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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
SUBGROUP ON THE PRODUCTION SECTOR

**REPORT OF THE EXECUTIVE COMMITTEE'S SUBGROUP
ON THE PRODUCTION SECTOR**

Introduction

1. The third meeting of the Executive Committee's Subgroup on the Production Sector was held on 25 May 1997 at the headquarters of the United Nations Environment Programme (UNEP) at Nairobi.
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 the report of its second meeting (UNEP/OzL.Pro/ExCom/21/29), the draft report of the Consultant recruited pursuant to decision 21/34 of the Executive Committee, the final report of that Consultant, the comments of the Core Group of the Expert Group on the Production Sector on the draft and final report of the Consultant, and consolidated comments from the Consultant and spreadsheet data on the China and India plants. The meeting was opened by the representative of Australia, continuing in his capacity as Facilitator of the Subgroup, at 10 a.m. on Sunday, 25 May 1997.

AGENDA ITEM 1: ADOPTION OF AGENDA

4. The Subgroup adopted the following agenda:
 1. Adoption of agenda
 2. Briefing by Chief Officer
 3. Presentation by Consultant
 4. Review of the Report of the Consultant
 5. Report of the Subgroup to the Executive Committee

AGENDA ITEM 2: BRIEFING BY CHIEF OFFICER

5. The Chief Officer recalled that the Twenty-first Meeting of the Executive Committee had decided, on the recommendation of the Subgroup, to conduct a trial run using the draft methodology for compensation for full closure and gradual closure of ODS production facilities, which had been developed by the Expert Group. Decision 21/34 of the Executive Committee provided a detailed procedure for undertaking the study and the Secretariat had proceeded to implement that decision. It had sent an invitation to three participating Governments (China, India and Venezuela) to each nominate a plant to take part in the study. Companies had been nominated by India and China, while Venezuela had not nominated a company. Also on the basis of Decision 21/34, the Secretariat had drawn up the terms of reference of the Consultant, together with a schedule of work, and sent those to the core group for comments. After consultation, the terms of reference had been finalized and it had been agreed to recruit Mr. Robert Hoch to act as consultant to provide the deliverables set out in Decision 21/34. The Draft and Final Reports of the Consultant as well as the comments of the Core Group on both the draft and final reports were made available to the Subgroup, as well as spreadsheets reflecting the data received from the plants in India and China, using the main parameters recommended by the Expert Group.

AGENDA ITEM 3: PRESENTATION BY THE CONSULTANT

6. The Consultant recruited pursuant to Executive Committee Decision 21/34 introduced his report and outlined its main findings and recommendations. In particular, he identified those issues that required policy guidance from the Executive Committee. The main points raised by the Consultant are set out in annex I to the present report.

AGENDA ITEM 4: REVIEW OF THE REPORT OF THE CONSULTANT

7. The Subgroup proceeded to discuss the main issues raised in the Consultant's report and decided on a number of actions to facilitate further progress. The discussion also focused on the related recommendations of the Expert Group considered by the Subgroup at its second meeting (contained in document UNEP/OzL.Pro/ExCom/21/29). The recommendations, as revised in the light of the discussion, are contained in annex II. The Subgroup agreed that any discussion of these recommendations continued to be conditional on the understanding that there would be no final agreement to any particular recommendation until the whole package was agreed. The main conclusions of the Subgroup's discussion are reflected in paragraphs 8-14 below.

8. Discount rates. While the Subgroup agreed that the methodology should apply the real, as opposed to nominal, discount rate, no agreement could be reached on the magnitude of the rate to be applied, with suggestions ranging from 5 per cent to 12 per cent plus within the Subgroup. The issue of risk was raised, but there was no agreement on how this issue should be factored into calculations. To aid further discussion of this issue, the World Bank was requested to provide information on what real discount rates it applied to chemical industry projects in the relevant Article 5 countries over the 8 to 17 year time period concerned. As no agreement was reached regarding the bracketed text in Recommendation 9 of the Expert Group, the Subgroup decided to retain the text and discuss this issue further following receipt of the information from the World Bank.

9. Residual useful life of plant. After much debate, the Subgroup agreed to amend the language of Recommendation 6, leaving in brackets those parts on which no consensus could be reached.

10. Margins. It was noted that the data run had resulted in figures showing high profit margins, which some members of the Subgroup considered realistic and sustainable, and others found to be unrealistic and unsustainable, particularly in view of the situation which would have existed in the absence of the Montreal Protocol. After a lengthy debate on what constituted a reasonable margin, the views expressed by the members of the Subgroup showed that the range pre-tax could lie between 6 and 56 per cent. One member suggested that the appropriate profit margin to be considered for compensation is earnings before interest, depreciation and tax. It was agreed that there needed to be further discussion of what constituted a reasonable margin. Some members suggested that resolution of this and a number of other issues may require higher-level discussion.

11. Inflation. In Recommendation 8, section 1, subparagraph c (iv) and section 2 subparagraph d (i), the Subgroup agreed to refer the bracketed figure for inflation rates back to the Expert Group for clarification. One member suggested that the Expert Group might be requested to study the price trends for other industrial chemicals since 1986, in order to get an indication of what the inflation rate for CFCs could have been in the absence of the Montreal Protocol. Others suggested that it was not necessary to take any inflation rate into account.

12. Capacity and growth rate. The Subgroup agreed to retain in square brackets the dates of 1996 and 1997 in the first sentence of Recommendation 7. It accepted the second sentence, dealing with plants having commercial production of less than 36 months before 31 December 1997. There was acceptance that in [special] [some] cases there may need to be allowance for some growth, but that the criteria to determine which were these cases still needed to be precisely determined. The Subgroup therefore agreed to insert this concept in bracketed text. There was no agreement regarding the last sentence of the first paragraph of Recommendation 7 and, therefore, that sentence was also retained in square brackets. The 7 December 1995 date at the end of paragraph 2 was deleted to conform with the Subgroup's similar decision regarding Recommendation 6.

13. Capacity verification. Recommendation 1(a), Definition of capacity to be verified, was accepted, except for the question of whether it was necessary to include the language relating to design capacity. It was therefore agreed to retain square brackets around "the greater of the design capacity" and refer that question back to the Expert Group for clarification.

14. Packaged forms/local conditions. The Subgroup noted Recommendation 8, section 1, paragraph (c) of the Expert Group that substances sold in packages (e.g. cylinders, drums, disposable containers) may command higher margins. One member noted that higher margins could also be commanded where there was a preference for local suppliers (e.g. because of local service and support). It was agreed that this matter should be referred back to the Expert Group for clarification.

AGENDA ITEM 5: REPORT OF THE SUBGROUP TO THE EXECUTIVE COMMITTEE

15. The Subgroup decided that a draft report on the work of the meeting should be prepared and circulated to members for comments. The report would be finalized on the basis of those comments and submitted to the Executive Committee at its twenty-second meeting. The Subgroup further decided that the final report of the Consultant and the comments on the draft and final reports submitted by the members of the Core Group of the Expert Group should be annexed (see annexes III and IV below).

16. It was also decided that the Secretariat should be requested to work with the Expert Group to produce draft consolidated guidelines for the production sector that would incorporate Decisions of the Executive Committee and the recommendations of the Expert Group. Results of this exercise should be circulated to the members of the Subgroup for its comments before the results of this document are brought to the next meeting of the Subgroup.

17. One member of the Subgroup suggested that the United Nations Development Programme (UNDP) should be invited to participate in any future meetings of the Subgroup.

18. The Subgroup recommended that it meet again back-to-back with the Ninth Meeting of the Parties in December 1997.

ANNEX I

MAIN POINTS RAISED IN THE REPORT OF THE CONSULTANT

Conclusion

Method is workable - but needs further refinement

Two advantages:

- (1) Includes way to allow for "absence of the Montreal Protocol"
- (2) Significant effort already invested

Summary of method

Depends on 5 parameters:

- Margin (difference between price and fixed and variable costs)
- Remaining useful life
- Discount rate
- Actual capacity
- [growth on 36 months average production] ^{1/}

Net Present Value of lost profit stream =
$$\frac{\text{useful life}}{S(1-i)_{n-1}}(\text{margin})(\text{foregone production})$$

The following parameters are important and require policy advice:

- | | | |
|------------------------|---|--|
| <u>Useful life</u> | - | Difficult to determine, thus default values (proposed by expert group) are critical. |
| <u>Capacity growth</u> | - | Fixed in year one, based on plant past production (average of 3 best years), then increased at (10 per cent annually up to actual capacity |
| <u>Discount rate</u> | - | Magnitude of the real rates to be applied |

^{1/} This has not yet been agreed by the Subgroup.

- Margin
- What is the appropriate margin and how should this be determined, including whether the margin should be calculated on the basis of earnings before or after tax, or earnings before or after depreciation, interest and tax.
 - Premium on price for packaged forms and local circumstance.
- Inflation
- On prices and costs.

Annex II

Recommendations of the Third and Fourth Meetings of the Expert Group on the Production of Substitutes of Ozone-Depleting Substances, as amended by the Third Meeting of the Sub-Group on the Production Sector.

While the presence of brackets denotes outstanding disagreement, the absence of brackets does not necessarily mean that there has been full agreement. The Sub-Committee understands that there will be no final agreement to any specific recommendation until there is agreement to the full package of recommendations.

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 availability² and [the greater of the design capacity³ or]the maximum achieved daily rate⁴.

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.

² 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.

³ Design capacity is the output of which the plant is capable in terms of its current engineering specification, as determined from verified records.

