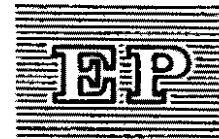




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Executive Committee of
the Multilateral Fund for the
Implementation of the Montreal Protocol

Eleventh Meeting
Bangkok, 10-12 November 1993

Addendum

COUNTRY PROGRAMME: INDIA

This addendum includes:

- a) The remaining pages (following page 3) of the India Country Programme Evaluation Sheet and Country Programme Cover Sheet which were inadvertently omitted.
- b) Letter dated 13 October 1993 (with enclosures) from the Government of India, providing additional information on the India Country Programme.
- c) Response of the Fund Secretariat (dated 18 October 1993) on the above letter.
- d) Letter from the Government of India (with enclosures) dated 28 October 1993 relating to the Secretariat's response of 18 October 1993.

**THE REMAINING PAGES OF THE INDIA COUNTRY PROGRAMME
EVALUATION SHEET AND COUNTRY PROGRAMME COVER SHEET**

COMMENTS

1. The country programme does not contain an Executive Summary.
2. The evaluation of the country programme is constrained by a number of factors, the most important of which are:
 - (a) the lack of projects either on short term or long term basis, providing the background and justification for the estimated required financial resources; and
 - (b) the uncertainty regarding the scope, the level of ODS consumption and the estimated financial resource requirements in the non-formal and small scale sector

The Procedures for the Presentation of Country Programmes (UNEP/OzL.Pro/ExCom/5/16) require a description in order of priority of identifiable projects being undertaken or expected to be undertaken within the producer and user industries in response to the government's commitment to phase-out consumption of ODS.

They also require that a more detailed description of projects for the initial three-year period be provided.

These two requirements are particularly essential for such a country programme whose resource requirements are estimated to be nearly US \$2 billion stretching over a period of about 17 years. The level of resource requirements and the lifespan of the country programme necessitate the setting of priorities.

3. It is indicated in the document (pages 62-63) that the net incremental cost calculations have been based on sectoral and inter-sectoral analysis of project and programme needs comprising technology transfer, technical assistance, technical training, establishment of testing and evaluation facilities for technology selection, pre-feasibility studies, investment projects, including technology development, transfer and adaptation, ODS recovery and recycling, and measures to facilitate ODS phaseout in small-scale and informal sector operations. However, no projects have been identified in the country programme. If the calculations indicated above were not based on theoretical assumptions but on potential needs defined by identifiable activities then it should be possible to provide the projects that form the basis of the costs, as required by the guidelines.
4. The Addendum makes the comment that "India has all the ODS producer and user industry in the private sector and in a liberalized economy industries will willingly commit scarce resources only when the framework and strategy for phase-out is clearly spelt out and approved. It is only after the approval of the country programme that industries will consider project preparation".

The country programme not only provides a framework and strategy for phase-out, but more importantly it forms a basis for the commitment of the Multilateral Fund to the phase-out programme in the country. In the circumstances when the nature and scope of such commitment cannot be clearly ascertained it becomes difficult to make such commitment.

5. It may be noted that in spite of the caution exercised by industry (as expressed above), the process has already been set in motion to assist the Government of India and industry in the phase-out process through funding amounting to about US \$2.6 million through the World Bank, UNDP and UNIDO for institutional strengthening, a feasibility study in refrigerant recovery and recycling, project preparation in all sectors (US \$629,000) and two investment projects in the refrigeration sector. Other investment projects and a pre-investment study amounting to about US \$5.6 million are expected to be considered at this (Eleventh) meeting of the Executive Committee. The country programme preparation process which has included workshops for industry and other actors was expected to lead to identification of potential activities in the areas of major concern.
6. A number of conclusions made in the sub-chapter on Incremental Costs are not borne out by the data provided in the country programme. For instance, although no projects are specified in the country programme it is asserted that "the net incremental costs cover the category of projects specified in the country programme". It may be noted that Table 13 which indicates the net incremental cost provides sector-wise incremental cost rather than category of projects. Again, it is not certain how "incremental benefits, where identifiable and quantifiable have been deducted from project costs" when no projects are specified.
7. The country programme indicates that "for individual projects submitted for approval, incremental benefits will be deducted for the same number of years for which operational costs are approved". It may be noted that for projects submitted for approval, the Executive Committee has adopted guidelines for considering their savings and benefits, in the document entitled Incremental Cost Policies and Operational Interpretation (UNEP/OzL.Pro/ExCom/10/39). This document recommends the consideration of net present value of savings and benefits over the economic life of the project taking into consideration their uncertainty. Savings and benefits that are not in accord with the guidelines in the aforementioned document must be provided with justifications.
8. With regard to interest cost on bank loans it is not clear for what purpose interest cost on Bank loans would be incurred since the purpose of the Fund is to provide mostly grants for projects and since such grants are provided upfront on the basis of project proposals submitted to the Executive Committee. Financial cost of this nature might be incurred in order to initiate a project for which a company would be reimbursed at a later date. However, the indicative list does not specify interest costs. It only specifies capital and operational costs. Therefore, it may not be appropriate to include such costs in the country programme document.

