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EXECUTIVE COMMITTEE OF  
THE MULTILATERAL FUND FOR THE  
IMPLEMENTATION OF THE MONTREAL PROTOCOL  
Twenty-eighth Meeting  
Montreal, 14-16 July 1999

Corrigendum

**BILATERAL COOPERATION**

Requests from the Government of Belgium

Add the following as paragraph 5(bis)

“Annexes I and II of this document contain the justifications for the use of HCFC-141b”.

Requests from the Government of France

Add the word “(withdrawn)” to the end of the following bullet on the cover page:

- Preparation of phase-out projects in soil fumigation, commodities and structures treatment in Costa Rica (France)

Delete paragraphs 10-15.

Delete the following bullet from the cover page:

- Preparation of a refrigerant management plan in Iran (France).

Replace paragraph 16 with the following paragraph 16 (bis) and 16 (ter).

16 (bis). Iran Polyacril is a state-owned company producing artificial fibres made of acrylic and polyester. CTC is used in the quality control section in the process used to test the quality of the finished product. Average consumption is said to be 4.4 ODP tonnes per year. Specifically, the fibres and threads produced by the enterprise are coated with internationally sourced proprietary chemical finishes. The quantity of the finish deposited on the fibres is

measured by dissolving the finish in the CTC and measuring the concentration, and hence the quantity deposited, using infra-red spectroscopy. One test is conducted every one to two hours of production.

16 (ter) It is proposed to replace the process with alternative technology using “nuclear magnetic resonance” (NMR). The new process requires an NMR testing machine at a cost of US \$95,000 including delivery and installation. No solvent is required with this technology. The new technology is more accurate and takes only 60 seconds per test.

Replace paragraphs 17-21 with the following paragraphs:

17. The baseline ODS consumption for Iran (1995-97) was not included in the project document background information and it is stated in the project document that updated sectoral information is not yet available.

18. Clarification has been sought on the level of consumption stated in the project because the quantity used in the tests, calculated from information in the project document, appears to be around one quarter of the suggested consumption.

19. The eligibility of the project is in question as the use appears to fall within the ambit of the list of categories and examples of laboratory uses adopted by the Parties in Decision VII/11. Section 2 of the list includes quality control uses. A global essential use exemption applies in respect of these uses.

20. Some proposed incremental operating costs, have already been agreed as ineligible and the project would have incremental operating savings which would be deducted from the capital cost if the project is eligible.

21. The outcome of discussions with the Government of France on this project will be advised to the Sub-Committee on Project Review.

Delete paragraphs 22-24.

Replace paragraph 26 with the following paragraph:

26. IRAN DOCHARKH is a 100% Iranian company producing motorcycles and bicycles and using carbon tetrachloride for the degreasing of tubular metal parts before welding. The purpose of the project is to phase out the use of 11 ODP tonnes of carbon tetrachloride through a new aqueous degreasing process. The project includes equipment to support this conversion, provisions for technology transfer and training. The main capital expenditure is an aqueous degreasing machine at a cost of US\$ 155,000 including installation and set-to-work costs.

Replace paragraphs 27-29 with the following:

27. The baseline ODS consumption for Iran (1995-97) was not included in the project document background information and it is stated in the project document that updated sectoral information is not yet available.

28. No policy issues have been identified by the Secretariat. Several issues related to determination of eligible incremental costs are under discussion. A number of minor items including some proposed incremental operating costs have been agreed as ineligible and the project will have a small level of incremental operating savings which will be deducted from the eligible capital cost.

29. The outcome of discussions with the Government of France on this project will be advised to the Sub-Committee on Project Review.

Delete paragraphs 30-35.

Delete paragraphs 37-39 and the title above these paragraphs.

Delete paragraph 43.

Replace the word “Kenya’s” with the word “Lebanon’s” in paragraph 50.

Requests from the Government of Japan

Please replace paragraphs 77-95 with the paragraphs 77-95 attached to this document.

## REQUESTS FROM THE GOVERNMENT OF JAPAN

77. The Government of Japan has submitted a request for bilateral cooperation for one project in China. The Executive Committee decided to allow flexibility in the year for which bilateral projects would be credited provided that bilateral agencies submit their work plans to the first meeting of the year. Japan submitted its 1999 work plan.