⁴ 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.

Recommendation 3

- (c) Estimation of the cost of verifying capacity

The Expert Group recommends, for budgeting purposes, an allocation of US \$300,000⁵ for near-term capacity verification of the approximate 15 plants of 4,000 tonnes or more capacity.

Recommendation 4

- (d) Information required in order to verify capacity⁶

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).

⁵ 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.

⁶ The Subgroup noted that the definition of "capacity" still requires resolution and that this will have an impact on the data to be presented.

Residual life of plant**Recommendation 6**

The Expert Group recommends that for the purpose of determining appropriate shut-down costs compensation⁷ should be based upon the ‘remaining useful life’ of an ODS producing plant. The **maximum default** 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 actual date of cessation of production,⁶ (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;
- or, (b) a period calculated as eight months for each complete year by which the date of cessation of production⁶, as contained in the project document and approved by the Executive Committee predates 31 December 2010⁸.

[The ‘remaining useful life’ shall be determined by the Technical Audit team.] [In either case, the ‘remaining useful life’ so determined shall be subject to technical verification by the Technical Audit Team.]

[The final level of compensation for full closure projects shall be based on the actual date of cessation of production.]

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] [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.

⁷ The cessation of production refers to full closure projects.

⁸ 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.

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.] **[There was acceptance that in [special] [some] cases there may need to be allowance for some growth, but the criteria to determine which were these cases and what, if any, the growth rate still needed to be precisely determined.]**

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]

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 prices⁹ 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 in the range of 13 to 46 per cent 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.

⁹ 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)

(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.

2. Costs

(a) Costs of raw materials:

These should be based on 1986 international prices¹⁰, 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.]

¹⁰ In fact, there is little difference between 1986 and 1996 prices.

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:

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.

ANNEX III

FINAL REPORT April 30, 1997

I. EXECUTIVE SUMMARY

A method (called Method Two) for computing the value of the profit stream foregone when a CFC producing enterprise closes has been proposed by the Expert Group. Briefly, the approach is to establish a Cost at the enterprise level and subtract it from what the Price of CFCs would be if there were no Montreal Protocol. This margin, with correction for local and enterprise specific factors is multiplied by an annual production, based on the best three years production, increased annually up to the plant capacity, and its discounted present value determined over the remaining useful life of the plant. (Details of all these concepts have been previously considered by the Expert Group.) The present study is a test of the method based on data from two real plants.

It is concluded that the method can work, but better definition of a number of the concepts involved is needed. Furthermore, guidance from the ExComm on strictly financial parameters such as discount rate and depreciation will have a significant effect on the values of lost profit stream computed.

It is recommended that the method be retained as our preferred approach at least until the Expert Group can consider the implementation issues uncovered by this study and confirm this recommendation.

The foregone profit computation is most sensitive to the margin, however computed or defined. For the almost fully depreciated plant in China, the net present value of the foregone profit stream ranges from \$1157 to \$6892 per tonne of nominal capacity, over the set of assumptions evaluated. Limiting results to 17 year life and 8% discount reduces the upper bound to \$4700. If plant life turns out to be only 12 years, the upper bound falls to \$2555/tonne of nominal capacity. The \$1157 figure corresponds to 10% actual margin.

For the plant in India, a range from \$1107 to \$3180 per tonne can be calculated, again over the set of parameters evaluated, which in this case includes both inclusion and exclusion of depreciation. Limiting depreciation to ten years from plant startup raises the lower bound to \$1347. The gradual closure option reduces the upper bound to \$2256/tonne.

The methodology has been incorporated into an Excel Workbook which is being distributed on disk along with this report and can be used to more fully study the significance of assumptions on the results.

II. BACKGROUND

At the third and fourth meetings of the Expert Group, a Methodology (Method Two) was recommended for calculating compensation to CFC producing enterprises, in Article V countries, that cease production in accordance with the Montreal protocol. Succinctly, the method is to establish an enterprise specific margin by subtracting actual cost from an artificial "Price" which reflects what the price would have been in the absence of the Montreal Protocol. The Expert Group arrived at a rational consensus for this "Price" on a bulk, international basis and identified both qualitatively and quantitatively factors involved in making this meaningful at the enterprise level. Compensation is then the product of this margin and the capacity¹ over the remaining life of the plant, appropriately discounted.

The present study is a test of the methodology. Based on Decision 21/14 of the ExComm, a core group of the Expert Group was established to oversee this work and two producing plants, one in India and one in China, have been nominated by their governments to supply data for this test.

Initially a Questionnaire was developed, circulated through the Core Group for comments and then transmitted to the nominees. This Study Questionnaire seeks information that, in actual implementation, may be sought either by questionnaire or by audit. (A copy of the Questionnaire is attached as Appendix One.)

The philosophy used in its development was to err on the side of asking for too much data, while trying not to place too large a burden on the nominees. Beside straightforward cost elements, therefore, the questionnaire asked for labor headcounts by category, both to support calculation of a cost for labor displacement and to check for double counting, for example, of utilities generation. Similarly, data from which information that on implementation would be acquired by field audit, viz. maximum plant capacity, availability, life, etc., could be inferred, was requested.

Actual revenues were also requested. This allows the calculation of actual margins as well as providing the raw data to test alternative computation methodologies.

Then the calculational methodology of Method Two was embodied in a Microsoft Excel spreadsheet and circulated through the Core Group. One purpose of the Spreadsheet is as a repository for the data supplied. Ideally, one then captures this data and computes the compensation. Because there are choices to be made, (some anticipated, some previously unanticipated), between the raw data and the computation, the spreadsheet developed has a "partial disconnect" between the "data reporting" and the computation sections, allowing for human intervention on key economic calculation input data. These include the cost elements to be used in computation of the margins and the year-by-year compensatable capacity.

¹ Further defined as the average production of the three best consecutive years, increased at 10%/year.

The spreadsheet also, of course, allows for the parameterization of economic variables like discount rate and Price. An electronic version of the spreadsheets is being distributed with this report.

Data has now been received from two actual plants, one in India and one in China. These plants represent a broad enough range of operating parameters to allow the methodology and spreadsheet to be fully tested.

The operations differ significantly, the Indian plant produces both CF-11 and CFC-12 in a variety of packaged forms, has increased production annually, operates 330+ days per year, but is still at only ca. 40% of capacity. The plant in China produces only CFC-12, has been expanded several times, is almost fully depreciated, but is experiencing steeply decreasing production and achieves this "turndown" by operating only part-time.

A DRAFT Report was distributed on April 25 and comments received as of April 30 are reflected in this Final Report.

III. CONCLUSIONS

1) Workability of Method - Need for Definition

Method two is fundamentally workable, but incompletely defined.

- a) Of particular significance is the need to better define "cost" The concept is clearly meant to be established at the enterprise level but no guidance is provided on what year's experience to choose. Furthermore, "costs" can be rationally projected into the future; if compensatable production is allowed to increase at 10% per year, should not the cost reduction that goes with increased production be reflected?
- b) Price also needs to be better defined; although a "World" price, in bulk was set, differences due to local circumstance and packaging (the so-called "upcharge") were acknowledged, but not concretely specified. This latter is important because both of the nominated plants produce packaged products.
- c) Finally "remaining useful life" is not clear for plants that have been debottlenecked and/or expanded², nor is it determinable via questionnaire.

Finally, the data from one of the nominees suggests that the price of CTC, at least in China, has not been constant. This is contrary to the basic assumptions underlying Method Two, but is not felt to be a fatal flaw.

² In fact, Recommendation 6 of the Third and Fourth Meetings of the Expert Group, which deals with remaining useful life is itself ambiguous

The remedy for many of these issues is to subsume them into a strictly mathematical exploration of the effect of margin, in the context of Method Two, on the value of the foregone profit stream. Doing this, leads to a range of compensation, depending on the assumptions used, (and these were typical, but not by any means exhaustive), from \$20 million to \$ 59 million in the case of the Indian plant, (not including the option of gradual closure which further reduces the compensation by about another 20%) or about \$1107 to \$3180 per tonne of nameplate capacity. For the smaller (but higher margin) Chinese plant, a compensation range of ca. \$14.7 to 41 million has been calculated or about \$2100 to \$6892 per tonne.³ If, for this plant, one abandons the strategy of Method Two and simply computes the lost profit stream at 10% margin, a value of only \$8.1 million results, corresponding to \$1157/tonne of nominal capacity.

2) High Actual Margins

Both submitted sets of data show or suggest margins⁴ far in excess of the 20% guideline set by the committee as "realistically sustainable." Although depreciation is a factor, these higher than anticipated margins persist, even after including a typical figure for capital recovery. This is a clear indication that a classic free market in CFCs no longer exists. Note, however, that Method Two is based on an "artificial margin" between a Price that would have applied if there were no Montreal Protocol and the actual enterprise specific cost⁵, and its applicability is unaffected by this finding.

3) Significance of Financial Parameters

Strictly financial parameters: discount rate, depreciation etc. also, of course, have a profound effect on the compensation calculation. Because the compensation is spread relatively evenly over time, the effect on NPV of changing discount rate is crudely proportional to the discount rate, i.e. changing from 10% discount to 12% discount reduces the compensation by roughly ca. 15%. There is no guidance from the ExComm suggesting how to choose these values. Unlike the application of discount rates to new capital authorization, the transactions contemplated here carry no risk, so that a low choice of discount, covering only the anticipated cost of money plus anticipated local inflation would seem to be appropriate.

