



**United Nations
Environment
Programme**

Distr.
GENERAL

UNEP/OzL.Pro/ExCom/55/50
17 June 2008



ORIGINAL: ENGLISH

EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Fifty-fifth Meeting
Bangkok, 14-18 July 2008

**CTC USE AS FEEDSTOCK AND PROCESS AGENTS, AND THE CO-PRODUCTION
OF CTC IN ARTICLE 5 COUNTRIES (DECISIONS 51/36 AND 52/44)**

1. At its 52nd Meeting, the Executive Committee decided to postpone further discussion of the consideration of the issue of CTC use as feedstock and process agents, and the co-production of CTC in Article 5 countries (decision 52/44) until the summer of 2008 when the TEAP progress report and the World Bank's draft report on the global assessment of the CTC phase-out in the chlor-alkali sector would be available. This document is being issued in relation to the above cited decision 52/44.

Background

2. At the 51st Meeting, the Secretariat presented a draft report, contained in document UNEP/OzL.Pro/ExCom/51/41, which was prepared further to decision XVII/6 of the Meeting of the Parties requesting TEAP and the Executive Committee to report to the Open-ended Working Group at its 27th Meeting 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.

3. Document UNEP/OzL.Pro/ExCom/51/41, which is attached for ease of reference, was essentially an update of a first report on the subject, which was prepared in response to a similar mandate under decision X/14 of the 10th Meeting of the Parties. It presented the progress that has been made up to the end of 2006 by the Multilateral Fund in assisting Article 5 countries in reducing 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 listed the projects and activities that had been funded in 2005 and 2006, with information on the level of funding approved, on the impact and the date of completion of such projects. It also took into consideration the progress in on-going projects as reported by implementing agencies.

4. The Executive Committee requested the Secretariat by decision 51/35 to finalise the draft report and subsequently submit the report to the 27th Meeting of the Open-ended Working Group. The document was submitted to the Open-ended Working Group as UNEP/OzL.Pro.WG.1/27/4 "Report of the Executive Committee on the progress made in reducing emissions of controlled substances from process-agent uses". The report was welcomed by the Meeting.

Recent developments

5. TEAP, in its progress report of May 2008 advised under the item "Reconsideration of carbon tetrachloride emissions" that although the Parties had requested the TEAP/CTOC to prepare a final report for the 27th Open-ended Working Group for the consideration at the 19th Meeting of the Parties in 2007 under the decision XVIII/10, the CTOC could not complete the task mainly due to difficulties in accessing relevant information. The TEAP decided to establish a Task Force to complete this study and the final report will be published by the Task Force and presented at the 28th Open-ended Working Group in Bangkok in July 2008. As of writing this document, no report had been issued. The Executive Committee will be advised during the 55th Meeting of any further results from that undertaking.

6. The World Bank has produced a draft report on the global assessment of CTC phase-out in the chlor-alkali sector, which is provided in document UNEP/OzL.Pro/ExCom/55/49.

7. The Executive Committee might consider whether it wishes to discuss the issue at its 55th Meeting, in light of the information provided in documents UNEP/OzL.Pro/ExCom/55/49 and UNEP/OzL.Pro/ExCom/51/41, and in the report of the TEAP task force to the 28th Meeting of the Open-ended Working Group.



**United Nations
Environment
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Distr.
GENERAL

UNEP/OzL.Pro/ExCom/51/41
5 March 2007

ORIGINAL: ENGLISH

EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Fifty-first Meeting
Montreal, 19-23 March 2007

**DRAFT 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 BETWEEN
2005 AND 2006**

Pre-session documents of the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol are without prejudice to any decision that the Executive Committee might take following issue of the document.

For reasons of economy, this document is printed in a limited number. Delegates are kindly requested to bring their copies to the meeting and not to request additional copies.

I: INTRODUCTION

1. This draft report is prepared further to decision XVII/6 of the 17th Meeting of the Parties which requested the Technology and Economic Assessment Panel and the Executive Committee to report to the Open-ended Working Group at its 27th 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.