78. The amount requested, including previous approvals offset against Japan's bilateral contributions, does not exceed 20 per cent of Japan's total contributions for the 1997 through 1999 triennium replenishment.

### **Phasing out ODS in the production of compressors at Changshu Refrigeration Equipment Works in China (US \$3,596,441)**

#### Domestic Refrigeration and Compressor Sector in China

79. In 1993, there were about 16 compressor production enterprises in China with a total output of 5.9 million units. Currently, there are 18 compressor plants in operation in China with a production in 1997 of about 7.4 million units of hermetic compressors.

80. The Executive Committee approved US \$10.9 million for the conversion of 8 of these plants to non-ODS technology. The combined annual production capacity of these plants after conversion will be 10.75 million compressors.

81. There are 57 domestic refrigerator and freezer plants in China. The total production level of domestic refrigerators and freezers using hermetic compressors was reported by the Government of China to be 14.6 million units in 1997. The production of refrigerators and freezers was 8.1 million units in 1993. An increase represents 80%. The detailed information on production of domestic refrigeration appliances and hermetic compressors is provided in the information document UNEP/OzL.Pro/ExCom/28/Inf.2.

82. The Executive Committee approved 29 conversion projects for manufacturers of refrigerators and freezers. The aggregated annual production of enterprises covered by approved projects is 9.4 million units.

#### Project description

83. The project proposal was prepared by the Government of Japan and UNIDO upon a request from SEPA, to convert Changshu compressor manufacturing facilities from CFC-12 based technology to HFC-134a technology. The implementation of the project will result also in phasing out of 75 ODP tonnes of CFC-113 used as a cleaning agent.

84. The production of hermetic compressors at Changshu started in 1987 at the same time as several other major compressor manufacturers in China. The current capacity of the plant is 600,000 compressors per year. The average production for 1996 to 1998 was 514,300 units/year.

85. The conversion of Changshu to HFC-134a technology will require the redesign of eleven compressor models according to the new technology taking into consideration the specific characteristics of the new refrigerant. Two of these models were introduced in 1997.

86. The changeover from CFC-12 to HFC-134a technology requires replacement of degreasing/cleaning technology and equipment and improvement of dehydration equipment. All the cleaning equipment is locally made. The project request complete replacement of 9 cleaning lines with new degreasing, passivating and drying lines, including additional drying oven for assembly line. The total cost requested for the equipment amounts to US \$1,460,000.

87. The proposal includes funding of retooling and for new gauges and fixtures needed for production of HFC-134a compressors, including new stamping dies for production of shells, modification of calorimeter for testing of performance of new product and other testing equipment.

88. HFC-134a compressors require new lubricant. The project requests funds for new lubricant handling and filtration equipment at US \$140,000. The project indicates that the enterprise will be converted to the new technology over a 2 to 3 year period. During this period, the enterprise will be producing both CFC-12 and HFC-134a compressors in parallel.

89. All equipment replaced by the project will be sold to enterprises not involved in the use of ozone depleting technologies or, in case it is not feasible, the equipment will be discarded or destroyed. A list of equipment to be destroyed after completion of the project is provided in the project document.

89 (bis). The project requests US \$600,000 in technology transfer fee.

90. The project will be implemented by UNIDO. After competitive bidding, performed according to UNIDO's financial rules and procedures, a technology partner will be appointed by UNIDO for the implementation of the technology transfer, product redesign etc. The selected bidder will be responsible for the supply of machinery and instruments, installation, commissioning and on-the-job training of Changshu's staff. UNIDO with the assistance of the Government of Japan will identify such experienced technology and equipment suppliers in Japan which are capable of participating in the implementation of the project. In the selection of technology partner and suppliers of equipment and services due consideration will be given to the Japanese companies in accordance with UNIDO's rules and procedures.

### Comments

91. The cost of the project at US \$3.2 million (excluding agency support costs) is one of the highest ever submitted to the Executive Committee.

92. The Secretariat discussed with the Government of Japan the issues of cost of several items proposed in the project. Most of the equipment to be replaced is of local manufacture.