Depreciation may also be a big factor in computing the value of foregone profits. In a head-to-head comparison, (India Case One vs. India Case Two), application of an annual estimate for depreciation (the Indian nominee declined to provide a figure) more than halves the compensation at equal discount rate. On the other hand, of the two nominated

³ These data ranges reflect inclusion and exclusion of capital recovery within the range for India, but not within the range for China.

⁴ Raw margins for the plant in China range from 5 to 37%, because of wildly varying product pricing. The plant in India shows raw margins between 52 and 56% in the absence of capital recovery and 24 to 39% with an arbitrary allowance for capital recovery included.

⁵ These costs are adjusted to use a "world price" for CTC in order to make them logically comparable with the "non-Protocol" CFC price.

plants one was started up in 1989 and the other was expanded in 1990. If these capital costs are recovered, as is conventional in the chemical industry, over ten years, it is inappropriate to burden these computations with depreciation over the remaining plant life. If depreciation is included for only two years (i.e. through 1998), then the value of foregone profits is decreased by about 10% (India Case 3 vs. Case 1).

4) Gradual Closure

Gradual closure, on the basis selected in discussion with the Indian Nominee, decreases the net present value of the foregone profit stream by about 20%.

5) Difficulty of Data Collection and Interpretation

If the data provided via questionnaire is an indicator of what will be readily obtained on audit, assembling the data needed to implement Method Two may be a challenge. In order to get meaningful margins, accuracy and consistency are critical.

Avoiding "double counting" is another element of the challenge. Two areas that need work are consistency among the utilities cost and the operating costs of the utilities facilities and avoiding double counting of the packaging labor. The Expert Group's estimate of the cost of audit should be revisited.

6) Labor Displacement

Although the data assembled does not permit definitive computation of labor displacement, it is clear that this component of compensation will be small compared to the compensation for foregone profit.

IV. RECOMMENDATIONS

- 1) Either make the calculation basis as non-arbitrary as possible OR establish general guidelines to be followed subject to case -by-case review, which could be combined with audit.
- 2) Use enterprise specific data to calculate the cost differences between packaged and bulk products. (This would appear to work so long as some quantity of bulk product was sold.) This makes the calculation dependent upon a single outside (non-financial) parameter: bulk price.
- 3) Investigate to what extent the capital cost of the existing plants has already been recovered and base depreciation only on the balance. This becomes complex for plants that have been expanded or modified. The questionnaire on implementation should inquire into both prior depreciation and operating history.

4) Retain Method Two as our preferred methodology and repair the shortcomings revealed by this study. The next meeting of the Expert Group, with spreadsheet capability at their disposal, should at a minimum, consider the following:

- a) what enterprise level cost to use
- b) rationalizing our "margin expectations" with the reported data
- c) the "local circumstance" issue
- d) remove ambiguity in definition of "remaining useful life"
- e) confirm the idea of enterprise specific upcharge determination
- f) confirm method of distributing costs in swing plants
- g) elimination of other arbitrary aspects of the methodology
- h) explore basis for choice of financial parameters
- i) examine possible double counting issues and recommend how to handle them on audit and their effect on the estimated audit cost

V. DISCUSSION OF RESULTS

A. RAW DATA FROM THE NOMINEES

The raw data from the nominees has been previously circulated to the core group and the sub-group along with the Draft of this Report. It can also be found, converted to current U.S. Dollars in the attached spreadsheets. Conversion is at:

8.32 RMB/USD, and
34.18 IRP/USD.⁶

There are a number of surprising things about the data:

- 1) CFC-11 and CFC-12 prices realized and CTC Price, (reported only by the plant in China), vary wildly. A basic idea underlying Method Two is that these behave in a somewhat orderly fashion.
- 2) Cost elements as reported on a per tonne basis were much higher in the Plant in India than in the Plant in China. This is surprising, because the Indian Plant is both larger and newer. Inasmuch as the point of this study was to test the methodology, this wide variability is actually beneficial, but it highlights the need, on implementation, for careful checking of the raw data.
- 3) Actual margins, as reported directly by the plant in China, and as can be deduced from the cost data submitted by the plant in India, also vary significantly and are much higher than anticipated. Table One below summarizes these margins:

⁶ There is a slight inconsistency here. The figure for India was supplied by the nominee as representative of 1995/96 rates; the figure for China is current.

TABLE ONE
"ACTUAL" MARGINS OF NOMINATED PLANTS

Enterprise \ Year	1991	1992	1993	1994	1995
Plant in India w/o depreciation ⁷	NA	NA	53%	55%	56%
Same with estimated depreciation	NA	NA	24%	35%	39%
Plant in China with depreciation ⁸	18%	5%	37%	NA	NA

It should be pointed out that these data are not exactly comparable, because they cover both single product and dual product plants and actual and computed margins, but they are suggestive of quite high returns.

The Expert Group has pointed out that margins in excess of 20% are not sustainable in the long term. On reflection, however, the idea of lack of sustainability assumes a free market - something which has not existed in CFCs since the Montreal protocol. The price variations of CFC-11 and CFC-12 are not what one would expect from a mature commodity chemical. Observe additionally that these values have been both higher and lower than the "world bulk prices in the absence of the Montreal Protocol" on which Method Two depends.

Although the margins are high, the underlying cost details contain numerous inconsistencies. Generally, the cost data from China is on the low end of what was expected and the data from India are very high.⁹ In terms of showing operability of the methodology, this is good, but it suggests that, on implementation, extraction of accurate data will not be straightforward.

Both nominees also report production of packaged forms of CFCs, although sufficient information to take account of this in the compensation calculations is not available. Recommendation 8 of the Third and Fourth Meeting of the Expert Group envisioned higher pricing for packaged goods, but did not definitively fix a price differential. Additionally, it was not clear that all the costs associated with packaged goods production were included. Therefore, for this analysis, all the product was assigned one price.

While all of the above is certainly indicative of a need to revisit details of Method Two, these high and fluctuating margins and prices also suggest that alternative methods of

⁷ Based on mixed CFC-11 and CFC-12 and "world" CTC price.

⁸ Plant makes CFC-12 only, also note that depreciation, although reported, is minimal. These are actual margins, not corrected to "world" CTC Price.

⁹ In fact, the data from the Indian plant for 1993 and 1994 had to be discarded, because of inconsistencies.

calculating compensation will be equally troublesome. For example, the approach of valuing enterprises by the future value of their profit streams becomes impossible when these profits are not predictable. Similarly, valuing enterprises based on a fixed percentage margin, although clearly simpler than Method Two, still needs to resolve what year's margin to use and whether to compute margins with or without depreciation. Finally, only within Method Two has the Expert Group established a procedure that allows for computation of foregone profit "in the absence of the Montreal Protocol".

B. USING THE SPREADSHEETS

Appendices Two and Three present the spreadsheet calculations for the two nominated plants as two Excel files named, Ch\$fin (Data from China, converted to US\$, to accompany final report) and In\$fin (Data from India, converted to US\$, to accompany final report.) Those who wish to manipulate these are reminded to experiment on copies of the originals. These data have already been converted to US dollars at the exchange rates stated above.

Past inflation can be accommodated on these spreadsheets by adjusting the conversion factors, year-by-year. Even though the Indian Nominee was kind enough to provide us annual figures for IRP to US dollar conversion, an election was made not to apply these at this time, because the exchange rates over the three year period for which data was provided, deteriorated by only about ten percent and this would have to be offset by the inflation rate of the US dollar.

All the Tables after the Input Data Summary are self explanatory. The worksheets susceptible to manipulation are the Margin Calculation Tables and the Compensation Calculation Tables, both of which capture information from the Input Data Summary.

1. Margin Calculation Tables - These calculate, year-by-year¹⁰, the margin between the enterprise specific cost and fixed product prices, representing what the "world price in the absence of the Montreal Protocol" would have been. To put the calculation on a "world" basis, the CTC costs in the Data Input Summary tables have been standardized at \$275/te. The Tables all allow for two sets of computation, with and without depreciation. (Depreciation is as reported for the plant in China and estimated, but built into the Table for the plant in India.) Two further interventions are needed in this calculation:

- one needs to set the fixed price of CFC-11 and CFC-12 against which the margin will be calculated, and
- one needs to divide the costs between CFC-11 and CFC-12. This latter is not as arbitrary as it may seem, because raw materials costs dominate and the yields are close enough to theoretical that they can be distributed on the

¹⁰ Tables for all the years for which data was reported are included in "Ch\$fin", but because of inconsistencies in the raw data, only one table (1995) is included in "In\$fin".

assumption for the raw materials and further apportions the non-raw material costs on the basis of equal cost per mole of CFC-11 and CFC-12. This division probably should not be changed without new information.

2. *Compensation calculation tables* - Using a margin, manually inputted, from the Margin calculation Tables (or elsewhere), these compute the Net Present Value (NPV) of foregone profits subject to certain assumptions. These include:

- Life - The spreadsheet is capable of handling life up to 25 years from the date of commissioning contemplated by Recommendation 6 of the Third and Fourth Meeting of the Expert Group. Shorter lives can be conveniently accommodated by using a zero currency deflator in the "out years."
- Discount rate - Directly specified.
- Annual Production - The numbers shown on the spreadsheets are based on the average of the three best years of production in 1997, increased by 10% annually, until the nominal plant capacity is reached. It so happens that both nominated plants have a reported "three day maximum" capacity close to nameplate, so that, if these plants have been adequately maintained, one is comfortable with the idea that the maximum compensatable capacity is nameplate. Alternative scenarios can be tested by manually overriding the spreadsheet data.
- Future Inflation/ currency conversion - The spreadsheet provides for annual values of currency deflator and conversion to be specified. Unless there is a reason to use these features, it is more convenient to subsume future inflation within the discount rate, i.e. look upon these as "real" discount rates after allowing for inflation.