9. With regard to selection of technologies, particularly in relation to technological research and development activities in areas where technologies are proven and commercially available, it may be noted that although the selection of technology is clearly a choice of the country concerned, the Fund pays for the most cost-effective options based on technical advice received from its consultants and the implementing agencies.

Testing and evaluation centres may not be necessary in all cases and the establishment of generic testing facilities may not be eligible. Testing for adaptation should be considered on a case-by-case basis.

10. Administrative costs amounting to US \$15 million may not be eligible. These costs usually constitute a component of projects. Additionally, funds are provided for institutional strengthening. The amount of US \$430,000 has been approved (March 1993) for institutional strengthening in India.
11. Establishment of new facilities for the production and utilization of ODS substitutes would not be eligible unless such facilities are meant to replace equivalent existing capacity.
12. A Reward Fund and Technical Assistance Fund for small scale industries are proposed to be set up. While financial arrangements for transfer of funds are the prerogatives of the beneficiary country and the implementing agencies concerned, the establishment of a Fund as a project per se additional to other project-related financial transfers would not be eligible. It may also be noted that feasibility study on fiscal mechanisms per se may not be an eligible activity.
13. An issue which needs careful consideration is the commissioning of ODS producing facilities and increasing growth in their production, particularly in the halon sector, after India became a Party to the Montreal Protocol. One issue arising from this is the funding of ozone-free technologies and research and development in these technologies in some sectors while ODS production and consumption builds up in others to eventually increase their cost of phase-out to the Fund. The peak net incremental cost reached in the year 2007 could in part be the result of such dual expenditure.
14. In the Action Plan Summary for India the interrelationships among some of the items/activities are difficult to discern. For instance, the relationship between the incentives, reward fund and technology transfer cannot be discerned from the action plan as structured. The Action Plan Summary provides a list of items or activities to be undertaken in the period 1993-2010 rather than sequential, structured Action Plan.
15. In the statement on "Total Phase-Out Costs" it is stated that "in addition to these (net incremental) costs which would be covered by the Multilateral Fund there are other costs that will have to be covered by the country itself". It should be understood that the consideration of the country programme by the Executive Committee in no way imposes financial obligation or commitment on the Multilateral Fund to the extent described in the country programme.

RECOMMENDATIONS

1. To take note of the India Country Programme.
2. To invite the Government of India to:
 - (a) assess, with the possible assistance of the relevant implementing agency, the full extent of the consumption of ODS in the non-formal and small scale sector with the view to formulating an appropriate strategy for the phase-out of ODS in the sector.
 - (b) identify, using as a guide the Procedures for Presentation of Country Programmes and Project Proposals to the Executive Committee (UNEP/OzL.Pro/ExCom/5/16, Annex III) projects to be undertaken in the phase-out period, indicating, if possible, the order of priority, estimated costs and the ODS to be phased-out, as well as projects for the initial three-year period. It is understood that these projects will be subject to periodic updates as necessary.
 - (c) revise the country programme on the basis of information obtained in 2(a) and 2(b) above and taking account of comments communicated earlier to the Government of India by the Fund Secretariat.

PROJECTS APPROVED FOR INDIA

(as at June 1993)

Project	Date Approved	Implementing Agency	Cost US \$
1. Feasibility study for the recovery and recycling of refrigerants	June 1993	UNIDO	55,000
2. Substitution of CFC-11 refrigerant by HCFC-123 in centrifugal chillers	June 1993	World Bank	567,000
3. Conversion of compressor manufacture from CFC-12 to HFC-134a designs	June 1993	World Bank	685,000
4. Project formulation for the conversion of electronic cleaning processes from CFC-113/alcohol blended and 1,1,1-trichloroethane to non-CFC cleaning	June 1993	UNIDO	74,000
5. Assistance in project preparation in all sectors	Oct. 1992	UNDP	100,000
6. Institutional strengthening	Oct. 1992	UNDP	430,000
7. Country programme preparation	March 1992	UNDP	200,000
8. Preparation of investment projects	March 1992	World Bank	400,000
9. Project formulation for phasing-out ODS in the unorganized sector	June 1993	UNIDO	55,000
TOTAL			2,566,000
Estimated ODS to be phased out: 54 tonnes ODP			

**PROJECTS PENDING APPROVAL OF THE
ELEVENTH EXECUTIVE COMMITTEE MEETING
(November 1993)**

Project	Implementing Agency	Cost US \$
1. Basic Data Development HFC-134a Process	World Bank	1,400,000
2. Modification of CFC-12 Mobile Air Conditioning Manufacturing for HFC-134a	World Bank	1,710,000
3. Application development for the conversion of CFC-11/Polyol system to low/non-ODS formulation (Manali Petroproducts)	World Bank	829,000
4. Applications development for the conversion of CFC-11/Polyol system to low/non-ODS formulation (UB Petroproducts)	World Bank	836,000
5. User sector pre-investment studies	World Bank	100,000
6. Replacement of CFC-11 blowing agent in polyurethane (PU) Systems with low and non-ODS materials	World Bank	619,000
7. Aero Pharma Aerosol Conversion	World Bank	87,520
TOTAL		5,581,520

