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the Multilateral Fund for the
Implementation of the Montreal Protocol

Twenty-first Meeting
Montreal, 18-20 February 1997

REPORT OF THE SECOND MEETING OF THE EXECUTIVE COMMITTEE'S SUBGROUP ON THE PRODUCTION SECTOR

Introduction

1. The second meeting of the Executive Committee's Subgroup on the Production Sector was held in Montreal on 16 February 1997 at the premises of the Secretariat of the Multilateral Fund for the Implementation of the Montreal Protocol for the Protection of the Ozone Layer.

2. The meeting was attended by the representatives of the following members of the Subgroup, as re-established pursuant to Executive Committee decision 20/43: Australia, China, Costa Rica, India, United Kingdom of Great Britain and Northern Ireland, and United States of America.

3. The Subgroup had before it a briefing note by the Secretariat on the status of work undertaken on the production sector, as well as the report of the third and fourth meetings of the Expert Group on the Production Sector. A number of background documents were also available.

4. The meeting was opened by the Chief Officer of the Secretariat of the Multilateral Fund at 2.15 p.m. on Sunday, 16 February 1997.

AGENDA ITEM 1: ADOPTION OF THE DRAFT AGENDA

5. The Subgroup adopted the following agenda on the basis of the draft circulated by the Secretariat:

1. Adoption of the draft agenda.

2. Briefing by the Chief Officer on the proceedings of the Third and Fourth Meetings of the Expert Group.

3. Discussion of the Report of the Third and Fourth Meetings of the Expert Group.

4. Adoption of the Report of the Subgroup to the Executive Committee.

5. Closure of the Meeting

AGENDA ITEM 2: BRIEFING BY THE CHIEF OFFICER ON THE PROCEEDINGS OF THE THIRD AND FOURTH MEETINGS OF THE EXPERT GROUP ON THE PRODUCTION SECTOR

6. The Chief Officer recalled that, in accordance with Executive Committee decision 20/43 (c), the Subgroup had been re-established with a new membership by the Executive Committee appointed by the Eighth Meeting of the Parties to the Montreal Protocol.

The Expert Group had held two meetings since the Twentieth Meeting of the Executive Committee, once before and once after the Eighth Meeting of the Parties, and its report on its work was before the Subgroup. That report had not been circulated as a document of the Executive Committee, as the Expert Group was required to report to the Committee through the Subgroup, in accordance with decision 20/43 (d).

AGENDA ITEM 3: DISCUSSION OF THE REPORT OF THE THIRD AND FOURTH MEETINGS OF THE EXPERT GROUP ON THE PRODUCTION SECTOR

7. The Subgroup agreed to go through recommendations of the Expert Group in order and see if they answered the questions raised by it at its previous meeting and the points made by members of the Executive Committee at its Twentieth Meeting. It was also agreed that the recommendations were part of a package and that no definitive agreement could be reached on any one of them until the package as a whole was agreed.

8. The Subgroup accepted the offer of the representative of Australia to act as facilitator of the discussion.

9. Having reviewed the 12 recommendations made by the Expert Group, the Subgroup agreed that there was a need to move forward with the work on the production sector as a matter of urgency. There was also agreement that the recommendations submitted by the Expert Group constituted a potentially useful framework, but there were differing opinions on the appropriateness of some of the specific definitions, approaches and parameters included in the report. These differences of opinion are reflected by the inclusion of square brackets and additional text in the version of the report of the Expert Group which is annexed to the present report. All amendments introduced by the Subgroup are indicated in bold type.

10. To assist the Executive Committee's understanding of the proposed framework as it is evolving, the Subgroup recommended that a consolidated proposal, including previously discussed recommendations of the Expert Group, should be prepared for the next meeting of the Executive Committee.