2. The document is essentially an update of a first report on the subject, which was prepared in response to a similar mandate under decision X/14 of the 10th Meeting of the Parties and subsequent versions, the latest of which, prepared pursuant to decision XV/7 submitted in the form of a draft to the 45th Meeting of the Executive Committee under the title “Process agent uses in Article 5 Parties and their related emission levels” (UNEP/OzL.Pro/ExCom/45/53). That report was subsequently approved and forwarded by the Executive Committee to the 25th Meeting of the Open-ended Working Group.

3. This draft report presents the progress that has been made up until the end of 2006 by the Multilateral Fund in assisting Article 5 countries in reducing 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 funded in 2005 and 2006, with information on the level of funding approved, the impact and the date of completion of such projects. It takes also into consideration the progress in on-going projects as reported by implementing agencies.

II: OVERVIEW OF PROCESS AGENT USES OF ODS IN ARTICLE 5 COUNTRIES IN 2005

4. To provide an insight into the magnitude of the challenge, the first report which was submitted by the Executive Committee to the 25th Meeting of the Open-ended Working Group, provided an estimate of the total consumption of ODS as a process agent in Article 5 countries using the data of 2003 and stated:

“The total identified annual process agent use in Article 5 countries for 2003 is 13,623 ODP tonnes.”

“Of the total identified use of some 13,600 ODP tonnes, about 13,500 ODP tonnes is CTC. Out of the remainder, 40 ODP tonnes of CFC-113 was identified in one Article 5 country, and 12 ODP tonnes of BCM was identified in a single use in one other Article 5 country.” and

“Ninety-seven per cent of the total identified use was reported in three countries, China (10,538 ODP tonnes), India (2,268 ODP tonnes) and D.P.R. Korea (432 ODP tonnes)”. (paras 7, 8 and 9 of document UNEP/OzL.Pro/WG.1/25/INF/4)

5. To continue this useful practice, this draft report provides an update on the consumption of CTC, a controlled substance predominantly used as a process agent in Article 5 countries, using the data reported under Article 7 of the Montreal Protocol for 2005. It shows that the total reported CTC consumption in Article 5 countries in 2005 (excluding the Republic of Korea) was 3,247.5 ODP tonnes and that the country distribution remained broadly the same as in 2003, with four countries consuming 94 percent of the total, namely China (1,060.3 ODP tonnes), India (1,644 ODP tonnes), the Democratic People's Republic of Korea (191.4 ODP tonnes) and Pakistan (145.5 ODP tonnes).

III: PROJECTS APPROVED BY THE MULTILATERAL FUND IN 2005 AND 2006

6. Between 2005 and 2006, the Executive Committee approved two projects in phasing out CTC in process agent applications. These were the second phase of the sector plan for phasing out CTC process agent applications in China, and the terminal phase-out management plan for CTC production/consumption for process agent use in Romania.

7. The details of these two projects are shown below:

Country	Project	Implementing agency	Date of approval	Level of funding (US\$)	Impact (ODP tonnes)	Date of completion
China	Phase out ODS process agent applications in China (Phase II)	World Bank	December 2005	46.5 million	6,000 + 14,300*	2010
Romania	Terminal phase-out management plan for CTC production/consumption for process agent use	UNIDO	December 2006	1.389 million	120	2008

* A ceiling of 14,300 ODP tonnes is set to cover the CTC consumption by process agent applications in Table A-bis of Decision XVII/8 and any other applications that are not already covered in Phases I and II of the sector plan.