COUNTRY PROGRAMME COVER SHEET

Country : India

Date Received : September 1993

Period Covered : 1993-2010

Lead National Agency : Ministry of Environment and Forests

Lead Implementing Agency : Not indicated

1. Phase-out schedule

Substances	Current Consumption (Tonnes X ODP) in 1991	Planned Consumption till Phase-out* Tonnes X ODP	Planned Year of Phase-out
CFC-11	1,900	133,800	2010
CFC-12	2,850		
CFC-113	256		
Halon-1211	1,650	82,700	2010
Halon-1301	2,000		
Carbon Tetrachloride	4,400	133,000	2010
Methyl Chloroform	55	1,300	2010
TOTAL	13,111	350,800	

* Based on figures 8-11 in the country programme representing the phase-out scenario to year 2010

2. Government Action Plan

The summary of the Action Plan provides activities to be undertaken in three phases, namely in the periods 1993-1997, 1998-2000 and 2000-2010 as reproduced below.

Action plan summary for India			
Item	1993-1997	1998-2000	2000-2010
Country Programme Restrictions	Elaborate and commence implementation Review of assessment, regulation and monitoring arrangements. Study the feasibility of the steps for ODS phaseout in the small scale and informal sector	Reassess and adjust, then continue Ban on new plants to produce ODS, except essential uses Set up institutional arrangements for the small scale and informal sector Ban on aerosols using ODS, except essential ones	Reassess, continue and complete Ban to import ODS and products using or containing ODS Review arrangements for the small scale and informal sector Emissions control of ODS during servicing
Management	Study and review the process specifications and standards related to substitutes, codes of good practice, training, etc.	Establish quality inspection and control centres, and national standards for equipment, testing procedures, certification, etc.	Continue
Incentives	Feasibility study on fiscal mechanisms	Notify policies	Continue
Awareness, education and technical information exchange	Carry out awareness and education on Ozone Layer protection through public media, such as newspapers, broadcasting, and TV programmes, so as to upgrade the environmental awareness of the public Communicate key points of National Action Plan to the public Issue special bulletins on ozone layer protection, particularly to the small scale and informal sector	Continue the awareness and education hold technical workshops and public meetings Announce new policies in advance of their introduction Inform the consumers about the premature retirement of refrigerators and refrigerant and air conditioning equipment	Continue
Reward fund for ozone layer protection	Establish management institution for the funds and elaborate their management methods		Continue

ECO-MARK	Elaborate and implement standards for issuing ECO-mark to qualified products	Bureau of Indian Standards to enhance products range using ECO-MARK. Popularize and monitor	Continue
Technology transfer	Encourage projects for transfer and adaptation of technology for phaseout of ODS production and consumption Evaluation of substitutes and substitute technologies Develop cleaning processes Review arrangements for transfer of technology	Conversion of manufacturing facilities for production, including ancillaries and servicing Adaptation and test manufacture of non ODS substances and technologies - do -	Continue Continue Continue
Recycle/Recovery , destroying technologies	Techno-economic feasibility status	Establish networks and sites for recycle/recovery and destruction, where appropriate	Continue activities beyond the last period
Monitoring	Develop a monitoring system for ODS imports Define and divide responsibilities for supervision and management of the technical substitute projects among environmental protection agencies and agencies for dealing with the small scale and informal sector Determine the phaseout plan for identical units Report regularly on the progress of ODS phaseout	Review the arrangements for the identical units, particularly for the small scale and informal sector Develop feedbacks on the requirements of finance and consumer protection	Continue the activities beyond the last period

Projects have not been identified in the country programme. However, a Table indicating the cost of ODS phase-out by sector and sub-sector is provided as follows.

Sector	Incremental costs (\$ million)
Aerosols	13
Foams	150
Halons	36
Domestic refrigeration	295
Other refrigeration and AC	120
Solvents	104
Trade-in of refrigerators and other appliances	325
Recovery and recycling	50
Chemical producers	466
Small scale and informal sector	
Other R&AC	105
Foams (non-refrigerator)	84
Aerosols (fillers only)	21
Solvents	174
Fire-fighting	6
Sub total	390
Administrative cost	15
Total	1964

Estimated cost of complete phase-out*	US \$ 1,964 million
Estimated cost effectiveness	US \$ 9.85/Kg

* This cost could be subject to further adjustment on the basis of a survey which would clarify the cost implications of phasing-out ODS in the small scale and informal sector estimated to account for two-thirds of the ODS consumption.

LETTER DATED 13 OCTOBER 1993 (WITH ENCLOSURES)
FROM THE GOVERNMENT OF INDIA,
PROVIDING ADDITIONAL INFORMATION
ON THE INDIA COUNTRY PROGRAMME.



DO No. 4(1)/1/92-IC-I

संयुक्त राष्ट्र संघ (UNEP)

भारत सरकार

SECRETARY (ENVIRONMENT & FORESTS)
GOVERNMENT OF INDIA

New Delhi, 13th October, 1993.

Dear Dr. El-Arini,

This has reference to your Fax dated 5 October, 1993 enclosing the Evaluation Sheet of the Fund Secretariat on the India Country Programme.