C. COMPUTATION OF COMPENSATION

Many case studies were run to elucidate the effect of economic parameters on the compensation. Table Three, following summarizes the cases for the plant in China and Table Four summarizes the cases included for the plant in India. From these data, one can determine the sensitivity of the compensation computation to the key variables: margin, life and discount rate (including within it, future inflation). The issues of significance of depreciation on the calculation and gradual closure can also be addressed.

1. Sensitivity

Sensitivity can be gleaned by comparing case studies, whose parameters were selected to provide such comparison. The key variables are:

Margin - Margin is clearly the most critical factor affecting the NPV of the foregone profit stream, although it is only indirectly specified in Method Two. The easiest way to rationalize seemingly disparate results is to look at them in terms of their inherent margin, i.e. the difference between the specified "price" and the enterprise specific cost. Cases four and five of Table Three and cases one and two of Table Four provide direct comparisons of compensation to margin, all other things being equal.

Additionally, and to broaden the range of variables studied, two artificial cases have been created wherein the margin is set at a percentage of the cost.¹¹ These are cases eight and nine of Table Three.

Table Two, below, compares cases from Table Three which differ only (all based on 17 year life and 8% discount) in margin. The data shows that the compensation is almost linear with margin.

TABLE TWO			
NPV of Foregone Profit Stream vs. Margin			
Case #	Margin \$/tonne	NPV \$ Million	\$/nominal annual tonne
Four	887	32.9	4700
Five	731	27.2	3879
Eight	219	8.1	1162
Nine	329	12.2	1743

Life - Recommendation 6 of the Third and Fourth Meeting of the Expert Group clearly set 25 years as the maximum default value for residual useful life of a CFC plant. This becomes undefined for plants, like the nominated plant in China, which have been expanded, (in this case, twice). Further, the application of default method (b) of the Recommendation is unclear, at least to this author. It was decided therefore, to look at a range of remaining useful life from 12 to 25 years from the date of construction or

¹¹ These cases are created for the Plant in China, because it is simpler to work with a one product plant.

TABLE THREE

Summary of Calculated Compensation for Plant in China

Case #	Margin	Discount Rate	Life	Compensation \$ Million	Compensation \$/nominal annual tonne
One	World Price (\$1560/te) vs. 1991 Cost, excl. depreciation, adjusted to world CTC price = \$887/te	.10	25 years from last expansion	41.2	5881
Two	same as case one	.12	25 years	35.5	5074
Three	same as case one	.08	25 years	48.2	6892
Four	same as case one	.08	17 years from last expansion	32.9	4700
Five	90% World Price (\$1404/te) vs. 1991 Cost, excl. depreciation, adjusted to world CTC price = \$731/te	.08	17 years	27.2	3879
Six	Same as Case One	.08	12 years from last expansion	17.9	2555
Seven	Same as Case Five	.08	12 years	14.7	2100
Eight	10% actual = \$219/te	.08	17 years	8.1	1157
Nine	15% actual = \$329/te	.08	17 years	12.2	1743

TABLE FOUR

Summary of Calculated Compensation for Plant in India

<u>Case #</u>	<u>Margin</u>	<u>Discount Rate</u>	<u>Life</u>	<u>Compensation \$ Million</u>	<u>Compensation \$/nominal annual tonne</u>
One	1995 margin (excl. depreciation) vs. "world" prices	.10	25 years from startup	\$59.2	3180
Two	1995 margin (incl. Depreciation) vs. "world" prices	.10	ditto	\$24.0	1288
Three	1995 margin vs. "world" prices (incl depreciation only through 1998)	.10	ditto	\$54.8	2942
Four	Same as case One	.10	17 years from startup	\$37.2	1998
Five	Same as case Two	.12	25 years from startup	\$20.6	1107
Six	Same as case Three	.12	ditto	\$46.5	2499
Seven	1995 margin vs. 90% of "world Price"	.12	17 years	\$25.1	1347

most recent expansion. This can show the sensitivity of the compensation to this parameter, which, on implementation is likely to be set by Field Audit.

Comparison of cases three and four of Table Three and cases one and four of Table Four shows the NPV of foregone profits to be almost proportional to assumed remaining useful life.

Discount rate - Discount rates from 8 to 12%/annum were used. Because inflation was not separately applied, these should be looked at discount plus inflation rates. NPV is strongly, but not linearly proportional to discount.

2. Capital Recovery

Neither of the nominated plants provided a clear test of the significance of inclusion vs. exclusion of capital recovery. The Indian nominee declined to provide depreciation data and the Chinese plant is quite old and almost fully depreciated. Thus, in order to show the potential effect of capital recovery on the economic calculations, an assumed value had to be employed. Comparison of Cases One and Two of Table Four shows that depreciation, applied annually, can more than halve the value of the foregone profit stream. This, however, may not be realistic.

While there is justification based on sound business principles for recovering the cost of a plant, this recovery charge ceases once the investment has been recovered. The newest of the two nominated plants began production in 1989; if, as assumed in the estimate made for capital recovery, the capital is linearly depreciated over ten years, then the full investment will have been recovered by 1999. Accordingly, a computation including just two years of depreciation was made. Table Four shows (Case Three vs. Case One) that this reduces the foregone profit stream by only about 10%.

3. Gradual Closure

A schedule for gradual closure was obtained from the nominated plant in India. The schedule reduces production linearly from present values to zero in 2006. A revised Compensation Calculation Table was developed in the Spreadsheet (In\$fin) to handle this and the NPV of foregone profit was computed for two cases, otherwise corresponding to cases One and Three of Table Four. These show that the gradual closure option reduces the foregone profit stream from \$59.2 million in Case One to \$42 million on a comparable basis and from \$54.7 million to the same \$42 million compared to Case Three. Thus, about a 20% reduction is realized.

D. OTHER OBSERVATIONS

While the prime objective of this study was to test Method Two, it also provided useful insight on issues that will arise in implementation.

1. Complexity of Information to be Acquired on Audit

Both nominees were very co-operative in supplying the requested data; thus to the extent that problems are indicated these should be viewed as harbingers of basic difficulties with the method. The underlying problem is that this is an information intensive methodology. Further, because, as described above, the results are very sensitive to margin, which is a small difference between two large numbers, accuracy and consistency in the raw data are critical.

2. Labor Displacement

Neither nominee was able to supply information as to the potential compensation for labor displacement, but some guidance can be obtained by looking at the labor component of the cost estimates.

For the plant in India, the most recent annual labor cost is \$700,000. The net present value of the foregone profit stream for this plant (See Table Four), depending on assumption ranges from \$20 to \$59 million. Similarly, for the plant in China, annual labor costs are under \$100,000 and the foregone profits are from \$14 to \$48 million; even in the fixed margin case (cases eight and nine of Table Three), the NPV is no less than \$8 million. Thus, the labor displacement is unlikely to be a significant contributor to the compensation calculation.

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**QUESTIONNAIRE FOR
METHODOLOGY STUDY****1. Plant Availability**

Please give the total hours of annual on-stream operation for the years 1993-1996.

Year	Operating Hours
1993	
1994	
1995	
1996	

If there is any reason to consider any of these years to be atypical, please explain.

2. Plant History and Capacity

- A. What do you consider to be the Annual Nameplate Capacity of the plant ?
- B. Please review the operations of the plant to determine the maximum output achieved in any 72 hour period and report it below.

Maximum 72 hour production

- C. Please give the plant production history.

Metric Tonnes/Yr.		
Year	CFC-11	CFC-12
1993		
1994		
1995		
1996 ¹		

¹ Please estimate if necessary.

- D. When did commercial production in this plant begin ?
- E. If the plant has been expanded/or debottlenecked, please give the date of such expansion(s).
- F. Please review the plant production history and identify the 36 months of highest production and report that value below.

.....

- G. Please estimate 1997 production, if possible.

3. Revenues

Please report in the Table below, gross sales revenues. To the extent possible, we ask that this information be distributed between the products. Where products were manufactured in more than one "finished form" (bulk, drums, cylinders, etc.), please give details separately, if available.

Revenues/Yr ²			
Year	TOTAL	CFC-11	CFC-12
1993			
1994			
1995			
Best 36 Month Period as determined in Question 3 D above			
1996 ¹			

4. Costs

A. Raw Materials

Please give in the following Table the raw materials consumption of the plant.

² Please specify currency

Metric Tonnes			
Year	CTC	HF ³ (100% basis)	Other
1993			
1994			
1995			
Best 36 Month period as determined in Question 3 D above			
1996 ¹			

B. Byproducts

Was by-product HCl sold ? Any other saleable by-products ? Please give production volumes and revenue realized.

Year	HCl		Other	
	Quantity	Revenue ²	Quantity	Revenue ²
1993				
1994				
1995				
1996 ¹				

C. Utilities

The Table below requests utilities consumption for the plant. Were steam generation and cooling water dedicated or allocated ? If dedicated, please distribute fuel consumption between steam generation and direct process fuel.

If generation is allocated, please indicate whether labor and utilities used in generation are included in the costs given in the Table.

³ If plant is based on fluorspar, please give consumption of fluorspar and of H₂SO₄ (100% basis).

