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EXECUTIVE COMMITTEE OF  
THE MULTILATERAL FUND FOR THE  
IMPLEMENTATION OF THE MONTREAL PROTOCOL  
Seventieth Meeting  
Bangkok, 1-5 July 2013

**REPORT OF THE EXECUTIVE COMMITTEE TO THE OPEN-ENDED WORKING GROUP  
ON THE PROGRESS MADE IN REDUCING EMISSIONS OF CONTROLLED SUBSTANCES  
FROM PROCESS-AGENT USES (FOLLOW-UP TO DECISION XVII/6  
OF THE SEVENTEENTH MEETING OF THE PARTIES)  
AN UPDATE FOR THE PERIOD 2011 AND 2012**

## I. INTRODUCTION

1. This report is prepared pursuant to decision XVII/6 of the 17<sup>th</sup> Meeting of the Parties. Decision XVII/6 required a report to the Open-ended Working Group (OEWG) at its 27<sup>th</sup> Meeting in 2007, and every other year thereafter, unless the Parties decide otherwise, on the progress made in reducing emissions of controlled substances from process agent uses; the associated make-up quantity of controlled substances; on the implementation and development of emissions-reduction techniques and alternative processes and products not using ozone-depleting substances. Decision XXI/3 of the 21<sup>st</sup> Meeting of the Parties requested, *inter alia*, the Technology and Economic Assessment Panel (TEAP) and the Executive Committee of the Multilateral Fund to prepare a joint report for future meetings, reporting on progress with phasing out process agent (PA) applications. This report is the contribution of the Multilateral Fund to the joint report. Decision XXII/8 of the Meeting of the Parties requested once all process agent projects approved by the Executive Committee are completed, the reports by the Executive Committee to the Parties as requested in decision XVII/6 will no longer be required.

2. The 22<sup>nd</sup> Meeting of the Parties decided in decision XXII/8 to update Table B of decision X/14 specifying the limits for process agent uses in several countries. The decision also specified that, in Article 5 countries, quantities of controlled substances for use as process agents in plants and installations in operation before 1 January 1999 should not be taken into account in the calculation of production and consumption as of 1 January 2011 onwards, provided that emissions of those substances are within the levels defined in Table B of the updated decision XXII/8. Presently, all the activities related to the projects approved by the Executive Committee for reducing emissions of controlled substances from process agent uses have been operationally completed and phase-out or emission reduction targets have been achieved. Based on decision XXII/8 of the Meeting of the Parties, this document will be the final report addressing decision XVII/6 on this subject.

3. The document provides an update to the report of the Executive Committee submitted to the OEWG at its 31<sup>st</sup> Meeting in response to decision XVII/6. It presents the progress made by the Multilateral Fund from the status described in the last report, i.e. from the end of 2009 to date in assisting Article 5 countries to reduce the emissions of controlled substances from process agent use to “levels agreed by the Executive Committee to be reasonably achievable in a cost-effective manner without undue abandonment of infrastructure” (decision X/14). It lists the projects and activities that were implemented during the period from 2010 to the present, with information on the levels of funding provided, the impact and the date of completion of such projects.

4. The Secretariat noticed that although CTC consumption is not permitted under the Montreal Protocol as of 1 January 2010, paragraph 3 of decision X/14 of the Meeting of the Parties stipulated that the quantities of controlled substances produced or imported for the purpose of being used as process agents in plants and installations in operation before 1 January 1999, should not be taken into account in the calculation of production and consumption as of 1 January 2002 onwards, provided that the emissions of controlled substances from process agent use have been reduced to levels agreed by the Executive Committee to be reasonably achievable in a cost-effective manner without undue abandonment of infrastructure. This “reasonably achievable level” was further clarified by decision XXII/8 in Table B of the Annex to decision XXII/8 with a quantity assigned to two Article 5 countries, Brazil (2.2 metric tonnes) (mt) up to 2013 and China (1,103 mt); these quantities were used as a basis for the respective levels agreed by the Executive Committee.

