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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Seventy-sixth Meeting
Montreal, 9-13 May 2016

REPORT OF THE SUB-GROUP ON THE PRODUCTION SECTOR

Introduction

1. The Production Sector Sub-group was reconstituted at the 76th meeting of the Executive Committee. The Sub-group consisted of the representatives of Argentina, Austria, Canada, China, Germany, India, Japan, Jordan, Mexico and the United States of America, with Canada selected as facilitator. The representative of the World Bank was also present as an observer.

Agenda item 1: Adoption of the Agenda

2. The Sub-group adopted the provisional agenda contained in document UNEP/OzL.Pro/ExCom/76/SGP/1.

Agenda item 2: Organization of work

3. The Sub-group agreed to the follow the organization of work proposed by the facilitator.

Agenda item 3: HCFC production sector guidelines

4. The Sub-group continued its discussion of the HCFC production sector guidelines (UNEP/OzL.Pro/ExCom/76/SGP/2), which it had previously considered on the margins of the, 64th, 65th, 68th, 69th, 70th and 71st meetings. At the 72nd meeting, the Sub-group discussed paragraph 1(a)(i) of the draft Guidelines and had agreed to remove the square brackets in that paragraph and to delete the words “requirements for/considering parallel reductions in the consumption sector”.

5. The facilitator noted that the Secretariat had made several editorial changes to the guidelines which the Sub-group incorporated into the document. He asked the members to address those four paragraphs of the guidelines that remained in square brackets.

6. There was no agreement to remove the square brackets in paragraphs 1(e) and 1(h). In relation to paragraph 1(j), one representative said that the cut-off date for the eligibility of production sector plant capacity should be established as of 1 March 2007 because the Ozone Secretariat had circulated an HCFC

adjustment proposal in March of 2007 which should have been an adequate signal to all Parties not to establish any further production lines. However, other representatives supported that the cut-off date be established as of 21 September 2007. Following a discussion, it was agreed to remove the square brackets in paragraph 1(j), and replace words in square brackets within the paragraph, “1 January 2005/21 September 2007/31 December 2008”, with the words “1 March 2007/21 September 2007”.

7. In relation to paragraph 1(k) on additional support for swing plants that had already received CFC closure funding, one representative proposed that the words, “loss of profit due to accelerated phase-out schedule of HCFCs per decision XIX/6” replace the words “additional support for HCFC production phase-out”. It was agreed to add the words and place them in square brackets. Due to the continued lack of agreement on the eligibility of swing plants, some representatives suggested that one way forward would be to let the Meeting of the Parties decide the issue as it affected the compliance of Article 5 countries with the Montreal Protocol. However, it was also pointed out that when the same issue had been raised at a previous meeting of the Open-ended Working Group of the Parties to Montreal Protocol, those raising the issue had been told that it could not be discussed because it was already being discussed in the Sub-group on the Production Sector. There was no agreement to have the Executive Committee seek guidance on this issue from the Meeting of the Parties.

8. It was agreed to postpone further consideration of the guidelines. A copy of the proposed guidelines, as agreed at the meeting of the Sub-group with bracketed text, is contained in Annex I of the present report.

Agenda item 4: Other matters

9. No other matters were raised.

Agenda item 5: Adoption of the report

10. The present report was reviewed by the facilitator.

Agenda item 6: Closure

11. The meeting of the Sub-group was closed at 3.00 pm on 11 May 2016.

Annex I

Recommendation

1. The Sub-group on the Production Sector recommends that the Executive Committee:
 - (a) Approves:
 - (i) The formats for preliminary data on the production sector and the form for the sector phase-out plan, included in Appendices I and II to the current document;
 - (ii) The collection of “Quantities of exported HCFCs” called for in item 3.2 of Appendix I to the current document, where countries were willing to provide such data;
 - (iii) The collection of data on “Total employees per HCFC plant” called for in Table 4.1 of Appendix I to the current report;
 - (b) Decides that:
 - (i) Each Article 5 producer country should complete the Preliminary Data on the Production Sector form in Appendix I to the current document;
 - (ii) The Article 5 producer country should inform the Executive Committee eight months before it is ready to submit its sector phase-out plan according to the format provided in Appendix II to the current document. The Executive Committee should commission a technical audit of the production sector of the country concerned in conjunction with the preparation of the sector plan. This will enable the results of the technical audit to be incorporated into the sector plan and serve as a reference point for reviewing the sector plan. The Executive Committee should approve funding for the preparation of the sector plan and the technical audit;
 - (iii) The technical audit should follow the terms of reference provided in Appendix III to the current document and include a detailed questionnaire/check-list to be developed prior to the commencement of the audit;
 - (iv) The technical audit should be conducted by a combined team of local and international experts;
 - (v) In general, the cost of dismantling the old plant should be offset by the scrap value of the old plant. However, this should be examined on a case-by-case basis; and
 - (vi) The environmental clean-up of the ODS-producing facility should not constitute an incremental cost; however, it should be done in an environmentally responsible manner;
 - (c) Notes that countries may wish to use the flexibility clause in agreements to fund the clean-up of ODS-producing facilities on the understanding that any such use of funding should be identified in the annual work programme requests in advance of using the funds for a non-incremental cost;

