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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
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Montreal, 18-20 July 2001

PROJECT PROPOSALS: YEMEN

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

Aerosol:

- Phase-out of CFC 12 in the manufacture of aerosols by conversion to hydrocarbon propellant at Al-Thowra Industrial Complex Industrial (AIC) UNIDO
- Phase-out of CFC 11, 12 and 114 in the manufacture of aerosols by conversion to hydrocarbon propellant at Arabia Felix Industries Ltd. UNIDO

**PROJECT EVALUATION SHEET
YEMEN**

SECTOR: Aerosol ODS use in sector (1999): 179.3 ODP tonnes

Sub-sector cost-effectiveness thresholds: US \$4.40/kg

Project Titles:

- (a) Phase-out of CFC 12 in the manufacture of aerosols by conversion to hydrocarbon propellant at Al-Thowra Industrial Complex Industrial (AIC)
 (b) Phase-out of CFC 11, 12 and 114 in the manufacture of aerosols by conversion to hydrocarbon propellant at Arabia Felix Industries Ltd.

| Project Data | Filling plant | Filling plant |
|-------------------------------------|----------------------------------|---------------|
| | Al-Thowra | Arabia Felix |
| Enterprise consumption (ODP tonnes) | 82.70 | 96.60 |
| Project impact (ODP tonnes) | 82.70 | 96.60 |
| Project duration (months) | 26 | 26 |
| Initial amount requested (US \$) | 275,035 | 425,040 |
| Final project cost (US \$): | | |
| Incremental capital cost (a) | 191,500 | 383,170 |
| Contingency cost (b) | 19,150 | 18,260 |
| Incremental operating cost (c) | -31,142 | -34,626 |
| Total project cost (a+b+c) | 179,508 | 366,804 |
| Local ownership (%) | 100% | 100% |
| Export component (%) | 0% | 0% |
| Amount requested (US \$) | 179,508 | 366,804 |
| Cost effectiveness (US \$/kg.) | 2.17 | 3.80 |
| Counterpart funding confirmed? | Yes | |
| National coordinating agency | Environmental Protection Council | |
| Implementing agency | UNIDO | UNIDO |

| Secretariat's Recommendations | | |
|--|---------|---------|
| Amount recommended (US \$) | 179,508 | 366,804 |
| Project impact (ODP tonnes) | 82.70 | 96.60 |
| Cost effectiveness (US \$/kg) | 2.17 | 3.80 |
| Implementing agency support cost (US \$) | 23,336 | 34,676 |
| Total cost to Multilateral Fund (US \$) | 202,844 | 401,480 |

PROJECT DESCRIPTION

Phase-out of CFC 12 in the manufacture of aerosols by conversion to hydrocarbon propellant at Al-Thowra Industrial Complex Industrial (AIC)

Phase-out of CFC 11, 12 and 114 in the manufacture of aerosols by conversion to hydrocarbon propellant at Arabia Felix Industries Ltd.

1. The Government of Yemen is submitting two project proposals in the aerosol sector, Al-Thowra Industrial Complex and Arabia Felix Industries Ltd., to phase out 179.3 ODP tonnes of CFCs, representing the entire consumption of aerosols in Yemen.
2. Al-Thowra produces air fresheners (685,120 cans/year) and perfumes (590,724 cans/year) using CFC propellant through a semi-automatic line (comprising of a product filler, a crimper, a gassing unit and a manual test bath), and insecticides using hydrocarbon aerosol grade propellant (HAP) through an automatic high speed line (120 cans/min). In 1994, the enterprise converted this line from CFCs to hydrocarbon at its own cost. The project is for the conversion of the semi-automatic line to HAP technology. Conversion entails installation of a gas filler machine with a propellant handling system, a conveyor system, gas detection system, construction of modular enclosed gassing room, propane storage tank, and a destenching column system.
3. Arabia Felix produces insecticides, air fresheners (754,000 cans/year) and perfumes (580,000 cans/year) in two separate lines. The project is for the conversion of the air freshener and perfume line to HAP technology, which entails installation of a gas filler machine with a propellant handling system, a conveyor system, gas detection system, an enclosed gassing room and propane storage tank.
4. In 1990, Arabia Felix purchased an Aerofill StarPak high speed line (120 cans/min) for the production of insecticides and converted it to HAP technology in 1996. Conversion included the installation of a tank farm (two LPG storage tanks, destenching column system and pumps at US \$136,160), an external gassing room (US \$54,094), a propellant filler and gas detection system (US \$45,880), pipe work materials (US \$18,840), water deluge system (US \$57,942) and installation and training (US \$51,800). Retroactive funding of the line converted in 1996 is also requested.
5. Technical assistance will be provided for performance and supervision of engineering designs, installation of equipment and commissioning of the plant and training.