## **II: OVERVIEW OF PROCESS AGENT USES OF ODS IN ARTICLE 5 COUNTRIES IN THE REPORTING PERIOD**

5. In its first report submitted to the 25<sup>th</sup> Meeting of the OEWG (2005), the Executive Committee estimated that the total consumption of ODS as a process agent in Article 5 countries in 2003 was approximately 13,623 ODP tonnes, 97 per cent of which was reported as being used in three countries: China (10,538 ODP tonnes), India (2,268 ODP tonnes) and the Democratic People's Republic of Korea (432 ODP tonnes) (document UNEP/OzL.Pro/WG.1/25/INF/4).

6. A list of all process agent investment projects supported by the Multilateral Fund was provided in Table 1 in Annex I of document UNEP/OzL.Pro/ExCom/62/Inf.2/Rev 1. Since the publication of this document, the Executive Committee did not approve new activities in Article 5 countries. The table is reproduced in Annex I to this report. The projects funded by the Multilateral Fund have supported Article 5 countries in reducing the emissions of controlled substances from process agent uses to the levels that are reasonably achievable in a cost-effective manner. When the status report was submitted in 2011, projects in four countries (Brazil, China, Colombia and Romania) were still on-going. At the present, all of the projects listed in Annex I to this report have been operationally completed. Project completion reports (PCRs) were submitted to the Multilateral Fund Secretariat for projects in Brazil, Colombia and Romania. PCRs for sector plans for phase-out of ODS process agent applications (phases I and II) for China are being prepared.

7. The information available to the Secretariat provides no indication that new plants using controlled substances as process agent have been installed or commissioned after 30 June 1999. The considerable monitoring and verification efforts undertaken as part of the process agent activities provide further reassurance that no additional process agent using plants have been commissioned. The same monitoring and verification activities strongly suggest that the provisions of decision X/14 of the Meeting of the Parties regarding the use of ODS as process agents have been followed.

## **III: NEW PROJECTS APPROVED BY THE EXECUTIVE COMMITTEE**

8. No new projects or plans have been funded for the phase-out of CTC as a process agent since 2010, and all tranches of existing plans had been approved prior to the last report in 2011.

## **IV: STATUS OF IMPLEMENTATION OF ON-GOING PROJECTS IN THE LAST UPDATE**

### Project in Brazil

9. The project in Brazil was approved at the 54<sup>th</sup> meeting to achieve sustainable emission reduction of CTC process agent use in the production of vinyl chloride monomer (VCM) and the removal of nitrogen trichloride during the production of chlorine. A summary and status of implementation of the project can be found in document UNEP/OzL.Pro/ExCom/62/Inf.2.

10. As previously reported, the Government of Brazil agreed to limit the use of CTC as a process agent in the production of chlorine to 2 ODP tonnes per year up to and including 2013, by which time the emissions control process will be changed to eliminate the use of CTC at no additional cost to the Multilateral Fund. UNDP advised that the CTC-using equipment was retrofitted to non-CTC based chloroform. The beneficiary enterprise Braskem has stopped using CTC as a process agent in its production process since 2009. The phase-out of CTC in two applications was verified by the implementing agency. The project completion report was received by the Fund Secretariat in

September 2012 which indicated that the project was financially completed. Brazil has reported zero consumption of CTC under Article 7 of the Montreal Protocol since 2008.

### Colombia

11. The project in Colombia was approved at the 48<sup>th</sup> meeting to phase out CTC as a process agent to eliminate nitrogen tri-chloride in chlorine production at Prodesal. The project experienced significant delays due to several alterations in technology choice and the change of ownership of the beneficiary enterprise. The enterprise finally chose chloroform as the alternative to substitute CTC. When the status report was submitted to the 31<sup>st</sup> Meeting of the OEWG, the conversion plan was agreed and the bidding process had commenced. By February 2012, the conversion of the production line at Prodesal was completed and the enterprise resumed its production without using CTC. In September 2012, the project completion report was submitted to the Secretariat. The Government of Colombia has banned the import of CTC since 2010. The consumption of CTC in the country has been zero since 2010.