11. In order to understand the implications of the methodology recommended by the Expert Group and to help the Executive Committee make further progress in the most expeditious manner possible, the Subgroup recommended that the Executive Committee should request the Secretariat to undertake the following actions:

(a) Bring together a consultant and a core group of the following four members of the Expert Group: Messrs. Mike Harris, Tony Vogelsberg, Ravi K. Sinha and Jianan Jiang. [The core group working with] The Secretariat will select an appropriate consultant who will work under the direction of the [Secretariat who will consult, if necessary, with the] core group. The consultant working with the core group will prepare a questionnaire based on the report of the 3rd and 4th Meetings of the

Expert Group. The questionnaire will be designed to enable three volunteer firms to provide data that would allow for an understanding of the approximate financial implications of the methodology recommended by the Expert Group in respect of these firms. The [consultant] [core group] would submit its report directly to the Subgroup [and the core group] by the end of April 1997. The [consultant] [core group] will also make a presentation directly to the Subgroup when it meets prior to the Twenty-second Meeting of the Executive Committee. [The core group may also provide comments to the Subgroup on the consultant's report];

(b) Request the consultant to assist the volunteer firms in understanding the questionnaire so that the data obtained from the three firms would be as reasonable as possible. Such assistance could, if deemed essential, involve a mission to the country concerned by the consultant;

(c) Request the consultant to prepare a spreadsheet incorporating the main parameters included in the recommendations of the 3rd and 4th Meetings of the Expert Group, so that interested parties could test the sensitivity of the overall levels of funding to changes in those parameters. These parameters should include, inter alia, assumed profit margins, discount rates to be used in calculating the net present value of the profits forgone, inflation rates, projected production growth rates, remaining useful life, parameters on prices and costs as included in Recommendation 8, compensation for labour displacement, etc.;

(d) Request the consultant to prepare a short paper describing the relative sensitivity of total funding requirements to changes in the different parameters with respect to the three volunteer firms. The analysis should be presented in a manner that varied the assumptions by an equal amount, both positive and negative.

12. The representatives of China and India, and the member from Venezuela on the delegation of Costa Rica said that their countries could each provide one firm for the survey. The representative of India said that the methodology proposed by India for calculating the incremental costs of gradual closure (enforced idleness) could also be tested on the volunteer firm from his country.

13. The Subgroup emphasized that it was conscious of the need for the Expert Group to undertake further work in certain areas and that some issues remained outstanding. Nevertheless, it believed that, for the moment, the most important thing was for the Expert Group, through its core group, to proceed with the case-studies and sensitivity analyses.

AGENDA ITEM 4: ADOPTION OF THE REPORT OF THE SUBGROUP TO THE EXECUTIVE COMMITTEE

14. The Subgroup agreed that the draft report should be circulated to all members as soon as possible after the closure of the meeting. The representative of Australia was entrusted with the task of finalizing the report for submission to the Executive Committee on the basis of the comments on the draft received from members of the Subgroup.

AGENDA ITEM 5: CLOSURE OF THE MEETING

15. The second meeting of the Subgroup on the Production Sector was closed at 6.15 p.m. on Sunday, 16 February 1997.

ANNEX

REPORT OF THE THIRD AND FOURTH MEETINGS OF THE EXPERT GROUP ON THE PRODUCTION OF SUBSTITUTES FOR OZONE-DEPLETING SUBSTANCES (ODS)*

Introduction

The Expert Group on the Production of Substitutes for Ozone-Depleting Substances (ODS), hereinafter referred to as the Expert Group, held its third and fourth meetings on 15-16 November 1996 and 13-15 January 1997, respectively, in Montreal, Canada, to address the various issues where advice was specifically sought from the Group by the Subgroup on the Production Sector of the Executive Committee, as contained in the Subgroup's report on its first meeting (UNEP/OzL.Pro/ExCom/20/63), and in accordance with the decision of the Executive Committee at its 20th Meeting:

> "(a) To accept the report and refer the matter back to the Expert Group on Production of Substitutes for Ozone-Deleting Substances for further work in the light of the comments made on the presentation by various representatives;
>
> (b) To request India to make a presentation on enforced idleness to the Expert Group;" (UNEP/OzL.Pro/ExCom/20/72, Decision 20/43)

As done previously, the Expert Group provided recommendations covering all the issues put to it by the Executive Committee's Subgroup on the Production Sector. By these recommendations, the Expert Group had provided a methodology for the calculation of compensations to those CFC-producing facilities in Article 5 producing countries which wish to shut-down their CFC productions. These recommendations could be the basis to construct the guidelines for funding the shut-down of ODS-producing facilities in Article 5 countries.

