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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Thirty-first Meeting
Geneva, 5-7 July 2000

PROJECT PROPOSALS: NIGERIA

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

Foam

•	Phasing out of CFC-11 in the manufacture of flexible slabstock foam at Abeokuta Commercial and Industrial Co. Ltd. By conversion to methylene chloride	UNDP
•	Phasing out of CFC-11 in the manufacture of flexible slabstock foam at Climax Ind. Ltd. (Ely Foam) by conversion to methylene chloride	UNDP
•	Phasing out of CFC-11 in the manufacture of flexible slabstock foam at Jafa Foam Products Nig. Ltd. by conversion to methylene chloride	UNDP
•	Phasing out of CFC-11 in the manufacture of flexible slabstock foam at Sokoto Foam Factory (Nig.) Ltd. by conversion to methylene chloride	UNDP
•	Phasing out of CFC-11 in the manufacture of flexible slabstock foam at Wappah Foam Limited by conversion to methylene chloride	UNDP
•	Phasing out of CFC-11 in the manufacture of rigid polyurethane foam at Celplas Industries Limited by conversion to a combination of water + HCFC-141b based systems	UNDP

PROJECT EVALUATION SHEET
NIGERIA

SECTOR: Foam ODS use in sector (1996): 625 ODP tonnes

Sub-sector cost-effectiveness thresholds: Flexible US $6.23/kg
Rigid US $7.83/kg

Project Titles:

(a) Phasing out of CFC-11 in the manufacture of flexible slabstock foam at Abeokuta Commercial and Industrial Co. Ltd. By conversion to methylene chloride
(b) Phasing out of CFC-11 in the manufacture of flexible slabstock foam at Climax Ind. Ltd. (Ely Foam) by conversion to methylene chloride
(c) Phasing out of CFC-11 in the manufacture of flexible slabstock foam at Jafa Foam Products Nig. Ltd. by conversion to methylene chloride
(d) Phasing out of CFC-11 in the manufacture of flexible slabstock foam at Sokoto Foam Factory (Nig.) Ltd. by conversion to methylene chloride
(e) Phasing out of CFC-11 in the manufacture of flexible slabstock foam at Wappah Foam Limited by conversion to methylene chloride
(f) Phasing out of CFC-11 in the manufacture of rigid polyurethane foam at Celplas Industries Limited by conversion to a combination of water + HCFC-141b based systems

Project Data	**Flexible slabstock**					**Rigid**
	Abeokuta	**Climax Ind.**	**Jafa**	**Sokoto**	**Wappah**	**Celplas**
Enterprise consumption (ODP tonnes)	23.30	29.70	34.20	26.10	24.03	35.30
Project impact (ODP tonnes)	23.30	29.70	34.20	26.10	24.03	32.60
Project duration (months)	36	36	36	36	36	36
Initial amount requested (US $)	118,468	173,362	124,667	141,421	130,081	254,475
Final project cost (US $):						
Incremental capital cost (a)	117,000	168,000	136,000	141,000	136,000	140,000
Contingency cost (b)	11,700	16,800	13,600	14,100	13,600	14,000
Incremental operating cost (c)	-10,232	-11,438	-24,933	-13,679	-19,519	157,806
Total project cost (a+b+c)	118,468	173,362	124,667	141,421	130,081	311,806
Local ownership (%)	100%	100%	100%	100%	100%	100%
Export component (%)	0%	0%	0%	0%	0%	0%
Amount requested (US $)	118,468	173,362	124,667	141,421	130,081	215,325
Cost effectiveness (US $/kg.)	5.08	5.84	3.65	5.42	5.41	7.83*
Counterpart funding confirmed?						
National coordinating agency	Federal Ministry of Environment					
Implementing agency	UNDP					

Secretariat's Recommendations						
Amount recommended (US $)	118,468	173,362	124,667	141,421	130,081	215,325
Project impact (ODP tonnes)	23.30	29.70	34.20	26.10	24.03	27.50
Cost effectiveness (US $/kg)	5.08	5.84	3.65	5.42	5.41	7.83 *
Implementing agency support cost (US $)	15,401	22,537	16,207	18,385	16,911	27,992
Total cost to Multilateral Fund (US $)	133,869	195,899	140,874	159,806	146,992	243,317

*Cost-effectiveness is based on the amount of CFC-11 actually consumed in production of foam (27.5 tonnes)