### Romania

12. The terminal phase-out management plan of CTC production/consumption for process agent uses was approved at the 50<sup>th</sup> meeting to phase out the remaining amount of CTC production and consumption in Romania. The project addressed the co-production and use of CTC as a process agent in the manufacture of di(ethylhexyl)-peroxydicarbonate (DEHPC), an intermediate chemical used in the manufacture of polyvinyl chloride (PVC) at Oltchim S.A. After project approval, Romania joined the European Union, which impacted on the economic and industrial structure of the country. The production cost of DEHPC at Oltchim S.A was above that of other European manufacturers, therefore purchasing this chemical was economically advantageous over producing it. In addition, Oltchim S.A. had in the meantime to close its PVC production line out of economic reasons, and is currently insolvent. At the 61<sup>st</sup> meeting, upon the request of the Government of Romania, the Executive Committee took decision 61/4 to cancel the remaining elements of the project related to the establishment of a new CTC-free production line and requested the project funding balance of US \$370,032 be returned to the Multilateral Fund. Since the production line of DEHPC was terminated and disassembled, the production of intermediates ceased and there is no CTC use at the enterprise. Hence, the project target of phasing out 120.50 ODP tonnes of CTC was met. The project completion report was received in February 2011. Romania reported zero CTC consumption since 2010.

### China sector plans for phasing out ODS process agent applications (phases I and II)

13. China process agent sector plan phase I (PA I) was approved at the 38<sup>th</sup> meeting to address CTC and CFC consumptions in process agent applications identified by the Parties to the Montreal Protocol in accordance with decision X/14 of the Meeting of the Parties. China identified for PA I four applications among the 25 process agent uses listed in Table A of decision X/14. Through implementing PA I, China committed to reducing CFC consumption in the six process agent applications to zero and CTC consumption in 18 process agent uses to 220 ODP tonnes by 2010.

14. China's process agent sector plan phase II (PA II) was approved at the 47<sup>th</sup> meeting to address new process agent applications approved by decision XVII/6 of the Meeting of the Parties other than those covered by decision X/14. China identified 13 applications among the 39 process agent applications listed in Table A of decision XVII/7. By implementing PA II, China committed to reducing CTC consumption by 2010 in process agent applications listed in Table A of decision XVII/7 to 994 ODP tonnes. It also committed to reducing CTC consumption in process agent applications listed in the interim Table A-bis of decision XVII/8 and in potential future process agent uses as identified and reported by China in its annual verification reports to zero, or to any insignificant levels of emissions which might be approved at the Meeting of the Parties.

15. During the implementation of PA I and PA II, the World Bank, as the implementing agency, provided annual verification reports on the two related sector plans in China to the Executive Committee. As of 2010 onwards, CTC use by the enterprises covered under PA II was zero and by the enterprises covered under PA I were 197.2 ODP tonnes for 2010 and 197.9 ODP tonnes for 2011. In accordance with decision X/14 of the Meeting of the Parties as mentioned in paragraph 4 above, this amount was not reported as consumption. The total CTC consumption reported under Article 7 by China were 282.6 ODP tonnes for 2010 and 258.7 ODP tonnes for 2011 which were uniquely used for laboratory and other essential uses (exempted by decision XXII/7 of the Meeting of the Parties).

#### Implementation of PA I

16. The status report submitted to the 31<sup>st</sup> Meeting of the OEWG included the status of and progress made until the end of 2009. By 2009, the total CTC consumption in process agent uses by the enterprises covered under PA I had been reduced from the baseline level of 3,825 ODP tonnes (average of consumptions over 1998 to 2000) to 462.15 ODP tonnes. Complete phase-out had been achieved in all the plants that used CTC or CFC-113 as a process agent in 2001 through either plant closure or conversion to non-ODS processes except for one plant, Jilin Chemical Industrial Co. Ltd (JCIC) which uses CTC as process agent and opted for emission reduction.