However, the Expert Group wishes to note that, due to time and data availability limitations, it did not cover the specific calculations for the compensation of shut-down of halon production facilities.

The Expert Group also wishes to reaffirm its opinion about the importance of a sector plan, which the Group expressed at its earlier meeting, because the Group is convinced that a sector plan would enable an overall consideration of the compensation level, taking into account such situations as CFC/HCFC-22 "swing" plants. A sector plan is also deemed as an effective tool to avoid the possibility of substitution of the closed capacity by increased production of another facility, or by increased imports.

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* As amended by the Subgroup on the Production Sector at its second meeting. The amendments of the Subgroup are indicated in bold type.

This report sums up the recommendations of both the third and fourth meetings of the Expert Group.

Capacity verification

Recommendation 1

(a) Definition of capacity to be verified

[The Expert Group recommends that the capacity to be verified should be the "actual capacity". "Actual capacity" should be defined as the product of the plant availability[1] and the greater of the design capacity[2] or the maximum achieved daily rate[3].]

Recommendation 2

(b) Definition of "larger" plants which could be subject to near-term capacity verification

The Expert Group recommends that the "larger" plants which could be subject to near-term capacity verification should be those that have individual capacities of 4,000 tonnes or over. It notes that this would include approximately a total of 15 plants in Article 5 countries.

Recommendation 3

(c) Estimation of the cost of verifying capacity

The Expert Group recommends, for budgeting purposes, an allocation of US **$300,000**[4] for near-term capacity verification of the approximate 15 plants of 4,000 tonnes or more capacity.

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[1] Plant availability is the average number of days per year on which the plant in its local circumstances, e.g. maintenance, utility availability, raw material availability, and weather-related factors such as drought or floods, could normally operate, as determined from verified records.

[2] Design capacity is the output of which the plant is capable in terms of its current engineering specification, as determined from verified records.

[3] Maximum achieved daily rate is one-third of the maximum amount of usable product achieved in any continuous 72-hour period, as determined from verified records.

[4] Based on a four-six person verification team (consisting of one-two international technical expert(s); one-two country-based technical expert(s); one independent interpreter, where necessary; one local auditor/bookkeeper) and 12 man-days per site verified.

Recommendation 4

(d) Information required in order to verify capacity[5]

The Expert Group recommends that the questionnaire included as Annex I to this report ("Preliminary Data for the 'Capacity Verification' of a Plant") should be sent well in advance to the management of a plant that is to undergo "capacity verification", with a request that the reply be sent in good time (e.g., eight weeks) back to the Fund Secretariat to permit the "capacity verification team" to prepare its work. The covering letter transmitting the questionnaire should make clear that the data requested was an indicative list only of the material that would have to be made available to the team in the course of its on-site verification.

Approaches for calculating lost profits

Recommendation 5

The Expert Group recommends adoption of Approach Two as the basis for the calculation of incremental costs related to the shut-down of ODS-production facilities. That Approach proposes to use historical pricing data (pre-Protocol), corrected for inflation, to avoid distortions that might otherwise arise from the disturbance in the market occasioned by the Montreal Protocol and work out from there the foregone production and lost profit as a result of plant shut-down. An elaboration of that Approach appears as Annex VI to the report of the second meeting of the Expert Group (UNEP/OzL.Pro/ExCom/19/59).