PROJECT DESCRIPTION

Sector Background

- Latest available total ODS consumption (1998) 5,476.10 ODP tonnes
- Baseline consumption of Annex A Group I substances (CFCs) 3,650.00 ODP tonnes
- Consumption of Annex A Group I substances for the year 1998 4,761.50 ODP tonnes
- Baseline consumption of CFCs in foam sector Not Available ODP tonnes
- Consumption of CFCs in foam sector in 1998 3,770.00 ODP tonnes
- Funds approved for investment projects in foam sector as of end of 1999 US $5,062,130.00
- Quantity of CFC to be phased out in investment projects in foam sector as of end of 1999 1,107.70 ODP tonnes
- Quantity of CFC phased out in investment projects in foam sector as of end of 1999 315.00 ODP tonnes
- Quantity of CFC to be phased out in investment projects in foam sector approved in 1999 274.30 ODP tonnes
- Funds approved for investment projects in the foam sector in 1999 US $1,183,830.00

Flexible Slabstock Foam

1. Five companies (Abeokuta, Climax, Jafa, Sokoto and Wappah) used a total of 137.33 ODP tonnes of CFC-11 in the production of flexible polyurethane foam slabstock (average 1996-1998). The companies will phase out 137.33 ODP tonnes of CFC-11, converting their production to methylene chloride/LIA technology. Abeokuta and Climax operate boxfoam units while Jafa, Sokoto and Wappah operate maxfoam units.

2. The projects include the retrofitting of existing equipment. The incremental capital cost of conversion includes the cost of a methylene chloride storage tank and metering system at US $25,000-US $42,000, storage and metering systems for softening additive at US $10,000-US $20,000, machine enclosure and ventilation at US $50,000-US $70,000, methylene chloride detectors at US $8,000, trials, technology transfer and training (US $19,000-US $28,000). There are incremental operational savings ranging from about US $10,000 to US $25,000.

Rigid Foam

Celplas

3. Celplas used 27.5 ODP tonnes of CFC-11 in the production of rigid polyurethane foam thermoware products. In addition the enterprise used 7.8 tonnes of CFC-11 for cleaning purposes. The density of the foam is stated to be 30-35 kg/m^3. The production is to be converted to a combination of water and HCFC-141b based systems. The project includes the replacement of the three existing low-pressure machines with three medium-pressure machines

at the cost of US $40,000 each. Other costs include technology transfer, training and trials (US $20,000), and incremental operational cost for two years of US $157,806 requested. This amount includes the cost of 10% increase in systems usage attributed to 10% increase in the foam density after conversion.

Justification for the use of HCFC (at Celplas)

4. UNDP indicated that the company was briefed during appraisal prior to project preparation about available conversion technologies and their "techno-economic", health and environmental impacts, and that the enterprise will be responsible for conversion to zero ODP technology. The company selected the HCFC-141b option against the background of these discussions.

5. UNDP has also provided a letter from the Government of Nigeria supporting the company's choice of the HCFC-141b technology. The justification from UNDP and the Government's letter are attached to this document.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

Flexible slabstock foam

1. The Fund Secretariat and UNDP have agreed on the cost of the flexible slabstock foam projects.

Rigid foam

2. The Fund Secretariat and UNDP discussed the project and agreed on the eligible grant to the company as US $215,325. The incremental operational costs was calculated based on the quantity of CFC-11 that is actually used in the foam production. The cost of the 7.8 tonnes of CFC-11 used for cleaning was calculated and deducted from the project cost as savings to the company due to conversion to high pressure machines which will obviate the need for cleaning.

3. The claimed increase in foam density will not affect the eligible grant, hence the project has been recommended for blanket approval.

RECOMMENDATIONS

4. The Fund Secretariat recommends blanket approval of the Abeokuta, Climax, Jafa, Sokoto, Wappah and Celplas projects with the level of funding and associated support costs indicated in the table below.

	Project Title	Project Funding (US$)	Support Cost (US$)	Implementing Agency
(a)	Phasing out of CFC-11 in the manufacture of flexible slabstock foam at Abeokuta Commercial and Industrial Co. Ltd. By conversion to methylene chloride	118,468	15,401	UNDP
(b)	Phasing out of CFC-11 in the manufacture of flexible slabstock foam at Climax Ind. Ltd. (Ely Foam) by conversion to methylene chloride	173,362	22,537	UNDP
(c)	Phasing out of CFC-11 in the manufacture of flexible slabstock foam at Jafa Foam Products Nig. Ltd. by conversion to methylene chloride	124,667	16,207	UNDP
(d)	Phasing out of CFC-11 in the manufacture of flexible slabstock foam at Sokoto Foam Factory (Nig.) Ltd. by conversion to methylene chloride	141,421	18,385	UNDP
(e)	Phasing out of CFC-11 in the manufacture of flexible slabstock foam at Wappah Foam Limited by conversion to methylene chloride	130,081	16,911	UNDP
(f)	Phasing out of CFC-11 in the manufacture of rigid polyurethane foam at Celplas Industries Limited by conversion to a combination of water + HCFC-141b based systems	215,325	27,992	UNDP