	Steam		Electricity		Fuel ⁴		Other	
	Metric Tonnes	Cost	KWH	Cost	Kcal	Cost		
1993								
1994								
1995								
1996 ¹								

If it is possible to segregate consumption attributable to HF Production (if applicable) and to packaging, please do so.

D. Labor Costs

Please tabulate below, the number of employees by activity. If HF manufacture is included, please distribute employees between HF production and CFC production if possible.

	Direct Labor	Overhead	Labs	Maintenance	Packaging
1993					
1994					
1995					
1996 ¹					

Please tabulate below, total labor cost by category. Again, if HF manufacture is included, please distribute costs between HF production and CFC production if possible.

	Direct Labor	Overhead	Labs	Maintenance	Packaging
1993					
1994					
1995					
1996 ¹					

⁴ Please specify type

E. Maintenance

Please indicate below annual out-of-pocket maintenance costs. Do these include major equipment items routinely replaced as part of a preventive maintenance program ? Please identify any other extraordinary items.

Year	Cost
1993	
1994	
1995	
1996 ¹	

F. Other Cash Costs

Please tabulate and explain other out-of-pocket costs for miscellaneous supplies, spare parts etc.

Year	Cost
1993	
1994	
1995	
1996 ¹	

G. Capital Recovery

Is an accounting charge made for capital recovery ? If so, please give the basis and report the figure below.

Year	Cost
1993	
1994	
1995	
1996 ¹	

H. Depreciation

If depreciation is reported to local taxing authorities, please report the annual figures below.

Year	Cost
1993	
1994	
1995	
1996 ¹	

I. Interest Payments

If the plant makes either internal or external interest payments, please report them below.

Year	Cost
1993	
1994	
1995	
1996 ¹	

J. Sales, Administration and Research Expenses

Is a charge made for sales, administrative, research or other expense and not accounted for in the tables above ? If so, please explain and tabulate below.

Year	Cost
1993	
1994	
1995	
1996 ¹	

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APPENDIX TWO Spreadsheet of data from China

Compensation Calculation - Plant in China - 25 Year Life from Last Expansion					
Year	1997	1998	1999	2000	2001
Compensated Annual production CFC-11	0	0	0	0	0
Compensated Annual production CFC-12	3485	3812	4183	4612	5074
Case 1 - 1991 Margin (incl. depreciation) vs \$1580/kg CFC-12 Price - 18% Discount Rate					
margin - CFC-11					
margin - CFC-12	887	887	887	887	887
Compensation	3073455	3381244	3718181	4080844	4500638
Currency Converter					
Currency Deflator					
Compensation in 1997 \$	3073455	3381244	3718181	4080844	4500638
Discount rate	0.1				
NPV of Annual Compensation Stream	\$41,167,891.28				
Case 2 - 1991 Margin (incl. depreciation) vs \$1580/kg CFC-12 Price - 12% Discount Rate					
margin - CFC-11					
margin - CFC-12	887	887	887	887	887
Compensation	3073455	3381244	3718181	4080844	4500638
Currency Converter					
Currency Deflator					
Compensation in 1997 \$	3073455	3381244	3718181	4080844	4500638
Discount rate	0.12				
NPV of Annual Compensation Stream	\$35,820,826.81				
Case 3 - 1991 Margin (incl. depreciation) vs \$1580/kg CFC-12 Price - 8% Discount Rate					
margin - CFC-11					
margin - CFC-12	887	887	887	887	887
Compensation	3073455	3381244	3718181	4080844	4500638
Currency Converter					
Currency Deflator					
Compensation in 1997 \$	3073455	3381244	3718181	4080844	4500638
Discount rate	0.08				
NPV of Annual Compensation Stream	\$48,247,861.48				
Case 4 - 1991 Margin (incl. depreciation) vs \$1580/kg CFC-12 Price - 8% Discount Rate and 17 year life					
margin - CFC-11					
margin - CFC-12	887	887	887	887	887
Compensation	3073455	3381244	3718181	4080844	4500638
Currency Converter					
Currency Deflator					
Compensation in 1997 \$	3073455	3381244	3718181	4080844	4500638
Discount rate	0.08				
NPV of Annual Compensation Stream	\$32,844,873.10				
Case 5 - 1991 Margin (incl. depreciation) vs \$1404/kg CFC-12 Price - 8% Discount Rate - 17 year life					
margin - CFC-11					
margin - CFC-12	731	731	731	731	731
Compensation	2532915	2786572	3085083	3371372	3708094
Currency Converter					
Currency Deflator					
Compensation in 1997 \$	2532915	2786572	3085083	3371372	3708094
Discount rate	0.08				
NPV of Annual Compensation Stream	\$27,150,817.74				
Case 6 - 1991 Margin (incl. depreciation) vs \$1580/kg CFC-12 Price - 8% Discount Rate - 12 year life					
margin - CFC-11					
margin - CFC-12	887	887	887	887	887
Compensation	3073455	3381244	3718181	4080844	4500638

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APPENDIX THREE

Spreadsheet of data from India

Compensation Calculation Under Gradual Closure					
Year	1997	1998	1999	2000	2001
Compensated Annual production CFC-11	2926	3218.8	3541	3685	4284
Compensated Annual production CFC-12	4253	4578.3	5145	5681	6227
Production under gradual closure - CFC 11	3128	2815	2500	2189	1876
Production under gradual closure - CFC 12	4548	4093	3538	3123	2728
Adjusted Compensated production CFC-11	0	403.5	1036	1706	2408
Adjusted Compensated production CFC-12	0	585.3	1508	2478	3498
Case 1 - 1995 margin (incl. depreciation) vs \$15800/a CFC-12 Price - 10% Discount Rate					
margin - CFC-11	532	532	532	532	532
margin - CFC-12	598	598	598	598	598
Compensation	0	563554	1451518	2384480	3386460
Currency Converter					
Currency Deflator					
Compensation in 1997 \$	0	563554	1451518	2384480	3386460
Discount rate	0.1				
NPV of Annual Compensation Stream	\$42,863,294.54				
Case 2 - 1995 Margin vs. Base Incl depreciation through 1998 only					
margin - CFC-11	218	218	532	532	532
margin - CFC-12	240	240	598	598	598
Compensation	0	228456.8	1451518	2384480	3386460
Currency Converter					
Currency Deflator					
Compensation in 1997 \$	0	228456.8	1451518	2384480	3386460
Discount rate	0.1				
NPV of Annual Compensation Stream	\$42,816,354.71				

ANNEX IV

PART I

COMMENTS BY THE CORE GROUP ON THE DRAFT REPORT OF THE CONSULTANT

26-APR-1997 SAT 00:58 ID:ICI HALOCHEMICALS MIKE HARRIS

TEL: +44-1606-889451

P:02

COMMENTS FROM MIKE HARRIS ON DRAFT REPORT OF CONSULTANT

OORG Production Sector

SUBJECT: Pilot Study of "Approach 2"

A. Response from China

a. The information is more or less in line with data seen by the World Bank / OORG. This is a small, decaying CFC-12 plant (with minor production of CFC-11) which in the developed world would have been phased out years ago. It is most unlikely to be competitive with the big modern CFC plants built in China in recent years.

b. The response highlights a gap in the methodology. Although not strictly required for the mathematical implementation of "Approach 2", it would be extremely useful (e.g. under items 2.D and 2.E) to have an outline of the capacity history of the plant. Seen against the production history provided, this would give a good insight into what had been going on and an important yardstick against which qualitatively to judge the rest of the data.

c. China has been short of CFC-12 for some time, imports it, and has recently built a lot of new modern capacity. Yet the production of this plant has been decreasing rapidly. The decrease cannot have been due to falling demand, so what does this say about the state of the plant and its competitiveness. This needs reflecting in the figures assumed for the "residual life" of the plant, and/or in the maintenance costs.

d. Notwithstanding points (b) and (c), there is enough information in the submission to allow the application of the methodology - and for it to produce a result which should be meaningful on a "lost profit stream per annum" basis. There may be a remaining debate about "residual life" and therefore the number of years for which compensation should be paid.