17. In September 2011, the World Bank submitted a further verification report on the implementation of PA I. The status of implementation of all investment activities in the sector plan PA I were reviewed. The verification report confirmed the following:

- (a) All uses of CFC-113 as a process agent for polytetrafluoroethylene (PTFE, tradename e.g. Teflon) were phased out with the closure of CFC-113 production on 1 July 2007. Enterprises used up their remaining stocks of CFC-113 and changed to a non-ODS substitute;
- (b) All enterprises were either converted to non-ODS processes, or closed down and dismantled their production facilities except for one PA I enterprise, which chose to reduce emissions while retaining the existing production process (JCIC). All of the closures were audited and reported in verification reports. Two production lines using CTC as a process agent in the production of chlorinated rubber in Jiangyin Fasten Fine Chemical Co. and Ltd. Shanghai Chlor-Alkali Chemical Co. Ltd., operated until December 2009 and were closed at the end of 2009. The two lines were dismantled in March 2010.
- (c) The use of CTC in the production of chlorosulphonated polyethylene (CSM) at JCIC was associated with a production facility built in 1989, and was to be reduced by means of emission control. In addition to the financial support from the Multilateral Fund, JCIC has invested an additional US \$7.6 million and made several improvements in its production process to reduce the CTC consumption per metric tonne of CSM produced from the range of 0.31 mt to 0.35 mt to the current 0.26 mt. If JCIC were in full operation with a 2,000 mt per year capacity, the minimum emission it could possibly achieve in a cost-effective manner without abandoning its equipment would be approximately 620 mt. However, in order to comply with the maximum allowable consumption of 220 ODP tonnes for 2010 and beyond listed in the PA I Agreement between China and the Executive Committee, China is managing the CTC consumption through a procurement quota system, limiting the access of JCIC to CTC supplies. Currently JCIC is operating at less than 30 per cent of its capacity with a CTC quota of 180 mt issued by the Foreign Economic Cooperation Office of the Ministry of Environment (FECO/MEP). In 2010, total use of CTC at JCIC was 277.4 mt. Of this amount, 179.3 mt (197.2 ODP tonnes) was procured under the license and 98.1 mt was

from historical stockpile. The verification report submitted in September 2011 indicated that the Government of China intended to limit the quota for JCIC to the 220 ODP tonnes set in the PA I Agreement. The use of CTC in 2010 and 2011 has been within the limits set in Table B of Annex to decisions XXII/8 and XXIII/7. The local Environmental Protection Bureau (EPB) and FECO will continue to monitor the CSM production and CTC consumption at this facility and report to the Meeting of the Parties in accordance to decision X/14.

### Implementation of PA II

18. When the previous status report was submitted to the 31<sup>st</sup> Meeting of the OEWG in 2011, four production lines for chlorinated polypropene / chlorinated ethylene-vinyl acetate (CPP/CEVA) production and three production lines for methyl isocyanate (MIC) production were in operation using existing CTC stock. Two production lines for CPP/CEVA were closed but, at that time, waiting to be converted to non-CTC technologies.

19. Based on the verification reports submitted by the World Bank in 2011 and 2012 on the implementation of PA II, it has been confirmed that all the CTC consumption as process agent uses in enterprises covered under PA II had been phased out through either conversion to non-ODS technologies or by closing down their production, including the uses mentioned in the previous paragraph. All of the CTC stocks and CTC recovered from systems closure had been used or sold to eligible CTC buyers for feedstock use. Although the maximum allowable consumption for enterprises covered under PA II was set in the agreement at 994 ODP tonnes, the total consumption for these enterprises was zero ODP tonnes since 2010. The project targets of PA II were fully achieved.