The Executive Committee has approved 20 investment projects for the conversion of domestic refrigeration manufacturing facilities (including 8 from China). The production capacity of these enterprises ranges from 100,000 units/year to 2 million units/year. The eligible incremental costs per project approved by the Executive Committee are between US \$330,000 to US \$2.25 million.

93. Given the fact that the baseline of this enterprise is very similar to those for which conversion projects have been approved, eligible cost of conversion of the Changshu enterprise to HFC-134a technology should be comparable to other conversion projects approved for China and other Article 5 countries in the same sector. The costs of redesign and tooling of the two models introduced in 1997 is not an eligible incremental cost.

94. The major component in the proposal is related to provision of cleaning equipment. The proposal contains a request for installation of 9 new phosphating, degreasing, passivating, and drying lines at a total cost of US \$1,460, 000. Both the number of requested lines and the cost of individual items significantly exceed requests for similar equipment in other projects approved by the Executive Committee. The Government of Japan and UNIDO have been informed about costs for this equipment in approved projects and were requested to consider reducing the funding level.

94. (bis) The project document indicates that modification of existing machinery and equipment will be applied wherever technically and economically feasible and/or necessary. The Secretariat proposed to examine the possibility of modifying the existing cleaning equipment at a reduced cost. This was based on information obtained from a company in an Article 2 country with experience in retrofitting cleaning equipment in China similar to those installed at Changshu.

94. (ter) Replacement equipment include passivating equipment for providing resistance to corrosion of metal parts of compressors which was not part of the baseline. This technology is not essential for the conversion to HFC-134a and therefore, not eligible for funding from the Multilateral Fund. Less expensive processes are available and should be considered in Changshu's conversion.

94. (qua) According to the proposal, the conversion to non-CFC cleaning process will lead to phasing out of 93 tonnes (75 ODP tonnes) of CFC-113. This will result in significant incremental operating savings (IOS). The Government of Japan has been requested to include IOS in the calculation of net incremental costs.

94. (quin) The proposal indicates also that some equipment replaced by the project might be sold for use in non-ozone depleting technologies. The Secretariat proposed to assess the salvage value of this equipment and deduct this value from the requested incremental costs.

95. The requested technology transfer fee at US \$600,000 is double the maximum amount approved so far by the Multilateral Fund for this item at US \$300,000 per compressor project. The Secretariat proposed to follow the same policy in case of Changshu.

95 (bis). The Secretariat is still discussing the eligible incremental cost with the Government of Japan and UNIDO.

Annex I**JUSTIFICATION FOR THE USE OF HCFC-141b**

(Extract from the Project Document)

**Quimica Andina - Conversion from CFC-11 to HCFC-141b Technology in the  
Manufacture of rigid polyurethane foam**

The presently available ODS phase-out technologies for rigid polyurethane insulating foams are:

CLASSIFICATION	LIQUID TECHNOLOGY	GAS TECHNOLOGY
LOW ODP TECHNOLOGIES (INTERIM)	HCFC-141b HCFC-141b/22	HCFC-22, -142b HCFC-22/142b
NON-ODS TECHNOLOGIES (PERMANENT)	(CYCLO)PENTANE, WATER, HFC-365, HFC-245fa	HFC-134a

The selection of the alternative technology is governed by the following considerations:

- a) Proven and reasonably mature technology
- b) Cost effective conversion
- c) Local availability of substitute, at acceptable pricing
- d) Support from the local systems suppliers
- e) Critical properties to be maintained in the end product
- f) Meeting established standards on environment and safety

Following is a discussion of the mentioned technologies in view of these criteria specifically applied for the operations of Quimica Andina (QA)(50% spray foam, 50% discontinuously produced slabstock):

HCFC-141b has an ODP of 0.11. Its application is proven, mature, relatively cost-effective and systems that fit QA's applications are locally available. HCFC-141b can, however, be destabilizing in higher concentrations, being a strong solvent, which would lead to the need to increase the foam density. Being an interim option, its application would only be recommended if permanent options do not provide acceptable solutions.