IV: STATUS OF IMPLEMENTATION OF ON-GOING PROJECTS AND PROGRAMMES

China sector plan for phasing out ODS process agent applications

Phase I of the sector plan

8. Phase I of the sector plan was approved in December 2002, which covered the 25 CTC and CFC-113 process agent applications included in List A of Decision X/14. The table below provides the status of implementation of the programme as of December 2006. The total CTC consumption came down from 3,382 ODP tonnes in 2003 to 461 ODP tonnes in 2006 and the consumption of CFC-113 was completely phased out in 2006. The number of plants that use CTC or CFC-113 as process agent decreased from 33 in 2003 to three in 2006. Actions which have been taken on these plants include closures, conversion to non-ODS alternatives and reducing emission levels. Table 1 in Annex I to this paper presents a summary of the progress achieved as of the end of 2006.

9. Of the three plants which continue using CTC as process agent in the production of chlorinated rubber and chlorosulphonated polyethylene (CSM), the CSM project has been experiencing difficulties in trying to reduce the level of CTC emissions. The verification report from the World Bank on CTC consumption in Phase I of the sector plan for the year 2006 has reported the following:

- (a) Jilin Chemical Industrial Co. Ltd. (JCIC) is a chlorosulphonated polyethylene (CSM) producer that uses CTC as a process agent for producing CSM products. The company has three CSM production lines with a total capacity of over 3,000 MT/a. The 1st CSM line of 1,000 MT/a was constructed in 1970 based on its own technology. The line stopped production in June 2004 and was dismantled in May 2006. The 2nd CSM line was constructed in 1989 with an annual capacity of 2,000 MT/a. Its reaction system ceased operation when the 3rd line was installed in 2005. CTC consumption ratios of the old line operations were from 0.35 to 0.38 MT/MT. Most of the lost CTC was emitted into the air and/or discharged into the water, with little remaining in the final product.
- (b) In compliance with requirements of the China PA I Sector Plan, the company signed a contract with SEPA to phase out CTC by controlling emissions, and installed its 3rd line in 2004. The new line aims to replace the two old lines and reduce the CTC consumption level from 0.35-0.38 MT/MT to 0.06 MT/MT. However, due to a malfunction of the imported solvent stripping and double-screw extrusion system, the new line's CTC/CSM separating operation has been unsuccessful and therefore the CTC consumption level still remained high, even though a great effort has been made on the new line's process and equipment modification during 2005 and 2006.
- (c) Following the 2005 operating style, the company organized its 2006 CSM production by integrating the 3rd line's reaction system with the 2nd line's product-drying and separating system. Its 2006 the CTC consumption quota was 230 metric tonnes.
- (d) The new CSM line's process and equipment modification for reducing CTC consumption through emission control was still unsuccessful. No progress was made in 2006. Due to technical and financial reasons and, more importantly, compliance with China's environmental protection requirements, the company does not exclude the option of shutting down and dismantling all its CSM production lines before 2010.

Phase II of the sector plan

10. Phase II, which was approved in December 2005 by the Executive Committee, targets the CTC consumed by the process agent applications contained in decision XV/6 of the 15th Meeting of the Parties, and will reduce the total consumption of CTC in these uses from around 7,000 ODP tonnes in 2005 to 994 ODP tonnes in 2010 and beyond. Table 2 in Annex I presents the list of applications, CTC consumption between 2001-2005 for each application, and the number of enterprises under each application in 2003. The strategy to achieve the reduction

consists mostly of plant closure and conversion to non-ODS technology. However emission reduction is planned for two applications, chlorinated polypropene (CPP) and chlorinated EVA (CEVA).

11. In addition to these applications, China also commits to phasing out the CTC consumption in applications listed under Table A-bis of Decision XVII/8 and any other applications which were not identified at the time of the approval of Phase II by 2009. A ceiling of 14,300 ODP tonnes is provided to cover these applications. The recent survey conducted by China reported a total consumption of about 6,000 ODP tonnes of CTC for these applications in 2006. Table 3 in Annex I provides a list of applications under decision XVII/8 in 2006 and Table 4 in Annex I contains a list of applications that were newly identified in 2006.