### Sustainability of CTC phase-out in China

20. The Government of China has put in place policies and regulations to support a sustainable phase-out of CTC and CFC-113 in process agent applications. These include a procurement licensing system and an on-line application system for CTC trade. Only those enterprises that are registered with the CTC procurement system can buy CTC from dealers and CTC producers who are only allowed to sell CTC to enterprises with procurement licenses issued by FECO. Both the buyers and the sellers report their transactions to FECO for compilation and verification.

21. All regulatory measures are effectively enforced by the Ministry of Environment and local EPBs in close cooperation with FECO. During the verification, the World Bank audit team reviewed the sales procurement licenses issued by FECO. It has been confirmed that, in 2010, CTC procurement licenses were only issued to JCIC for the amount of a maximum 180 mt for the production of CSM and to enterprises using CTC as feedstock for production of non-ODS chemicals. None of the other PA I or PA II enterprises applied for CTC procurement licenses. The World Bank audit team also reviewed sales records from CTC producers and dealers and confirmed that only JCIC procured CTC for controlled use under the Montreal Protocol. The JCIC procurement records show that five purchases were made in 2010 with a total amount of 179.3 mt.

### India

22. Phase-out of CTC as a process agent in India is being accomplished through a sector plan for the phase-out of production as well as consumption of CTC related to both process agent and all other controlled uses. The sector plan was approved in principle in July 2003 at a total cost of US \$52 million. Under the plan, India committed to reducing the consumption of CTC used as a process agent and as a solvent from a baseline of 11,505 ODP tonnes to zero by 2010. All tranches and all funding have been approved with the last approval decided by the 58<sup>th</sup> meeting of the Executive Committee in 2009.

23. Based on the Article 7 data reported by the Government of India and the verification report submitted by the World Bank, CTC consumption in India since 2010 has consistently remained at zero, in compliance with the sector plan Agreement and the Montreal Protocol control measures.

24. Since 2010, the CTC produced in India has been used for feedstock uses only and not in process agent applications. Main applications for feedstock production included the production of dichloro vinyl acid chloride (DVAC), VCM and CFC. The CFC consumption in India was for essential uses allowed by decision XXI/4 of the Meeting of the Parties. The production of VCM was considered to be a process agent use until decisions XXIII/7 and XXIV/6 of the Meeting of the Parties defined it to be a feedstock use. In 2010, India produced 15,223 mt of CTC. Of this amount, 98.6 per cent was used for DVAC production, 1.02 per cent was used for CFC production and 0.42 per cent was used for VCM production. In 2011, the total production of CTC was 17,740 mt, which was solely used for feedstock in DVAC production. The complete phase-out of CTC as a process agent was achieved in 2010.

25. At the 66<sup>th</sup> meeting, the Executive Committee requested the World Bank to provide a work plan covering the funds remaining in the CTC phase-out plan in India (decision 66/15). Such a plan was provided to the 70<sup>th</sup> meeting of the Executive Committee, which is to take place 1 to 5 July 2013, but has not been approved to-date. However, all those activities under this sector plan which are related to process agents have been completed, and the work plan is proposing activities related to oversight of the production and use for feedstock, awareness as well as information to previous CTC solvent users about alternatives.

### Conclusion

26. All of the process agent activities approved by the Executive Committee have been operationally completed, and remaining activities relate to awareness raising, data collection, reporting, and oversight to ensure that CTC produced is used exclusively for non-controlled uses. In all but one case the processes have been converted to other technologies, or the production facility has been closed. In the case where an emission control approach has been taken, and the access for the enterprise to the process agent in question, CTC, is effectively limited through a thorough national licensing system for this substance. All of the phase-out activities mentioned related to process agent use including the operation of licensing systems have been verified. It should be noted that the information provided by the Executive Committee on process agent uses only refers to those Article 5 countries which received Multilateral Fund assistance. The 22<sup>nd</sup> Meeting of the Parties, through decision XXII/8, has included the two Article 5 countries into the updated Table B of decision X/14 which specifies the limits for process agent uses. This decision appears to supersede the limits on process agent use set in the Agreements between the respective Governments and the Multilateral Fund. Based on decision XXII/8 of the Meeting of the Parties, reporting by the Executive Committee to the Parties as requested in decision XVII/6 will no longer be required, thus this is the last such report.