Annex I

- (d) Calculates compensation for eligible facilities on the basis of closure, conversion, and/or redirection to feedstock, whichever is feasible and more cost-effective taking into account among others decision XIX/6 of the Meeting of the Parties, foreign ownership, exports to non-Article 5 countries, and production for feedstock uses;
- (e) [In calculating the compensation, takes into account pro-active regulatory actions taken by Article 5 Parties, for limiting production of HCFCs in facilities in their countries, beyond those required for compliance with the relevant control schedule];
- (f) Encourages a synchronized production/consumption phase-out;
- (g) Considers, as appropriate, providing incentives for early phase-out of HCFC production and/or providing disincentives for HCFC production that would be phased out later;
- (h) [Requires a robust monitoring system, similar to that used for the verification of the CTC phase-out, to monitor facilities that received funding but continued to produce HCFCs for feedstock uses];
- (i) Gives priority to phasing out HCFCs with larger ODP values first, taking into account national circumstances, and paragraph (d) above;
- (j) Decides a cut-off date of [1 March 2007/21 September 2007] for establishment of production sector plant capacity eligibility; and
- (k) [Decides whether activities in swing plants that have already received CFC closure funding may be eligible for [loss of profit due to accelerated phase-out schedule of HCFCs per decision XIX/6] [additional support for HCFC production phase-out]/[Decides that swing plants could phase out according to the pre-2007 phase-out schedule]].

Appendix I

PRELIMINARY DATA ON THE PRODUCTION SECTOR

1. List of plants in the country:

Name	Location	Product list	Nominal capacity	Date of construction	Name of proprietors

2. Effective production of ODS substances country-wide:

Metric tonnes/year					
	HCFC-22	HCFC-141b	HCFC-142b	HCFC-123	HCFC-124
2005					
2006					
2007					
2008					
2009					
2010					

3. Effective production of ODS substances by plant:

Data for plant "X" (one table for one plant*)

Metric tonnes/year					
	HCFC-22	HCFC-141b	HCFC-142b	HCFC-123	HCFC-124
2005					
2006					
2007					
2008					
2009					
2010					

*If it is a swing plant, please specify.

3.1 Industry turn over as % of GNP
as % of chemical industries

3.2 Quantities of exported HCFCs:

Metric tonnes/year					
	HCFC-22	HCFC-141b	HCFC-142b	HCFC-123	HCFC-124
2005					
2006					
2007					
2008					
2009					
2010					

4. Total employees in the HCFC industry:

- (a) In the production sector (direct labour + overheads + maintenance)
- (b) In the packaging sectors

4.1 Total employees per HCFC plant (one table per plant):

Number of employees in the plant "XY"							
	Direct labor	Overhead	Labs	Maintenance	Packaging	Other (specify)	Total
2005							
2006							
2007							
2008							
2009							
2010							

Appendix II

FORM FOR THE SECTOR PHASE-OUT PLAN

1. Strategy for phase-out:

(a) Time schedule for the phase-out

Name of the plant	Proposed date of shut down	Name and quantities of HCFC (mt)	
		Controlled uses	Feedstock uses

(b) Proposal of an action plan for phase-out regarding sites

(c) Strategy and action plan regarding manpower

2. Strategy for production of new substitutes:

Substitutes with zero ozone depletion potential: HFCs, hydrocarbons and others						
Technology and time schedule						
Name of the plant	Location of the plant	Proposed date of start up	Name and quantities of substitutes	Status of technology	Status of the plant*	Availability of raw materials

*New equipment or revamping of the existing plant.