India shares the global concern over new information concerning the depletion of the ozone layer and its effects on life and the environment. The Country Programme provides for an accelerated phase out of ozone depleting substances. It is expected that nearly 2250 tonnes of ODS would be phased out by 1997. This would mean that 45% of CFC-11, 35% of CFC-12, 80% of H-1211 of 1991 consumption is expected to be phased out by 1997. Even though the Protocol entitles us to delay compliance with the control measures the Country Programme provides for phase out of about 10% of the different substances compared with the unconstrained demand in 1997, which is nearly 25% reduction of the consumption in 1991. The details are given in Tables 5 and 9 of the Country Programme.

India is amongst the developing countries that are self-sufficient in the production of CFCs and is expected to become self-sufficient in the production of halons. Substantial investments to create capacity have been made in recent years. Moreover, a large number of small scale units in dispersed locations will be involved in the phase out of ozone depleting substances. Consequently, India would make use of a mix of policy instruments to distribute the burden of adjustment among the various sectors. The selection and timing of feasible investment projects would depend on corporate plans based on the approved Country Programme. We have initiated work on a detailed survey of the firms to determine the approach to be adopted consistent with our economic and and social development objectives. We are also obtaining from industry information on when they propose to phase out CFCs; we will rely on voluntary agreements as far as possible and use regulations only as a last resort. All this will take time. Therefore, we have prepared our Country Programme on the basis of available data and interaction with industry as we have to send clear signals to our industry about the approval by the Multilateral Fund and, we are sure that after approval phase out of ozone depleting substances will not be delayed.

The Country Programme provides the framework for the phase out. Total country incremental cost will be different from the sum of the financial incremental costs of eligible firms because of transfer payments, etc. The industry structure may change. There will be problems related to information and enforcement. The workshops of the Country Programme Preparation Process have served to give firms and consumers warning of the future measures and reductions required. In this way, adjustment should be less disruptive and costly. This process has not identified the potential activities in the areas of concern. The Country Programme is a dynamic document, as has been clarified by the Fund also, and, as we have indicated in the Country Programme, a list of projects would be made available in the next revision in 1995.

During the period 1993 - 1995 we hope to have a data base of the units and their management plans for the phase out. The arrangements for the small scale and informal sector are also expected to be finalised in this period. We also hope to complete the review of process specifications and standards related to substitutes, codes of good practice, training, etc.; as well as a study on the appropriate fiscal mechanisms needed to facilitate the phase out. We are separately bringing out a newsletter on Ozone related matters, which will be useful particularly to the small scale and informal sector. An awareness campaign is being initiated to raise the environmental awareness of the public. We will also examine the modalities for a ban on creation of new capacity and restrictions on imports. These, rather extensive, arrangements are necessary because it is estimated that nearly two-thirds of the consumption of ozone depleting substances is in the small scale and informal sectors.

As regards investment projects for the large and medium units as well as identified small scale units, we have already initiated work and a number of project proposals have been submitted to the Fund and others are under preparation. Our priorities are to maximise indigenous production of substitutes. So far, the industry is working on the following projects for possible submission to the Fund:

SECTOR	NUMBER OF PROJECTS	APPROXIMATE INCREMENTAL COST
Refrigeration	17	\$ 45 m.
Foams	33	\$ 14.5 m.
Aerosols	26	\$ 10.8 m.
Solvents	12	\$ 10.4 m.
Halons	5	\$ 6 m.
Producers	1	\$ 40 m.
Small Scale	5	\$ 28 m.

Note: These projects are under various stages of consideration by firms; they relate to the Country Programme - phase out of ODS (Table 9) and incremental cost (Table 14).

The considerations that are under discussion with industry in determining the phase out strategy for each sector are given in the Annexure. The "bottom up" approach in determining the strategy that we are adopting takes time to evolve, but once a consensus is reached ensures implementation. This is a more effective way of securing agreement of the interest groups involved than mere reliance on regulation; particularly when there is no societal concern for the phase out of ozone depleting substances. The Government will, however, regulate the recalcitrant units to ensure the phase out according to the commitments under the Protocol.

Regarding the other points raised in your fax it is stressed that the Fund should adopt a positive and constructive role to assist developing countries in their compliance with the provisions of the Montreal Protocol. The Country Programme commits India to an accelerated phase out which would be possible only when the Fund facilitates the financial and technical cooperation that is needed for the purpose. The concerns relating to interest costs, reward fund and technical assistance fund for small scale industries and the informal sector would be taken up with the Fund after the completion of the survey through specific projects. It may be noted that the Protocol provides that incremental costs other than those mentioned in the indicative list would be taken up by the Executive Committee on the basis of criteria decided by the Parties.

The Montreal Protocol on Substances that Deplete the Ozone Layer as adjusted and amended by the meeting of the Parties in London and Nairobi acknowledges that "Funds can be expected to make a substantial difference in the world's ability to address the scientifically established problem of ozone depletion and its harmful effects" and considers the importance of promoting international cooperation in "research, development and transfer of alternative technologies". The India Country Programme provides for an accelerated phase out of ozone depleting substances. The strategy is being evolved with the active involvement of industry. Its implementation is contingent on the Fund meeting the incremental costs according to criteria decided by the Parties. Approval of the Country Programme by the Fund is necessary for the Government of India to undertake its obligations to bear other costs, including transfer payments, etc. as well as for industry to prepare their corporate plans for the phase out.