Annex I

Table 1 - Projects for phasing out process agent use supported  
by the Multilateral Fund

Investment project number	Total funds approved (US \$)	Funds disbursed (US \$)	Consumption to be phased out (ODP tonnes)	Consumption phased out (ODP tonnes)	Production to be phased out (ODP tonnes)	Production phased out (ODP tonnes)	Status
BRA/PAG/54/INV/281	1,178,554	24,740	0.0	0.0	0.0	0.0	COM
CPR/PAG/58/INV/488	1,500,000	0	6,896.0	0.0	0.0	0.0	COM
CPR/PAG/38/INV/397	2,000,000	2,000,000	0.0	0.0	0.0	0.0	COM
CPR/PAG/39/INV/402	20,000,000	20,000,000	0.0	0.0	2,638.0	2,638.0	COM
CPR/PAG/43/INV/416	16,000,000	16,000,000	0.0	0.0	6,657.0	6,657.0	COM
CPR/PAG/46/INV/432	2,000,000	2,000,000	4,556.0	4,556.0	16,171.0	16,171.0	COM
CPR/PAG/47/INV/437	15,000,000	15,000,000	0.0	0.0	0.0	0.0	COM
CPR/PAG/48/INV/440	16,000,000	16,000,000	0.0	0.0	6,642.0	6,642.0	COM
CPR/PAG/48/INV/441	10,000,000	10,000,000	0.0	0.0	0.0	0.0	COM
CPR/PAG/51/INV/448	5,000,000	5,000,000	0.0	0.0	6,642.0	6,642.0	COM
CPR/PAG/52/INV/452	10,000,000	10,000,000	0.0	0.0	0.0	0.0	COM
CPR/PAG/54/INV/458	3,000,000	1,500,000	0.0	0.0	10,594.0	10,594.0	COM
CPR/PAG/55/INV/463	10,000,000	5,500,000	0.0	0.0	0.0	0.0	COM
CPR/PAG/57/INV/483	1,000,000	0	6,587.0	0.0	2,591.0	0.0	COM
COL/PAG/48/INV/66	114,480	10,117	2.0	2.0	0.0	0.0	COM
IND/PAG/34/INV/313	155,830	155,830	16.7	16.7	0.0		FIN
IND/PAG/35/INV/338	383,913	383,913	38.5	38.5	0.0		FIN
IND/PAG/34/INV/320	1,964,316	1,964,316	248.8	248.8	0.0	0.0	FIN
IND/PAG/34/INV/314	238,180	238,180	34.1	34.1	0.0		FIN
IND/PAG/28/INV/217	366,000	366,000	375.0	375.0	0.0	0.0	FIN
IND/PAG/34/INV/311	278,991	278,991	133.9	133.9	0.0		FIN
IND/PAG/34/INV/303	132,880	132,880	23.0	23.0	0.0		FIN
IND/PAG/32/INV/291	288,638	288,638	94.6	94.6	0.0		FIN
IND/PAG/32/INV/287	259,474	259,474	27.9	27.9	0.0		FIN
IND/PAG/32/INV/284	249,547	249,547	54.2	54.2	0.0		FIN
IND/PAG/32/INV/283	145,736	145,736	69.7	69.7	0.0		FIN
IND/PAG/34/INV/316	127,667	127,667	17.9	17.9	0.0		FIN
DRK/PAG/49/INV/46	883,600	883,600	229.9	229.9	0.0		COM
MEX/PAG/52/INV/133	1,518,094	830,784	87.3	87.3	0.0		COM
PAK/PAG/35/INV/42	485,701	481,998	80.0	80.0	0.0		COM
ROM/PAG/50/INV/36	1,019,768	981,107	120.5	120.5	0.0		COM

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