HCFC-22 has an ODP of 0.05 and is under ambient conditions a gas. It is not offered in the applicable regional area as a premixed system and would require an on-site premixer. It is not suitable for spray foam/slabstock applications. Its insulation value is somewhat less than with HCFC-141b.

HCFC-141b/HCFC-22 blends can reduce the solvent effect of HCFC-141b alone and therefore allow lower densities while maintaining acceptable insulation values. The blends are, however, not available in Bolivia or neighbouring countries. On-site blending would

significantly increase the one-time project costs. In addition, the technology is not proven for spray foam applications. Being an interim option, the same restrictions as for HCFC-141b would apply.

(CYCLO-)PENTANE meets all selection criteria, except that local availability. The use of hydrocarbons is a preferred solution when feasible from a safety and cost effectiveness standpoint. The relatively high investments for safety costs tend to limit pentane use to relatively large CFC users. In addition, the use of pentane is limited to those enterprises whose facilities can be adapted to meet safety requirements, and can be relied on to maintain safe operations. While it may be applicable albeit connected with high investments and density limitations for the slabstock operation, it cannot be used and never has been used for (on-site) spray foam applications, where ever-changing ambient conditions never could provide for the required safety.

WATER-BASED systems are an alternative in cases where pentane is not feasible due to safety concerns, cost efficiency or availability. Water-based systems are, however, more expensive (up to 50%) than other CFC-free technologies due to reductions in insulation value (requiring larger thickness) and lower cell stability (requiring higher densities). They are also currently not available in the region, although this may change in the next two years based on MLF-sponsored activities in Brazil and Argentina. Water-based formulations tend to be most applicable in relatively less critical applications, such as in situ foams and thermoware. In spray foam, while in principle feasible, it is reported that the current technology does not allow for overhead spraying and is therefore limited applicable. For boxfoam, the technology is not applicable as it would lead to an unacceptable high increase in the reaction temperature, leading to severe scorching and even spontaneous combustion.

LIQUID HFCs do not meet requirements on maturity and availability. However, trials show that systems based on these permanent options would be feasible in spray foam as well as slabstock.

HFC-134a is under ambient conditions a gas. It is not offered in the applicable regional area as a premixed system and would require an on-site premixer. It is not suitable for spray foam applications. It is also less energy efficient, and expensive compared to most other technologies.

Based on the before mentioned, the enterprise has the following options under this project:

Spray foam: HCFC-141b or all water based  
Slabstock: HCFC-141b or n-pentane

Project costs for HCFC-141b for both spray foam and slabstock operations would amount to projected conversion costs of US\$ 96,000 (US\$ 21.30/kgODP/y).



Project costs for all-water (spray)/n-pentane (slab) would amount to projected conversion costs of US\$ 448,500 (US\$ 89.70/kgODP/y).

Project costs for HCFC-141b (spray)/n-pentane (slab) would amount to projected conversion costs of US\$ 434,500 (US\$ 89.22/kgODP/y).

(The relatively small difference between the threshold for water/pentane and 141b/pentane is related to the residual ODP in case of HCFC-141b).

Note that the project would have exceeded in any configuration the applicable standard threshold were it not for the status of Bolivia as an LVC country.

After considering these alternatives, and realising that:

- the extra costs related to zero ODP technology amount to about five fold of the 141b technology,
- pentane and water-based technologies are not readily available in Bolivia and carry process as well as product quality restrictions and are even in other countries seldom practised for the pertinent applications;

It is recommended to employ HCFC-141b as an interim solution. This can be followed in the future by water-based technology or liquid HFCs for spray foam and just liquid HFCs for slabstock. The equipment retrofitted/replaced under this project allows these technologies without further adaptations. If the enterprise were to choose pentane for the slabstock operations as a permanent technology, significant capital investments would be required.

The enterprise has accepted this recommendation. It has also been informed that HCFCs are transitional substances, and that under present Multilateral Fund rules, they will not be able to seek additional funding from the Fund at a later date to convert to zero-ODP technologies.

Annex II

**Supporting letter from the Government of Bolivia on the use of HCFC-141b by Quimica Andina, submitted in accordance with Executive Committee Decision 27/13.**