We request this communication be circulated to the members of the Executive Committee.

With regards,

Yours sincerely,

A handwritten signature in dark ink, appearing to read 'R. Rajamani', with a long horizontal stroke extending to the right.

(R. Rajamani)

Dr. Omar E. El-Arini,
Chief Officer,
The Multilateral Fund for the Implementation
of the Montreal Protocol,
Montreal, Quebec,
Canada.

ANNEXURE

REFRIGERATION AND AIR CONDITIONING SECTOR

There are several considerations for formulating a viable phase out strategy.

1. Prioritisation for phase out between different products within the sector

In Water Coolers and Room Air Conditioners compressors based on HCFC-22 are already in use in the country. Similarly for Central Plants and Cold Stores, technologies based on HCFC-22 and Ammonia are well established. In fact a number of these systems are designed to operate on CFC-12 or HCFC-22 and HCFC-22 or Ammonia. It should not be difficult to phase out CFC-12 from these applications at an early date.

It is also possible to convert the refrigeration system of Ice Candy Machines to be based on HCFC-22, or other suitable substitute. However, majority of these products are made in unorganised sector.

2. Quantity of Consumption Consideration

The consumption of CFCs in 1996 by Central plants and Ice Candy machines is of the same order as that of Refrigerators, Deep Freezers and Bottle Coolers put together. This because the per unit consumption of CFCs in the the former is very high.

An effective strategy will be one in which products, requiring larger consumption and for which alternative technologies are available, are phased out earlier so as to give more head room for more products where substitutes have not been identified.

3. Level of Technology of Products

In some of the products like Cold Stores, Central Plants and Ice Candy machines it is not difficult to change over to substitute technologies which are available, established and in use. This can be done at an early date during phase down.

4. Phase-Out Strategy for Refrigeration and Air Conditioning Sector

Taking into account the above, a phase-out scenario is under consideration:

Date	Substitution Scenario
1.1.1999	---
1.1.2000	- 50% CFC-12 phase-out in Refrigerators, Deep Freezers, Bottle Coolers, Water Coolers, Centrifugal Chillers and Mobile A/C based on CFC-12. - 100% conversion of CFC-12 compressors of Central Plant, Cold Store, Ice Candy Machines and Room A/C to HCFC-22 - 50% CFC-11 reduction in foam.
1.1.2005	100% change over of CFC-12 substitute in Refrigerators, Deep Freezers, Bottle Coolers, Water coolers, Mobile/A.C. and Centrifugal Chillers based on CFC-12. - 100% Change over of CFC-11 by CFC-11 substitute in foam and Centrifugal Compressors.
1.1.2010	- Residual recharging requirements to be met by recovery/recycling, or drop-in substitutes or retrofitting the compressors.

SOLVENTS

Industry will be resorting to diverse advanced and mature technologies for its phaseout of the use of Solvents. The phase out will be taking place in each sub sector by applying appropriate and safe alternative technologies. Since there is no single alternative to OOS solvents in many subsectors (especially where cleaning and degreasing is concerned) the introduction of alternative technologies would be staggered and will be proceeded by evaluated and continuously monitored through projects in the key sub-sectors.

The key subsectors are :

a) Electronic and precision cleaning (including metal cleaning, aerospace, marine equipment, optics and jewellery cleaning, etc. The identified technologies for the sector include:

- no clean technologies (e.g. LS flux applications, controlled atmosphere soldering)
- aqueous cleaning (including partially water based semi-aqueous emulsion systems i.e. terpenes / dibasic ester water systems).
- Organic non halogenated solvents (eg. alcohol, ketones, glycols, esters, terpenes, petroleum distillates etc.)
- Halogenated solvents (e.g. trichloroethylene, percholoroethane etc.)
- Perfluorocarbons (e.g. perfluoro hexane)
- A combination of the above.

The available technologies listed above can, in most cases for cleaning purposes be applied more effectively in conjunction with additional mechanical action via sprays, submerged impingement or ultrasonics.

b) In the areas of coating and their applications (e.g. in medical syringe manufacturer) identified technologies include aqueous and/or chlorinated solvents, and/or perfluoro hexane, and/or controlled mechanical applications.

c) The pesticide and pharmaceutical industry consumes large quantities of OTC solvents for the manufacture of bulk substances (e.g. endosulfan, dicofol, ibuprofen, chlorophenesil etc.) In the areas of pesticides and pharmaceuticals identified technologies include hydrocarbons, chlorinated solvents, process modifications and/or a combination of above.

d) In the area of textile cleaning the key option is better housekeeping. Amongst the alternatives are aqueous systems, chlorinated solvents, HCFCs, hydrocarbon solvents and or a combination of the above.

e) In the area of chlorinated rubber the key immediate measure is to incorporate good housekeeping practices. Substitute technologies include aqueous systems, chlorinated solvents, hydro carbon based solvents and/or a combination of the above.