Transition/redirection to feedstock production				
Name of the plant	Location of the plant	Proposed date of transition/redirection to feedstock production	Status of technology	Status of the plant*

*New equipment or revamping of the existing plant.

3. General comments

Appendix III

TERMS OF REFERENCE (TOR) FOR THE TECHNICAL AUDIT OF HCFC PRODUCTION IN ARTICLE 5 COUNTRIES

Background

1. The Montreal Protocol on Substances that Deplete the Ozone Layer and its Montreal Amendment advanced the phase-out schedule of HCFCs in 2007 by its signatory countries, although a distinction has been made in the schedule between developed and developing countries. The developing countries (the Article 5 countries in the language of the Protocol) are required to freeze the production and consumption of such chemicals in 2013 at the average level, between 2009 and 2010. They are subsequently required to reduce the levels of production and consumption in a number of phases until complete phase-out has been achieved in 2040. The Multilateral Fund for the Implementation of the Montreal Protocol (MLF) was established in 1991 as part of the London Amendment to assist Article 5 countries in complying with the control schedule of the Montreal Protocol. Up until 2009, the MLF has successfully assisted over ~~145-146~~ countries in phasing out the production and consumption of CFCs, halons, the controlled use and production of CTC and methyl bromide and other ozone depleting substances in accordance with the control schedule of the Montreal Protocol. The assistance of the MLF is primarily to cover the incremental costs associated with the transition from employing ozone-depleting to ozone-friendly technologies.

2. Funding of the phase-out of the production of ODS has been done initially by independently auditing the ODS production sector of the concerned country. These audits examine the relevant national and sectoral policies; collect data on ODS-producing plants with respect to their technological sophistication, status quo, designed and actual used capacity, production history, cost of production, and other relevant data. The purpose of the audit is to establish a factual basis for the Executive Committee (the management body of the MLF) to consider the funding requests proposed by the respective Article 5 ~~countries~~country. For ensuring consistency of conducting such audits across countries, the Executive Committee adopted the terms of reference (TOR) for technical audits in 1995 as a general guide to auditing ODS production. These TOR were subsequently amended and further developed as necessary to accommodate the specific needs associated with auditing the production of different ODS.

3. The TOR contained in this document are designed for auditing of the production of HCFCs, which include HCFC-141b, HCFC-142b, HCFC-123, ~~HCFC-124~~ and HCFC-22 or any applicable HCFC. While the TOR requires the auditing to follow the procedure and cover the ground that are standard to the auditing of the production of other ODS, there are several issues that are specific to the HCFC production. Among these are the impact of the clean development mechanism (CDM) on the HCFC-22 production and the impact of the phase-out of HCFC-22 production on the down-stream industries (such as the production of TFE/PTFE). TFE, the direct reaction product of HCFC-22, is not just used to make PTFE polymer, but also has been used to make HFC-125 which is one component for making R410a, a blend for making a refrigerant.

4. With regard to the CDM impact, one key question is whether the CDM credits awarded for reducing HFC-23 emission (~~a gas controlled by the Kyoto Protocol~~) provide a perverse incentive to produce HCFC-22, since HFC-23 is a by-product of HCFC-22 production. If it could be established that the high HCFC-22 production was not driven either by the demand for feedstock for TFE/PTFE or refrigeration purposes, it might be due to the financial reward of the CDM credits. A technical audit might provide some insight into this issue. It is expected that to clearly understand the workings of the CDM the audit would collect national and individual plant data from the field, place them in the global context for a supply and demand analysis, and assess the impact of the CDM on an individual company, as well as on national and global situations.

5. With respect to the impact of phasing out HCFC production on downstream industries, the key is the extent to which HCFC-22 production could be absorbed as feedstock for PTFE production, regardless of its final use. Converting HCFC-22 from its use as a refrigerant or foam blowing agent (a controlled use~~uses~~ under the Montreal Protocol) to being used as feedstock (a non-controlled application) would result in a win-win situation. Plants could continue to produce, but with no adverse impact on the environment, since HCFC-22 is completely transformed in the process of being used as feedstock. It is also possible that some plants could be converted from HCFC-22 production (using chloroform) to HFC-32 production (using methylene chloride). Since there is no plant closure, there might only be a need for compensation for the cost of conversion and no need for compensation for plant closure by the MLF.