B. Response from India

a. Two pages from China and six from India - but three times as much information in the shorter submission!

b. The Indian plant is said to be a "swing" plant, but there is no mention of what sort of "swing" - it is reasonable to assume that it produces CFC-11, CFC-12 and HCFC-22. Throughout the submission there is a coyness about "factors specific to CFC-11 and CFC-12" without stating what other factors there may be - even qualitatively. This makes the entire submission almost impossible to audit in any meaningful fashion.

c. The plant availability is amazingly high - presumably all of the problems were associated with "factors NOT specific to CFC-11 and CFC-12".

d. The nameplate capacity is stated as 18,615 te/yr - of what? Against this fairly high figure, the actual production of CFCs 11 and 12 is very low - despite the continuing robust demand for product (cf. continuing high world prices). Either the plant is running overall well below capacity - on the total of the three co-products, or it is producing predominantly HCFC-22. In the first case it is a very unprofitable operation (apart from the 40-60% inward tariffs remaining) and the "lost profit stream" may be of a magnitude that would make India a net contributor to the MLF (17). In the second case, the plant is essentially an HCFC-22 plant

25-APR-1997 SAT 00:58 ID:ICI HALOCHEMICALS MIKE HARRIS

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which makes some marginal profits by making some CFCs - the proportion of production to be compensated is then rather small.

e. As in the case of China, it would be very informative to have a *capacity* history set alongside the *production* history.

f. I regret the repeated statements that data "may not be relevant". This does not contribute to the process of carrying out a test run on the methodology - an exercise which, by sensitivity analysis, was designed to *test* the relevance of various parameters. Surely there cannot be anything to hide??

g. In fairness, a quick scan of the cost data that *is* provided does not flag up anything particularly unusual - but I suspect that the data needs much more careful analysis than I can give it tonight.

h. I was disappointed at the absence of data on personnel employed - and then surprised when I arrived at footnote 8(c) stating that "compensation of labour displacement cost may not be necessary". If this is indeed the case, the absence of data is quite legitimate.

i. References to confidentiality, and the supply only of "data which may be relevant to the intended purpose" raises an important fundamental issue. I accept that some of the data is confidential - albeit not particularly commercially sensitive given the rather exceptional nature of the CFC market post-Montreal. However, ExCom is entitled to ask for the data - even if it is confidential - if they are to pay out compensation. The solution may lie in developing a suitable secrecy agreement between company (or its government) and the agents of ExCom (e.g. the audit team). Countries wishing to receive early funding will doubtless find it easier to enter into such an agreement (assuming a sensible format) than those who are less concerned about early shut-down funding. This leaves us with a *common* methodology, with a *differentiated* implementation reflecting to the political interests of each Article 5 country. This may not be as unhelpful as it might at first seem.

j. While the submission provides just about enough data for the methodology to be applied, I am not sure that there is enough data for a professional judgement to be made about the relevance of the calculated figures for compensation. This is something that - in a "real-life" case (as opposed to this pilot study) will need some more attention on audit. If ExCom does decide to continue with this approach (I hope so, after all of the invested effort!), there may be value in moving ahead with the appointment of an audit team and an early meeting between this team and the Expert Group on Production Core Group in order to see what pragmatic compromises can be made.

C. Other Comments

a. In general, I think we are making progress. I believe that, on the basis of Bob's work, the case can be made that "Approach 2" can work - at least when both donor and recipient *want* it to work.

b. Some thought needs to be given to:

1. Means of obtaining a sensible view of the overall qualitative history of the plant. This need only be semi-quantitative, but is required to show what sort of operation it is that is requesting compensation. A *capacity* history would help. Together with some sort of narrative explanation of plant occupancy. Perhaps this could be provided by the audit team, possibly working with the implementing agency.

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Page 3

- ii. Confidentiality issues. They are real, but need not stand in the way of a sensible application of the methodology *if all parties to the exercise want it to work.*
- iii. Amount of collateral data required for "swing" plants.
- iv. How the audit team will interface with (a) the implementing agency, and (b) the expertise of the Secretariat's Expert Group on Production. There is potential synergy here.

D. Comments on Draft Consultant Report

See attachment.

P: 25

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26-APR-1997 SAT 01:00 10:10 HALOCHEMICALS MIKE HARRIS

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Page 2

What were the residual plant lives (in years) for the two test plants?

I have compared your bottom line (ranges of) figures with those calculated from my very much simpler spreadsheet which I used to underpin discussions in the RGP.

You display a range of unit costs of compensation from \$2400 to \$7300 per tonne. For a (maximum estimate of) total CPC capacity in the Article 5 countries of 140,000 tc/yr, the total compensation is thus in the range \$240 to \$1020 million. This is the bottom-line figure that ExCom xxx xxx x xxx xxx (and still excludes halon shut-down).

Compared with my own spreadsheet (and the family of curves I handed out in an earlier RGP meeting), this range is equivalent to an assumed margin (using a surrogate margin instead of detailed cost-price calculation) varying with the assumed residual life of the plants (global weighted mean) as follows:

Residual life of plants	Margin	Margin as % of Selling Price of \$2/kg
5 years	0.6 to > 1.2 \$/kg	30% to > 60%
10 years	0.4 to 1.2 \$/kg	20% to 60%
20 years	0.3 to 0.8 \$/kg	15% to 40%

These back-calculated values of "equivalent margin" are satisfyingly within the expected range NOT of "realistically sustainable" margins, but of the actual margin figures that have been bandied around in discussion and negotiation (within the RGP and elsewhere) to date.

As you can see, the "realistically sustainable" guideline maximum of 20% is achieved where the residual life is at least 10 years (for your lowest compensation figures), but is not achieved even at a residual life of 20 years in the case of your highest compensation figures.

Alternatively put, a median value of compensation from your analysis and a median value of residual life (say, 10 years) suggests that the test cases are working with a margin of some 40% (Ravi has often quoted to me 40% minimum). This more than amply repays capital - both real cost of money and opportunity cost of sunk capital.

I hope that this comparison helps set a perspective on the work.

Conclusions:

- The report is on track.
- The bottom line figures for compensation emerging are in the anticipated range.
- The difficulties with Methodology 2 are not unanticipated, and do not fundamentally undermine the method. I still believe it's our best chance of getting something past ExCom - by providing xxx "xxxx xxx xxxxxx" xx xxxxxx xxx xxxxxxxx xxxxxxxxxxxx xxx xxxxxxxx.
- The key issues will be (a) to resolve the remaining uncertainties as per your first recommendation, (b) to ensure that the audit guidelines and execution are robust enough to provide confidence in the methodology for the donor countries, (c) to xxxxxxxx xxx xxxxx xxxxx xxx xxxxx more xxxxxxx around the financial parameters, or to settle for negotiated guide

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Page 3

figures as defaults, (d) to find a political solution to the discrepancy between "calculated" and "realistically sustainable" margins (XXXX XXX XXXX XXXXXX XXXX XXXXX XXXX XXX XXXX XX XXX XXXXXX XX. XXX XXXX XX XXX XXXXXXX XXXXXXX XXX XXXXX XXXXX'X XXXXX).

I leave the UK for the USA on Saturday 26th April on a combined business/vacation trip, and will be back home on Wednesday 14th May, and back in my office (after a day's business in London) on Friday 16th May. My secretary, Shirley Southern (telephone: +44-1928-511108; fax: +44-1928-569459) will be anchoring my desk in my absence and has as much of my itinerary as is known in advance. Broadly speaking I am contactable as follows:

Sunday 27th - Tuesday 29th April:

State Plaza Hotel, Washington DC
Fax: (202) 659-8601

World Bank, Washington DC

c/o Louise Shaw
Fax: (202) 522-3258

Thursday 1st May - Friday 2nd May:

ICI Americas, Wilmington (DE)
c/o Paul Dugard
Fax: (302) 887-7706

Tuesday 7th May - Sunday 11th May:

Sand Pebble, Anna Maria Island (FL)
Fax: (941) 779-1259

Kind regards

Mike Harris

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01928-813213
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d134@cityscape.co.uk

COMMENTS TO DRAFT REPORT
RECEIVED FROM MR. TONY VOGELSBERG 29 APRIL 1997

Conclusions

- 1) Method Two is incompletely defined....

When the choice is made to use costs and price to arrive at profit or margins, you must be very careful to insure that future projections are realistic. I believe that using past cost/price history should allow fair and realistic margin calculations. One problem in projecting forward is to be realistic on future assumptions. You recall that I stated strongly that costs and prices did not inflate in duPont's CFC business for a ten year timeframe. If "fixed costs" are truly fixed, that margin will rise significantly with increased volume, or fall with declining volume.

- 2) Strictly financial parameters....

I still feel strongly that 10% discount rate is typical for this type business; but selection of a discount rate is more political than technical. The business is mature and involves almost no business risk therefore in selecting a discount rate, this should be taken into account.

- 3) Both submitted....

The high margins are not a surprise since the chosen plants are operated in a non-free market. From a technical and business view, I have real problems in projecting into the future margins greater than 20% gross or 10% after tax.

4. No comment (NC)

5. "Double counting"....

I appreciate what Bob has stated here and I believe that the visiting team must be very careful in apprising the data to insure that double-counting is avoided. Hopefully, close examination of initial data will allow a more realistic time estimate for verification prior to any actual inspection trip.

6. No comment (NC)

7. Compensation calculated....

The area of compensation begs the question of what is realistic. I believe donor nations have an upper limit and will not exceed it since it will tend to set a standard for other environmental treaties, i.e. climate change.

8. No comment (NC)

Recommendations

- 1) I agree with the statement that non-arbitrary basis must be used. However, having said this, I recognize that in different business cultures, there will be a wide range of ways to "treat

costs". Hence, using Method 2 requires a lot of work that may mean far more effect than a compensation approach based on simple parameters:

- fix total dollars for global phase out and divide up the pie based on share of capacity
- fix maximum margins for compensation (my Method 1 proposal)

2) I still believe that non-bulk goods should not command prices much beyond the actual costs to package. The way Bob has worded #2 is not clear to me as far as the message.

3) I agree these are eight key points.

Discussion

Questionnaire Issues

I believe most CFC plants can meet 25 year life span and is fully dependent upon the level of maintenance and equipment replacement costs.

Spreadsheet Issues

In point (1) there is a point of confusion in the use of the term "swing plants". The sentence implies a swing between 11 and 12. When we use this term, it applies to swinging between CFC 11/12 and HCFC-22. You can vary the CFC 11/12 ratio but you are limited to the minimum and maximum of about 25% for either compound; i.e. 75% CFC 11 and 25% CFC 12 or the reverse.

Raw material costs for CFC 11 and 12 in simple terms will vary primarily on three factors:

- 2x HF for 12 vs. 11
- 2x HCl by product for 12 vs. 11
- higher packaging costs for pressurized gas (CFC 12 if returned containers are not used).