India

12. In July 2003, the Executive Committee approved in principle a total of US \$52 million to assist India in complying with the Montreal Protocol control schedule for the production and consumption of carbon tetrachloride (CTC), and had disbursed approximately US \$41 million to the programme by the end of 2006. Under the programme, India commits to reducing the consumption of CTC used as process agent and as a solvent from a baseline of 11,505 ODP tonnes to zero by 2010. Progress in implementation by the end of 2005 is reported as follows:

Sector	Consumption in 2001 ODP tonnes (1)	Consumption in 2005 ODP tonnes (2)	Reduction achieved ODP tonnes (1)-(2)	Number of Projects Completed
Process agents	1,916	1,657	5,004	18
Solvent	4,745			30
Total	6,661	1,657	5,004	

Romania

13. The terminal phase-out management plan for CTC production/consumption for process agent uses is to phase-out the remaining CTC consumption by 2007 as a process agent in the country in the manufacture of di(ethylhexyl)-peroxydicarbonate (DEHPC), an intermediate chemical used in the manufacture of polyvinyl chloride (PVC). DEHPC became a controlled use in 2005 by Decision XVII/6 taken at the 17th Meeting of the Parties. The phase-out will be accomplished by changing the process agent in the second stage of production from CTC to the hydrocarbon isododecane.

14. Through the completion of the project in 2007, Romania will have completed its phase out of CTC consumption since DEHPC is the last application where CTC is still used as controlled substance.

SECRETARIAT'S RECOMMENDATIONS

15. Following its consideration of the draft report, the Executive Committee might wish to request the Secretariat to:

- (a) Finalise the draft report, incorporating the views of members of the Executive Committee expressed at the 51st Meeting; and
- (b) After seeking the approval of the Chair of the Executive Committee, submit the report to the 27th Meeting of the Open-ended Working Group.

Annex I

Table 1: Summary of implementation of phasing out CTC and CFC-113 as a process agent (Phase I) as of December 2006

ODS	Application number	Products	Annual consumption (ODP tonnes)				No. of Plants		Actions
			2003	2004	2005	2006	2001	2006	
CTC	C3	CR	965	1,963.52	210.5	208	8	2	4 plants closed in 2004 and 1 plant closed 2005, 1 plant closed in 2006 and 2 still active
	C4	Endosulfan	359	0	0	0	2	0	Both closed in 2005
	C7	CSM	1,338	1,343.5	230.4	252	3	1	2 closed and dismantled, 1 for emission control
	C12	CP-70	694	225.4	0	0	12	0	11 closed and 1 converted to non-ODS
	C17	Ketotifen	6	0	0	0	1	0	Converted to non-ODS technology
		Total		3,382	3,532.5	440.93	460		
CFC-113	C9	PTFE	21.5	13.5	4	0	6	0	1 plant merger, and 5 converted to non-ODS

Table 2: Status of implementation of Phase II

ODS consumption of each application between 2001-2005 and number of production lines of each application in 2003

ODS used	Applica-tion No.	Product	Annual consumption of ODS (t/a)					Total number of production lines 2003
			2001	2002	2003	2004	2005	
CTC	PA19	Cyclodime	230.95	180.55	152.85	231.46	258.34	9
CTC	PA20	CPP	2,303.98	3,157.15	2,505.32	1,922.71	2,339.53	15
CTC	PA21	CEVA	188.68	208.22	225.08	313.98	271.27	4
CTC	PA22	MIC derivatives	718.35	627.58	574.54	724.08	724.49	6
CTC	PA23	MPB	623.23	587.61	679.95	632.26	631.59	3
CTC	PA24	DCMP	0.00	0.00	0.00	0.00	0.00	0
CTC	PA25	Imidacloprid	487.54	726.10	264.81	148.25	180.71	4
CTC	PA26	Bupropfenzin	213.09	199.38	316.87	437.98	457.13	3
CTC	PA27	Oxadiazon	14.25	24.70	57.00	5.00	23.27	3
CTC	PA28	CNMA	108.80	133.13	136.12	86.00	182.60	1
CTC	PA29	Mefenacet	22.24	8.11	6.93	12.51	36.26	1
CTC	PA30	DCBT	16.03	0.00	0.00	0.00	0.00	0
		Sub-Total CTC tonnes	4,927.14	5,852.53	4,919.47	4,514.24	5,108.11	49
BCM	PA31	BPS	0.00	0.00	0.00	-	-	-
		Total ODP tonnes	5,419.87	6,437.77	5,411.4	4,965.66	5,618.92	49