6. However, there are difficulties associated with achieving this win-win situation. These difficulties relate to segments of the TFE markets, demand from the various global market segments, and availability of technology for PTFE production. These challenges should be examined carefully to determine to what extent they are real, and whether they prevent switching HCFC-22 production completely to feedstock production. It is also important to know whether these difficulties can be overcome and, if so, at what cost.

7. While these are policy-related and macro-level issues, questions are included in the TOR to guide the consultants implementing the audit to collect the relevant data and provide the analysis.

Objective of the technical audit

8. The objective of the technical audit is to provide a factual basis for:

- (a) Preparing and finalizing the sector plan by a producing country for phasing out the production of HCFCs in the country; and
- (b) Enabling the Executive Committee's review and funding decisions with respect to the sector plan.

Scope of the audit

Overall consideration

9. The results of the technical audit should provide a wide enough scope for considering various options for the elimination of HCFC production in a producing country, including the closure of production facilities, the production of ODS substitutes, conversion to feedstock production, and other possibilities.

Data collection and assessment

10. Where applicable, data should be collected over the past three to five years, except for HCFC plants with approved CDM projects, for which data for three years before and three years after the approval of the CDM projects should be collected. Specifically, the audit should cover:

Capacity

- (a) Assess the ability to produce HCFCs under sustainable conditions for a full year and the potential capacity of individual plants, and total country production capacity. Where levels of actual production are significantly lower than capacity, explanations are needed (for example, lack of demand, power or feedstock shortages, maintenance, technical failure to operate at full capacity);

- (b) Assess the potential for conversion of individual sites to non-ODS production. For CFC/HCFC-22 swing plants, actual production levels should be stated, along with the capacity of each plant, if operated: a) for CFC-11 and CFC-12 only, and b) for HCFC-22 only (subject to further analysis and verification, including detailed process calculations if necessary. Data should be collected for such analysis and rule out sites for expansion, conversion and/or revamp based on factors such as space limitation or limited access to raw materials);
- (c) Assess the impact of the credits from the CDM on HCFC-22 production by establishing data on:
- Time (month/year) of approval of the CDM project;
 - Level of HFC-23 produced per year ~~for the past 3 years~~, where applicable;
 - Individual plant and national HCFC-22 production history, based on site production and storage records and from plant and national sales records, including imports/exports;
 - Sales data, including volume, and unit prices of products, taxes and subsidies, and profit margin of sales; and
- (d) Assess site and national availability and cost of raw materials (such as size and location of plants).

Production history and profitability

- (a) Assess individual plant and national production history based on site production and storage records and from plant and national sales records, including imports/exports;
- (b) Establish site-specific economics of production data, including volume and unit costs of raw materials, energy and utilities, by-product credits, maintenance costs, transportation costs, distribution costs, operating labour (number of workers and applicable labour law), plant overhead, taxes and insurance, depreciation, and general and administrative costs; and
- (c) Establish sales data, including volume and unit prices of products, taxes and subsidies, profit margin of sales.

Assessing HCFC production for controlled and feedstock applications

- (a) Collect data over the past five years on the distribution of HCFC sales for controlled use and feedstock use;
- (b) Collect data over the past five years on the imports and exports of HCFC for controlled use and feedstock use;
- (c) Assess the potential of each plant producing HCFC entirely for feedstock application;
- (d) Identify the hurdles that prevent a plant from producing entirely for feedstock; and
- (e) Assess options for overcoming such hurdles and the cost scenarios for the different options.

Assessing HCFC-141b¹ and HCFC-142b²

~~11. Whilst HCFC-141b is used entirely as an emissive foam blowing agent and to a limited extent, as a solvent, HCFC-141b is also used to make the important fluoropolymers, polyvinylidene fluoride PVDF, and fluoroelastomer. HCFC-142b can be made deliberately from HFC152a.~~ Key questions to assess HCFC-141b and HCFC-142b include:

- (a) Do you produce HCFC-141b, HCFC-142b, HFC-143a? In what capacity, since when, by what technology (feedstock)?
- (b) At what level the production is exported, and what level is used domestically from 2005 to the present year?
- (c) What are the applications by volume by year?
- (d) Can you convert your plant to HCFC-142b, and/or do you already make produce HCFC-142b as a co-product? In this case, can you completely eliminate HCFC-141b production but still produce HCFC-142b?
- ~~(e) In this case can you completely eliminate HCFC-141b production but still make HCFC-142b?~~
- ~~(e)~~(e) Do you sell HCFC-142b to the PVDF sector? What amount? Can you manage your plant to the explicit volume demands on the PVDF sector?
- ~~(e)~~(f) If you produce HCFC-142b deliberately from HFC-152a, how much do you produce? What are the uses? How much is controlled (foam/~~refrigeration~~refrigerant) versus non-controlled (feedstock)?
- ~~(h)~~(g) If you produce HCFC-142b by this route, what is the impact on HFC-152a production if you must abandon the controlled (~~XPS~~foam/refrigerant) uses of HCFC-142b?
- ~~(i)~~(h) Do you export HCFC-142b for intermediate/feedstock applications?