SECRETARIAT'S COMMENTS AND RECOMMENDATION

COMMENTS

CFC consumption

6. The Al-Thowra Industrial Complex project was first submitted for consideration by the Executive Committee at its 32nd Meeting in December 2000 but it was withdrawn because the

Yemen country programme (approved at the 27th Meeting) and the progress reports on the implementation of the country programme for 1995, 1996, 1997 and 1998 reported zero consumption in the aerosol sector. Pursuant to Decisions 17/2 and 27/14, the Government of Yemen was required to update the CFC consumption figures in their country programme and provide the most up-to-date sectoral ODS consumption data when submitting the project proposal.

7. Subsequently, through an official communication to the Secretariat, the Government of Yemen reported that there were five aerosol manufacturing plants in the country. The two major fillers, Arabia Felix Industries Ltd., and Al-Thowra Industrial Complex, were still using CFC propellant with a total consumption of 175 tonnes; a third company, Al-Mujahed Aerosol Factory switched to LPG propellant in 1997 (and was not requesting assistance from the Fund); and the other two companies were small in size and were filling their products at the other major plants.

8. It was also communicated by the Government of Yemen that the CFC consumption figures reported for 1995, 1997, and 1998 were based on the results of a survey carried out in 1996. Data was collected only from governmental institutions (Department of Customs, Civil Defence and Agriculture Department) since the private sector did not provide data because they were not aware of ozone related issues. In 1999, the Ozone Unit was established and held several meetings with the private sector. As a result, more reliable ODS consumption figures were gathered for all the sectors.

Al-Thowra Industrial Complex

9. The Secretariat noted that the proposal for the conversion of the perfume line to HAP technology at Al-Thowra Industrial Complex included equipment that is also used for production of insecticides; it would have been expected that the equipment available after the conversion of the insecticide line could also be used for the production of perfumes with minor modifications. UNIDO informed the Secretariat that due to safety considerations, the production of perfumes and insecticides must be completely separated; the HAP for perfume aerosols is of greater quality than the HAP used for insecticide products; and modifications to the current insecticide line to accommodate for the perfume line would be very complicated. Therefore, it was not feasible to utilise the equipment available for the production of insecticides.

10. The Secretariat and UNIDO also discussed issues regarding the capacity of the requested storage tank (30 m³) and the high costs of the liquid fill/vapour balance hose/connections (US \$5,900) and the off-loading pump assembly (US \$7,400). UNIDO agreed to adjust the capital cost of the project by US 210,650.

Arabia Felix Industries

11. The Secretariat pointed out that the size of the equipment that was purchased when the insecticide production line in Arabia Felix Industries was converted to HAP technology was large compared to the quantity of CFCs used (100 tonnes/year). Also, the costs associated with installation and training (US \$51,800) were high. UNIDO agreed to adjust the project costs taking into consideration the baseline equipment prior to the conversion (US \$218,830).

Operating savings

12. The calculation of the total operating savings in the project has been based on three components: (i) the difference in costs associated with the formulations based on CFCs or HAPs, (ii) increase in maintenance costs (at 5 per cent of capital investment) due to the use of HAP, and (iii) increase in energy consumption due to additional ventilation. The Secretariat pointed out that the incremental costs associated with maintenance are very difficult to quantify and not all of them are incremental (for example, old pieces of equipment which will be replaced with new equipment; capital costs associated with racks, OAFR, and lighting). Consequently, operating savings were adjusted accordingly (US \$31,142 at Al-Thowra Industrial Complex and US \$34,626 at Arabia Felix Industries in savings).

RECOMMENDATION

13. The Fund Secretariat recommends blanket approval of the projects with associated support costs at the funding level shown in the table below:

| | Project Title | Project Funding (US\$) | Support Cost (US\$) | Implementing Agency |
|-----|---|-------------------------------|----------------------------|----------------------------|
| (a) | Phase-out of CFC 12 in the manufacture of aerosols by conversion to hydrocarbon propellant at Al-Thowra Industrial Complex Industrial (AIC) | 179,508 | 23,336 | UNIDO |
| (b) | Phase-out of CFC 11, 12 and 114 in the manufacture of aerosols by conversion to hydrocarbon propellant at Arabia Felix Industries Ltd. | 366,804 | 34,676 | UNIDO |