Table 3: Use of CTC for PA applications under Decision XVII/8 in 2006 (metric tonnes)

No.	Application No. in Dec. XVII/8	Process agent applications ¹	CTC purchase in 2006, MT	Reported by
1	44	Prallethrin/ ES-Prallethrin	165.70	SEPA
2	45	2-Methoxybenzoylchloride	19.80	SEPA
3	46	O-Nitrobenzaldehyde / M-Nitrobenzaldehyde	420.48	SEPA
4	49	Benzophenone	675.26	SEPA
5	51	3-Methyl-2-Thiophenecarboxaldehyde	12.00	SEPA
6	54	2-Thiophene ethanol	103.30	SEPA
7	56	Levofloxacin	66.00	SEPA
8	57	Cinnamic acid	247.58	SEPA
9	59	3,5-DNBC/triiodoisophthalic	17.50	SEPA
10	60	Fipronil	28.00	SEPA
11	61	Processing of Aluminium, Uranium	67.20	SEPA
12	63	3,3,3-trifluoropropene	638.64	SEPA
13	64	Triphenylmethyl chloride	596.70	SEPA
14	65	Tetrachloride dimethylmethane	300.72	SEPA
15	66	4,4-difluorodiphenyl ketone	240.14	SEPA
16	67	4-trifluoromethoxybenzenamine	357.11	SEPA
17	68	1,2-benzisothiazol-3-ketone	280.60	SEPA
18	68	1,2-Benzisothiazol-3-Ketone	205.30	SEPA
Total Table A-bis uses in MT			4,442.03	

¹ As defined by Table A-bis of Decision XVII/8.

Table 4: Use of CTC for new PA applications identified in 2006 (metric tonnes)

No.	Application No. in Dec. XVII/8	New process agent applications ²	CTC purchase in 2006, MT	Reported by
31	NA	Chloromethane-sulfoniceaster	3.90	SEPA
32	NA	2-(p-Bromomethylphenyl) propionic acid	90.00	SEPA
33	NA	2-methoxy-3-methylpyrazine	7.10	SEPA
34	NA	4-(trifluorometoxy)aniline (TFAM)	82.93	SEPA
35	NA	4-Bromoanisole	8.00	SEPA
36	NA	4-Bromo-benzenesulfonyl	68.45	SEPA
37	NA	4-Chloro-2-Trichloromethyl pyridine	30.00	SEPA
38	NA	Chloropyrazine	14.20	SEPA
39	NA	diamino pyrazole sulfate	20.00	SEPA
40	NA	Dichloro-p-cresol	29.40	SEPA
41	NA	Dope	190.00	SEPA
42	NA	Doxofylline	17.30	SEPA
43	NA	Ethyl γ -chloroacetoacetate	75.57	SEPA
44	NA	Ethyl-4Chloroacetoacetate	20.00	SEPA
45	NA	Ozagrel	15.90	SEPA
46	NA	PVDF	36.38	SEPA
47	NA	Single-ester	3.00	SEPA
48	NA	Ticlopidine	19.80	SEPA
49	NA	Using as G.I.	9.90	SEPA
50	NA	β -Bromopropionic acid	3.00	SEPA
51	NA	Acrylamide (N-(1,1-dimethyl-3-oxobutyl) (DAAM)	29.85	SEPA
Subtotal new process agent applications in MT			774.68	

² To be reviewed and add to the list of process agent applications by the MOP at a future meeting.