Due to the broad spectrum and nationally important nature of user industry, rapid development of ODS alternative technologies and intrinsic newness of some of the technologies, each sub-sector in the user sphere requires careful evaluation, verification and installation back-up for the relevant alternative technologies.

In this context, the strategy under consideration for the successful ODS phaseout is based on a three pronged technical approach encompassing the following elements:

- good housekeeping and recycling measures
- institutional and industry evaluation of alternatives, switch monitoring and post-installation technical back-up.
- implementation of lead/beacon projects in key identified user sub-sectors

A key consideration is to reduce costs for ODS solvent phaseout. An added cost rationalisation can be achieved by domestic production of relevant technologies, including equipment and substitutes.

FOAMS

Successful implementation of the phaseout in the Foams sector is based on a consideration of actions from raw materials suppliers and users. These actions involve availability of replacement chemicals at acceptable prices, evaluation capacities and training facilities for the ODS consuming industry and institutional support for the phase-out programs with promotional programs etc.

Governmental action will be needed to develop product standards, and for the institution and implementation of awareness program. Government action will be supportive and not restrictive. However, in the later phase of the program some restriction on the use of CFCs may be needed to enforce compliance.

HALONS

General purpose Halon-substitutes having capability of direct replacement and having the characteristics of Halon extinguishant are unlikely in the foreseeable future i.e., for atleast 15-20 years. However, alternatives with lower ODP for specific uses may be possible if lower fire extinguishing capabilities, higher toxicity etc. are acceptable.

Two possibilities for Halon replacement are under consideration:

- i) Identification and evaluation of non-chemical alternatives for certain applications.
- ii) Research & Development work for substitutes which have properties similar to Halons but with zero ODP - a chemical substitute.

It is recognized that there are fire/explosion risk scenarios which would result in adverse consequences for society, if Halon or Halon-like replacement agents are not used for protection.

The alternative protection choices may not achieve the same level of fire protection and explosion protection offered by the use of the present Halons and in some circumstances greater fire loss and risk to people and property may result from the use of the alternatives.

Some alternatives for Halon 1211 in portable fire extinguishers being used in development countries CO2, Dry Powder multipurpose type, AFFF, Water Fog etc need to be evaluated and for some of them technology transfer will be needed.

1. Research work being done worldover has shown that the substitute having properties equivalent to the present Halons are unlikely to be available atleast in the foreseeable future. If trade offs in fire extinguishment capability, toxicity etc. are acceptable, then some of the agents with lower ODP, which are at present under development in developed countries can be considered as alternatives. This question needs to be considered in the light of an emerging industrial economy in India with increased risk of fire. Many of the extinguishers having low extinguishing capability etc. could pose problems due to the nature of infrastructure facility, response time structure, major design changes in the building and equipment layout (involving higher costs), effective training etc. Acceptance of such trade-offs will thus require societal acceptance and higher costs. This issue is being considered separately by the experts in the area of fire protection.

Substitutes being considered for Halon substitutes are :

Candidate	Formula	Application	Ext. Conc.	ODP	Lethal Conc.
HCFC -123	CF3CHCl2	Streaming	7.5	0.02	3.2
HFC-125	CF3CHF2	Total Flood	9.1	0	>70
HFC-23	CHF3	Total Flood	13.0	0	>65
HFC-227ea	CF3CHFCF3	Total Flood	5.9	0	>80
FC-3-1-14	C4F10	Both	5.0	0	>80
fc-5-1-14	C6F14	Streaming	4.4	0	>30
<u>Comparison</u>					
Halon 1211	CCl3BrF2	Streaming	3	3	>40
Halon1301	CF3Br	Total Flood	3	10	>80

Some of the alternatives for Halon 1301 system being tried in developed countries, which have selectively started using them, are

Water sprinkler systems
Fine Water mist systems
CO2 systems
Foam systems
Inert Gas (Inergen systems) etc.

These would require technology transfer and thorough evaluation in India

2. Recommendation

The following strategy is under consideration:

i) CONSERVATION

- a. Evaluation of replacment of Halon by some other gas during testing.
- b. Development of leak proof valves to avoid leakage during storage and gas leak detector.
- c. Study on possibility of the recycling of old gas instead of discharging of the gas after the fixed life.

ii) REPLACEMENT

- a. Study of trade-offers involved in using substitutes wherever possible.
- b. Recommendation on change in design & equipment layout for using existing substitutes.
- c. Assessment of cost of change in design.

iii) SUBSTITUTE

- a. Evaluation of substitutes by way of
 - first hand information from manufacturers abroad
 - Test and evaluations
 - Identification of substitute appropriate to India
- b. Process Development of Halon substitute
- c. Commercialisation of Halon substitute

**RESPONSE OF THE FUND SECRETARIAT
(DATED 18 OCTOBER 1993).**



MULTILATERAL FUND
FOR THE IMPLEMENTATION OF THE MONTREAL PROTOCOL

Secretariat

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TELEFAX TRANSMISSION

FAX TO	: Mr. R. Rajamani Secretary Ministry of Environment and Forests Lodi Road New Delhi	DATE: 18 October 1993
		OUR FAX: (514) 282-0068
FAX NO.	: (91-11) 4360678	NO. OF PAGES: 3
FROM	: <i>Omar E. El-Arini</i> Omar E. El-Arini Chief Officer	

Dear Mr. Rajamani,

Re: your fax dated 13 October 1993. Please note that the first page did not appear. However, attempts to reach your office for the missing page have not been successful. Hence, our comments are based on the information provided in the first two pages of the draft of the document of same reference dated 12 October 1993 and the part of the fax of 13 October that was received.