Choice of margin for NPV

Fully agree that "fixed costs" have big input as a given plant volume is changed.

Currency inflation

For domestic plants supplying the domestic market, I would not expect currency fluctuations to be an issue. I have stated many times that inflation should not be a factor in our calculations.

Hopefully, these comments are constructive.

(Signed)

Tony Vogelsberg

(3F)

上海三爱富(3F)新材料股份有限公司

SHANGHAI 3F NEW MATERIALS CO., LTD.

To Dr Omar E El-Arini
Chief Officer
Multilateral Fund

Date 29 April, 1997

FAX NO 001-514-282-0064.

From Jianqun Jiang
Chief Engineer of Slopex
Shanghai, China.

Dear Dr El-Arini,

Thank you for your fax (yesterday morning received).

As requested, I have already sent my comment to
Mr Hoch, the consultant - production sector. Here please find
a copy of my comment on the draft report.

I'll try my best to make prompt reply to the
final report as you wish.

Regards

Yours sincerely

Jin Jin

MULTILATERAL FUND	
Recd: Apr 29/97	Ref No 38
To: Dr. El-Arini	
CC:	
Officer: SSL	
Division: Production	

地址: 上海吴淞路4411号
ADD: 4411 LONG WU RD.
WU JING, SHANGHAI

电话: 64340154
TEL: 64340154

传真: 64345915
FAX: 64345915

邮编: 200241
ZIP: 200241

28/04/97 13:49 202104345810

SHANGHAI JF CO

0002/003

FACSIMILE TRANSMITTAL SHEET

TO:	FROM:
Mr Robert Hoch	Jiang Jiang <i>Chief-Engineer of SHFT, Shanghai</i>
COMPANY:	DATE:
	April 29, 1997
FAX NUMBER:	TOTAL NO. OF PAGES INCLUDING COVER:
001-518-734-5802	02
PHONE NUMBER:	SENDER'S REFERENCE NUMBER:
RE:	YOUR REFERENCE NUMBER:
Comment on Draft Report	
<i>Note: This is my revised copy of the comment on Draft Report</i>	
URGENT ☐ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY	

Dear Mr Hoch,

I received both your revised copy of the draft report and also the official copy from Dr El-Arini (the later was rearranged in sequence). Here please find my comments on it for your reference.

1. Thank you very much for the elaborate calculation on Methodology test based on Method 2. Some important key factors have been shown their significant role on the compensation through the test calculation: depreciation(capital recovery), discount rate etc. But the margin for CFC11 and CFC12 as well as the resulted NPV of Annual Compensation Stream looked too high which is beyond what I expected and it might lead to misunderstanding due to using the figures at maximum. For example, the lifetime eligible for compensation should not be the limitation 25 years for both nominees. As I know the lifetime for Shanghai Chlor-Alkali co Ltd. as proposed is 17 years. I suggest using the later years rather than using the upper limitation lifetime. As far as the margin is concerned the figure listed in your table is also much higher than what we calculated using same raw data.

2. For discount rate, my pointview is that it should follow the present and future economic development tendency and ignore the past real and temporary discount rate since it was rather complicated from year to year. Thus 10% discount rate would not be the real rate in the future since the inflation rate has been put under control at a fairly low level. We appreciate the suggestion from World Bank regarding discount rate, i.e. 8% will be reasonable. We are not expecting to adopt an even higher discount rate.

3. The results listed in the table seemed to have some problem. For example, Case3 and Case4 for Chinese nominee should have no results, the NPV of Annual Compensation Stream should be left

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Shanghai JF Co

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blank, the figures here which show same values with Compensation in 1997 for the NPV are meaningless.

4. Recommendations 1),2),and 3) should be considered.

5. In Conclusion 5), double counting was mentioned, I agree it should be avoided by taking some measure. But in the present case, there is no any evidence to show some factors involved in such double counting.

6. I do not think the compensation will be as high as the value obtained in the test calculation. As long as the parameters get more and more close to reality, the compensation would be more reasonable as wish.

Regards

Yours sincerely



Jinnan Jiang

01/05 '97 15:42 3324052

SRF CORP NEWDEL

001

**SRF LIMITED**

FAX NO. : 00-1-518-734 5802

TO : MR. ROBERT HOCH
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Fax: (011) 3324052
Cable: NYLOTEX

Date: April 30, 1997

FROM : RAVI K. SINHA
MANAGING DIRECTOR

TOTAL NO OF PAGES : FOUR

Dear Bob,

I have received the raw data used for the methodology testing only today from the Multilateral Fund, Montreal. My comments on the Draft Report, pending receipt of spreadsheet floppy, are as under :

CAPITAL RECOVERY

I would like to reiterate the comment already made by me on Capital Recovery. As discussed in the Expert Group, the NPV of the profit forgone is to be calculated before depreciation and interest. No reference was made to Capital Recovery, Depreciation and Interest in the Expert Group.

There was, however, a reference made to Maintenance and an item "Capital Provision" was added to include expenses incurred once every several years to maintain plant in good health. Such items would be covered under maintenance and capital provision.

Scenario developed with Capital Recovery in the draft report is not in line with the methodology recommended in the Report of Expert Group.

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002



APPORTIONING OF COSTS

Adjusting CFC-11 and CFC-12 for molecular weight to apportion cost and determine cost per unit production of CFC-11 & 12 (exclusive of raw materials) is not best suited as the two substances are co-produced in a swing plant.

Apportioning of costs (other than raw materials) between CFC-11 & 12 is not even necessary since we are looking at CFC production and demand as a whole.

Apportioning should, therefore, be done on absolute production basis. This would make computation simpler and would serve the purpose. Moreover, on an overall CFC-11 & 12 basis, it does not make any difference.

PRICES

The international bulk price, as specified by the Expert Group, do not seem to have been adjusted to take account of differences due to packaging. A range of premium on small packaging was specified by the Expert Group.

Similarly, the prices do not seem to have been adjusted to account for the price premium for preference for a local supplier. A range of values 10-15% was recommended in the Report of the Expert Group.

Calculation done without adjusting prices to take account of packaging and premium for local supplier will be misleading as it would not reflect the methodology recommended in the Report of the Expert Group.

COSTS

As per the recommendation of the Expert Group, the cost of raw materials has been specified and the 'Other Costs' for bulk material will need to reflect local conditions. The concept is clearly meant to be established at country level/enterprise level. These are actual auditable costs.

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INFLATION

Correction of historic prices and costs (1986) to the current base do not seem to have been done. A range of inflation was specified for both prices and costs in the Report of the Expert Group. There is a need to do sensitivity for the whole range of inflation rate (0 - 3%) as recommended in the Report of the Expert Group.

DISCOUNT RATE

No basis is given for using discount rate of 10% and 12% for the NPV calculations. Furthermore, Discount Rate is very high and has not been adjusted for inflation. The Expert Group has recommended the use of "real discount rate (as opposed to Nominal discount rate)".

Real discount rate should be about 5%.

In the absence of using real discount rate, the results of computation done would not be as per the recommendation of the Expert Group.

MARGINS

There is no 'guideline' set by the Expert Group that pre-tax margin in excess of 20% is not 'sustainable'.

- * This was not a guideline set by the Expert Group and was more in the nature of a noting. This is evident from the fact that details of prices and costs were defined and specified and hence the resulting figure would be the margin eligible for compensation.
- * Methodology, provides for the assimilation of certain costs based on local circumstances and the figures provided by the two nominee companies reflected businesses as they are carried out now.
- * Finally, the noting of margin of 20% by the Expert Group is clearly given as "Pre tax Profit" margin whereas the methodology provides for compensation based on margins/earnings before interest, depreciation and tax (EBIDT).

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004



The above have been extensively debated in the Expert Group and you may refer to the minutes of the Expert Group meeting.

In the absence of the floppy disk and programme which could operate the software, we are unable to comment in detail on data and methodology used for computation. Please arrange to send the floppy.

More comments would follow after the floppy disk and programme are received.

With Regards,

Yours sincerely,

A handwritten signature in dark ink, appearing to read "Ravi K. Sinha", written in a cursive style.

RAVI K. SINHA

cc : Dr. Omar E. El-Arini
Chief Officer, MLF
UNEP
Montreal, Canada

(Fax No. : 00-1-514-282 0068)

PART II

COMMENTS BY THE CORE GROUP ON THE FINAL REPORT OF THE CONSULTANT

06/05 '97 14:44 332405

SRF CORP NEWDEL

001



SRF LIMITED

FAX NO. : 00-1-518-734 5802
TO : MR. ROBERT HOCH
RR 1, BOX 422
HENSONVILLE
NY 12439, U.S.A.
FROM : RAVI K. SINHA
MANAGING DIRECTOR

Corporate & Regd. Office
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New Delhi-110 002, India
Phone: (011) 3324052 3738494
Telex: (031) 85824
Fax: (011) 3324052
Cable: NYLOTEX
Date: May 06, 1997

TOTAL NO OF PAGES (INCLUDING THIS PAGE): FOUR

Dear Bob,

I am in receipt of the Final Report of the Methodology Testing through Multilateral Fund Secretariat.

I have not yet received the spreadsheet and the floppy containing programme which could operate formulae for fully studying the data elements and significance of assumptions on the results. It would have been meaningful to have received the floppy before the final report was received. My comments, therefore, would at best be interim.

