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Executive Committee of  
the Multilateral Fund for the  
Implementation of the Montreal Protocol

Twenty-second Meeting  
Nairobi, 28-30 May 1997

**PROJECT PROPOSALS: MACEDONIA**

This document includes the comments and recommendations from the Fund Secretariat on the following projects:

Foam

- Phasing out of CFC-11 from flexible slabstock foam manufacturing at Sileks Ad Co. UNIDO
- Phasing out of CFC-11 from manufacturing of rigid PU sandwich panels at Sileks Ad Co. UNIDO

|                                           |                    |                           |                |
|-------------------------------------------|--------------------|---------------------------|----------------|
| SECTOR:                                   | Foams              | ODS use in sector (1995): | 361 ODP tonnes |
| Sub-sector cost-effectiveness thresholds: | Rigid              |                           | 7.83 US \$/kg  |
|                                           | Flexible Slabstock |                           | 6.23 US \$/kg  |

- (a) Phasing out of CFC-11 from flexible slabstock foam manufacturing at Sileks AD Co.
- (b) Phasing out CFC-11 from manufacturing of rigid PU sandwich panels at Sileks AD Co.

| Project Data                         | Slabstock                            | Rigid   |
|--------------------------------------|--------------------------------------|---------|
|                                      | Sileks                               | Sileks  |
| ODS phase-out (ODP tonnes)           | 280                                  | 76      |
| Proposed project duration (Yrs)      | 1.5                                  | 1       |
| Incremental capital cost (US \$)     | 721,600                              | 198,000 |
| Contingency (%)                      | 10                                   | 10      |
| Incremental operational cost (US \$) | 0                                    | 257,800 |
| Total project cost (US \$)           | 721,600                              | 455,800 |
| Local ownership (%)                  | 100                                  | 100     |
| Export component (%)                 | 0                                    | 0       |
| Amount requested (US \$) {Original}  | 721,600                              | 455,800 |
| {Revised}                            |                                      |         |
| Cost effectiveness (US \$/kg)        | 2.58                                 | 6.74    |
| National Coordinating Agency         | Ministry of Urbanism and Environment |         |
| Implementing Agency                  | UNIDO                                |         |
| Technical review completed?          | Yes                                  | Yes     |

|                                          |         |         |
|------------------------------------------|---------|---------|
| Amount recommended (US \$)               | 520,125 | 313,386 |
| Project impact (ODP tonnes)              | 280     | 67.64   |
| Cost effectiveness (US \$/kg)            | 1.86    | 4.63    |
| Implementing Agency support cost (US \$) | 67,616  | 40,740  |
| Total cost to Multilateral Fund (US \$)  | 587,741 | 354,126 |

## PROJECT DESCRIPTION

### Flexible Slabstock

(a) Phasing out of CFC-11 from flexible slabstock foam manufacturing at Sileks AD Co.

1. Sileks AD Co. manufactures flexible slabstock polyurethane foam for the furniture and textile lamination industries. The company operates two lines. One line has a Cannon Viking machine installed 1975 which had a total output of 2,000 tonnes and CFC consumption of 90 tonnes in 1996. The other a maxfoam is used to produce super soft (13-15 kg/min.) foam. The output for 1996 was 2,300 tonnes and CFC consumption 190 tonnes.

2. The company will phase out CFC-11 from the production of flexible slabstock foams by the use of the licensed technology which utilizes liquid carbon dioxide as a blowing agent (liquid carbon dioxide (LCD) technology). It will reorganize its production, transferring production of all foam densities that require auxiliary blowing agent to one machine in order to save costs. The project will be implemented through acquisition of the license, modification of existing production facilities and installation of supplementary equipment and instruments.

3. The project costs are as follows:

|      |                                                                                                                       |                |
|------|-----------------------------------------------------------------------------------------------------------------------|----------------|
| (i)  | Capital Costs                                                                                                         | US \$          |
|      | Storage and handling of liquid CO <sub>2</sub>                                                                        | 70,000         |
|      | LCD system                                                                                                            | 350,500        |
|      | Support frame for LCD system                                                                                          | 25,000         |
|      | High pressure transfer systems<br>(TDI US \$5,000 - Polyol US \$5,000)                                                | 10,000         |
|      | High pressure metering systems<br>water/amine US \$6,000; Silicone US \$10,000;<br>TDI US \$50,000; water US \$10,000 | 76,000         |
|      | License fee                                                                                                           | 50,000         |
|      | General consultancy and engineering design                                                                            | 75,000         |
|      | Contingency                                                                                                           | <u>65,600</u>  |
|      | Total                                                                                                                 | 721,600        |
| (ii) | Incremental operational cost (savings)                                                                                | not calculated |

### Rigid Foam

(b) Phasing out CFC-11 from manufacturing of rigid PU sandwich panels at Sileks AD Co.