With regard to the pace of phase out, the most credible reference sources are the ODS consumption phase out profiles provided in figures 8-11 of the country programme. These indicate as follows:

- Annex A Group I ODS

Consumption is frozen at 9,000 tonnes ODP/year between 1995 and 1997 as against 5,070 in 1991. The phase-out begins from 2000. 1991 levels are further reached in about 2002-2003.

- Annex A, Group II ODS

1996-1997 consumption levels at about 5,000 tonnes ODP. This is maintained until 2004 when the phase-down begins according to the Montreal Protocol. The consumption of Annex A, Group II ODS in 1991 was 750 ODP tonnes.

Thus, the statement that 45 per cent of CFC-11, 35 per cent of CFC-12 and 80 per cent of H-1211 of 1991 consumption is expected to be phased out by 1997 is difficult to understand. The interpretation of the phase out profile is that although phase out projects may

be undertaken in various sectors, net reduction in ODS consumption relative to 1991 consumption would be discernible after the year 2000 for almost all the ODS.

The interpretation of figures 8 and 9 therefore seems to be at variance with ODS consumption reduction figures in Table 9. In fact, Table 9 does not add to the reader's understanding of the phase-out process in India, it rather confuses the reader dealing as it does with specific sector reduction not clearly related to earlier discussions. For instance, in the case of Aerosol, can it be assumed that in spite of measures to be taken to phase out, consumption will grow to the extent that over 26,000 tonnes of CFC-11 and CFC-12 will be phased out in 2010.

Except in the case of CTC and MCF, the phase out to a large extent takes advantage of the grace period. In the case of Annex A Group I ODS, the phase out when it occurs is faster than provided for by the Protocol while for Annex A Group II ODS, the phase out is in accordance with the Protocol.

With regard to the Table providing the number and cost of projects which are now under various stages of consideration by firms, it would have been more meaningful and its relationship to Tables 9 and 14 made more obvious if there had been:

- breakdown of the projects by sector;
- indication of ODS to be phased out;
- indication of estimated time scales either for submitting the projects for consideration or implementing the projects.

For instance, in Table 14 for the production sector, the cumulative funding requirement for the three-year period 1994-1996 is US \$35 million, while for the small scale and informal sector, the requirement for the three-year period 1993-1995 is US \$28 million. Do these projects reflect these phases in the incremental cost in Table 14 or are additional projects expected within the 1993-1996 period.

Please note that paragraph 14 of the Addendum submitted earlier explains the methodology for the calculation of the incremental cost which is said to be based inter alia "on project cost estimates provided by Indian industry and comparison with other similar large country programmes". What is expected is a summary of the "projects", their cost estimates, the ODS to be phased out and the timeframe within which the phase out is to occur.

With regard to the "bottom-up" approach used in evolving the strategy to be adopted, much as this approach ensures a consensus between government and industry, notwithstanding the dynamic nature of country programmes, it may not be an acceptable precedent to approve a country programme whose adopted strategy is likely to be subject to change due to the fact that no consensus has been reached with industry which is in effect responsible for implementing the country programme.

Although this approach "ensures implementation", unless all the consensus making processes are carried to their logical conclusion the credibility of the strategy in the country programme could be undermined. Hence, it may appear that this approach could take a longer

time to produce the country programme than the approach where the government has a more dominant role in determining the strategy.

Regarding the comment that the "Fund should adopt a positive and constructive role to assist developing countries in their compliance with the provisions of the Montreal Protocol", we are pleased to note that indeed, the Fund has adopted such a positive and constructive role in assisting developing countries. Acting quickly to devise criteria, guidelines and methods that would ensure that areas of activity that are not specifically covered by criteria adopted by the Parties are brought into the funding mechanism and that would engender flexibility without sacrificing equity in the allocation of resources and maximize the benefits to be gained by all Article 5 Parties irrespective of consumption level within the limits of available resources is indeed a positive approach towards assisting Article 5 Parties. Clearly, faced with a situation where demands far exceed the resources available, nothing short of rationalization of the financial support provided would satisfy all the beneficiary Parties.

With regard to the phase out strategies for refrigeration and air-conditioning, only one of two scenarios mentioned has been provided. You may wish to correct the omission.

With regard to the solvents strategy, it will be advisable to delete the technical aspects and retain only the section that describes the strategy. Also, in the case of the halon strategy, the technical aspects could be reduced. The whole strategy describes R&D including development of Halon-1301 and commercialization of H-1211. The latter two activities may not be eligible for funding.

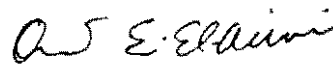
When these revisions are made, this additional information may be included in the country programme. We suggest that you revise the addendum to the country programme to reflect the necessary changes. If this is agreeable to you, the Secretariat will issue the revised addendum to members of the Executive Committee.