Residual life of plant

Recommendation 6

The Expert Group recommends that for the purpose of determining appropriate shut-down costs compensation should be based upon the "remaining useful life" of an ODS producing plant. The **[**default**]** **[maximum]** value for the "remaining useful life" of a producing plant should be defined as**[**the longer of**]**:

either, (a) a period of [25] years (the typical lifespan) less the number of years, as at the date of ~~project approval~~ **cessation of production, as contained in the project document and approved** by the Executive Committee of the Multilateral Fund, determined by the Technical Audit team to have elapsed since the start of commercial production;

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[5] The Subgroup noted that the definition of "capacity" still requires resolution and that this will have an impact on the data to be presented.

or, (b) a period calculated as [eight months] for each complete year by which the date of ~~project approval~~ **cessation of production, as contained in the project document and approved** by the Executive Committee predates 31 December 2010[6].

In either case, the "remaining useful life" so determined shall be subject to technical verification by the Technical Audit team.

In making this Recommendation, the Expert Group understands that no shut-down costs should be payable for any new production capacity determined by the Technical Audit team to have been installed after **[June 1990]** [25 July 1995] [7 December 1995], **[or resulting from any investment to increase capacity where such an increase was not demonstrated to be warranted by a high utilization of existing capacity]**.

For purposes of clarity, it is to be noted that new production capacity would mean either a new plant, or new capacity resulting from a major investment to increase the capacity of an existing plant.

It is also to be noted that the date of capacity installation means the date by which sufficient financial disbursements were made for setting up the new capacity.

Baseline period for the calculation of production capacity eligible for funding, and methodology for allowing growth

Recommendation 7

The Expert Group recommends that the calculation of production capacity eligible for financing should be based upon the actual production levels of the 36 consecutive months of highest production ending no later than 31 December **[1996]** [1997]. **[**For plants having commercial production less than 36 months before 31 December 1997, the calculation of production capacity eligible for financing should be based upon actual production level for 36 consecutive months from the start of commercial production**]**. **[**In order to allow for growth, this [36] month average should be increased by **[**10%**]** per annum, but not exceeding the "actual capacity" of the plant as defined in Recommendation 1.**]**

In making this Recommendation, the Expert Group understands that no shut-down costs should be payable for any new production capacity determined by the Technical Audit team to have been installed after **[June 1990]** [25 July 1995] [7 December 1995].

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[6] Thus, for example, a project approved in 1998 would under this sub-clause be eligible for compensation for lost profits for a period of (2010-1998) x 8 months = 8 years.

Methodology for the calculation of annual profit foregone

Recommendation 8

The Group exhaustively discussed the detailed methodology that could be used to implement Approach Two (reference: Recommendation 5 above). It recalled that there were two methods suggested for the calculation of annual profit foregone, viz.

Method 1: Use a typical profit margin on sales as surrogate.

Method 2: More detailed analysis of costs and revenues.

The Group, while recognizing the inherent greater simplicity of Method 1, felt that justification of a 'typical' profit margin would in practice require an analysis of costs and revenues and therefore adopted Method 2.

The Group proceeded to develop Method 2 by identifying the components of revenues and costs that needed to be addressed. For each item, the Group began by examining available information on international costs and prices under pre-Protocol (i.e. unperturbed market) conditions. Where possible, typical values (or ranges of values) were assigned to each item. Consideration was then given to those special factors that should be considered under the conditions of Article 5 countries. The Group recognized that data might need adjustment to reflect specific local circumstances in any particular case. The Group recommended that all data should, so far as possible, be subject to audit or verification. This would be particularly important where local circumstances resulted in figures substantially different from those typical of the international situation. One member of the Group cautioned that figures used in the calculations were indicative in nature, and were for illustrative purposes only.

Summary of Method 2 for Calculation of Lost Profit Stream

The method recommended is as follows:

- Calculate revenue from sales income
- Calculate total costs (fixed and variable)
- Calculate profit margin by difference
- Calculate net present value of this profit stream over the remaining useful life (reference Recommendation 6 above) of the plant for the production capacity eligible for funding (reference Recommendation 7 above).

[1. Revenue from Sales Income:

(a) The starting point should be the 1986 international bulk list prices[7] for CFCs [($1.32/kg. for CFC-11, $1.56/kg. for CFC-12)]. The Group noted that these prices included an average pre-tax profit margin of about [20%], as is fairly typical for international traded commodity chemicals.