ANNEX I

Additional Justification for Using HCFC-141b Technology

The UNDP technical expert appraised the enterprise in November 1999 and March 2000, prior to the preparation of this project document, and had discussions with the company's representatives about the choice of technology for replacing the existing CFC-based technology. The enterprise was briefed in detail about the following:

(a) An overview of the available interim (low ODP) and permanent (zero ODP) replacement technologies.
(b) The "techno-economic impact" of each technology on the products manufactured, and the processes and practices employed.
(c) Possible implications of each technology, in terms of its known impact on environment, health and safety, such as ozone depleting potential, global warming potential, occupational health, etc.
(d) It was emphasized to the enterprise that HCFC technologies are interim technologies due to their residual ODP and therefore may continue to adversely affect the environment, although at a lower rate than CFCs.
(e) It was further explained that HCFCs may become controlled substances under present or future international conventions and will therefore also need to be phased out at a future date, and any investments required for their phase-out and for conversion to a permanent technology will have to be borne by the enterprise themselve.

The main conclusions reached by the enterprise through discussions with the UNDP technical expert were:

1. HCFC-141b will maintain the insulation properties required by the enterprise's customers.

2. All Water based formulations do not provide sufficient insulation properties for the application and would require a significant cost increases to the enterprise.

3. Hydrocarbon technology was seen as not a feasible option due to the layout of the plant operations. The use of hydrocarbons in this environment would be risky and very expensive.

In view of the above, the technology selected is HCFC-141b based systems in the interim, until permanent technology (either water based of HFC-based systems) is available and can provide the required physical properties.

Projected Techno-economic Impact of Zero-ODP Technologies

The projected impact of applying various zero-ODP technologies with respect to the selected technology (HCFC-141b) in this project is summarized as below:

Water based technologies are feasible, but do not provide adequate physical properties (insulation factor) for the applications and are therefore not considered. The impact of applying water blown formulations would be that the foam thickness would have to increase by at least 30% to provide the same k-factor as with the current CFC-11 blown foam. This results in increased systems usage, in addition to increased MDI usage from higher water content. It is unknown what the costs of the water blown formulation would be, but a *conservative* estimate of annual operating costs taking into account only the increased MDI usage and 30% higher systems usage at the same systems price is:

Before:	35.3 t CFC-11	@ US$ 2.10	=	74,130
After:	52.9 t MDI	@ US$ 2.50	=	132,250
	69.0 t additional systems	@ US$ 3.00	=	207,000
Incremental Operating Costs/y			=	265,120

Other costs would include reengineering of the tanks themselves to accommodate greater foam volumes.

HFC-134a based systems are not offered in the applicable regional area and are not a feasible zero-ODP option.

Hydrocarbons cannot be used for safety reasons related to the plant layout.

Thus, the selection of HCFC-141b based systems, as the preferred conversion technology, is justified taking into account all the technical, commercial and cost factors.

FEDERAL MINISTRY OF ENVIRONMENT

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Department of.....INTERNATIONAL AND PUBLIC AFFAIRS

Yerzhan Aisabayev
Montreal Protocol Unit
SEED/BDP
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I am directed to inform you that in line with the EX.COM decision 27/13 and in recognition of Art 2 of the Montreal Protocol regarding the use of HCFC in Foam Projects specifically in Celplast. The Government and the Company have received full information about the technology and the existing option for this sector.

2. The use of HCFC is justified because this option will maintain insulation critical values for the product. Other options to replace CFC 11 in this industry include:

i. Water blown technology: In this case appropriate formulation are not available yet.
ii. Hydrocarbons: The Safety Issues are very critical.
iii. HFC: Up till now, this alternative is not commercially available.

3. Government and the Company are aware that HCFCs are transitional substances, and understand that no funding from the multilateral fund for the conversation from HCFC for Celplast whenever such conversion to other alternative will be required.

4. We hope that this justification complies with the EX.COM decision.

Ms Anne Enc-Ita
for: Honourable Minister