Technology employed

- (a) Establish the age and source of technology employed at individual plants (locally developed or imported), material of construction of main process vessels (such as the main hydrofluorination reactor);
- (b) Assess maintenance expenditures of individual plants;
- (c) Assess de-bottlenecking (most recent); and
- (d) Assess the residual life and residue value of each plant.

¹ Whilst HCFC-141b is used entirely as an emissive foam blowing agent and to a limited extent, as a solvent, HCFC-141b is also used to make the important fluoropolymers, polyvinylidene fluoride PVDF, and fluoroelastomer.
² HCFC-142b can be made deliberately from HFC152a.

Other relevant data

- (a) Collect and assess data on cost of capital, inflation rate and other relevant national economic data;
- (b) Collect data on supply and demand for HCFCs and their substitutes;
- (c) Collect data on national production of HF and other raw materials necessary for the production of HCFC substitutes; and
- (d) Assess the status and availability of national technology for HCFC substitutes, together with their estimated production costs and possible scale of production over the next five years.

Data analysis

~~12.~~11. Data collected from the desk review and the field visits will be sorted, interpreted and analyzed for likely sector strategies of phasing out the HCFC production in the country, including plant closures, ODS substitutes production, and other possibilities. Under plant closures, the data should be organized to facilitate the identification of parameters such as, the baseline production level and the actual capacity of the plant, maximum and residual life of the plant, unit prices of HCFCs, profit margin of sales, and relevant national economic parameters. Under ODS substitute production, data should be presented to clearly indicate the supply and demand for the substitutes, technological readiness and estimate of conversion costs for applicable sites, and the economic feasibility and achievable capacities.

~~13.~~12. Data should be made available in a spreadsheet format suitable to allow testing the sensitivities of certain parameters.

Responsibilities of the audit team

~~14.~~13. The audit team should accomplish the following tasks:

- (a) Prepare a detailed work plan covering the entire audit exercise, including the methodology for assessing the impact of the CDM on HCFC production;
- (b) Screen the preliminary data from the production sector and other relevant data submitted by the country concerned, identify the gaps in those data, and design a questionnaire for collecting supplementary data, to be dispatched to plants in the country concerned before a field visit;
- (c) Based on the preliminary data from the country and the location of the plants, propose a field visit schedule, which should include a representative sampling of the plants in the country in terms of size, technology sophistication, capacity covered, and ~~sound~~ economics;
- (d) Implement the field visit schedule with local support from the national focal point designated by the ~~host~~ country concerned;
- (e) Prepare the draft technical audit report, with analysis and interpretation of the data collected from the field visit; and
- (f) Based on comments on the draft technical audit report, prepare the final draft technical audit report for submission to the Executive Committee.

Qualifications

~~15~~.14. Qualifications include:

- (a) Prior relevant experience working in developing countries (preferably in the country concerned);
- (b) Expertise in fluorocarbon technology, process and plant operations and financial accounting; and
- (c) A sound knowledge of the CDM programme and its global activities.

Local expertise

~~16~~.15. There should be participation of local expertise in the audit. However, the exact field of expertise (whether technical or financial) should be determined by the contracting firm on the basis of needs of the audit.

Deliverables

~~17~~.16. The deliverables include:

- (a) A detailed work plan, covering:
 - Methodology for assessing impact of the CDM on HCFC production;
 - Assessment of adequacy of existing data and identification of missing “links”;
 - A questionnaire designed for collecting additional data;
 - A schedule of field visit to a representative sample of the HCFC producing industries in the country concerned in terms of size, location, technology level and other relevant factors;
 - (b) Mid-term progress report on field visit;
 - (c) Report of field visit;
 - (d) Preliminary draft technical audit report; and
 - (e) Final draft technical audit report.
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