[(b) Subtract a factor of (typically) [15%] to reflect the prices at which business was actually conducted as compared with published list prices.]

(c) Adjust this international bulk price to take account of:

(i) Package: Goods sold in packages (e.g. cylinders, drums, disposable containers) command higher prices. Prices may be some [$0.30/kg.] (drums) to [$0.60/kg.] (cylinders and disposable containers) higher. The Group noted that most business in Article 5 countries was in packages rather than bulk.

(ii) Lot size: The Group noted that business in Article 5 countries would normally involve smaller lot sizes than in international trade. This would incur higher costs and command higher prices, but margins may be similar.

(iii) Local conditions: The Group noted that some price premium (perhaps as much as [10-15%]) could be commanded where there was a preference for a local supplier (e.g. because of local service and support), and/or where there were physical non-tariff barriers (e.g. practicalities/costs of import handling). The Group further noted that these price premia were to be distinguished from the much higher premia that might arise where competition was restricted by tariff barriers or other "protection".

(iv) Inflation: 1986 CFC prices could need some inflation to reflect present-day conditions. A range of inflation rates of [0-3%] per annum was discussed.

[7] Sources: SRI International "Chemical Economics Handbook Product Review: Fluorocarbons" by Maria Geigel (October 1988)
Statistical Abstract of the United States
Chemical Marketing Reporter (various issues)

2. Costs

(a) Costs of raw materials:

These should be based on 1986 international prices[8], thus:

Carbon tetrachloride: [1.17 kg./kg. @ $275/te.] = [$320/te.] of product for CFC-11
[1.37 kg./kg. @ $275/te.] = [$380/te.] of product for CFC-12

Hydrogen fluoride: [0.16 kg./kg. @ $1,200/te.] = [$195/te.] of product for CFC-11
[0.36 kg./kg. @ $1,200/te.] = [$435/te.] of product for CFC-12

Other chemicals (e.g. catalyst): approximately [$25/te.]

(b) Other costs for bulk materials:

These will need to reflect local conditions, but the Group indicated the following international data for bulk:

Utilities:	[$25/te.]
Labour:	[$35/te.]
Maintenance and Capital Provision:	[$175/te.]
Sales, Administration, Research Expenses:	[$225/te.]

This gives a total cost of [$1.00/kg.] for CFC-11 and [$1.30/kg.] for CFC-12 for bulk.

The Group noted that, in the international bulk business, an average [20%] pre-tax profit margin was typical and that these costs could be compared with a selling price of [$1.32/kg.] for CFC-11; [$1.56/kg.] for CFC-12 (see above). While there were instances where pre-tax profit margins could exceed [20%], these were not sustainable against competition other than in the very short term. The Fund did not recompense financial transfer costs (e.g. taxes), and payments were made on an untaxed basis.

(c) Other costs for packaged goods:

These will need to reflect local conditions, but the Group indicated the following international data for packaged goods:

[8] In fact, there is little difference between 1986 and 1996 prices.

All items as in sub-paragraph (b) above, in addition:

Packaging costs: Goods prepared in packages (e.g. cylinders, drums, disposable containers) carry additional costs. Costs may be some [$0.30/kg.] (drums), [$0.60/kg.] (cylinders and disposable containers) higher.

(d) Adjustments to costs:

(i) The Group noted that some, but not all, cost items would need adjustment if looked at on a 1996 basis. Broadly speaking, it could be appropriate to inflate all non-chemical items at about [3%] per annum.

(ii) The Group noted that the figures cited above were derived for a developed world 20,000 tpa plant with a capital cost of [$20 m.] In Article 5 countries:

- plants would in general be smaller; capital costs will correspondingly be reduced, but not to the same extent.
- HF manufacture might be integrated with CFC production leading to a lower HF price, but additional capital.
- Sales, Administration and Research expenses could be different (e.g. higher cost of sales for small companies, package trade, lower research costs).

(iii) It was noted that for CFC raw materials, there was little difference between 1986 and 1996 prices.]

