohibitive, based on the relatively small level of production. HFC or water-based systems will be used when they become commercially available. Until the commercial availability of one of the permanent solutions (expected time 3-5 years), the company will employ HCFC-141b as an interim technology to maintain product standards. Subsequent conversion to a zero-ODS alternative in the foam manufacturing will be undertaken at company expense.

5. A letter of commitment to dispose of any equipment that will be replaced under this project and to provide all the necessary additional funding required for a successful implementation of the project has been provided.

(b) Phasing out CFC-12 with HCFC-134a and CFC-11 with cyclopentane in the production of commercial refrigeration equipment at Panamante Refrigeraçao.

1. Panamante is a manufacturer of commercial refrigerators, freezers, display cases, and cold store rooms. Major components are sourced from outside, assembled, insulated with polyurethane foam and charged with refrigerant at the factory. Production in 1997 was 16,888 units.

2. The project will phase out 26.1 ODP tonnes through conversion of CFC-11 blowing agent to cyclopentane and CFC-12 refrigerant to HFC-134a. The proposal requests funding for replacement and retrofit of production equipment, safety equipment to handle the flammable blowing agent, engineering, commissioning, start-up and training.

3. Incremental operating costs are not requested.

4. The project document contains the statement that " Due to the late submission the project will not contribute to reach the 1999 freeze target in Brazil".

5. The proposal includes information on financial contribution of the company to implement the project and the list of equipment to be destroyed following the conversion.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

(a) Conversion to CFC-free technology in the manufacture of refrigerators and display cases at Termisa.

1. In regards to the 1999 freeze the sector description in the project document contains the following statement: "The projects will eliminate the use of 27 ODP tonnes, and as such is important in helping Brazil to meet the country's obligations with the Montreal Protocol"

2. The chosen technologies are proven. The justification for the use of HCFC-141b is provided by the enterprise.

3. The Secretariat discussed with UNDP the requested incremental capital and operating costs. Several issues have been raised regarding the acquisition of a new high pressure machine of high capacity to replace the existing foam dispenser of low capacity, the acquisition of a leak detector which is not part of the baseline, cost of replacement of vacuum pumps, foam density and associated cost of chemicals, savings associated with foam losses in the baseline.

4. The Secretariat and UNDP are still discussing the level of eligible capital and operating costs. The Sub-Committee on Project Review will be informed accordingly.

(b) Phasing out CFC-12 with HCFC-134a and CFC-11 with cyclopentane in the production of commercial refrigeration equipment at Panamante Refrigeraçao.

1. The company has two low capacity low pressure foaming machines which are locally made. The proposal requests the replacement of this equipment with a high capacity dispenser equipped with two mixing heads designed for cyclopentane. The Secretariat and UNIDO discussed the eligible cost of the new dispenser as well as costs of safety equipment. Capital costs of the project have been adjusted accordingly.

RECOMMENDATIONS

1. The Fund Secretariat recommends blanket approval of the Panamante project with the funding levels and associated support costs indicated in the table below.

Project Title	Project Cost US $	Support Cost US $	Implementing Agency
Conversion to CFC-free technology in the manufacture of refrigerators and display cases at Termisa.	Pending	Pending	UNDP
Phasing out CFC-12 with HCFC-134a and CFC-11 with cyclopentane in the production of commercial refrigeration equipment at Panamante Refrigeraçao	315,700	41,041	UNIDO