I have already sent my comments on the draft report vide my fax of April 30 which continue to remain relevant even for the final report and may therefore be treated as my comments on the final report as well. My additional comments on the final report are as under :

PLANT LIFE

Recommendation 6 of the Third & Fourth Meeting of the Expert Group clearly defines the concept of residual useful life of CFC plant. The Recommendation is defined as the longer of either a period of 25 years less the number of years as at the date of project approval or a period calculated as eight months for each complete year by which the date of project approval predates Dec. 31, 2010.

Assuming remaining plant life for one of the nominated plants from the date of last expansion, in the methodology testing, is not in line with the Recommendation 6 of the Expert Group. Plant expansion, by a specific date, is to be used only for determining the eligibility of the production capacity for compensation and not for determining the remaining useful life of the plant.

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GRADUAL CLOSURE

The draft report had concluded that the Gradual Closure, on the basis selected with Indian nominee, decreases the compensation by about 30%. However, the revised figures, as given in the final report, show a decrease in net present value of the forgone profit to about 20% instead of 30%. The reasons for such change are not given in the final report.

DEPRECIATION

It is to be reiterated that the NPV of the profit forgone is to be calculated before depreciation and interest. Hence, the computation including even two years of depreciation in the case of one of the nominated plants, as is indicated in the final report, is not required to be done as per the Recommendation of the Expert Group.

DISCOUNT RATE

Further to my comment on discount rate (on the draft report) it is noted from the final report that for the nominee company from India, sensitivity of compensation has not been done at the discount rate of 8 per cent as has been done for the other nominee company.

MARGINS

Since Recommendation 8 does not seem to have been followed in toto during methodology testing, the margins that have been derived may undergo changes and consequently the compensation figures would change once the computation is done in line with the parameters set out in Recommendation 8.

- * As stated in my comments sent earlier that there was no guideline set by the Expert Group that margins far in excess of 20% are not 'sustainable'. This was more in the nature of a noting. This is evident from the fact that details of prices and costs were defined and specified and hence the resulting figure would be the margin eligible for compensation.
It may be remembered that the prices recommended by the Expert Group reflected the lowest possible prices taken from the Harvard Case Study. Hence, we need to review the comment about 20% margin etc.
- * It is not known, in the absence of floppy disk, how the CTC consumption and other data which has been given on the *financial year* basis by the Indian nominee company is converted/used with the production data given on *calendar year* basis as is revealed by the raw data on Indian company. This may have resulted in inconsistencies in the computation.

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- * It is difficult to ascertain how the margins have been derived without taking into account price upcharge on account of different packaging and 'local preference' as provided in the Recommendation 8 of the Expert Group.
- * As I had communicated earlier that the prices and chemical costs (1986) need to be adjusted for inflation to bring them to current level.
- * The computations do not indicate the break-up of the raw material costs used. Of particular importance is the HP price since the Indian company has an integrated plant using its own HP produced captively. Therefore, please confirm that you have used inputs as fluorspar and H₂SO₄.
- * It is also not known as to how 'Other Costs' per tonne have been worked out. One may have to look at contribution levels especially in the case of Gradual Closure. The difference in contribution need to be compensated instead of differences in profits. The reason for this would be that overheads, in absolute terms, shall remain constant irrespective of production volumes. Computation of non-raw material costs on a per MT basis would lead to incorrect results. This method would increase these costs proportionately with increasing production and decrease these costs proportionately with decreasing production.
- * The basis for ratio of CFC 11 & CFC 12 base volume for NPV calculation seems to be based on current year's ratio of the production of the Indian nominee company and not the average of the last three years to correspond with average best 36 months period production. This may result in different sets of figures for the base volume resulting in different volumes of compensation.

LABOUR COMPENSATION

Details of labour compensation needs to be determined and calculated. This cost would require to be considered for full closure route and may not be needed to be computed for Gradual Closure. This may result in considerable difference in values between Full Closure and Gradual Closure.

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**DIFFICULTY OF DATA COLLECTION & INTERPRETATION**

- * You have indicated that if the data provided via questionnaire is an indicator of what will be readily obtained on audit, assembling the data needed to implement Method 2 may be a challenge. It would be useful if assumptions underlying such conclusion could be enumerated.
- * It has been indicated that data from Indian plant had to be discarded for certain years because of inconsistencies. It is not mentioned as to what kind of inconsistencies were encountered and whether such inconsistencies were discussed with the nominee company from India.

As per the Terms of Reference, a spreadsheet which would enable testing the sensitivity of the overall levels of funding to change in main parameters as recommended in the report of the Third & Fourth Meeting of the Expert Group was to be prepared. The sole purpose of this exercise was, therefore, to test methodology (Method 2), in practice, as recommended by the Expert. Compensation values, therefore, are by no means exhaustive and are typical depending on assumptions used.

I may add that we need to avoid revisiting issues that were settled after extensive deliberations in the Expert Group.

Best Regards,

Yours sincerely,

A handwritten signature in dark ink, appearing to read "Ravi K. Sinha", with a stylized flourish at the end.

RAVI K. SINHA

cc : Dr. Omar E. El-Arini
Chief Officer, MLF
UNEP
Montreal, Canada

(Fax No. : 00-1-514-282 0068)



上海三愛富(3F)新材料股份有限公司

SHANGHAI 3F NEW MATERIALS CO., LTD.

001-512-734-5802

To: Mr. Robert Hoch

Process Technology and Economics Consultant

PR 1, Box 422

Manserville, NY 12439

CC: Dr. Omar M EL-Arini

001-514-282-1122 0068

May 6, 1997

From: JianAn Jiang

Chief Engineer of SIOM

Dear Mr. Hoch,

I received the final report via the Multilateral Fund Secretariat.
And following the request here please find my personal comments:

1. I think the conclusions are quite all right, especially
 - 1) Workability of Method- used for Definition: The Methodology test with Method 2 indicated that the Method itself is workable, on the other hand, some important factors, i.e, cost, price, remaining useful lifetime would need to be further defined to eliminate any ambiguous explanation. But, it cannot be understood as to revise principally the main recommendations from expert group in the report of 3rd/4th meetings.
2. Take the above-said consideration, it is required to have another meeting of expert group to take further discussion. I agree the proposed 9 sub-topics should be taken into account.
3. You mentioned in the report a disk is being distributed (P.0002). I have not received it yet, so that I may retain some pointviews for further discussion after trying "the Excel Workbook".

Yours sincerely,

Jiang JianAn

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**COMMENTS TO FINAL REPORT
RECEIVED FROM MR. TONY VOGELSBERG 6 MAY 1997**

I have reviewed the 1 May report closely and am comfortable that the consultant has done a good job in testing Method 2, as well as highlighting areas that require non-technical guidance.

I believe the conclusions are complete, however, they clearly show that arriving at "acceptable" closure compensation will be a difficult political decision.

(Signed)

F.A. Vogelsberg

COMMENTS TO FINAL REPORT
RECEIVED FROM MR. MIKE HARRIS 7 MAY 1997

1. I congratulate the consultant on a fine piece of analysis. Thanks also to the "volunteers" for the cooperation on data provision.
2. In general, I agree with the report and its conclusions and recommendations. Minor points of difference of opinion/interpretation can readily be sorted out at the next meeting of the Expert Group, if we get (as I hope) the go-ahead from the ExCom Subgroup on production.
3. Conclusions:
 - A) Workability
 - (1) Yes - cost reduction going with increased production should be reflected, particularly where there has been low occupancy in the past, mostly will appear as lower fixed production cost on per tonne basis.
 - (2) "Remaining useful life" concept holds good for debottlenecked/expanded plants. Should treat conceptually as a set of plants, each of incremental capacity and of start-up date corresponding to that increment of capacity; questionnaire/audit must cover this.
 - (3) CFC prices in China known to be "crazy" due to temporary major national shortage early 90s.
 - B) Margins. Agree with consultant - must use "artificial" margin concept or "Approach 2" does not yield incremental cost.
 - C) Financials. Depreciation must not be allowed for more than ten years at most. Generous to include at all, as we already include cost of money and inflation. Need care to avoid rewarding lost cash flow (not legitimate) or opportunity cost (not legitimate) - only lost profit is truly an incremental cost.

Also: For debottlenecked/expanded plants, use concept of a national set of plants (see (A) above) and allow new depreciation only on incremental capital associated with incremental capacity. (Data essential from PNRE/audit).

4. RECOMMENDATIONS

- 1) Prefer non-arbitrary basis, but if final agreement on details not achieved in reasonable time frame then fall back on "guidelines plus" to avoid delaying closures.
- 2) Agree.
- 3) Agree fully - see above under 3A) and 3C). Needs work from Expert Group, but no fundamental problem.
- 4) Agree fully - but no fundamental problem.

5. RESULTS:

- 1) Need some anchoring of CFC prices to reality via world prices pre-Protocol. The wilder fluctuations would not have occurred in a true "free" market without political/economic barriers.
- 2) Using 12-25 years residual life from date of construction or most recent expansion is illustrative, but exaggerates incremental cost. Original tonnage retains original life - or we have "eternal" plants.

6. FINAL RECOMMENDATIONS:

- 1) Early meeting of Expert Group (if Subgroup on Production accepts) to iron out remaining points.
- 2) Move from this "dummy run" pilot (with no actual funding implied) to a couple of test cases on real-life basis, i.e. to go to implementing agency for comment/apro. and thence to ExCom for a real decision on a "This is not a precedent" basis to allow (A) progress while (B) respecting concerns of any party still having misgivings.
- 3) Strongly encourage sectoral approach, especially in multi-plant countries.

(Signed)

Mike Harris