Discount Rate

Recommendation 9

The Expert Group recommends the use of a real (as opposed to nominal) discount rate applicable to the country and time period of concern, thus removing the need to inflate costs, prices and margins when calculating the Net Present Value (NPV) of the lost profit stream. [This figure should be agreed with the relevant financial advisors at the time the project is approved.]

Cost of decommissioning

Recommendation 10

[The Expert Group reaffirms its recommendation made at its earlier meetings that the cost of decommissioning the old CFC plant should be offset by the scrap value of the shut-down plant.] **[The residual value of the location should be taken into account in determining**

final funding.] [And the cost of environmental clean-up of the CFC plant is not incremental and therefore is not eligible for funding.]

Compensation for labour displacement

Recommendation 11

The Expert Group, noting that there is no international norm or code on compensation for labour displacement, and that such compensation is essentially local and country specific, recommends that the details of such compensation would be determined by the technical audit team on a case-by-case basis.

Gradual Closure (Enforced Idleness)

One member of the Expert Group made a presentation to the Group on behalf of India on Gradual Closure, and explained the way incremental costs would be calculated under the concept.

Way of Calculating Incremental Cost under Gradual Closure (Enforced Idleness)

Step 1. Calculate incremental cost as per Closure Approach 2.

Step 2. Establish production level for every year from year of project approval until year of proposed closure based on proposal given by the applicant.

Note: (a) Such production level will be within the Montreal Protocol phase-out schedule;
(b) The applicant will be committed not to exceed such production level.

Step 3. Calculate earnings arising from the committed level of production using cost, prices, inflation rate, discount rate, etc. as per Closure Approach 2.

Step 4. Incremental Cost under Gradual Closure = Cost under Step 1 minus earnings under Step 3.

Recommendation 12

The Group discussed the presentation on Gradual Closure and recommended that Gradual Closure projects should be eligible for funding on a basis that would appropriately adopt the methodology recommended for full closure projects. The Group recognized that Gradual Closure projects had the potential to reduce costs to the Multilateral Fund. The Group sought guidance from the Executive Committee as to whether such projects would be as effective as full closure projects in assisting the transition away from a dependence on ODS, and whether any difference in effectiveness should be reflected in the extent of, or prioritization for, funding.

APPENDIX

PRELIMINARY DATA FOR THE "CAPACITY VERIFICATION" OF A PLANT

1. CV of the plant

Name	Location	Product List	Nominal Capacity	Date of Commencement of Commercial Production

2. Annual Production of the plant (past four years)

Tonnes/Yr.						
Year	CFC-11	CFC-12	CFC-113	Others*	Halon 1211	Halon 1301

* To be specified (e.g. HCFC-22, HFC-23, CFC-13, PFC-14, CFC-114, CFC-115).

3. Production of the plant

	Average Production	Highest Production Peak
	for consecutive 30-day period	for continuous 72 hours
CFC-11		
CFC-12		
CFC-113		
Others*		
Halon 1211		
Halon 1301		

* To be specified.

4. Consumption of raw materials by the plant

Tonnes/Yr.				
Year	CCl4 for 11 & 12	C2Cl4 for 113	CHC13 for 1211 or HCFC-22	CHCl3 for 1301 or HFC-23

5. Consumption of raw materials by the plant

Tonnes/Yr.						
Year	AHF for 11 & 12*	AHF for 113*	Br_2 for 1211	Br_2 for 1301	AHF for 1211	AHF for 1301

6. Local availability in the plant

	Total capacity in factory and capacity available to plant	Number of working hours/yr.	Availability expressed as % of time operation per month**
Cooling water			
Refrigeration unit			
Steam			
Electricity			
Br_2			
AHF*			
CCl4			

* If AHF is produced in an integrated plant, please quote Fluorspar (quantity and quality) and H_2SO_4 instead of AHF.

** Comments on availability including scheduled maintenance downtime per year and other major factors influencing availability such as power failures, raw material shortages, etc.

7. General comments and observations delivered from the plant management to Multilateral Fund authorities in Montreal