1. Sileks AD Co. will phase out the use of 67.64 ODP tonnes of CFC-11 in the manufacture of rigid foam for sandwich panels used for construction and prefabricated panels for commercial cold rooms and stores. The company currently uses one Admiral HD2000-2 high pressure metering unit.

2. The costs of the project include the following:

|                                                                                         |             |
|-----------------------------------------------------------------------------------------|-------------|
| Retrofit of high pressure dispenser                                                     | US \$30,000 |
| High pressure mixing head with piping                                                   | 20,000      |
| PU system flow control unit                                                             | 10,000      |
| High pressure mixing station                                                            | 60,000      |
| Electrical heating elements for molds and electrical supply and control instrumentation | 35,000      |
| General consultancy, engineering services and training                                  | 25,000      |
| Incremental operational cost                                                            | 257,800     |

## **SECRETARIAT'S COMMENTS AND RECOMMENDATIONS**

### **COMMENTS**

### Flexible Slabstock

1. Six projects utilizing the liquid carbon dioxide (LCD) technology - three for Iran, one for Macedonia and two for Morocco have been submitted for approval at this meeting. Although there is evidence that operational savings could be realized through the use of the LCD technology, an appropriate method for calculating such savings has not as yet been established in spite of the on-going efforts of the Secretariat and the implementing agencies to elaborate one. Calculation of incremental operational costs of the six projects based on the methylene chloride methodology and using 50% of the rate of yield losses applicable to methylene chloride projects, showed incremental operational savings range between 16% and 75% (for projects with CFC-11 consumption of 110 tonnes and 280 tonnes respectively) of the capital costs, while calculation using the same parameters as those of methylene chloride technology gave about zero and US \$94,000 operational costs for two companies using 150 and 160 tonnes of CFC-11 respectively.

2. Following discussions of the six projects between the Secretariat and the implementing agencies (UNDP and UNIDO) regarding potential benefits, project implementability and other related issues, it was agreed to consider 25% of the capital cost of each project as incremental operational savings, pending completion of the elaboration by the Secretariat and the

implementing agencies of a suitable method for calculating the incremental operational cost/savings.

3. The capital costs of all the six projects were also jointly reviewed by the Fund Secretariat and foam experts from UNDP and UNIDO to ensure uniformity in costing.

4. The following will be the project costs. The license fee of US \$50,000 is not subject to 10% contingency charge.

|       |                                                     |               |
|-------|-----------------------------------------------------|---------------|
| (i)   | Cost of equipment                                   | US \$ 585,000 |
| (ii)  | 10% Contingency                                     | 58,500        |
| (iii) | License fees                                        | 50,000        |
| (iv)  | Incremental capital cost                            | 693,500       |
| (v)   | Incremental operational savings, ie.<br>25% of (iv) | (173,375)     |
| (v)   | Total project cost                                  | 520,125       |

5. Consequently, the amount of US \$520,125 was recommended for approval for Sileks (Flex).

#### Rigid Foam

6. Since the company (Sileks) currently operates a high pressure machine, the items of capital costs including high pressure mixing head, PU system flow control unit, high pressure mixing station were considered ineligible. The agreed capital costs included retrofit cost of the dispenser (US \$20,000) and modification to the premixer (US \$3,000). The annual incremental operational cost of US \$128,900 when taken at net present value (NPV) at 10% discount becomes US \$224,286 instead of US \$257,800 used to calculate the project cost. The project costs should, therefore, be as follows:

Incremental capital cost: US \$ 89,100

Incremental operational cost: US \$224,286

Total project cost: US \$313,386

7. The amount recommended for approval for Sileks (Rigid) is US \$313,386.

Impact of Projects on Meeting the 1999 Freeze

8. No statement is provided on this subject in the project documents. However, since Sileks is reported to account for 64 per cent of the total ODS consumption of the country, if the project is completed as scheduled by the end of 1998, it will result in the phase-out of over 60 per cent of the country's consumption.

**RECOMMENDATION**

1. The Fund Secretariat recommends blanket approval of the projects with the funding levels and associated support costs as indicated below.

| <u>Project Title</u>                                                                   | <u>Project Cost</u><br><u>US \$</u> | <u>Support</u><br><u>Cost US \$</u> | <u>Implementing</u><br><u>Agency</u> |
|----------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|--------------------------------------|
| (a) Phasing out of CFC-11 from flexible slabstock foam manufacturing at Sileks AD Co.  | 520,125                             | 67,616                              | UNIDO                                |
| (b) Phasing out CFC-11 from manufacturing of rigid PU sandwich panels at Sileks AD Co. | 313,386                             | 40,740                              | UNIDO                                |