Please send the original of the fax dated 13 October by courier since the fax was dismembered and not very legible.

I shall be away from the office for the rest of the week. Hence, further correspondence on this issue should be addressed to Mr. R. Abrokwa-Ampadu, Programme Officer.

Yours sincerely,

Regards



Omar E. El-Arini
Chief Officer

**LETTER FROM THE GOVERNMENT OF INDIA
(WITH ENCLOSURES) DATED 28 OCTOBER 1993.**



सचिव (पर्यावरण एवं वन)
भारत सरकार
SECRETARY (ENVIRONMENT & FORESTS)
GOVERNMENT OF INDIA

Fax : 1-(514) 282 0068

R. RAJAMANI

DO No. 4(1)/1/92-IC-I
October 28, 1993.

Dear Mr. El-Arini

This has reference to your fax dated 18th October, 1993 regarding India Country Programme. Our response to your fax is enclosed. It is to reiterate our request that our comments may kindly be circulated to all the members of the Executive Committee.

With regards,

Yours sincerely,

A handwritten signature in dark ink, appearing to be 'R. Rajamani'.

(R. RAJAMANI)

Dr. Omar E. El-Arini
Chief Officer
The Multilateral Fund for the
Implementation of the Montreal Protocol
Montreal, Quebec
Canada H3A 3J6

RESPONSE TO MULTILATERAL FUND SECRETARIAT COMMENTS DATED 18TH
OCTOBER 1993.

1. The figures 8-11 of the Country Programme indicate unconstrained demand, consumption and the Protocol requirements for Annexure A, Group-I, Group-II, Annexure-B Group-II and Group-III ODS respectively. Figure-8 for Annexure-A, Group-I ODS i.e. CFC-11, CFC-12 and CFC-113 illustrates that around 1800 tonnes of ODS will be phased out. This is the difference between the actual consumption and the unconstrained demand during 1996. This phaseout amounts to 17% at the 1996 unconstrained demand.
2. In respect of CFC-11, the reduction in the year 1996 will be 830 tonnes in comparison to the actual consumption in the year 1991 of 1900 tonnes. This would mean an actual reduction of around 45% of use of CFC-11 from 1991 consumption. Similarly in respect of CFC-12, the quantity phased out in 1996 will be 960 tonnes in comparison to a consumption of 2850 tonnes in 1991 amounting to a reduction of 35%. The same logic could be extended to H-1211.
3. Considering that protocol provides for unrestricted consumption till the year 1996, any reduction in consumption from the unconstrained demand value will be due to phaseout only. This also clearly explains the reduction in ODS consumption - Table 9. As far as specific sector reduction is concerned, phaseout percentages have been deduced keeping the 1996 unconstrained demand value as the base figure and the difference in consumption in a particular year and the unconstrained demand in 1996. For example, the unconstrained RAC Sector demand in 1996 will be 3780 ODP tonnes and the actual consumption in the year 2000 will be 3716 ODP tonnes, in the year 2004, 3054, in the year 2005, 492 ODP tonnes. The reduction therefore will be 1.5%, 19% and 86% respectively. In fact, an 85% phaseout would have been achieved by the year 2005, two years in advance of the protocol.

4. Table-9 indicates phaseout quantities in representative targetted years. For example, in the year 2000 the quantity indicated as phaseout in the aerosol sector is of the order of 5,670 tonnes of which 1,370 tonnes was phasedout in the year 1996. Therefore, during the period 1996 to 2000, 4,300 tonnes has been phased out. This again is with reference to the unconstrained demand in the year 2000. As far as the aerosol sector is concerned, phaseout will be 100% in the year 1998.

5. The amount of US \$ 28 million for projects in the small scale sector during the period 1993-95 is not for additional projects but a break up of the already indicated 390 million for small scale sector for complete phaseout till the year 2010.

6. The following statements with regard to phaseout strategy are made :

6.1 Refrigeration and Air Conditioning

"In the short-term (1994-1996) small demonstration production line projects and other trials of alternative refrigerants like HFC-134a, HFC-152a, mixtures, blends and hydrocarbons will be taken up. In order to freeze the consumption of CFC to the average of consumption in the period 1995-97, conversion to HCFC-22 wherever possible will be achieved so as to meet the target set for 2005.

6.2 Foams:

Demonstration projects to evaluate technologies in all foam categories will be carried out during the years 1994-97. Wherever possible phaseout projects would also be taken up. Based on demonstration projects successful technologies will be popularised in the industry to expedite phaseout.

6.3 Solvents:

Since ODS Solvents is used in diversified sectors and in certain areas the substitutes/alternate technologies are not yet available, attempts will be made to phaseout ODS Solvents in a gradual manner so that normal demand of local consumers is not affected. The smooth transition from ODS to their substitutes would be carried out. Better house keeping, recovery and recycle of ODS-Solvents will be adopted. Phaseout by substituting some of the ODS-Solvents by available safe alternatives will also be resorted to. It is proposed to initiate ODS Solvents phaseout simultaneously wherever possible.